Title
Nuclear Data Sheets for A = 166

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Comments Dataset for A = 166*

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Abstract: Nuclear structure data pertaining to all known A=166 nuclides (Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Re, Os, Ir, Pt) have been compiled and evaluated, and incorporated into the ENSDF data file. This evaluation for A=166 supersedes the previous publication (E.N. Shurshikov and N.V. Timofeeva, *Nuclear Data Sheets* **67**, 45 (1992) (literature cutoff date 1 October 1990)) and the revision by C.M. Baglin of ^{166}W (literature cutoff date 16 April 2000). It includes literature available by 1 March 2008. Subsequent to the previous evaluation, ^{166}Gd has been observed for the first time and the first observations of excited states in ^{166}Tb, ^{166}Re, ^{166}Os and ^{166}Ir have been reported; also, knowledge of collective structure in ^{166}Dy, ^{166}Ho, ^{166}Er, ^{166}Tm, ^{166}Yb, ^{166}Lu, ^{166}Hf, and ^{166}Ta has been considerably expanded. However, the structure suggested here for ^{166}Re is highly tentative and a further, more detailed study of α decay into (and out of) ^{166}Re could be informative.

Cutoff Date: Data received by 1 March 2008 have been evaluated.

General Policies and Organization of Material: See the January issue of the *Nuclear Data Sheets* or http://www.nndc.bnl.gov/nds/NDSPolicies.pdf.

Acknowledgments: The evaluator is grateful to the reviewer of this mass chain for a thorough reading of the manuscript and for constructive comments; the evaluator also thanks the XUNDL database compilers (D. Reed, M. Lee, B. Singh) for initial data entry for 10 publications.

General Comments: Uncertainties of absolute γ−ray intensities are calculated using the method of Browne (1986Br21).

Throughout this evaluation, rotational band parameters are calculated from the standard energy equation:

$$E(J,K)=E_0+A[J(J+1)+\delta_{K,1/2}(-1)^{J+1/2}a(J+1/2)]+BJ^2(J+1)^2$$

where **A** is given in keV, **B** is given in eV, and the decoupling constant **a** is dimensionless. When not explicitly stated, **B** is assumed to be 0. The minimum number possible of the lowest energy levels was used to calculate each set of parameters, unless noted otherwise.

Theoretical conversion coefficient data are from relativistic Dirac−Fock calculations using the frozen−orbital approximation (2005KiZT).

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Adopted Levels

Q(β⁻)=3360 *SY*; S(n)=6000 *SY*; S(p)=11130 *SY*; Q(α)=−2070 *SY* 2003Au03.
Uncertainty in Q(β⁻), S(n), S(p), Q(α) is 600, 780, 920 and 780, respectively (2003Au03).
Production: 15.5 MeV proton–induced fission of ^{238}U; JAERI–ISOL on–line mass separation of products; plastic scin and Ge detectors for x and γ detection (2005Ic02).

^{166}Gd Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	0+	4.8 s *10*	%β⁻=100. Jπ: g.s. of even–even nucleus. $T_{1/2}$: from γ(t) in 2005Ic02.

Adopted Levels, Gammas

Q(β⁻)=4695 *70*; S(n)=5170 *SY*; S(p)=8580 *SY*; Q(α)=–1540 *SY* 2003Au03,2007Ha57.
Uncertainty in S(n), S(p), Q(α) is 220, 510 and 310, respectively (2003Au03).
Q(β⁻): 4695 *70* from 2007Ha57 (see also 2006HaZT) cf. 4830 *100* from 2003Au03. Uncertainty includes statistical uncertainty and 60–keV systematic uncertainty from the Fermi–Kurie plot method.
Production: ^{238}U(p,F) E=15.5 MeV, Gas–jet coupled JAERI–ISOL (1996Ic01,2005Ic02).

^{166}Tb Levels

Cross Reference (XREF) Flags

A ^{166}Gd β⁻ Decay

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
0.0	(2–)‡	A	25.1 s *21*	%β⁻=100. $T_{1/2}$: weighted average of 21 s *6* (1996Ic01; β(t) and X(t)), 25.6 s *22* (2005Ic02; γ(t)).
40.00 *16*	(–)	A		Jπ: 40γ not E1 to (2–); 40γ in prompt coincidence with γ feeding the 40 level.
158.80 *16*		A		
694.8 *3*		A		
1015.50 *23*		A		

† From least–squares fit to Eγ.
‡ The g.s. configuration is likely to be (π 3/2[411])⊗(ν 1/2[521]) based on Jπ(g.s.)=3/2+ for neighboring Tb isotopes and Jπ(g.s.)=1/2– for the N=101 isotones ^{169}Er, ^{171}Yb and ^{173}Hf, so Jπ=1– or 2– is expected for ^{166}Tb; log $f^{1u}t$<8.5 to 2+ and (3–), log *ft*=6.8 (log $f^{1u}t$=8.5 *3*) to 4+.

γ(^{166}Tb)

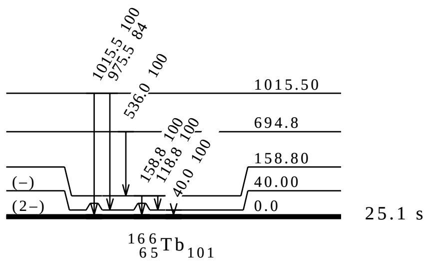
E(level)	Eγ†	Iγ†	Comments
40.00	40.0 *2*	100	Mult.: not E1 from intensity balance at the 40 level in β⁻ decay.
158.80	118.8 *2*	100 *27*	
	158.8 *2*	100 *27*	
694.8	536.0 *2*	100	
1015.50	975.5 *3*	84 *21*	
	1015.5 *3*	100	

† From ^{166}Gd β⁻ decay.

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



^{166}Gd β^- Decay 2005Ic02

Parent ^{166}Gd: E=0.0; Jπ=0+; $T_{1/2}$=4.8 s *10*; Q(g.s.)=3360 syst; %β^- decay=100.
Sources from ^{238}U(p,F), E=15.5 MeV; gas–jet transport; JAERI–ISOL on–line separator; Ge detectors; measured Eγ, Iγ, K x ray, γ(t), γγ coin, γ–K x ray coin.

^{166}Tb Levels

E(level)†	Jπ‡	$T_{1/2}$‡
0.0	(2–)	21.5 s *21*
40.00 *16*	(–)	
158.80 *16*		
694.8 *3*		
1015.50 *23*		

† From least–squares fit to Eγ.
‡ From Adopted Levels.

β^- radiations

$E\beta^-$	E(level)	$I\beta^-$	Log *ft*	Comments
(2345)	1015.50			
(2665)	694.8			
(3360†)	0.0	<0.3	>8.5	$I\beta^-$: upper limit assuming transition is first–forbidden unique.

† Existence of this branch is questionable.

γ(^{166}Tb)

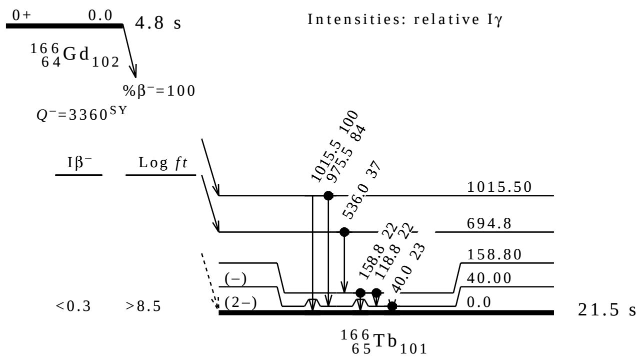
Eγ†	E(level)	Iγ†	Comments
40.0 *2*	40.00	23 *6*	Mult.: not E1 from intensity balance at the 40–keV level.
118.8 *2*	158.80	22 *6*	
158.8 *2*	158.80	22 *6*	
536.0 *2*	694.8	37 *12*	
975.5 *3*	1015.50	84 *21*	
1015.5 *3*	1015.50	100	

† From 2005Ic02.

^{166}Gd β⁻ Decay 2005Ic02 (continued)

Decay Scheme

Intensities: relative Iγ



Adopted Levels, Gammas

Q(β⁻)=486.8 *10*; S(n)=7043.5 *4*; S(p)=9220 *SY*; Q(α)=−728 *4* 2003Au03.
Uncertainty in S(p) is 200 (2003Au03).

^{166}Dy Levels

Cross Reference (XREF) Flags

A ^{165}Dy(n,γ) E=thermal
B ^{164}Dy(t,p)
C ^{118}Sn(^{164}Dy,^{116}Snγ)
D ^{166}Tb β⁻ Decay

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$	Comments
0	0+	ABCD	81.6 h *1*	%β⁻=100. Jπ: g.s. of even−even nucleus; L(t,p)=0. $T_{1/2}$: weighted average from 81.8 h *2* (1962Gu03) and 81.46 h *20* (1963Ho15). Others: 80.2 h *5* (1960He09), 82 h (1950Bu30), 81 h (1949Ke22).
76.587[#] *1*	2+[§]	ABCD		Jπ: E2 77γ to 0+ g.s..
253.5278[#] *14*	4+[§]	ABCD		
526.9670[#] *25*	6+[§]	A C		
857.163[@] *4*	(2)+	AB D		Jπ: M1(+E2) 781γ to 2+ 77; band assignment.
892.0[#] *10*	8+[§]	C		
928.729[@] *4*	(3)+	A D		Jπ: E2(+M1) γ to 2+ 77 and to 4+ 254; band assignment.
1023.434[@] *4*	(4)+	AB		Jπ: M1+E2 770γ to 4+ 254; E2 947γ to 2+ 77; band assignment.
1029.903[&] *4*	(2−)	A D		Jπ: γ to (3)+ 929 and to (2)+ 857 in γ band.
1095.210[&] *4*	(3−)	AB D		
1141.266[@] *13*	(5+)	A		
1149[a]	0+	B		Jπ: L(t,p)=0.
1180.854[&] *4*	(4−)	A		
1189.387 *4*	(2+,3,4−)	A		Jπ: 159γ to (2−) 1030; 166γ to (4+) 1023.
1208[a]	(2+)	B		
1274		B		E(level): for contaminated line.
1334		B		E(level): for contaminated line.
1341.0[#] *15*	10+[§]	C		
1351		B		E(level): for contaminated line.
1515		B		
1556		B		
1616		B		
1645		B		
1674		B		
1770		B		
1864		B		
1868.0[#] *18*	12+[§]	C		
1891		B		
2029		B		
2048		B		
2069.7 *3*	(≤3−)	D		Jπ: log *ft*≈5.4 in β⁻ decay from (1−,2−) ^{166}Tb.
2120		B		
2183		B		
2252		B		
2311		B		
2383		B		
2467.0[#] *20*	14+[§]	C		
3119.0?[#] *22*	(16+)[§]	C		

[†] From least−squares fit to Eγ, assigning 1 keV uncertainty to Eγ data for which the authors did not state an uncertainty, except for levels observed only in (t,p) reaction.
[‡] Based on the systematics for band structures of the even Dy isotopes, unless otherwise noted.
[§] Established Jπ for the g.s. and 76 level combined with known E2 multipolarity for the J=4 to J=2 *177*−keV transition and a regular sequence of level energies enable the assignment of definite Jπ to g.s. band members with J≤14.
[#] (A): Kπ=0+ band (1998Wu04). A=12.80, B=−0.0063.
[@] (B): Kπ=2+ γ−vibrational band (1988Ka44). A=12.05, B=−0.0065.
[&] (C): Kπ=(2−) band. A=11.13, B=−0.013. Possible octupole band analogous to that in ^{164}Dy.
[a] (D): Kπ=0+ band (1988Bu08). A=9.8 if B=0.

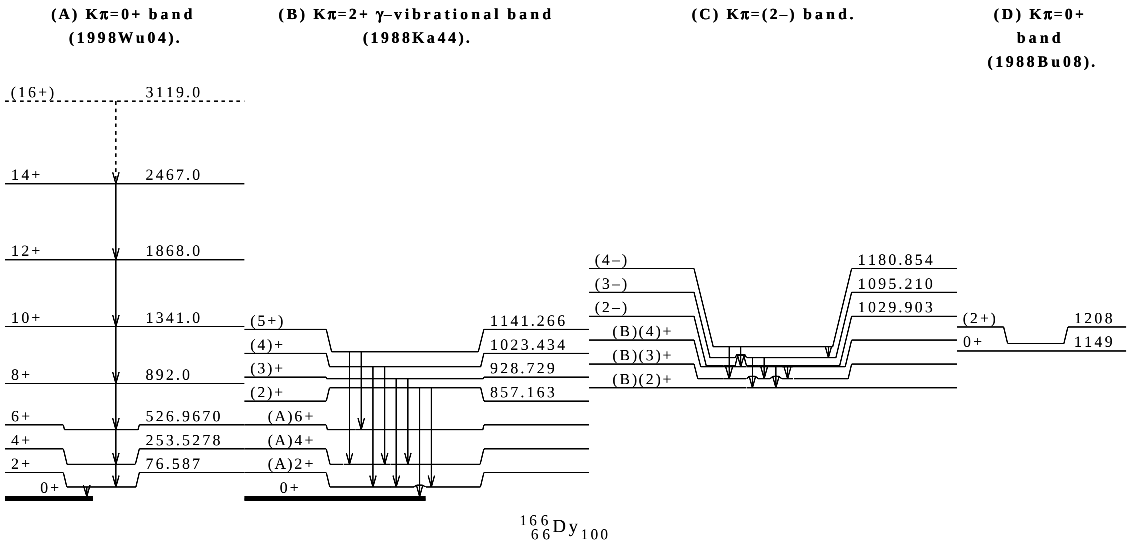
Adopted Levels, Gammas (continued)

γ(^{166}Dy)

E(level)	Eγ†	Iγ‡	Mult.§	α	Comments
76.587	76.587 *1*	100	E2	7.51	
253.5278	176.941 *1*	100	E2	0.357	
526.9670	273.439 *2*	100	E2	0.0859	
857.163	780.571 *6*	88 *17*	M1(+E2)	0.0074 *23*	
	857.156 *11*	100 *22*	[E2]	0.00422	
892.0	365#				
928.729	675.218 *9*	13.7 *27*	E2(+M1)	0.011 *4*	
	852.128 *8*	100 *19*	E2(+M1)	0.0061 *18*	
1023.434	769.907 *6*	100 *21*	M1+E2	0.0077 *24*	
	946.850 *15*	65 *13*	E2	0.00341	
1029.903	101.175 *1*	4.4 *8*	[E1]	0.299	Iγ: from (n,γ) E=thermal. Other I(101γ):I(173γ)=13 *4*:100 *13* in β⁻ decay.
	172.738 *1*	100 *10*	[E1]	0.0716	
1095.210	166.479 *3*	73 *8*	[E1]	0.0789	
	238.062 *4*	100 *10*	[E1]	0.0309	
1141.266	614.302 *26*	9.6 *17*			
	887.734 *15*	100 *21*			
1180.854	85.644 *2*	1.6 *8*			
	157.421 *3*	12.3 *8*			
	252.124 *3*	100 *10*			
1189.387	94.178 *1*	2.8 *18*			
	159.492 *4*	5.5 *9*			
	165.95 *1*	17.4 *18*			
	260.652 *2*	100 *9*			
1341.0	449#	100			
1868.0	527#	100			
2069.7	1039.8 *3*	100			Eγ: from β⁻ decay.
2467.0	599#	100			
3119.0?	652#@	100			

† From ^{165}Dy(n,γ), E=thermal, except as noted.
‡ Relative photon intensity normalized to 100 for strongest γ deexciting each level; from ^{165}Dy(n,γ) E=thermal, except as noted. Branching from β⁻ decay is in good agreement with that from (n,γ).
§ From subshell ratios and/or α(K)exp in (n,γ) E=thermal.
# From ^{118}Sn(^{164}Dy,^{116}Snγ); uncertainty unstated by authors.
@ Placement of transition in the level scheme is uncertain.

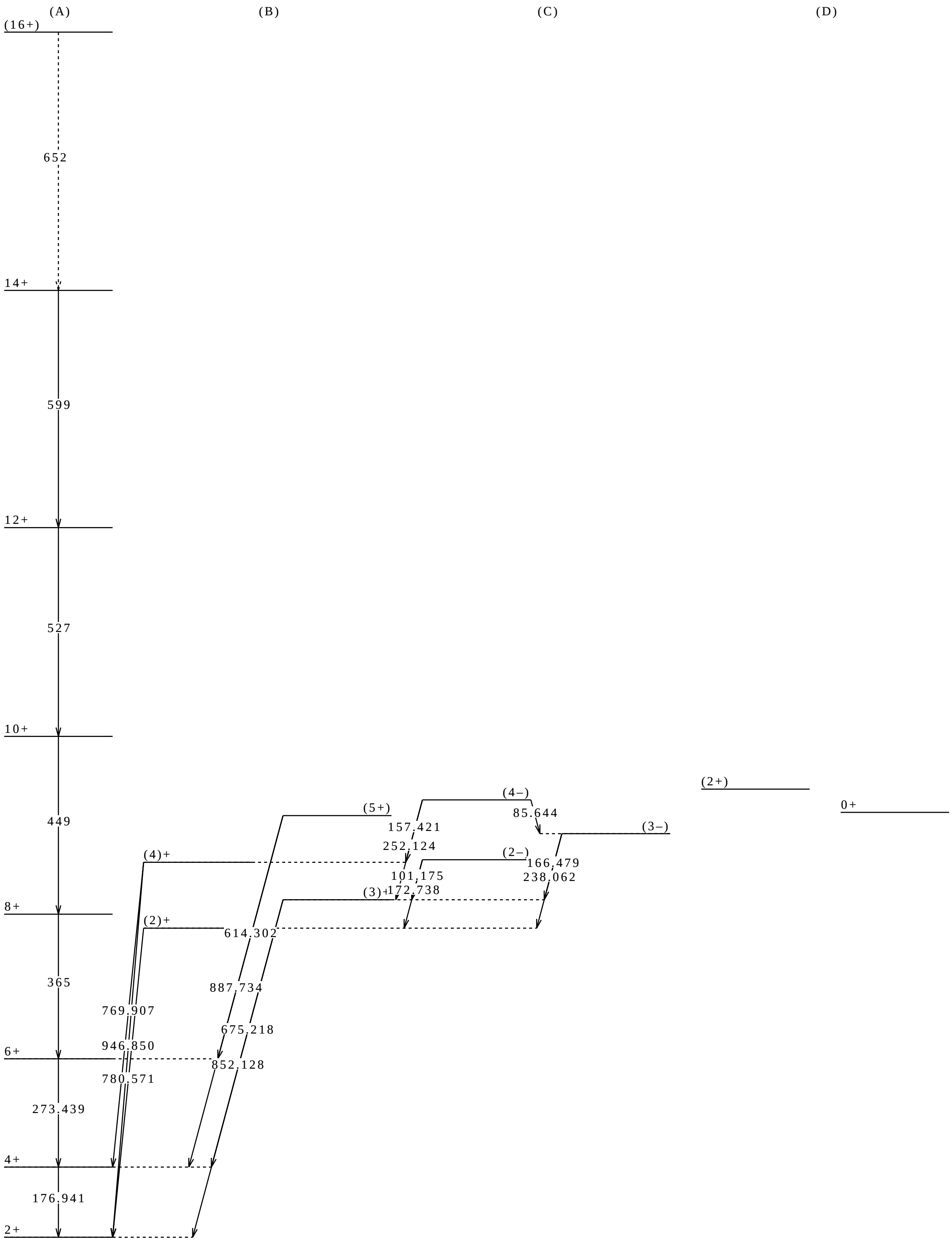
Adopted Levels, Gammas (continued)



$^{166}_{66}$Dy$_{100}$–4

Adopted Levels, Gammas (continued)

Bands for ^{166}Dy



$^{166}_{66}$Dy$_{100}$

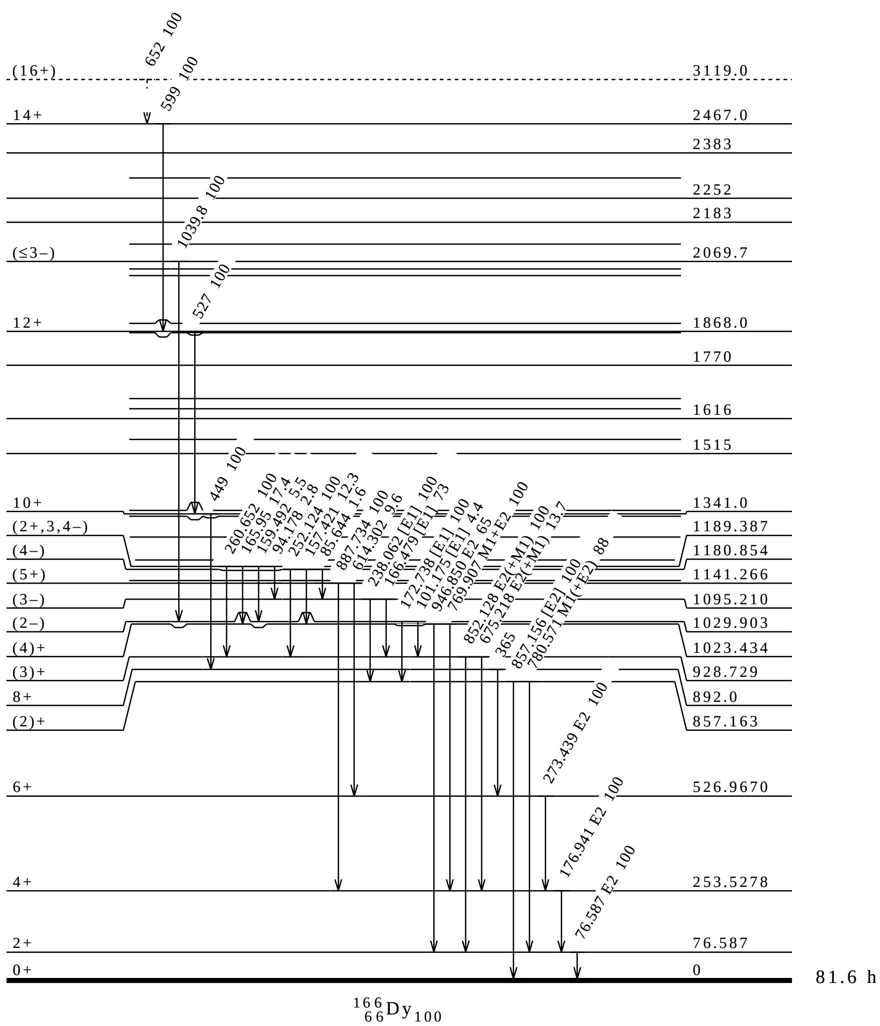
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



^{166}Tb β⁻ Decay 1996As05,1996Ic01

Parent ^{166}Tb: E=0.0; Jπ=(2−); $T_{1/2}$=25.1 s *21*; Q(g.s.)=4695 *70*; %β⁻ decay=100.

1996As05: ^{166}Tb produced from ^{238}U(p,F), E(p)=16 MeV; on–line isotope separator coupled to gas–jet transport system; plastic scintillator β detector, low–energy photon spectrometer (FWHM=0.61 keV at 122 keV), HPGe detector (FWHM=1.8 keV at1.33 MeV); measured Eγ, Iγ, singles β and γ spectra, β–γ coin, γγ coin, $T_{1/2}$ from β(t), γ(t), β–gated K x ray(Dy)(t). See 1996Ic01 for preliminary report of these data.

^{166}Dy Levels

E(level)†	Jπ‡
0.0	0+
76.58 *6*	2+
253.71 *22*	4+

Continued on next page (footnotes at end of table)

^{166}Tb β^- Decay 1996As05,1996Ic01 (continued)

^{166}Dy Levels (continued)

E(level)†	Jπ‡
856.99 *19*	(2)+
928.48 *20*	(3)+
1029.76 *20*	(2−)
1094.6 *3*	(3−)
2069.6 *4*	(≤3−)

† From least–squares fit to Eγ.
‡ From Adopted Levels.

β^- radiations

Eβ⁻	E(level)	Iβ⁻‡	Log *ft*	Comments
(2630 *70*)	2069.6	25 *15*	5.4 *3*	av Eβ=1039 *32*.
(3600 *70*)	1094.6	12 *7*	6.3 *3*	av Eβ=1481 *32*.
(4440 *70*)	253.71	9 *5*	8.46^{1u} *25*	av Eβ=1840 *32*.
(4620 *70*)	76.58	41 *24*	6.2 *3*	av Eβ=1948 *33*.
(4700§ *70*)	0.0	<57†	>6.1	av Eβ=1983 *33*.

† 7% *+50–7* (1996As05).
‡ Absolute intensity per 100 decays.
§ Existence of this branch is questionable.

γ(^{166}Dy)

Iγ normalization: from %(173γ)=26 *13* (1996As05).

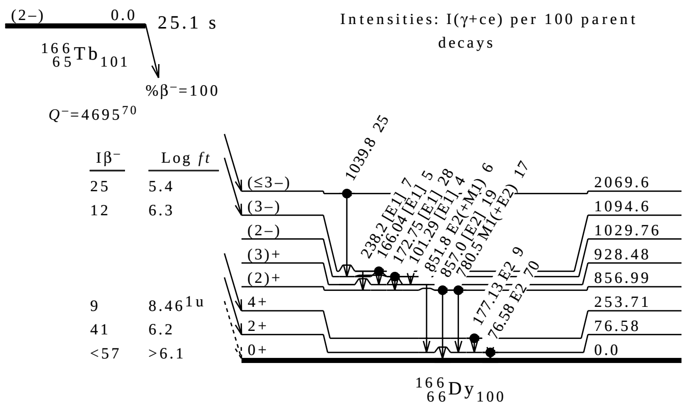
Eγ	E(level)	Iγ†§	Mult.‡	α	Comments
76.58 *6*	76.58	33 *5*	E2	7.52	α(K)=2.01 *3*; α(L)=4.24 *7*; α(M)=1.018 *15*; α(N+..)=0.255 *4*. α(N)=0.228 *4*; α(O)=0.0271 *4*; α(P)=8.59×10^{-5} *13*.
101.29 *11*	1029.76	13 *4*	[E1]	0.298	α(K)=0.249 *4*; α(L)=0.0386 *6*; α(M)=0.00846 *13*; α(N+..)=0.00219 *4*. α(N)=0.00192 *3*; α(O)=0.000262 *4*; α(P)=1.150×10^{-5} *17*.
166.04 *17*	1094.6	17 *6*	[E1]	0.0795	α(K)=0.0669 *10*; α(L)=0.00984 *14*; α(M)=0.00215 *3*; α(N+..)=0.000564 *8*. α(N)=0.000492 *7*; α(O)=6.87×10^{-5} *10*; α(P)=3.31×10^{-6} *5*.
172.75 *11*	1029.76	100 *13*	[E1]	0.0716	α(K)=0.0603 *9*; α(L)=0.00884 *13*; α(M)=0.00193 *3*; α(N+..)=0.000506 *8*. α(N)=0.000442 *7*; α(O)=6.18×10^{-5} *9*; α(P)=3.00×10^{-6} *5*. %Iγ=26 *13* (1996As05); the activity in the mass 165 fraction for a ^{165}Tb γ of known absolute intensity was used to deduce the total separation efficiency and, from this and the production cross sections for ^{165}Tb and ^{166}Tb, the emission probability for the I(173γ) in the 166 mass fraction was calculated.
177.13 *21*	253.71	25 *7*	E2	0.356	α(K)=0.227 *4*; α(L)=0.0989 *15*; α(M)=0.0233 *4*; α(N+..)=0.00592 *9*. α(N)=0.00526 *8*; α(O)=0.000658 *10*; α(P)=1.054×10^{-5} *16*.
238.2 *5*	1094.6	27 *12*	[E1]	0.0309	α(K)=0.0261 *4*; α(L)=0.00374 *6*; α(M)=0.000817 *13*; α(N+..)=0.000215 *4*. α(N)=0.000187 *3*; α(O)=2.65×10^{-5} *4*; α(P)=1.346×10^{-6} *20*.
780.5 *3*	856.99	65 *15*	M1(+E2)	0.0074 *23*	
851.8 *3*	928.48	23 *9*	E2(+M1)	0.0061 *18*	
857.0 *3*	856.99	74 *20*	[E2]	0.00422	
1039.8 *3*	2069.6	97 *26*			

† Photon intensity relative to I(173γ)=100 *13*. On this scale,I(Dy K x ray)=69 *5* (1996As05).
‡ From Adopted Gammas.
§ For absolute intensity per 100 decays, multiply by 0.26 *13*.

^{166}Tb β^- Decay 1996As05,1996Ic01 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{118}Sn(^{164}Dy,^{116}Snγ) 1998Wu04

E=790 MeV; GAMMASPHERE array (100 Ge detectors); CHICO array of position−sensitive avalanche counters (to detect both Dy−like and recoiling Sn−like particles); measured Eγ, γγ coin.

^{166}Dy Levels

E(level)[†]	Jπ[‡]	Comments
0.0[§]	0+	
76.6[§]	2+	E(level): rounded value from Adopted Levels.
253.6[§]	4+	
527.6[§]	6+	
892.6[§]	8+	
1341.6[§]	10+	
1868.6[§]	12+	
2467.6[§]	14+	
3119.6?[§]	(16+)	

† From Eγ assuming E=76.6 from Adopted Levels for the first excited state.
‡ Authors' values based on apparent band structure.
§ (A): Kπ=0+ g.s. band.

γ(^{166}Dy)

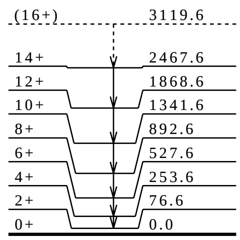
Eγ[†]	E(level)
177	253.6
274	527.6
365	892.6
449	1341.6
527	1868.6
599	2467.6
652[‡]	3119.6?

† From 1998Wu04; uncertainty unstated by authors.
‡ Placement of transition in the level scheme is uncertain.

From NNDC(BNL)
program ENSDAT

^{118}Sn(^{164}Dy,^{116}Snγ) 1998Wu04 (continued)

(A) Kπ=0+ g.s. band.



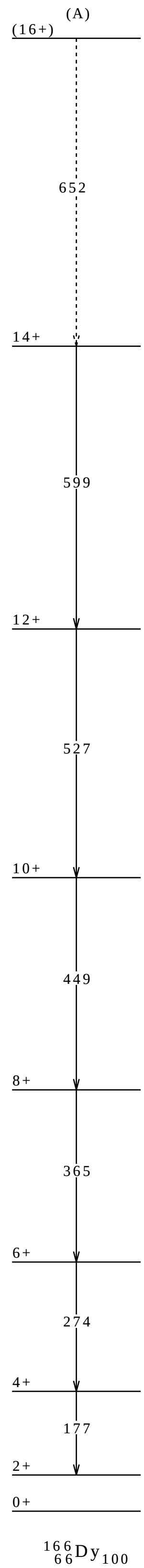
$^{166}_{66}Dy_{100}$

From NNDC(BNL) program ENSDAT

$^{166}_{66}Dy_{100}$–9

$^{118}Sn(^{164}Dy,^{116}Sn\gamma)$ **1998Wu04 (continued)**

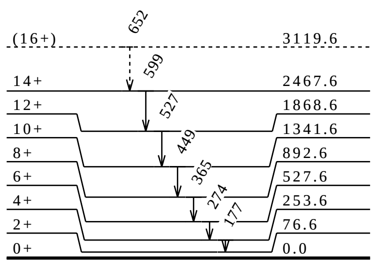
Bands for ^{166}Dy



From NNDC(BNL)
program ENSDAT

^{118}Sn(^{164}Dy,^{116}Snγ) 1998Wu04 (continued)

Level Scheme



^{164}Dy(t,p) 1988Bu08

1988Bu08: E=17 MeV; 98.43% ^{164}Dy target; Enge split–pole magnetic spectrograph with photographic emulsions (FWHM≈15–20 keV); measured E(level), angular distributions (θ(lab)=7.5° to 67.5° in 7.5° steps), differential cross section.

^{166}Dy Levels

E(level)	Jπ†	L‡	dσ/dΩ(30°) μb/sr§	Comments
0.0#	0+	0	220	Jπ: from L=0.
77#	2+		17	
254#	4+		12	
858@	2+		4	
1024@	(4+)		11	
1096			3	
1149&	0+	0	31	Jπ: from L=0.
1208&	(2+)		3	
1274				dσ/dΩ(30°) μb/sr: obscured.
1334				dσ/dΩ(30°) μb/sr: obscured.
1351				dσ/dΩ(30°) μb/sr: obscured.
1515			4	
1556			26	
1616			4	
1645			2	
1674			2	
1770			6	
1864			4	
1891			5	
2029			10	
2048			7	
2120			15	
2183			2	
2252			8	
2311			10	
2383			5	

† Authors' suggested values based on observed σ(θ), and deduced band structure, except as noted.
‡ From DWBA analysis of angular distributions.
§ dσ/dΩ(30°) μb/sr; uncertainty ≈20%.
# (A): Kπ=0+ band.
@ (B): Kπ=2+ γ–vibrational band.
& (C): Possible Kπ=0+ band.

From NNDC(BNL)
program ENSDAT

^{165}Dy(n,γ) E=thermal 1990Ka21,1988Ka44

Other: 1965Sc09.
1990Ka21: ^{164}Dy target; bent–crystal diffraction spectrometer. See also 1988Ka44, 1984KeZV, 1983KeZS.

^{166}Dy Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0§	0+	928.736# 4	(3)+	1180.858@ 4	(4−)
76.587§ 1	2+	1023.437# 4	(4)+	1189.390 4	(2+,3,4−)
253.5280§ 14	4+	1029.894@ 4	(2−)	(7043.5 4)	3+,4+&
526.9672§ 25	6+	1095.213@ 4	(3−)		
857.156# 4	(2)+	1141.266# 13	(5+)		

† From least–squares fit to Eγ.
‡ From Adopted Levels.
§ (A): Kπ=0+ g.s. band.
# (B): Kπ=2+ γ–vibrational band (1988Ka44).
@ (C): Kπ=(2−) band.
& s–wave capture by 7/2+ ^{165}Dy.

γ(^{166}Dy)

Eγ†	E(level)	Iγ‡	Mult.§	α	Comments
76.587 1	76.587	113 25	E2	7.51	Mult.: L1/L2=0.095 12, L1/L3=0.080 12 (1983KeZS).
85.644# 2	1180.858	2 1			
94.178# 1	1189.390	3 2			
101.175@c 1	1029.894	6 1	[E1]	0.299	
157.421# 3	1180.858	15 1			
159.492# 4	1189.390	6 1			
165.950 10	1189.390	19 2			
166.479 3	1095.213	73 8	[E1]	0.0789	
172.738 1	1029.894	137 13	[E1]	0.0716	
176.941 1	253.5280	801 86	E2	0.357	Mult.: L1/L2=0.56 2 (1984KeZV); α(K)exp=0.26 12 (1983KeZS).
238.062 4	1095.213	100 10	[E1]	0.0309	
252.124 3	1180.858	122 12			
260.652 2	1189.390	109 10			
273.439 2	526.9672	208 20	E2	0.0859	Mult.: L1/L2=1.04 8 (1984KeZV).
614.302# 26	1141.266	11 2			
x662.455 11		72 14			
675.218 9	928.736	71 14	E2(+M1)	0.011 4	Mult.: α(K)exp=0.0064 11 (1984KeZV).
769.907 6	1023.437	189 39	M1+E2	0.0077 24	Mult.: α(K)exp=0.0050 5 (1984KeZV).
780.571 6	857.156	203 40	M1(+E2)	0.0074 23	Mult.: α(K)exp=0.0043 5 (1984KeZV).
852.128 8	928.736	520 100	E2(+M1)	0.0061 8	Mult.: α(K)exp=0.0037 4 (1984KeZV).
857.156& 11	857.156	231 50	[E2]	0.00422	
887.734 15	1141.266	115 24			
946.850 15	1023.437	122 24	E2	0.00341	Mult.: α(K)exp=0.0024 4 (1984KeZV).
x953.810a 26		77 16			
x1225.25a 4		187 39			
x1256.62a 15		261 77			Eγ: 1988Ka44 show Eγ=1256.10 9 (assigned to ^{165}Dy by 1990Ka21) but give an Iγ value that matches that for the 1256.6γ in 1990Ka21. The evaluator assumes that the wrong Eγ was listed in 1988Ka44.
x1570.60a 13		77 18			
6789.6b 4	(7043.5)				
6968.0b 10	(7043.5)				

† From 1990Ka21, except as noted.
‡ Photon intensity per 1×10^5 neutron captures in ^{164}Dy. From table 2 of 1990Ka21. Values from 1988Ka44 differ slightly, but evaluator presumes that the data in 1990Ka21 supersede those in 1988Ka44.
§ From ce data in 1983KeZS and 1984KeZV; authors normalized their α(K)exp data assuming α(K)(E2 theory)=0.0035 for the 857γ.
# From list of unassigned and unplaced γ's from ^{164}Dy(n,γ) E=thermal (1990Ka21, table 2).
@ 1990Ka21 place this γ from a 1482 level in ^{165}Dy; however, a γ of this energy is expected in ^{166}Dy accompanying the 173γ from the 1030 level, as in ^{166}Tb β^- decay. The evaluator, therefore, tentatively places it from the 1030 level of ^{166}Dy.
& Eγ=857.146 11 in 1988Ka44 is presumed to be a misprint.

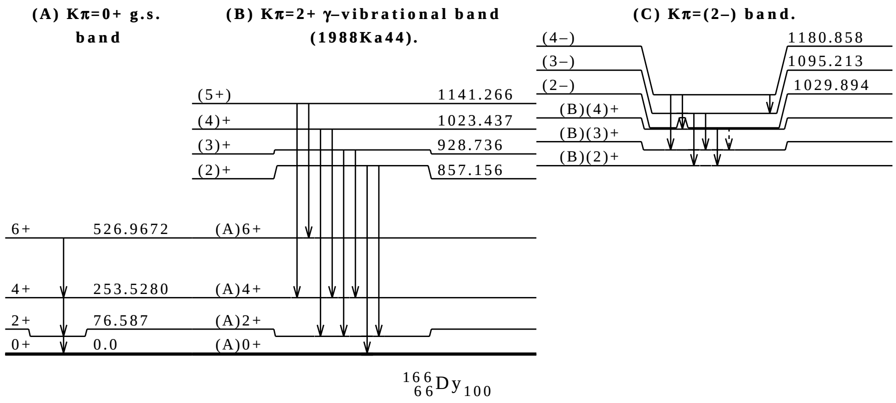
Footnotes continued on next page

^{165}Dy(n,γ) E=thermal 1990Ka21,1988Ka44 (continued)

γ(^{166}Dy) (continued)

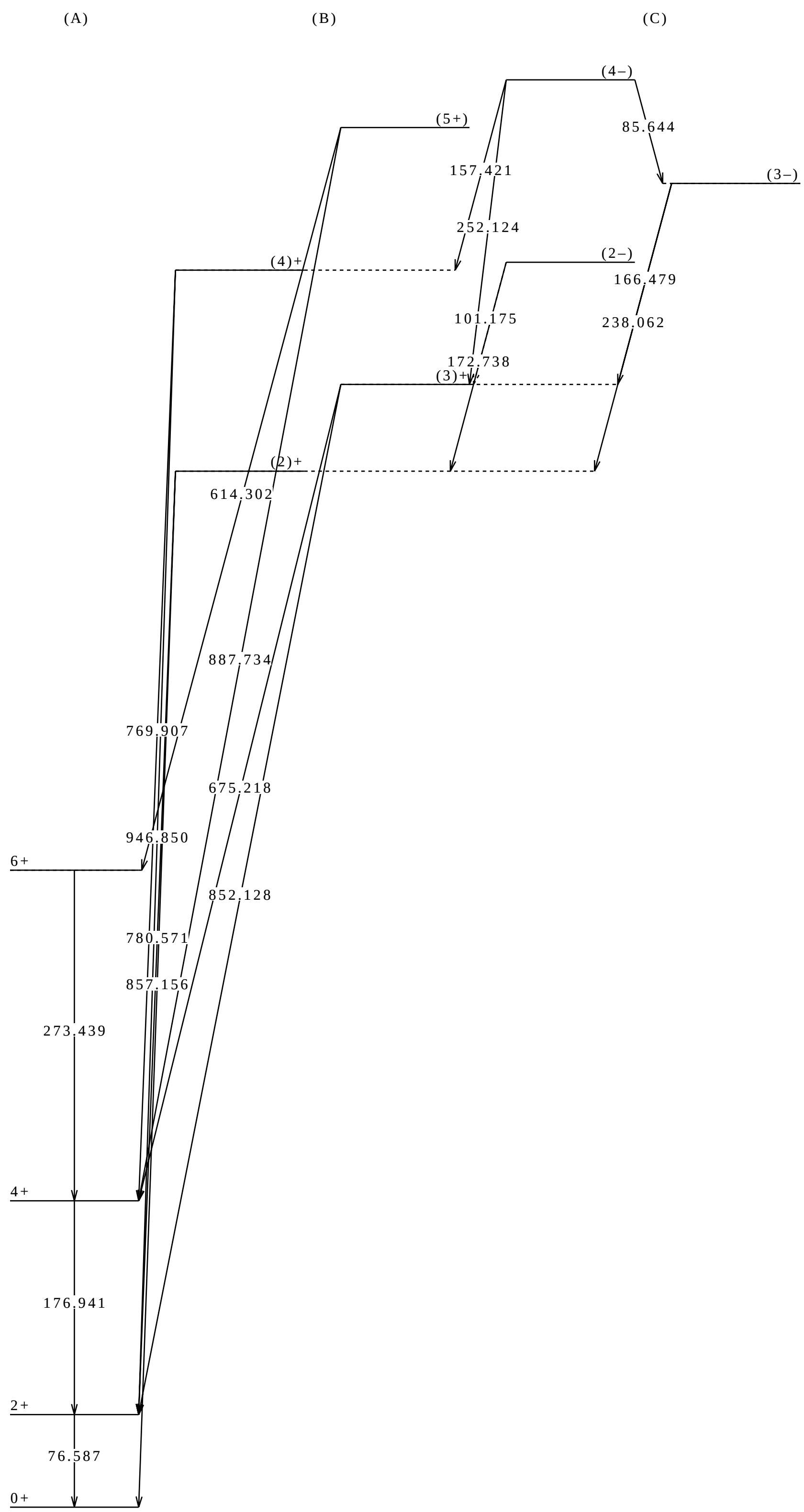
[a] Unplaced and unassigned in table 2 of 1990Ka21 but attributed to ^{166}Dy in 1988Ka44.
[b] From 1983KeZS. Only two primary gammas are reported; I(6968)/I(6790=0.4.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{165}Dy(n,γ) E=thermal 1990Ka21,1988Ka44 (continued)



^{165}Dy(n,γ) E=thermal 1990Ka21,1988Ka44 (continued)

Bands for ^{166}Dy



$^{166}_{66}Dy_{100}$

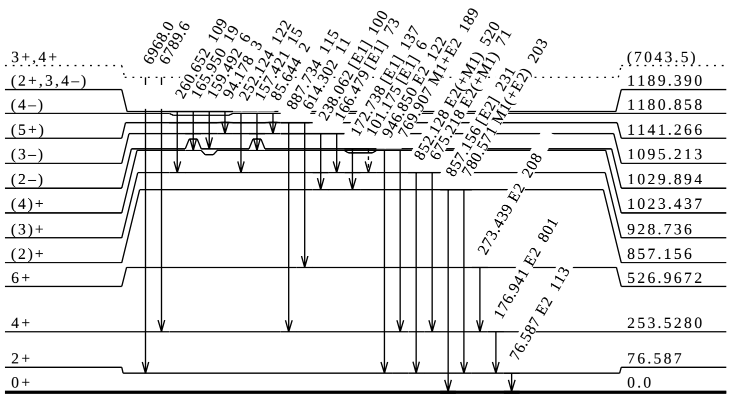
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Dy(n,γ) E=thermal 1990Ka21,1988Ka44 (continued)

Level Scheme

Intensities: Iγ per 100 neutron captures in ^{164}Dy.



$^{166}_{66}Dy_{100}$

Adopted Levels, Gammas

Q(β⁻)=1854.7 *9*; S(n)=6243.64 *2*; S(p)=6747.9 *9*; Q(α)=180 *40* 2003Au03.

^{166}Ho Levels

Cross Reference (XREF) Flags

A ^{165}Ho(n,γ) E=thermal	E ^{166}Dy β⁻ Decay
B ^{167}Er(t,α)	F ^{167}Er(d,^{3}He)
C ^{165}Ho(n,γ) E=2 keV	G ^{166}Ho IT Decay (185 μs)
D ^{165}Ho(d,p)	H ^{165}Ho(n,γ) E=thermal: γγ Coin

E(level)[†]	Jπ	XREF	$T_{1/2}$	Comments
0.0[#]	0−	AB E GH	26.824 h *12*	%β⁻=100. $T_{1/2}$: weighted average of 26.74 h *5* (1966Da04), 26.79 h *3* (1968Ne02), 26.83 h *3* (1974Ry01), 27.00 h *4* (1976Ra32), 26.827 h *5* (1989Ab05), 26.794 h *23* (2002Un02; supersedes 26.7663 *44* (1994Co02 and 1992Un01)). Others: 1946Bo25, 1949Co15, 1949Gr01, 1950An12, 1958Co76, 1963Fu17, 1963Ho15. Jπ: J measured by atomic beam (if J>0 μ≤10×10^{-4}) (1976Fu06); 1773β⁻ to 2+ level in ^{166}Er has 2–yes shape; E1 426γ from 1+ 426.
5.969[&] *12*	7−	AB D F	1.20×10^3 y *18*	%β⁻=100. μ=3.60 *5* (1980Al34); Q=−3 *3* (1981Ma43). Jπ: cross section fingerprint at 3 angles for 3 band members in (d,p) and (d,^{3}He). E(level): calculated by 1978Ba78. $T_{1/2}$: from 1965Fa01. Other: 1952Bu18. μ, Q: from static nuclear orientation. Other μ: 3.60 *16* (1981Kr12), 3.65 *13* (1981Ma43) from static nuclear orientation.
54.2391[#] *7*	2−	ABCD FGH	3.44 ns *12*	μ=+0.068 *10* (1979Ba40). μ: from IPAC. Jπ: E2 54γ to 0− g.s. $T_{1/2}$: from ^{166}Dy β⁻ decay.
82.4707[@] *20*	1−	ABCD F H	≤0.3 ns	$T_{1/2}$: from ^{166}Dy β⁻ decay. Jπ: M1 82γ to 0− g.s.
137.729[&] *13*	8−	AB D F		Jπ: from σ fingerprint in (d,p) and (t,α).
171.0738[@] *12*	3−	ABCD FGH		Jπ: M1 117γ to 2− 54; (d,p) cross section fingerprint.
180.467[#] *3*	4−	ABCD F H		Jπ: E2 126γ to 2− 54; (d,p) cross section fingerprint.
190.9021[a] *20*	3+[‡]	A CD FGH	185 μs *15*	%IT=100. Jπ: E1 137γ to 2− 54; E1 20γ to 3− 171; (d,p) cross section fingerprint. $T_{1/2}$: from 1965Bj03. Others: 214 μs *10* (1960Al27); 158 μs *14* (1964KaZZ); 207 μs (1965Mc03); see also 1961Kr01, 1962En04.
260.6625[a] *23*	4+[‡]	A CD H	≤0.5 ns	Jπ: M1 70γ to 3+ 190; (d,p) cross section fingerprint. $T_{1/2}$: from (n,γ) E=thermal.
263.7876[b] *24*	5+	ABCD F H	≤0.5 ns	Jπ: E2 73γ to 3+ 190; M2 258γ to 7− 6.0. Probable K=5 bandhead. $T_{1/2}$: from (n,γ) E=thermal.
286.96[&] *13*	9−	AB D F		XREF: D(287.5). Jπ: (d,p) cross section fingerprint.
295.085[c] *9*	(6)+	A D F	1.10 ns *15*	Jπ: E1 289γ to 7− 6; J=(6+) from σ in (d,p). $T_{1/2}$: from (n,γ) E=thermal.
296.8 *12*	(1−,6−)	C		Jπ: from (n,γ) E=2 keV. E(level): from (d,^{3}He).
329.774[@] *4*	5−	ABCD F H		Jπ: (M1) 149γ to 4− 181; Jπ=(2− or 5−) from (n,γ) E=2 keV; (d,p) cross section fingerprint.
348.257[a] *3*	5+	A CD F H		Jπ: M1(+E2) 88γ to 4+ 261; (d,p) cross section fingerprint.
371.985[d] *3*	4+[‡]	A CD H	≤0.2 ns	Jπ: (d,p) cross section fingerprint; M1(+E2) γ's to 4+ 261 and 5+ 264. $T_{1/2}$: from (n,γ) E=thermal.
373.092[p] *8*	(1)−	A H	≤0.2 ns	Jπ: M1 291γ to 1− 82; fit to a band. $T_{1/2}$: from (n,γ) E=thermal.
375.3 *14*	(6+)	b F		XREF: F(380.2). Jπ: from σ in (t,α). E(level): from (t,α).
377.806[#] *4*	(6−)	Ab d		Jπ: (E2) 197γ to 4− 180; continuation of 2− band.

Continued on next page (footnotes at end of table)

CITATION: Nuclear Data Sheets (1992)

From NNDC(BNL) program ENSDAT

Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$	Comments
379.547[b] *4*	6+	A d		Jπ: band assignment.
384.23 *16*		D		
416.086[p] *6*	2–	A C H	≤0.2 ns	Jπ: M1 334γ to 1– 82; M1 245γ to 3– 171. E(level): from (d,p). $T_{1/2}$: from (n,γ) E=thermal.
423.651[c] *10*	(7+)	A D		Jπ: fit to a band.
426.025[i] *6*	1+	A DE		Jπ: log *ft*=5.1 from 0+.
430.031[g] *4*	2+	ABC F H	≤0.2 ns	Jπ: M1 239γ to 3+; J=2 from γ(θ) for primary feeding level. $T_{1/2}$: from (n,γ) E=thermal.
431.239[r] *6*	(5)–	A		Jπ: 425γ to 7– 6; E1 167γ to 5+ 264; band assignment.
453.771[a] *4*	(6)+	A D F H		Jπ: M1(+E2) 106γ to (5)+ 348; fit to a band.
464.501[i] *6*	2+	A CD		Jπ: M1(+E2) 38γ to 1+ 426; (d,p) cross section fingerprint.
470.841[d] *3*	5+	A CD		Jπ: M1,E2 99γ to 4+ 371; (d,p) cross section fingerprint.
475.680[p] *7*	(3)–	A CD H	≤0.2 ns	Jπ: M1 305γ to 3– 171; 103γ to (1)– 373; fit to a band. $T_{1/2}$: from (n,γ) E=thermal.
481.846[g] *4*	3+	ABC F H	≤0.2 ns	XREF: H(483.1). Jπ: (d,p) cross section fingerprint; J=3,4 from 5761γ(θ) in (pol n,γ) E=thermal. $T_{1/2}$: from (n,γ) E=thermal.
514.362[b] *7*	(7+)[§]	AB D		
521.982[i] *6*	3+	A CD H		Jπ: (d,p) cross section fingerprint.
529.816[r] *8*	(6–)	A		Jπ: 267γ to 5+ 264; 524γ to 7– 6; 99γ to (5–) 431; band assignment.
543.672[h] *4*	2–	A C H		Jπ: E2 544γ to 0– g.s.
547.934[g] *5*	4+	ABCD F H		Jπ: (d,p) cross section fingerprint; (M1) 199.7γ to 5+ 348.
557.65[@] *7*	(7–)	AB		Jπ: continuation of 0– band; σ in (t,α).
558.571[n] *4*	4+	A CD F		Jπ: J=4 from γ(θ) for primary γ feeding this level in (pol n,γ); M1(+E2) 210γ to 5+ 348.
562.890[p] *7*	4–	A CD H		Jπ: M1 392γ to 3– 171; M1 233γ to 5– 329.
567.624[f] *7*	(1+)	A D		Jπ: γ's to 1+,(2+), (1)–, energy fit to the band.
577.208[a] *7*	7+	A D		Jπ: (d,p) cross section fingerprint.
588.083[d] *7*	6+	A D		Jπ: (d,p) cross section fingerprint.
592.501[j] *9*	(3+)	ABCD F H		Jπ: (3,4+) from (n,γ) E=2 keV; band assignment.
595.726[e] *15*	(1–)	A		Jπ: 594γ to 0– g.s.; 120γ to (3)– 476; band assignment.
597.015[h] *4*	(3)–	A C H		Jπ: M1+E2 543γ to 2– 54; γ to 5–.
598.448[i] *6*	4+	A CD H		Jπ: (d,p) cross section fingerprint.
605.047[f] *7*	2+	A CD		Jπ: (d,p) cross section fingerprint.
628.418 *13*	(2–,3–)	A C		Jπ: 255γ to (1)– 373; 437γ to 3+ 191; π=– from (n,γ) E=2 keV.
634.314[g] *6*	5+	ABCD F		Jπ: (d,p) cross section fingerprint.
638.235[q] *9*	(2–)	A C		Jπ: 265γ to 1– 373; 116γ to 3+ 522; 467γ to 3– 171; π=(–) from (n,γ) E=2 keV.
644.29[r] *6*	7–	A D		Jπ: band assignment supported by cross section in (d,p).
651.5 *8*	(3+,4–)	H		Jπ: 304γ to (5)+ 348; 597γ to 2– 54. E(level): from (n,γ) E=thermal: γγ coin.
654.818[n] *14*	(5+)	A CD F H		Jπ: 464γ to 3+ 191; 360γ to (6)+ 295; band assignment.
657.995[p] *11*	(5–)	A C H		Jπ: π=(–) from (n,γ) E=2 keV; 182γ to (3)– 476; 328γ to 5– 330; fit to a band.
659.01[s] *4*	(0–)	A C		Jπ: 286γ to (1)– 373; band assignment.
662.169[f] *8*	3+	A CD		Jπ: (d,p) cross section fingerprint.
668.005[h] *6*	(4)–	A C H		Jπ: M1 488γ to 4– 180; 614γ to 2– 54; 197γ to 5+ 471.
671.749[j] *12*	(4+)	A CD F		Jπ: 241γ to 2+ 430; 218γ to (6)+ 454.
683.805[e] *5*	(3)–	A C		Jπ: M1(+E2) 140γ to 2– 544; possible 423γ to 4+ 261; band assignment.
693.388 *17*	(2,3,4)	A		Jπ: 212γ to 3+ 482; 96γ to (3)– 597.
693.638[i] *7*	5+	A CD		Jπ: (d,p) cross section fingerprint; (2+ or 5+) from (n,γ) E=2 keV; γ to 3+ and 3– and 5+.
701.5 *16*		H		Jπ: γ to (5–) 330. E(level): from (n,γ) E=thermal: γγ coin.
704.962[q] *14*	(3–)	A C		Jπ: 109γ to 1– 596; 533γ to 3– 171; π=(–) from (n,γ) E=2 keV; band assignment.
715.4 *8*		H		XREF: H(717.0). E(level): from Eγ in (n,γ) E=thermal: γγ coin.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ	XREF	Comments
718[k] *3*	+	B	Jπ: L(t,α)=2 for 7/2+ target.
			E(level): from (t,α).
719.370[l] *11*	(4)+	A C F H	Jπ: M1(+E2) 456γ to 5+ 264; 57γ to 3+ 662; band assignment.
721.98[u] *15*	(6+)	A	Jπ: 427γ to (6)+ 295; band assignment.
723.239[d] *19*	(7+)	A D	Jπ: transitions to 6+ and (7+); band assignment.
725.68[s] *4*	(2−)	A C	Jπ: 643γ to 1− 82; 554γ to 3− 171; π=(−) from (n,γ) E=2 keV; band assignment.
732.513[g] *16*	(6+)	AB F	Jπ: band assignment.
736.430[f] *9*	4+	A CD	Jπ: (d,p) cross section fingerprint.
742.02[e] *3*	(4−)	A C	Jπ: 198γ to 2− 544; 412γ to 5− 330; band assignment.
757.707[h] *18*	(5−)	A C H	Jπ: 161γ to (3)− 597; 380γ to (6−) 378; band assignment.
760.345[t] *7*	(3−)	A C	Jπ: 217γ to 2− 544; 430γ to 5− 330; band assignment.
769.78[j] *4*	(5+)	A Cd H	Jπ: 248γ to 3+ 522; 390γ to 6+ 380; (2+ or 5+) from (n,γ) E=2 keV.
771.94[n] *8*	(6+)	Cd	Jπ: transitions to 5+ and 5−; π from (n,γ) E=2 keV; band assignment.
774.522[s] *16*	(1−)	A	Jπ: 116γ to (0−) 659; 91γ to (3−) 684; band assignment.
788.618[p] *11*	(6−)	A	Jπ: transitions to 4− and 5−; band assignment.
792.789[q] *12*	(4−)	A	Jπ: 155γ to (2−) 638; 612γ to 4− 180; band assignment.
801[x] *4*	0+	B	Jπ: from (t,α) cross section fingerprint.
			E(level): from (t,α).
806.56[l] *5*	(5+)	A C f H	Jπ: 325γ to 3+ 482; 336γ to 5+ 471; (2+,5+) from (n,γ) E=2 keV.
807.011[i] *8*	6+	A D f	Jπ: (d,p) cross section fingerprint; γ to 5+.
815.139[o] *10*	3+	A CD H	Jπ: J=3 from γ(θ) for primary γ feeding level in (pol n,γ); 389γ to 1+ 426; M1(+E2) 257γ to 4+ 559.
819.06[k] *20*		B D F	E(level): from (d,p).
824.62 *4*	(3−,4−)	A CD H	Jπ: π=(−) from (n,γ) E=2 keV; 634γ to 3+ 192; 563γ to 4+ 261.
832.197[f] *9*	5+	A CD	Jπ: (d,p) cross section fingerprint.
837.717[t] *8*	(4−)	A CD	Jπ: transitions to 4+ and (4)−; π from (n,γ) E=2 keV; band assignment.
848.46[u] *21*	(7+)	A D	Jπ: 553γ to (6)+ 295; band assignment.
856[x] *6*	2+	B	Jπ: from (t,α) cross section fingerprint.
			E(level): from (t,α).
858.1 *15*	(−)	C	E(level),Jπ: from (n,γ) E=2 keV.
860.7 *15*	(−)	C	E(level),Jπ: from (n,γ) E=2 keV.
868.24[s] *14*	(4−)	A C	XREF: C(867.1).
			Jπ: π=(−) from (n,γ) E=2 keV; 539γ to 5− 330; 392γ to (3)− 476; band assignment.
870.13 *5*	(4−,5−,6−)	A C H	XREF: C(868.7)H(873.6).
			Jπ: π=(−) from (n,γ) E=2 keV; γ to 5+ 634.
876.37 *22*	(3−)	A C H	XREF: C(874.8)H(873.6).
			Jπ: π=(−) from (n,γ) E=2 keV; 790γ to 1− 82; 547γ to 5− 330.
878.6 *10*		C	E(level): from (n,γ) E=2 keV.
881.040[s] *20*	3(−)	A C H	XREF: C(881.6)H(881.9).
			Jπ: J=3 from γ(θ) for primary γ feeding level in (pol n,γ); 799γ to 1− 82.
883.94[j] *5*	(6+)	A	Jπ: transitions to (4+) and possibly to (5+); band assignment.
885.371[m] *21*	+	ABCD F	XREF: B(884.0)C(884.4).
			Jπ: 217γ to (4)− 668; L(t,α)=2 for 7/2+ target.
891.134[o] *13*	(4+)	A CD	XREF: C(890.0).
			Jπ: transitions to 3+ and (5+); band assignment.
895.5 *6*		D	E(level): from (d,p).
902.2 *10*		C	E(level): from (n,γ) E=2 keV.
905.544[v] *10*	(2+)	A CD H	Jπ: 476γ to 2+ 430; 734γ to 3− 171; band assignment.
910.49[l] *4*	(6+)	A D	Jπ: band assignment.
915[z] *3*	(7+)[§]	B	E(level): from (t,α).
925.21[w] *16*	(5+)	A CD F	E(level): from (d,p).
			Jπ: band assignment.
935.12[t] *4*	(5−)	A	Jπ: band assignment.
942.524[f] *15*	(6+)	A	Jπ: band assignment.
945.86[k] *5*		ABC	XREF: B(946).
947.1 *6*		H	Jπ: transitions to 2− and 3−.
			E(level): from (n,γ) E=thermal: γγ coin.
951.1 *3*		A C	
953.4 *11*	(3−,4−)	H	Jπ: transitions to 2− and 5−.
			E(level): from (n,γ) E=thermal: γγ coin.
961.08[v] *6*	3+	A CD H	Jπ: 535γ to 1+ 426; 701γ to 4+ 261; band assignment.
976.1[y] *5*	1+	BC H	XREF: B(974)C(976.1)H(973.7).
			Jπ: from (t,α) cross section fingerprint.

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Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ	XREF	Comments
978.55 24		A CD	XREF: A(977.2).
			E(level): from (d,p).
979.8 10		A CD	Jπ: from (n,γ) E=2 keV.
985.20[o] 8	(5+)	A CD	Jπ: band assignment supported by cross section in (d,p).
996.8 8	(4+,5,6+)	C H	XREF: C(998.8).
			Jπ: 736γ to 4+ 261; 544γ to (6)+ 454.
			E(level): from (n,γ) E=thermal: γγ coin.
1004.84 5	(2−,3−)	A CD H	XREF: C(1003.5).
			Jπ: 634γ to 1− 372; 824γ to 4− 180.
1006[m] 4		B	
1010.68 18	(3−,4,5−)	A CD F H	Jπ: transitions to 3− 171 and 5− 330.
1016.23 15	(2,3,4−)	A C H	Jπ: 961γ to 2− 54; 825γ to 3+ 191; primary γ from 3−,4−.
1019.2 5		A C	
1023.3 7		A C H	Jπ: transitions to 3+ 191 and to 4− 180.
			E(level): from (n,γ) E=thermal: γγ coin.
1026.1 5		A C	
1028.7 15		H	E(level): from (n,γ) E=thermal: γγ coin.
1029.0 12		H	E(level): from (n,γ) E=thermal: γγ coin.
1030.38[v] 3	(4+)[‡]	A cD H	XREF: c(1032.3).
1035.8 6	(0−,1,2−)	Bc H	XREF: B(1037)c(1032.3).
			Jπ: 982γ to 2− 54, 1036γ to 0− g.s.
			E(level): from (n,γ) E=thermal: γγ coin.
1038.4[w] 3	(6+)	A D	E(level): from (d,p).
			Jπ: band assignment.
1045.7 15		C	E(level): from (n,γ) E=2 keV.
1054.87 22		A CD H	
1060.5 2		C H	E(level): from (n,γ) E=2 keV.
1062.7 9	2,4	A C H	Jπ: 2,4 from primary γ(θ) (1979Bo08). However, deexciting gammas proposed in (n,γ) E=thermal: γγ coin feed 5+ and 4− and 1− levels, so some must have been misplaced.
			E(level): from (n,γ) E=thermal: γγ coin.
1066[y] 5	3+	B	Jπ: from (t,α) cross section fingerprint.
1077.2 2		C	E(level): from (n,γ) E=2 keV.
1086.4 3	3[‡]	A CD H	E(level): from (n,γ) E=2 keV.
1090.7[k] 15		C	E(level): from (n,γ) E=2 keV.
1093.7 19		F	E(level): from (d,^{3}He).
1097.45[o] 5	(6+)	ABCD H	XREF: B(1091)C(1096.3)D(1098.6)H(1099.8).
			Jπ: 837γ to (5)+ 264; band assignment. However, 624γ to (3)− 476; this suggests that 624γ is misplaced or that 1097 level is a doublet.
1114.67 3	(5−)	A CD H	Jπ: 943γ to 3− 171, 661γ to (6+) 454. J=3,(5) from primary γ(θ) in (pol n,γ) (1979Bo08).
1118.7 10		C H	E(level): from (n,γ) E=2 keV.
1121.41 7	(3−,4−)	AbC H	XREF: b(1126).
			Jπ: 704γ to 2− 416, 792γ to (5−) 330.
1131.0 3		AbCD	XREF: b(1126).
1134.97 11		A C H	
1137.79 12		A CD H	
1141.3 3		A F H	
1146[m] 5		B	E(level): from (t,α).
1146.7[α] 4	1+	ABCD	XREF: D(1148.5).
			Jπ: from (t,α) cross section fingerprint.
			E(level): from (d,p).
1153.0 5		C	E(level): from (n,γ) E=2 keV.
1154.84 4	(3,4)	A C H	Jπ: possible gammas to 3− and 3+ and 4− and 4+.
1158.5 10		C	E(level): from (n,γ) E=2 keV.
1161.35 3	(4+)[‡]	A CD H	Jπ: 732γ to 2(+) 430, 831γ to (5−) 330, 899γ to (5)+ 264.
1168.4 11	(4+,5+)	D H	E(level): from (d,p).
			Jπ: 714γ to (6+) 454, 977γ to 3+ 192.
1174.9 5		A D	
1190.13[α] 4	2+	AB D H	Jπ: from (t,α) cross section fingerprint. 713γ to (3)− 476, 929γ to 4+ 261.
1199.4 13		A	
1202.11 14		Ab D	XREF: b(1205).
1208.61 9		Ab D	XREF: b(1205).
1214.93 23		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)†	Jπ	XREF	Comments
1217.2 *3*		A D	
1221.61 *13*		A	
1226.9 *15*		D	E(level): from (d,p).
1230.04 *4*		A	
1234.86 *12*		A	
1240.70α *6*	3+	AB D	Jπ: from (t,α) cross section fingerprint.
1244.24 *7*		A D	
1248.19 *10*		A	
1252.65 *14*		A	
1256.87 *12*		A	
1263.84 *4*		A D	
1271.44 *19*		A D	
1272.0β *20*	(6+)§	B	E(level): from (t,α).
1280.7 *18*		D	E(level): from (d,p).
1289.29 *11*		A D	
1293.79 *7*		A	
1298.45 *7*		A D	
1301.07 *9*		A	
1304.81α *13*	4+	AB D	Jπ: from (t,α) cross section fingerprint.
1310.54 *15*		A D	
1318.0 *3*		A	
1322.0 *3*		A	
1327.55 *21*		A D	
1332.1 *6*		A	
1334.5 *21*		D	E(level): from (d,p).
1338.75 *6*		A d	
1343.06 *8*		A d	
1349.93 *5*		A D	
1355.02 *5*		Ab	XREF: b(1356).
1358.8 *22*		b D	XREF: b(1356). E(level): from (d,p).
1362.73 *11*		A	
1367.31 *16*		A D	
1371.4 *10*		A	
1376.81 *6*		A D	
1380.15α *19*	5+	AB D	XREF: B(1379)D(1382.6). Jπ: from (t,α) cross section fingerprint.
1387.75 *5*		A D	
1391.93 *11*		A	
1396.77 *7*		A D	
1401.77 *11*		A	
1405.8 *3*		A	
1415.80β *4*	(7+)	AB D	
1421.48 *13*		A	
1429.80 *7*		A D	XREF: D(1426).
1433.64 *12*		A D	
1440 *3*		D	E(level): from (d,p).
1448.92 *5*		A D	XREF: D(1445).
1458.8 *5*		A D	
1461.6 *4*		AB	
1463.91 *14*		A D	
1467.3 *5*		A	
1471.7 *4*		A D	
1474.4 *6*		A	
1478.49 *13*		Ab	XREF: b(1487).
1487.15 *13*		Ab D	XREF: b(1487).
1494.59 *18*		Ab	XREF: b(1487).
1498.1 *4*		A D	
1505.5 *3*		A D	
1510.60 *7*		Ab D	XREF: b(1519).
1521.2 *4*		Ab	XREF: b(1519).
1526.86 *17*		b D	XREF: b(1519).
1532.12 *6*		A D	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)†	Jπ	XREF	Comments
1537.62 *11*		A D	
1540.9 *5*		A	
1544.4 *10*		A	
1547.49 *12*		A D	
1552.95 *13*		A	
1558.90 *17*		A D	
1560η *5*	(6−)§	B	
1561.0 *4*		A	
1566.5 *5*		A	
1570.75 *7*		A D	
1576.89 *12*		A D	
1588.79 *13*		Ab	XREF: b(1585).
1592.47 *18*		Ab D	XREF: b(1585).
1599.98 *9*		A D	
1603.81 *15*		Ab D	XREF: b(1604).
1606.25 *24*		Ab	XREF: b(1604).
1614.0 *4*		A d	
1616.0 *3*		A d	
1620.3 *3*		Ab D	XREF: b(1628)D(1623).
1628.1 *4*		Ab	XREF: b(1628).
1629.9 *3*		Ab	XREF: b(1628).
1635.51 *9*		Ab d	XREF: b(1628).
1638.97 *16*		A d	
1644.49 *15*		AB D	
1655.0 *5*		A d	
1657.5 *3*		A d	
1661.57 *21*		A	
1666.15 *9*		A	
1671.64 *8*		A	
1676.69 *12*		A D	
1681.2 *5*		A	
1683.5 *4*		A	
1687.3 *5*		A D	
1692η *4*	(7−)§	B D	
1695.01 *7*		A D	
1704.31 *8*		A D	
1710.6 *3*		A	
1713.24 *23*		A	
1716.65 *20*		A D	
1723.8 *6*		A D	
1731.10 *11*		A D	
1742.26 *12*		AB D	XREF: B(1743).
1752.4 *3*		A D	
1756.8 *6*		A	
1759.6 *3*		A D	
1763.59 *9*		A D	
1769.46 *18*		A	
1776.76 *7*		A D	
1785.5 *3*		Ab D	
1788 *5*		b D	E(level): from (d,p).
1794.18 *15*		Ab	
1798.5 *4*		A	
1805.5 *3*		A	
1816.98 *9*		A	
1823.86 *10*		A	
1829.53 *24*		A	
1834η	(8−)§	B	
1835.60 *16*		A	
1838.6 *11*		A	
1842.99 *9*		A	
1851.1 *3*		A	
1854.98 *13*		A	
1859.34 *11*		A	

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Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ	XREF	Comments
1864.8 *6*		A	
1870.3 *4*		A	
1876.86 *9*		A	
1882.99 *18*		A	
1890.85 *11*		A	
1895.28 *11*		A	
1898.96 *15*		A	
1907.67 *11*		A	
1914.0 *4*		A	
1916.3 *6*		A	
1919.32 *15*		A	
1928.17 *10*		A	
1933.09 *16*		A	
1938.88 *10*		A	
1945.97 *16*		A	
1950.87 *12*		A	
1954.3 *7*		A	
1957.52 *21*		A	
1960.67 *14*		A	
1969.8 *3*		A	
1972.9 *8*		A	
1975.5 *4*		A	
1978.33 *18*		A	
1985.98 *14*		A	
1995.37 *16*		A	
1998[η] *6*	(9−)[§]	B	
1998.94 *20*		A	
2004.89 *10*		A	
2010.77 *13*		A	
2015.07 *21*		A	
2017.6 *4*		A	
2023.0 *3*		A	
2025.63 *19*		A	
2029.8 *3*		A	
2032.02 *23*		A	
2037.44 *17*		A	
2040.4 *3*		A	
2051.3 *4*		A	
2054.4 *3*		A	
2056.7 *5*		A	
2058.7 *3*		A	
2062.1 *5*		A	
2065.20 *15*		A	
2072.60 *20*		A	
2075.3 *5*		A	
2077.72 *25*		A	
2087.76 *18*		A	
2090.96 *20*		A	
2094.4 *4*		A	
2098.37 *15*		A	
2103.7 *4*		A	
2105.7 *6*		A	
2109.2 *6*		A	
2111.7 *4*		A	
2115.82 *23*		A	
2118.7 *5*		A	
2122.5 *3*		A	
2127.47 *18*		A	
2131.19 *16*		A	
2137.2 *4*		A	
2139.3 *5*		A	
2145.43 *17*		A	
2148.5 *3*		A	

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Adopted Levels, Gammas (continued)

^{166}Ho Levels (continued)

E(level)†	XREF	Comments
2151.68 *16*	A	
2157.34 *14*	Ab	XREF: b(2160).
2161.1 *3*	Ab	XREF: b(2160).
2163.80 *24*	Ab	XREF: b(2160).
2167.7 *4*	A	
2169.8 *4*	A	
2172.1 *5*	A	
2180.0 *3*	A	
2182.92 *22*	A	
2193.20 *15*	A	

† From (n,γ) E=thermal, except as noted; obtained from least–squares fit to Eγ, excluding data for multiply–placed transitions and for the 48.303γ and 232.286γ, both of which fit their placement particularly poorly. However, it should be noted that 28 of the remaining 570 Eγ data deviate by at least 3σ from the least–squares prediction and, of those, 12 deviate by at least 5σ.

‡ Spin from the angular distribution measurements of the primary γ transition (1979Bo08).

§ From comparison of σ(exp) and σ(calc) in (t,α).

\# (A): Kπ=0–, α=0 (π 7/2[523])–(ν 7/2[633]) band. A=9.0 B=-1.2×10^{-3}. Jπ established by (d,p) cross section fingerprint for J=1 through 5 members of this configuration.

@ (B): Kπ=0–, α=1 (π 7/2[523])–(ν 7/2[633]) band. A=8.9, B=-1.6×10^{-3}. See comment on signature partner of this band.

& (C): Kπ=7–, (π 7/2[523])+(ν 7/2[633]) band. Jπ established by (d,p) cross section fingerprint for J=7 through 9 members of this configuration.

a (D): Kπ=3+, (π 7/2[523])–(ν 1/2[521]) band. A=8.7, B=2.2×10^{-3}. Jπ established by (d,p) cross section fingerprint for J=3 through 7 members of this configuration.

b (E): Kπ=5+, (π 3/2[411]+ν 7/2[633])+(π 7/2[523]+ν 3/2[521]). A=14.45, B=-4.5×10^{-2}.

c (F): Kπ=6+, (π 7/2[523])+(ν 5/2[512]) band. A=9.1 if B=0.

d (G): Kπ=4+, (π 7/2[523])+(ν 1/2[521]) band. A=9.9 if B=0. Jπ established by (d,p) cross section fingerprint for J=4 through 6 members of this configuration.

e (H): Kπ=1–, (π 1/2[411])+(ν 1/2[521]) band.

f (I): Kπ=1+, (π 7/2[523])–(ν 5/2[523]) band. A=9.65, B=-3.7×10^{-3}. Jπ established by (d,p) cross section fingerprint for J=1 through 5 members of this configuration.

g (J): Kπ=2+, (π 3/2[411]–ν 7/2[633])+(π 7/2[523]–ν 3/2[521]). A=9.1, B=-26.6×10^{-3}. Jπ established by (d,^{3}He) cross section fingerprint for J=3 through 6 members of this configuration.

h (K): Kπ=2–, (π 7/2[523])–(ν 7/2[633])+Q_{22} band. A=8.9, B=-1.3×10^{-3}.

i (L): Kπ=1+, (π 7/2[523])–(ν 5/2[512]) band. A=9.4 if B=0. Jπ established by (d,p) cross section fingerprint for J=1 through 6 members of this configuration.

j (M): Kπ=3+, (π 1/2[411])–(ν 7/2[633]) band.

k (N): π=+ band 1 (1982De37). Configuration not known; the Kπ=3+ configuration assigned in (t,α) (1982De37) is now assigned to a different sequence of levels.

l (O): Kπ=4+, (π 1/2[411])+(ν 7/2[633]) band. Configuration from (t,α) data (1982De37).

m (P): π=+ band 2 (1982De37). Configuration not known; the Kπ=4+ configuration assigned in (t,α) (1982De37) is now assigned to a different sequence of levels.

n (Q): Kπ=4+, (π 7/2[523])+(ν 1/2[510]) band.

o (R): Kπ=3+, (π 7/2[523])–(ν 1/2[510]) band.

p (S): Kπ=1–, (π 3/2[411])–(ν 1/2[521]) band.

q (T): Kπ=2–, (π 3/2[411])+(ν 1/2[521]) band.

r (U): Kπ=5–, (π 7/2[523])+(ν 7/2[633])–Q_{22} band.

s (V): Kπ=0–, (π 1/2[411])–(ν 1/2[521]) band.

t (W): Kπ=3– band. Configuration (π 1/2[541])–(ν 7/2[633]) or (π 1/2[411])+(ν 5/2[512]).

u (X): Kπ=6+, (π 7/2[523])+(ν 5/2[523]) band.

v (Y): Kπ=2+, (π 7/2[523])–(ν 3/2[521]) band.

w (Z): Kπ=5+, (π 7/2[523])+(ν 3/2[521]) band.

x (a): Kπ=0+, α=0 (π 7/2[404])–(ν 7/2[633]) band. Configuration from (t,α) data (1982De37). Jπ established by (t,α) cross section fingerprint for J=0 through 3 members of this configuration.

y (b): Kπ=0+, α=1 (π 7/2[404])–(ν 7/2[633]) band. Configuration from (t,α) data (1982De37). See comment on signature partner band.

z (c): Kπ=7+, (π 7/2[404])+(ν 7/2[633]) band. Configuration from (t,α) data (1982De37).

α (d): Kπ=1+, (π 5/2[413])–(ν 7/2[633]) band. Configuration from (t,α) data (1982De37). Jπ established by (t,α) cross section fingerprint for J=1 through 5 members of this configuration.

β (e): Kπ=6+, (π 5/2[413])+(ν 7/2[633]) band. Configuration from (t,α) data (1982De37).

η (f): Kπ=6–, (π 5/2[532])+(ν 7/2[633]) band. Configuration and level energy from (t,α) (1982De37).

Adopted Levels, Gammas (continued)

$\gamma(^{166}\mathrm{Ho})$

E(level)	Eγ†	Iγ†‡	Mult.†	α	I(γ+ce)	Comments
54.2391	54.2392 7	100	E2#	31.3		B(E2)(W.u.)=198 7.
82.4707	28.242 9	4.1 2	M1#	16.9 9		B(M1)(W.u.)≥0.021. Other data: Eγ=28.227 5, Iγ=8.2 6 in IT decay.
	82.470 2	100 10	M1#	4.55		B(M1)(W.u.)≥0.020.
137.729	131.759 5	100				
171.0738	88.60@ 3	0.19	[E2]	4.466		
	116.835 1	100 10	M1	1.673		
180.467	(9.39)				1160 94	I(γ+ce): from intensity balance at 180 level in (n,γ) E=thermal.
	126.228 3	100 10	E2	1.200		
190.9021	10.43 2	0.19 3	[E1]	27.2		B(E1)(W.u.)=1.4×10^{-9} 2.
	19.840 6	4.0 3	E1	4.79		B(E1)(W.u.)=4.3×10^{-9} 5. Mult.: from IT decay (1965Bj03).
	136.662 2	100 10	E1	0.1378		α(K)=0.116; α(L)=0.0175; α(M)=0.00384; α(N+..)=0.00108. B(E1)(W.u.)=0.33×10^{-9} 3.
260.6625	69.7604 14	100 11	M1	7.37		B(M1)(W.u.)≥0.015.
	89.599 13	3.6 5	[E1]	0.424		
263.7876	(3.12)					Eγ: from level energy difference. Transition unobserved, but expected. I(γ+ce): =1580 270 from intensity balance at 263 level in (n,γ) E=thermal. However, this leads to B(M2)(W.u.)(258γ)>69 and B(E2)(W.u.)(72.9γ)>300, both of which exceed RUL (assuming α(72γ)=9.62, α(258γ)=0.844). I(γ+ce)(3.1)=17.5×10^{4} would be needed to reduce B(M2)(W.u.)(258γ) to 1.
	72.8859 15	77 15	E2	9.62		
	257.81 2	100 15	M2	0.844		
286.96	280.99 10	100				
295.085	289.120 15	100	E1	0.0196		B(E1)↓=0.83×10^{-5} 15.
329.774	149.307 3	100 10	(M1)	0.835		
	158.702 9	1.4 3				
348.257	(18.49)					
	87.5946 16	100 10	M1(+E2)	4.2 5		
	157.344 8	16.9 24				
371.985	108.199 2	73 8	M1(+E2)	2.09 4		
	111.324 2	54 5	M1(+E2)	1.91		
	181.086 5	100 11	(M1)	0.487		B(M1)↓≥0.57×10^{-2}.
373.092	201.95 3	2.9 6				
	290.61 3	100 10	M1	0.1337		B(M1)(W.u.)≥0.39×10^{-2}.
377.806	48.0315 7	53 9				
	197.339 8	100 15	(E2)	0.255		
379.547	84.468 10	29 7				
	115.759 3	76 11				
	373.47 7	100 16				
416.086	(43.00)					
	245.007 7	65 6	M1	0.212		B(M1)(W.u.)≥2.6×10^{-3}.
	333.63 2	100 15	M1	0.0925		B(M1)(W.u.)≥1.6×10^{-3}.
423.651	128.566 5	100 15				
	159.89 3	7.1 21				
	285.81& 8	<56&				
426.025	343.51 3	10.0 16	(E1)#	0.01281		Iγ: weighted average from β^{-} decay and (n,γ) E=thermal.
	371.75 3	83 7	E1#	0.01060		Iγ: weighted average from β^{-} decay and (n,γ) E=thermal.
	425.99 3	100 13	E1#	0.0070		Iγ: weighted average from β^{-} decay and (n,γ) E=thermal.
430.031	169.45 3	0.48				
	239.140 11	100 10	M1	0.226		B(M1)(W.u.)≥0.65×10^{-2}.

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Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ[†]	Iγ[†‡]	Mult.[†]	α	Comments
431.239	167.450 *5*	73 *8*	E1		
	425.30 *3*	100 *20*			
453.771	105.517 *4*	100 *10*	M1(+E2)	2.27 *5*	
	193.107 *6*	36 *4*			
464.501	38.493 *6*	25.0 *15*	M1(+E2)	90 *80*	
	48.303 *4*	2.2			
	91.407 *13*	6.6 *13*			
	273.64 *7*	11.8 *22*			
	293.42 *8*	5.2 *10*			
	410.27 *2*	100 *20*			
470.841	91.286 *13*	13 *3*			
	98.8572 *15*	100 *11*	M1,E2	2.82 *13*	
	122.577 *4*	16 *3*			
	175.73 *4*	5.4 *16*			
	207.04 *2*	7.1 *11*			
	279.79 *10*	5.4 *16*			
475.680	(59.60)				
	102.55 *4*	0.6	[E2]	2.57	B(E2)(W.u.)≥24.
	304.60 *2*	100 *10*	M1	0.1179	B(M1)(W.u.)≥0.35×10^{-2}.
	420.7 *6*	6.2 *19*			
481.846	51.8155 *7*	5.9 *8*	[M1]	2.83	B(M1)(W.u.)≥0.030.
	109.887 *18*	0.51 *13*	[M1]	1.99	B(M1)(W.u.)≥0.27×10^{-3}.
	221.174 *9*	100 *10*	(M1)	0.280	B(M1)(W.u.)≥0.66×10^{-2}.
	291.04 *8*	3.1			
514.362	134.815 *6*	86 *21*			
	250.49 *9*	100 *20*			
521.982	57.517 *8*	100 *19*			
	95.953 *2*	38 *4*			
	261.31 *7*	13 *4*			
	341.57 *3*	20 *4*			
529.816	98.572 *16*	8.0 *16*			
	150.268 *8*	22 *3*			
	234.79 *5*	10			
	266.53[&] *5*	<58[&]			
	524.2 *3*	100 *20*			
543.672	113.644 *4*	4.7 *7*			Other I(114γ):I(489γ)=10.7 *12*:100 *5* from 2007ChZX in (n,γ) E=thermal.
	170.584 *15*	1.6 *3*			
	363.1 *3*	1.6			Other I(363γ):I(489γ)=2.5 *8*:100 *5* from 2007ChZX in (n,γ) E=thermal.
	489.39 *5*	100 *9*	E2+M1	0.025 *9*	
	543.66 *20*	75 *19*	E2	0.01275	Other I(544γ):I(489γ)=87 *4*:100 *5* from 2007ChZX in (n,γ) E=thermal. Iγ=1667 *500* in (n,γ) E=thermal: γγ coin is grossly discrepant.
547.934	66.103 *7*	25 *5*			
	175.98 *2*	8.8 *18*			
	199.710 *8*	100 *10*	(M1)	0.371	
	287.24 *3*	21 *3*			Other I(287γ):I(200γ)=11.7 *17*:100 *6* from 2007ChZX in (n,γ) E=thermal.
	357.04 *4*	36 *8*			
	376.91[&] *14*	<18[&]			
557.65	179.882[a] *4*	100[a] *33*	(M1,E2)	0.42 *8*	
	227.88 *7*	13.3			
558.571	76.7255 *14*	49 *8*			
	83.049[&] *14*	<17[&]			
	186.582 *6*	72 *8*	E2+M1	0.38 *7*	
	210.300 *6*	77 *13*	M1(+E2)	0.26 *6*	
	263.36 *5*	31 *5*			
	297.90 *3*	100 *20*	M1(+E2)	0.10 *3*	
	367.54 *16*	18			
562.890	87.193 *15*	3.5 *11*			
	146.808 *8*	8.4 *12*			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ[†]	Iγ[†‡]	Mult.[†]	α	Comments
562.890	233.112 *14*	56 *5*	M1	0.243	Other I(233γ):I(392γ)=75 *8*:100 *10* from 2007ChZX in (n,γ) E=thermal.
	382.8 *2*	4.4			
	391.89 *4*	100 *10*	M1	0.0605	
	508.4 *8*	25 *7*			Other Iγ: 75 *20* from (n,γ) E=thermal: γγ coin.
567.624	103.116 *15*	40 *6*			
	137.51[@] *2*	15 *5*			
	141.599 *7*	100 *10*			
	151.533 *9*	62 *9*			Other I(152γ):I(141γ)=36 *10*:100 *21* from 2007ChZX in (n,γ) E=thermal.
	194.529 *10*	100 *15*			
577.208	123.437 *5*	<96			
	229.00[&] *7*	<55[&]			
	313.48[&] *6*	100[&] *33*			
588.083	117.264[&] *3*	100[&] *10*			
	134.34 *3*	10 *3*			
	216.16 *5*	10 *3*			
592.501	162.452 *10*	3.1 *6*			
	331.88 *3*	12.9 *19*			
	401.56 *6*	100 *14*	(M1,E2)	0.043 *15*	
	412.1[&] *2*	<35[&]			
595.726	120.06 *2*	2.5 *8*			
	179.882[a] *4*	13[a] *4*			
	512.7[a] *3*	100[a] *20*			
	593.8 *7*	10			
597.015	53.3434 *7*	2.6 *4*			
	115.167 *4*	2.6 *4*			
	121.48 *3*	0.29			
	132.472 *17*	0.86			
	166.983 *5*	4.9 *5*			
	181.086 *5*	2.9 *9*			
	224.01 *15*	0.29			
	267.19 *5*	8.0 *17*			
	416.47 *5*	23 *5*			
	425.99 *3*	6.9 *20*			
	542.86 *20*	100 *26*	E2+M1	0.019 *7*	
598.448	76.4663 *14*	85 *8*			
	134.00 *3*	2.5			
	268.15 *9*	18 *5*			
	408.8[§] *6*	60[§] *31*			Iγ: from I(409γ):I(427 from 598 level)=0.5 *1*:0.83 *20* in (n,γ) E=thermal: γγ coin and I(427γ) here.
	418.08 *18*	50 *15*			
	427.0 *2*	100			
605.047	83.049[&] *14*	<26[&]			
	129.353 *7*	32 *6*			
	140.544 *10*	36 *4*			
	179.032 *6*	100 *16*	(M1,E2)	0.43 *8*	
	188.98 *3*	28 *6*			
	231.957 *14*	96 *20*			
	433.92 *18*	68			Other I(434γ):I(232γ)=38 *5*:100 *22* from 2007ChZX in (n,γ) E=thermal.
628.418	84.742 *14*	6.7 *20*			
	152.71 *3*	4.2 *8*			
	198.31[&] *5*	<5[&]			
	212.30[&] *6*	<8.0[&]			
	255.37 *3*	15 *3*			
	437.3 *3*	10			
	457.37 *7*	100 *20*			
634.314	46.232 *4*	60 *10*			
	75.753 *16*	35 *10*			
	86.359 *11*	50 *13*			
	152.45 *3*	8.0 *25*			
	180.545 *5*	100 *15*	(M1,E2)	0.42 *8*	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ†‡	Mult.†	α	Comments
638.235	94.643 *11*	67 *10*			
	116.197 *13*	20 *5*			
	173.47 *12*	6.7			
	208.34 *4*	22 *3*			
	265.12 *5*	60 *13*			
	467.3 *3*	100 *30*			
644.29	114.50& *3*	<5&			
	213.04 *6*	5			
	506.8 *3*	100			
651.5	304.1§ *7*	100§ *38*			
	596.6§ *6*	50§ *13*			
654.818	96.265 *20*	3.3 *10*			
	183.96 *4*	8.3 *25*			
	201.08 *3*	6.7 *13*			
	282.80 *8*	10 *3*			
	306.49 *3*	40 *8*			
	359.7 *2*	13 *4*			
	394.5@ *2*	17			
	463.9 *3*	100 *20*			
657.995	182.302 *16*	13.7 *21*	[E2]	0.3329	
	328.245 *15*	100 *10*			
	477.4 *3*	27			Other Iγ: I(477γ):I(328γ)=23 *8*:100 *23* in (n,γ) E=thermal: γγ coin.
659.01	285.81& *8*	100&			
662.169	94.529 *11*	15 *4*			
	118.49 *2*	11			
	197.677 *10*	74 *11*			
	232.286 *9*	100 *19*			
	236.31& *8*	<14&			
	246.07 *2*	74 *15*			
	472.2 *5*	52			
	607.7 *7*	41			
668.005	70.988 *10*	14 *3*			
	120.36 *3*	0.8			
	124.350 *15*	3.1 *6*			
	186.147 *6*	9.2 *14*			
	192.33 *2*	5.4 *11*			
	197.11 *5*	2.3			
	295.99 *8*	3.1 *9*			
	338.20 *4*	11.5 *18*			
	487.58 *6*	100 *15*	M1	0.0343	
	496.9 *2*	23			
	613.8 *4*	54 *16*			Other Iγ: 167 *33* in (n,γ) E=thermal: γγ coin suggest that γ is contaminated in that reaction.
671.749	(16.97)				
	113.17 *2*	2.7			
	123.81 *2*	1.3			
	189.89 *5*	1.3			
	218.00 *6*	5.3			
	241.76 *5*	6.7 *13*			
	299.88 *17*	4			
	323.42 *7*	16 *3*			
	411.09 *3*	100 *31*			
683.805	86.765 *11*	29 *7*			
	135.883 *4*	29 *4*			
	140.117 *5*	100 *11*	M1(+E2)	0.91 *9*	
	201.95 *3*	14 *3*			
	219.44 *6*	23 *6*			
	253.78 *3*	34 *7*			
	267.82 *9*	31 *6*			
	423.39& *18*	<46&			
693.388	96.381 *20*	100 *30*			
	211.53 *6*	50			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ†‡	Mult.†	Comments
693.638	95.190 3	100 16		
	171.67 3	12.0 24		
	512.7[a] 3	12[a]		
701.5	369.6[§] 10	100[§]		
704.962	99.584[&] 16	<4.1[&]		
	107.71 3	5.0 13		
	109.241 12	5.0 10		
	161.42 2	5.0 10		
	229.00[&] 7	<10.8[&]		
	274.77 7	22 4		
	288.60 7	20		
	533.5 3	100 30		
715.4	715.4[§] 8	100[§]		
719.370	57.19 1	9.4		
	248.77 9	3.5 7		
	347.24 8	11.8 24		
	455.60 6	100 15	M1(+E2)	
721.98	426.89 15	100		
723.239	135.15 2	100 30		
	208.90 4	75 15		
725.68	97.253[&] 20	<3.3[&]		
	182.04 4	4		
	309.59 6	22 4		
	352.28 12	29 6		
	554.3[a] 4	100[a] 31		
	643.1 8	89 27		
732.513	98.200 15	50 13		
	155.42[&] 3	<50[&]		
	278.69 10	100 30		
736.430	74.261 9	41 14		
	131.41 3	4.6		
	137.99 4	3.2		
	214.442 9	100 14	M1(+E2)	
	260.75 5	73 11		
	406.83 16	59 12		
	475.8[&] 3	<68[&]		
	564.8 3	91		
742.02	113.644 4	17.6 24		
	145.00 3	2.4		
	198.31[&] 5	3.5[&]		
	266.53[&] 5	<34[&]		
	412.1[&] 2	<85[&]		
	481.31 8	100 20		
757.707	99.584[&] 16	<50[&]		
	160.63 2	80 16		
	209.69 4	40 12		
	380.1 2	100 30		
	386.6 3	96 16		
	577.0[&] 3	<1680[&]		
760.345	92.355 13	9.8 20		
	163.352 7	100 10		
	216.85 6	7.8		
	430.31 18	25		
	499.5 4	<20		Line is complex in (n,γ) E=thermal (1967Mo05).
	570.0 3	39		
	579.9 7	98 59		
769.78	247.68 9	4.3 13		
	316.10 9	12.9		
	390.0 2	26 6		
	509.0 2	100		
771.94	117.264[&] 3	<88[&]		
	423.39[&] 18	<64[&]		
	442.17 8	100 28		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ[†]	Iγ[†‡]	Mult.[†]	Comments
774.522	90.720 *5*	36		
	115.51 *3*	9		
	358.4 *3*	45		
	401.31 *10*	100 *27*		
788.618	130.641 *16*	11		
	225.722 *9*	78 *11*		
	458.74 *22*	100 *33*		
792.789	154.71 *3*	8.3 *17*		
	195.687 *14*	27 *4*		
	230.11 *5*	10.0 *20*		
	317.28 *3*	73 *10*		
	376.91[&] *14*	<48[&]		
	612.0 *5*	100		
806.56	324.74 *7*	18 *3*		
	335.61 *8*	100 *19*		Iγ: branching may be overestimated; independent (n,γ) E=thermal studies report Iγ data that differ by an order of magnitude.
	433.9 *9*	2.4 *8*		
	546.0 *5*	3.2 *10*		
807.011	113.373 *3*	100		
815.139	222.634 *7*	37 *4*		
	256.60 *2*	43 *7*	M1(+E2)	
	267.19 *5*	47 *10*		
	350.61 *12*	11.7 *23*		
	385.0 *2*	6.7		
	388.8 *3*	13 *5*		
	442.9 *3*	67 *20*		Iγ: 62 *8* from (n,γ) E=thermal: γγ coin.
	485.2[@] *10*	13 *5*		Eγ,Iγ: from (n,γ) E=thermal: γγ coin. Placement is considered doubtful because it implies M2 multipolarity which seems unlikely.
	554.3[a] *3*	25[a] *8*		Iγ: 28 *5* from (n,γ) E=thermal: γγ coin.
	624.0 *4*	100 *30*		Iγ: 100 *8* from (n,γ) E=thermal: γγ coin.
824.62	266.03 *5*	35 *8*		
	563.3[§] *5*	36[§] *7*		
	633.5 *4*	100 *30*		
832.197	95.767 *3*	75 *8*		
	170.09[&] *3*	<8[&]		
	233.79 *5*	100 *20*		
	284.26 *12*	67 *20*		
	652.2 *7*			Eγ: from (n,γ) E=thermal: γγ coin.
837.717	169.712 *5*	100 *8*		
	577.0[&] *3*	<333[&]		
848.46	553.37 *21*	100		
868.24	305.36 *15*	70 *20*		
	392.2 *5*	55 *15*		
	538.6 *4*	100 *30*		
870.13	235.80 *5*	100		
	816.1[§@] *4*	[§]		Placement tentatively suggested by evaluator; Eγ is not consistent with placement from 876 level, but (n,γ) E=thermal: γγ coin establishes that it deexcites a level in the vicinity of 873.6.
876.37	450.3 *3*			Reported only in (n,γ) E=thermal; not accompanied in that reaction by any of the transitions deexciting this level in (n,γ) E=thermal: γγ coin.
	546.6[§] *5*	100[§] *20*		
	614.6[§] *9*	20[§] *7*		
	692.4[§] *7*	20[§] *7*		
	790.0[§] *10*	33[§] *13*		
881.040	155.42[&] *3*	<12[&]		
	242.90 *2*	65 *12*		
	404.7 *6*	19 *8*		
	620.5[§@] *7*	20[§] *7*		Reported in (n,γ) E=thermal: γγ coin only; may deexcite a different level in the vicinity of the 882 level.
	690.2[§@] *4*	23[§] *7*		Reported in (n,γ) E=thermal: γγ coin only; may deexcite a different level in the vicinity of the 882 level.
	709.6 *6*	54 *15*		

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Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ†‡	Comments
881.040	798.6 *4*	100 *31*	
	827.1 *3*	73 *23*	
883.94	114.50& *3*	<50&	
	164.57 *4*	100 *30*	
	212.30& *6*	<240&	
885.371	191.961 *11*	100 *15*	
	217.23 *6*	31	
891.134	75.985 *8*	100	
	236.31& *8*	<56&	
	519.0§ *7*	§	Iγ: see comment on 626.6γ.
	626.6§ *7*	§	Iγ: I(627γ):I(519γ)=0.4 *1*:1.2 *4* in (n,γ) E=thermal: γγ coin.
905.544	145.228 *7*	54 *4*	
	312.90 *8*	46 *15*	
	475.8& *3*	<58&	
	714.7 *2*	100 *31*	
	733.94 *21*	9.2 *27*	
910.49	191.12@ *3*	100	
925.21	206.15& *2*	<10&	
	661.0 *6*	100 *30*	
935.12	97.253& *20*	<75&	
	174.77 *4*	100	
942.524	110.327 *12*	100 *20*	
	206.15& *2*	<145&	
945.86	187.93 *5*	100	
947.1	774.9§ *3*	54§ *8*	
	892.4§ *5*	100§ *23*	
953.4	624.6§ *10*	100§ *40*	
	898.1§ *10*	80§ *40*	
961.08	534.9 *4*	100	Not observed in (n,γ) E=thermal: γγ coin. Placement from 961 level established by γγ coin; however, γ could have an additional placement.
	542.8 *8*	2.0 *7*	
	700.8 *3*	20 *7*	
	875.9§@ *9*	8§ *3*	Iγ: from Iγ(701γ) here and I(701γ):I(876γ)=100 *15*:38 *15* in (n,γ) E=thermal: γγ coin. However, placement requires M2 multipolarity for this γ so it is shown as uncertain.
976.1	889.2§ *10*	100§ *40*	
	921.1§ *9*	60§ *20*	
985.20	170.09& *3*	<100&	
	215.44 *9*	100	
	313.48& *6*	<1600&	
996.8	543.5 *10*	100 *42*	
	624.2 *5*	50 *17*	
	736.1 *10*	17 *8*	
1004.84	634.3§ *8*	12§ *4*	
	824.3§ *4*	40§ *8*	
	950.0§ *4*	100§ *20*	
1010.68	679.9 *8*	100 *29*	
	838.1 *6*	71 *14*	
1016.23	596.1§@ *7*	100§ *42*	Eγ: somewhat low for this placement, so placement is shown as uncertain.
	825.1§ *11*	50§ *17*	
	961.2§ *5*	17§ *8*	
1023.3	831.3§ *12*	67§ *33*	
	842.8§ *7*	100§ *33*	
1028.7	552.6§ *9*	100§	
1029.0	599.5§ *4*	100§ *19*	
	765.3§ *11*	15§ *8*	
1030.38	600.8 *7*	18 *5*	
	681.1§@ *6*	50§ *14*	Iγ: from I(840γ):I(948γ)=2.2 *9*:1.1 *3* in (n,γ) E=thermal: γγ coin. Branch should have been seen in other studies, but was not.
	701.1 *5*	12 *4*	
	770.5 *4*	46 *15*	
	839.9 *7*	100 *31*	
	849.5 *7*	12 *4*	

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Adopted Levels, Gammas (continued)

$\gamma(^{166}Ho)$ (continued)

E(level)	Eγ[†]	Iγ[†‡]	Comments
1030.38	858.0 *5*	31 *8*	
1035.8	664.3[§] *8*	11[§] *3*	
	952.4[§] *9*	54[§] *23*	
	981.6[§] *9*	11[§] *6*	
	1036.2[§] *8*	100[§] *9*	
1054.87	999.6[§] *11*	100[§]	
1060.5	689.1[§] *1*	100[§] *8*	
	798.1[§] *9*	3.8[§] *19*	
1062.7	368.45[&] *16*		
	586.1[§] *2*	55[§] *7*	
	646.1[§] *2*	100[§] *12*	
	716.0[§] *7*	14[§] *4*	
	734.0[§] *7*	8[§] *3*	
	871.8[§] *9*	2.7[§] *14*	
	881.1[§] *9*	6.8[§] *27*	
	979.3[§] *7*	12[§] *4*	
	1008.5[§] *4*	15[§] *3*	
1086.4	368.45[&] *16*		
	715.6[§] *3*	100[§] *20*	
	826.8[§] *9*	30[§] *10*	
	894.0[§] *9*	20[§] *10*	
	906.9[§] *7*	40[§] *10*	
	916.1[§] *7*	40[§] *10*	
	1034.3[§] *7*	50[§] *20*	
1097.45	623.6[§@] *8*	83[§] *33*	
	753.1[§] *10*	100[§] *50*	
	836.8[§] *8*	50[§] *17*	
1114.67	567.5[§] *5*	11[§] *3*	
	661.3[§] *2*	100[§] *10*	
	743.1[§] *10*	1.4[§] *7*	
	765.9[§] *3*	22[§] *3*	
	853.7[§] *3*	17.2[§] *21*	
	943.2[§] *9*	2.8[§] *7*	
1118.7	595.9[§@] *14*	100[§]	Evaluator tentatively places γ from this level rather than the 1114.7 level because it fits this placement better.
1121.41	704.4[§] *9*	100[§] *38*	
	791.9[§] *11*	63[§] *25*	
	940.0[§] *6*	100[§] *25*	
	949.2[§] *6*	75[§] *25*	
1134.97	761.5[§] *6*	50[§] *13*	
	873.9[§] *6*	100[§] *25*	
	942.2[§] *7*	38[§] *13*	
	951.4[§] *12*	50[§] *13*	Eγ also consistent with placement from the 1131.0 level.
1137.79	957.4[§] *3*	100[§]	
1141.3	950.3[§] *6*	100[§]	
1154.84	683.4[§] *4*	100[§] *17*	Eγ fits placement poorly; may deexcite the 1159 level instead.
	701.7[§] *9*	67[§] *28*	
	787.1[§] *4*	78[§] *17*	Eγ fits placement poorly; may deexcite the 1159 level instead.
	806.5[§] *7*	44[§] *17*	
	825.5[§] *11*	28[§] *11*	
	892.1[§] *8*	22[§] *11*	
	983.3[§] *6*	33[§] *11*	
	1099.0[§] *5*	44[§] *11*	
1161.35	612.7[§] *6*	83[§] *22*	
	732.1[§] *5*	100[§] *22*	
	813.3[§] *6*	56[§] *17*	
	831.3[§] *7*	61[§] *17*	
	898.8[§] *5*	56[§] *11*	
	981.0[§] *7*	28[§] *6*	
	989.6[§] *3*	83[§] *17*	
1168.4	713.6[§] *6*	100[§] *25*	
	976.9[§] *7*	17[§] *4*	
1190.13	712.6[§] *7*	63[§] *25*	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ[†]	Iγ[†‡]
1190.13	928.7[§] *5*	100[§] *25*

[†] From (n,γ) E=thermal, unless otherwise noted.
[‡] Relative photon intensity normalized to 100 for strongest photon branch deexciting each level.
[§] From ^{165}Ho(n,γ) E=thermal: γγ coin.
[#] From ^{166}Dy β^- decay.
[@] Placement of transition in the level scheme is uncertain.
[&] Multiply placed; undivided intensity given.
[a] Multiply placed; intensity suitably divided.

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

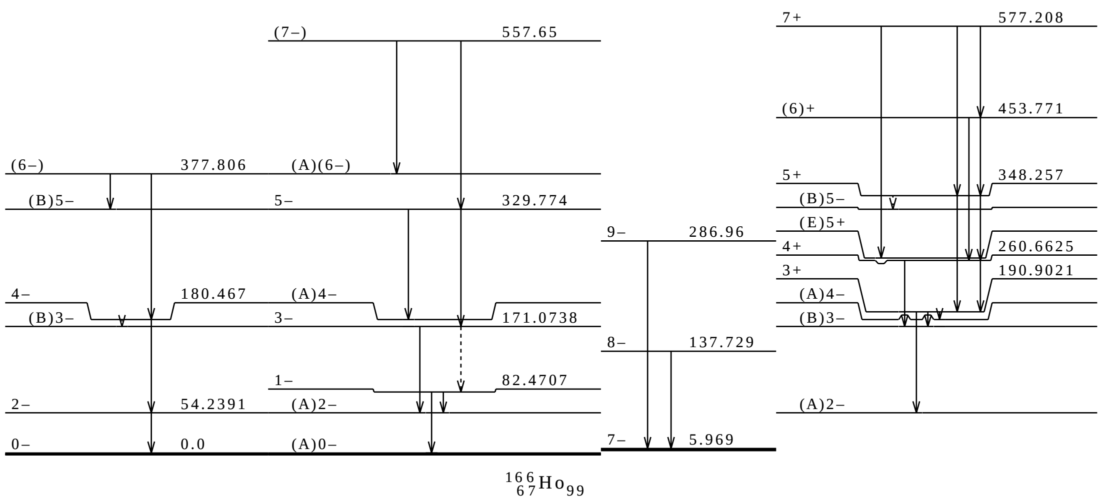
Adopted Levels, Gammas (continued)

(A) Kπ=0–, α=0 (π 7/2[523]) –(ν 7/2[633]) band.

(B) Kπ=0–, α=1 (π 7/2[523]) –(ν 7/2[633]) band.

(C) Kπ=7–, (π 7/2[523]) +(ν 7/2[633]) band.

(D) Kπ=3+, (π 7/2[523]) –(ν 1/2[521]) band.



CITATION:
Nuclear Data Sheets (1992)

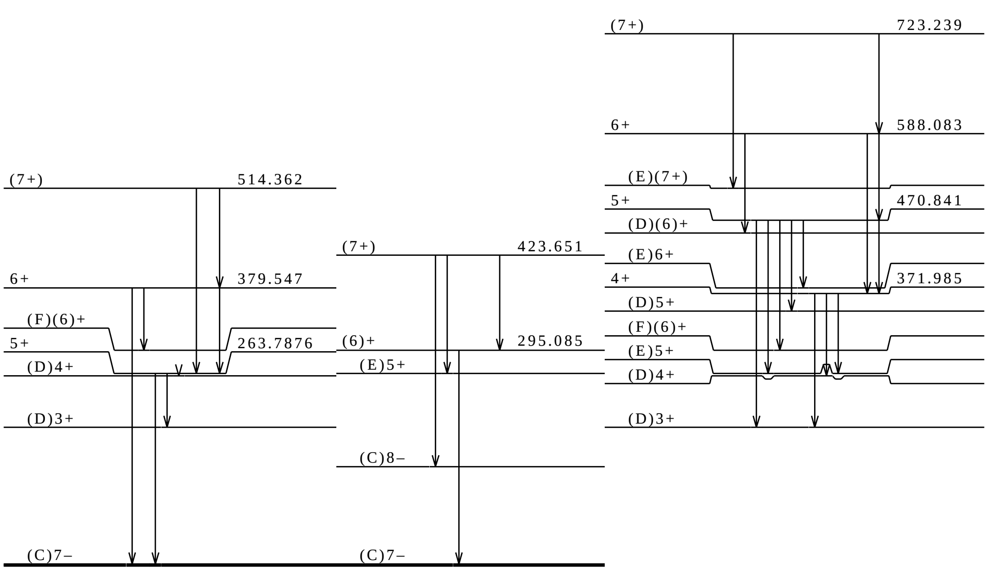
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(E) Kπ=5+, (π 3/2[411]+ν 7/2[633]) +(π 7/2[523]+ν 3/2[521]).

(F) Kπ=6+, (π 7/2[523]) +(ν 5/2[512]) band.

(G) Kπ=4+, (π 7/2[523]) +(ν 1/2[521]) band.

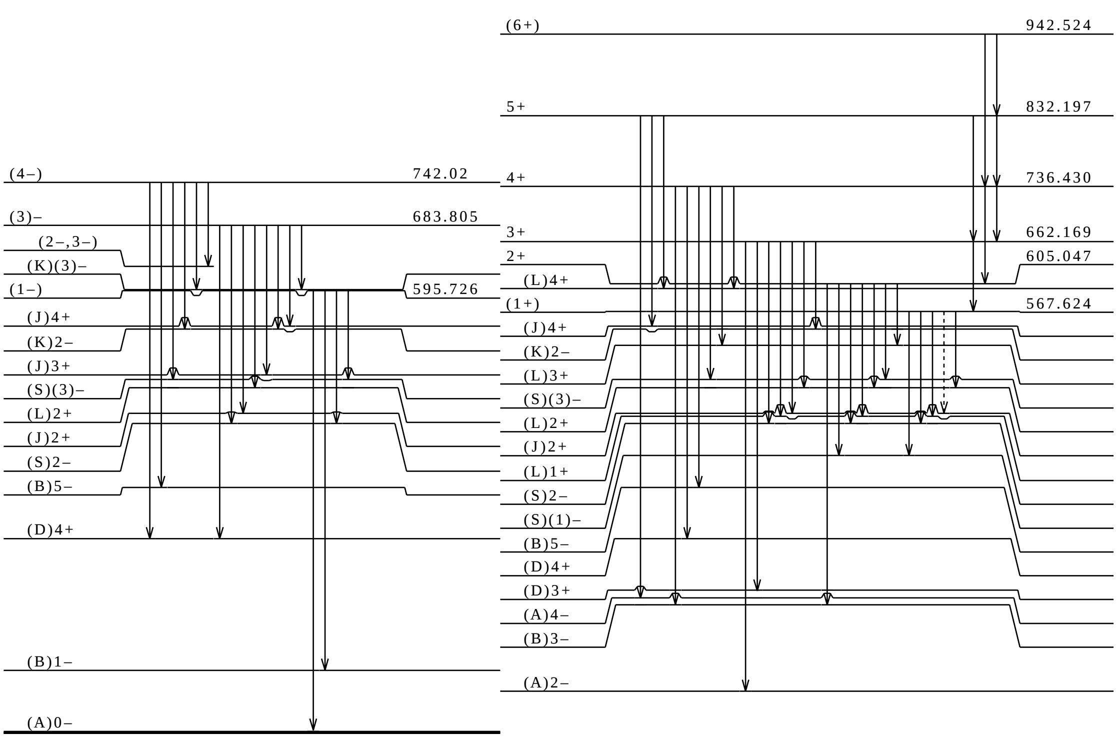


$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)

(H) Kπ=1–, (π 1/2[411])+(ν 1/2[521]) band.

(I) Kπ=1+, (π 7/2[523])–(ν 5/2[523]) band.

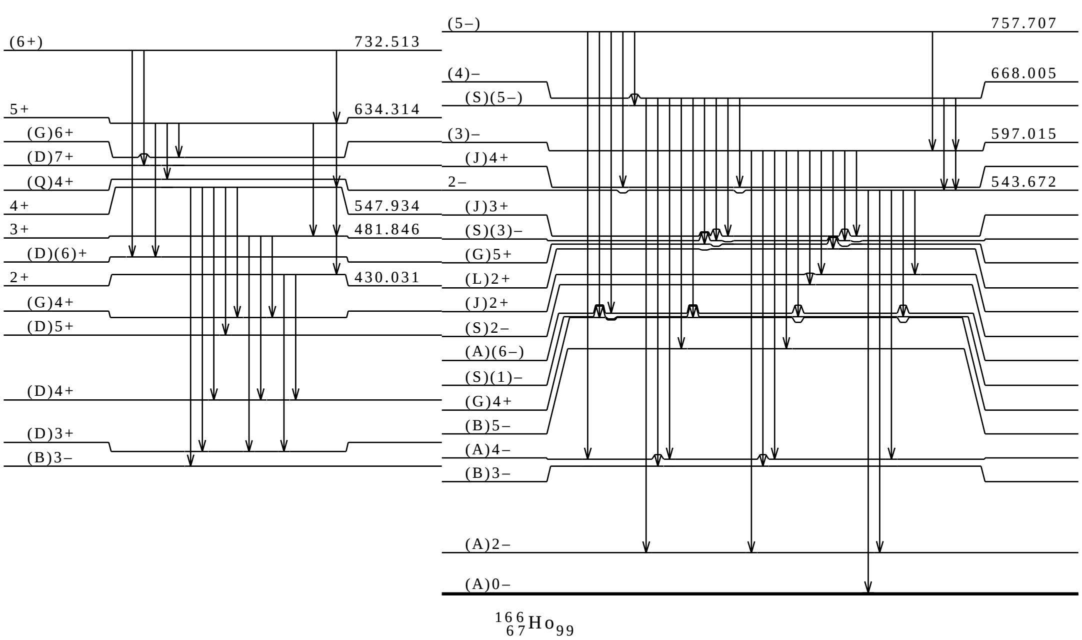


$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)

(J) Kπ=2+, (π 3/2[411]–ν 7/2[633]) +(π 7/2[523]–ν 3/2[521]).

(K) Kπ=2–, (π 7/2[523])–(ν 7/2[633])+Q_{22} band.



CITATION:
Nuclear Data Sheets (1992)

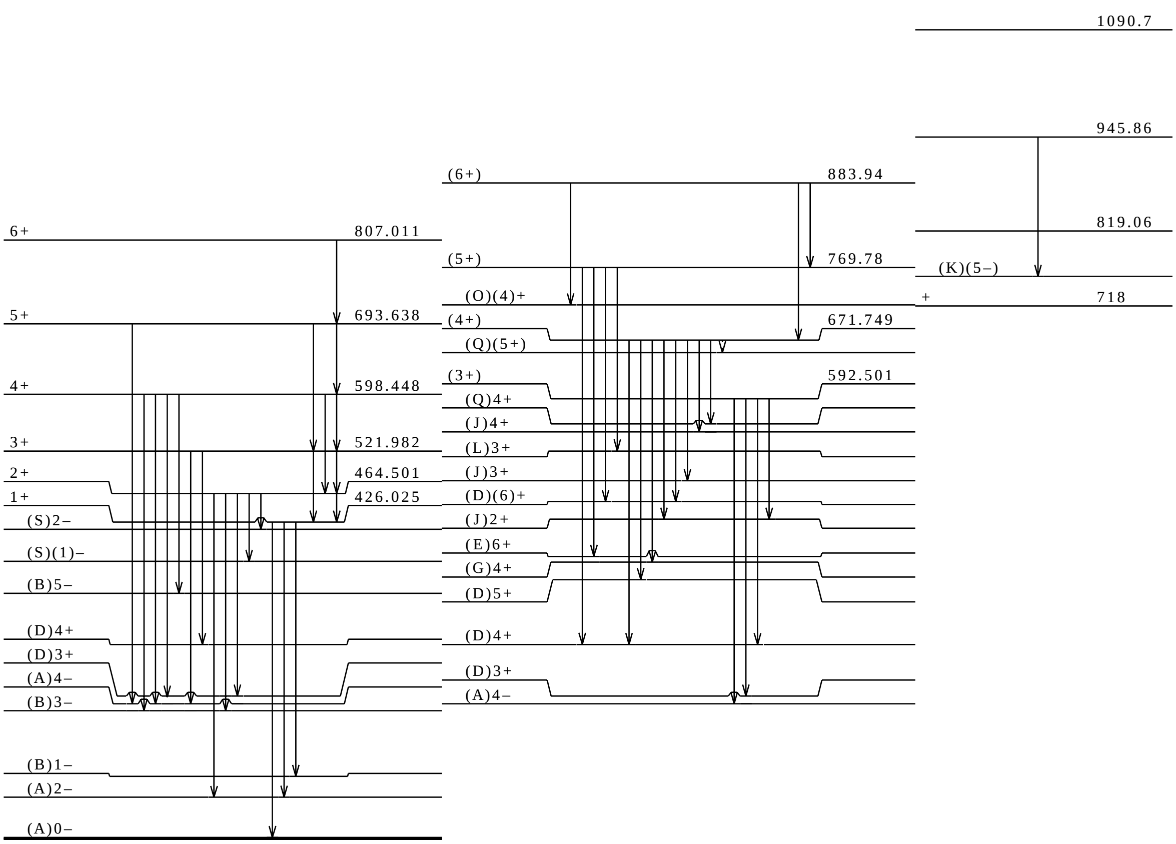
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(L) Kπ=1+, (π 7/2[523])–(ν 5/2[512]) band.

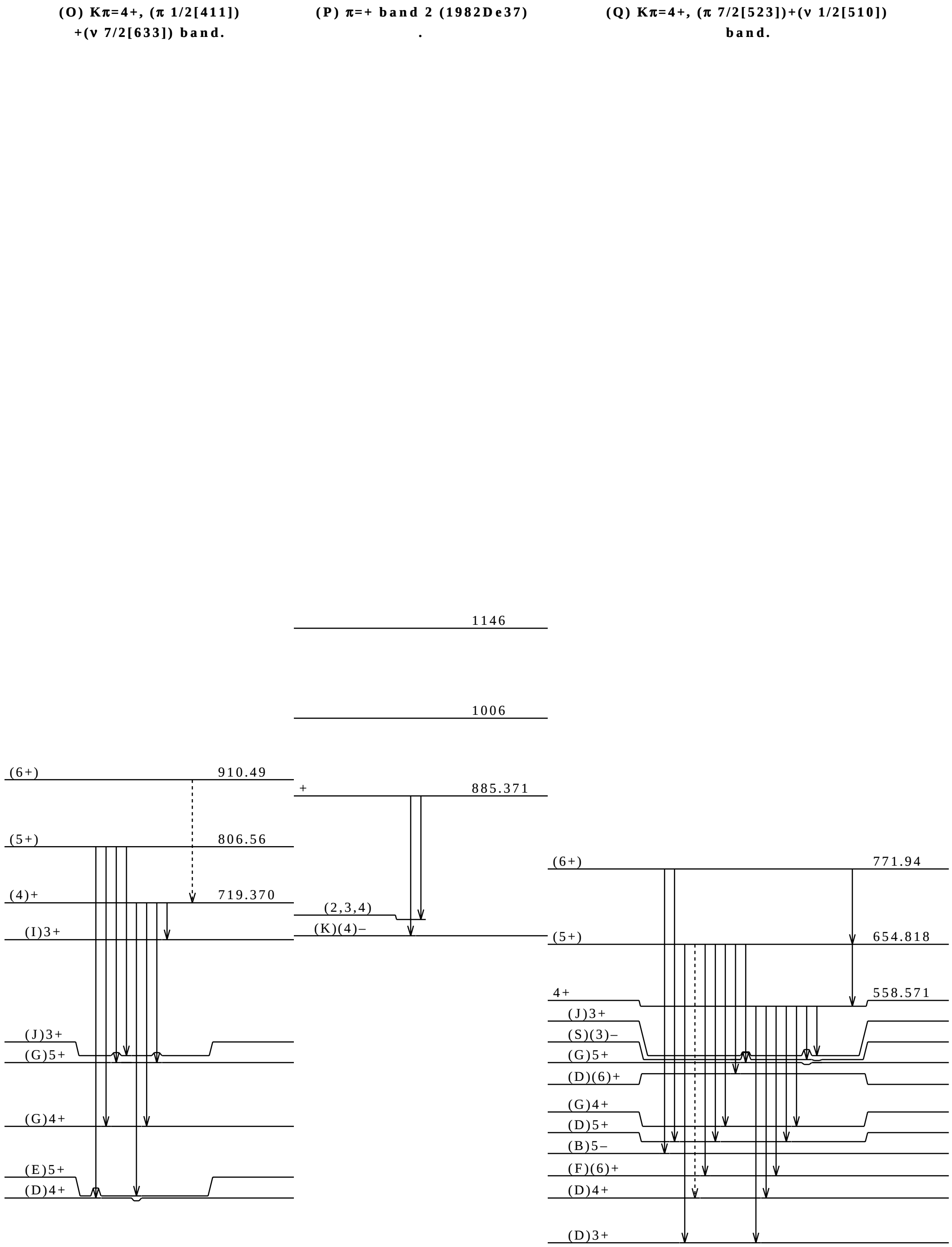
(M) Kπ=3+, (π 1/2[411])–(ν 7/2[633]) band.

(N) π=+ band 1 (1982De37).



$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)



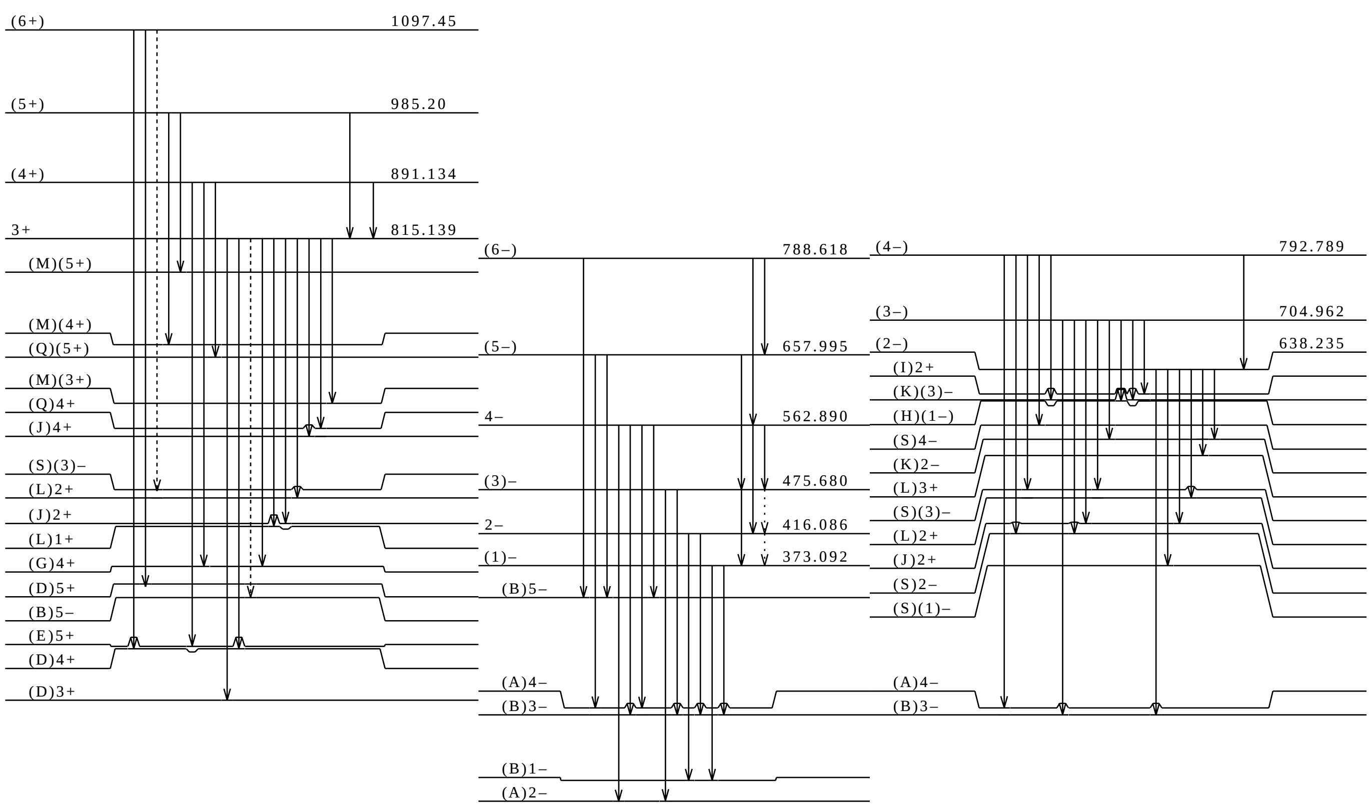
$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)

(R) Kπ=3+, (π 7/2[523])–(ν 1/2[510]) band.

(S) Kπ=1–, (π 3/2[411]) –(ν 1/2[521]) band.

(T) Kπ=2–, (π 3/2[411])+(ν 1/2[521]) band.



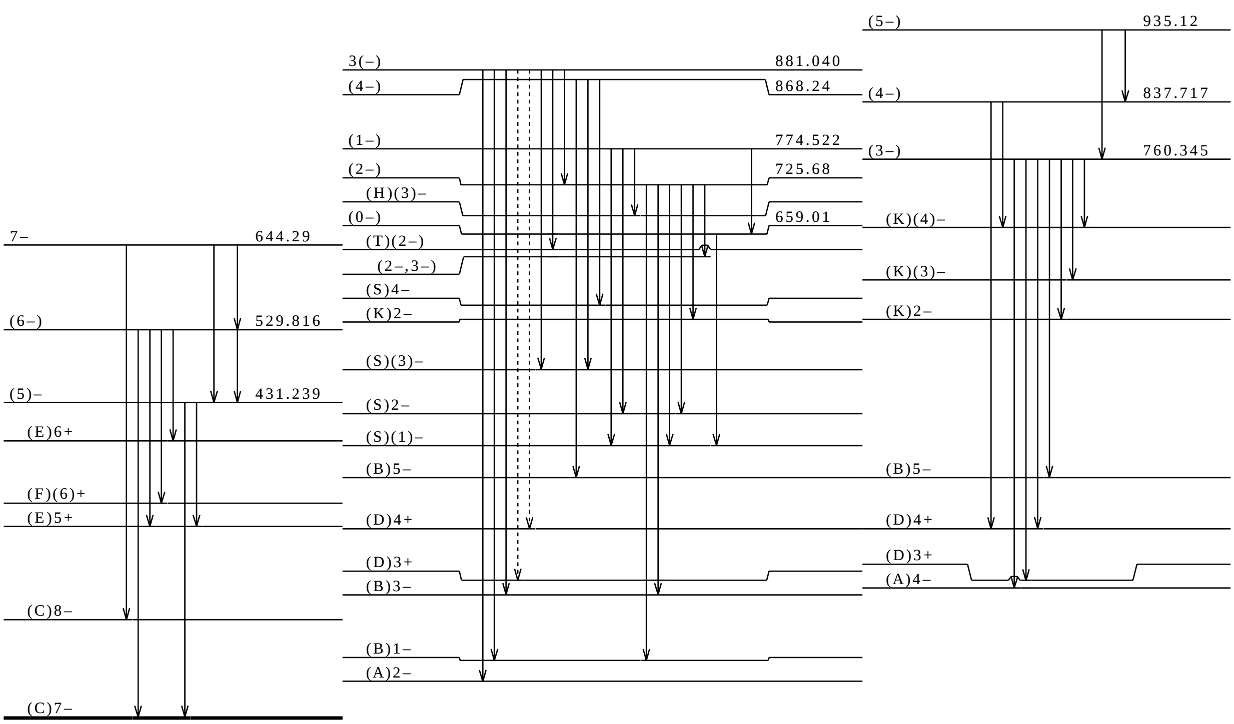
$^{166}_{67}Ho_{99}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(U) Kπ=5−, (π 7/2[523]) +(ν 7/2[633])−Q_{22} band. **(V) Kπ=0−, (π 1/2[411])−(ν 1/2[521]) band.** **(W) Kπ=3− band.**



$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)

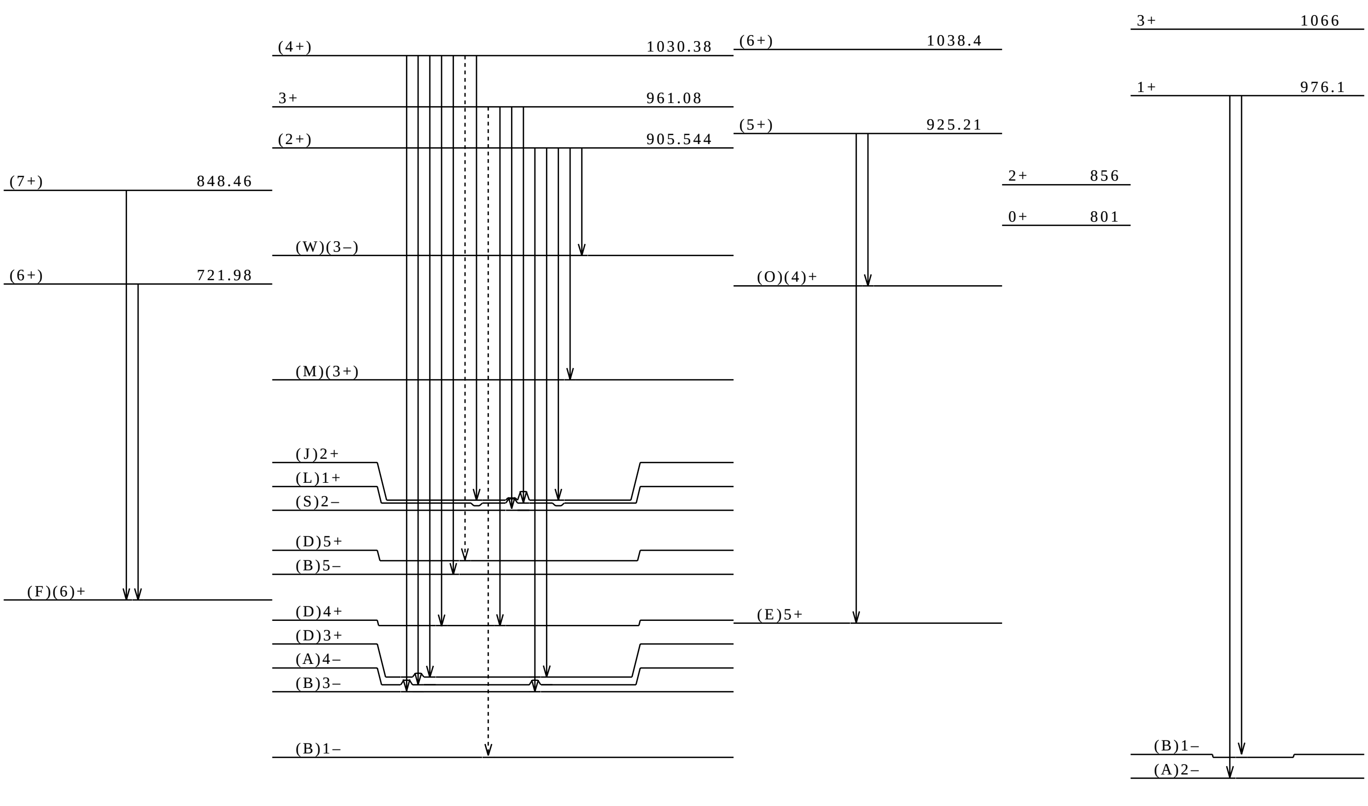
(X) Kπ=6+, (π 7/2[523]) +(ν 5/2[523]) band.

(Y) Kπ=2+, (π 7/2[523])–(ν 3/2[521]) band.

(Z) Kπ=5+, (π 7/2[523]) +(ν 3/2[521]) band.

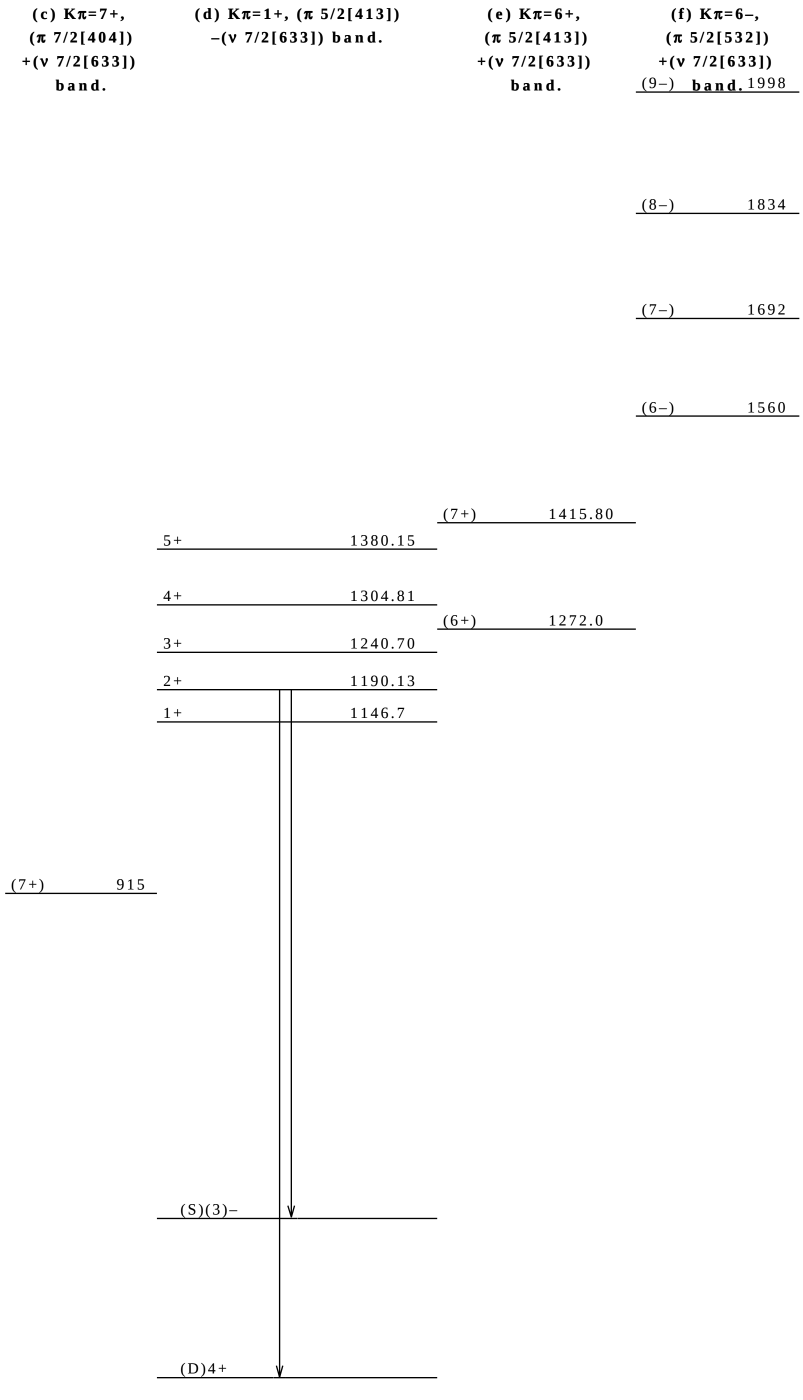
(a) Kπ=0+, α=0 (π 7/2[404])–(? n 7/2[633]) band.

(b) Kπ=0+, α=1 (π 7/2[404]) –(ν 7/2[633]) band.



$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)



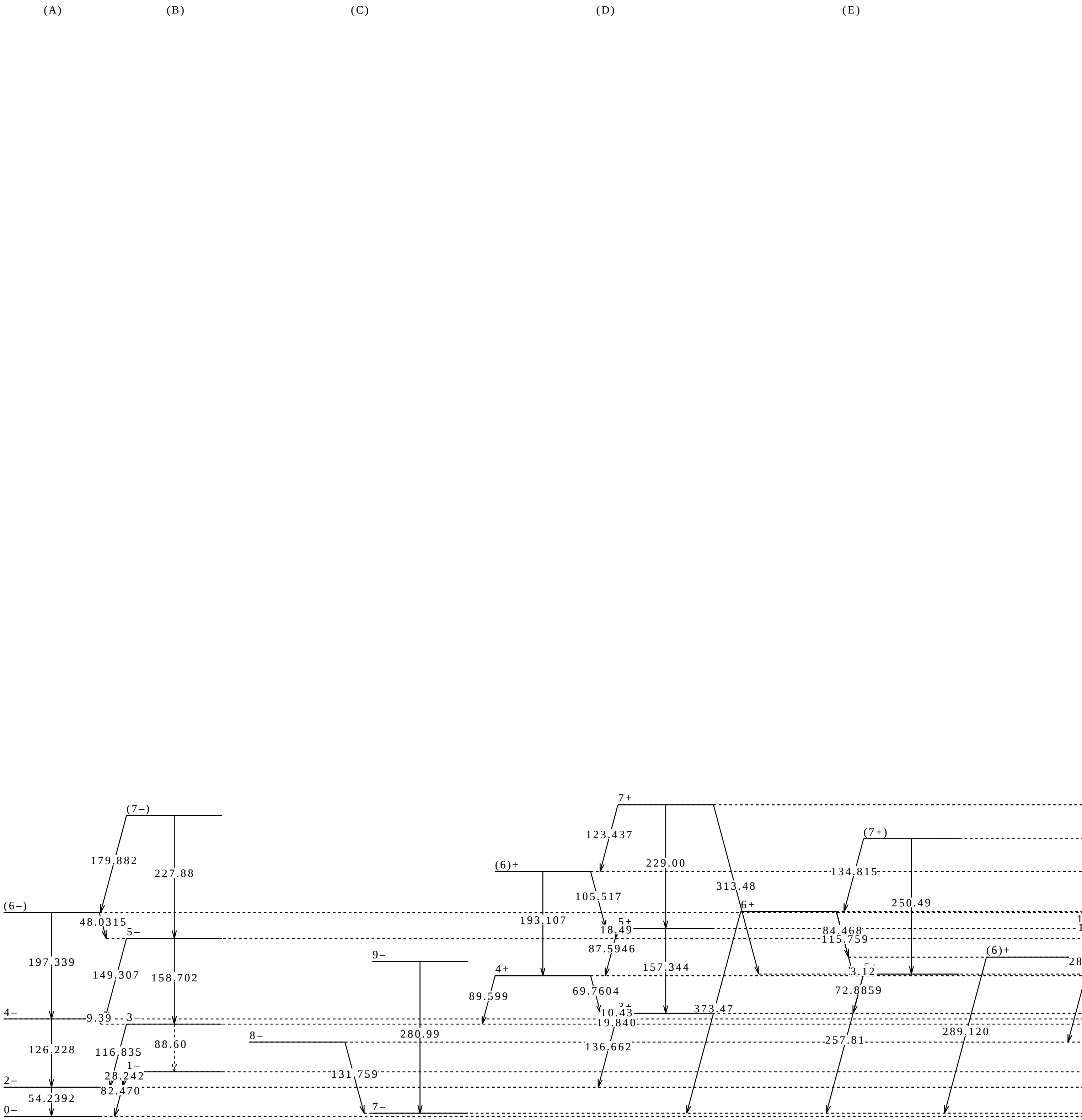
$^{166}_{67}Ho_{99}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Ho

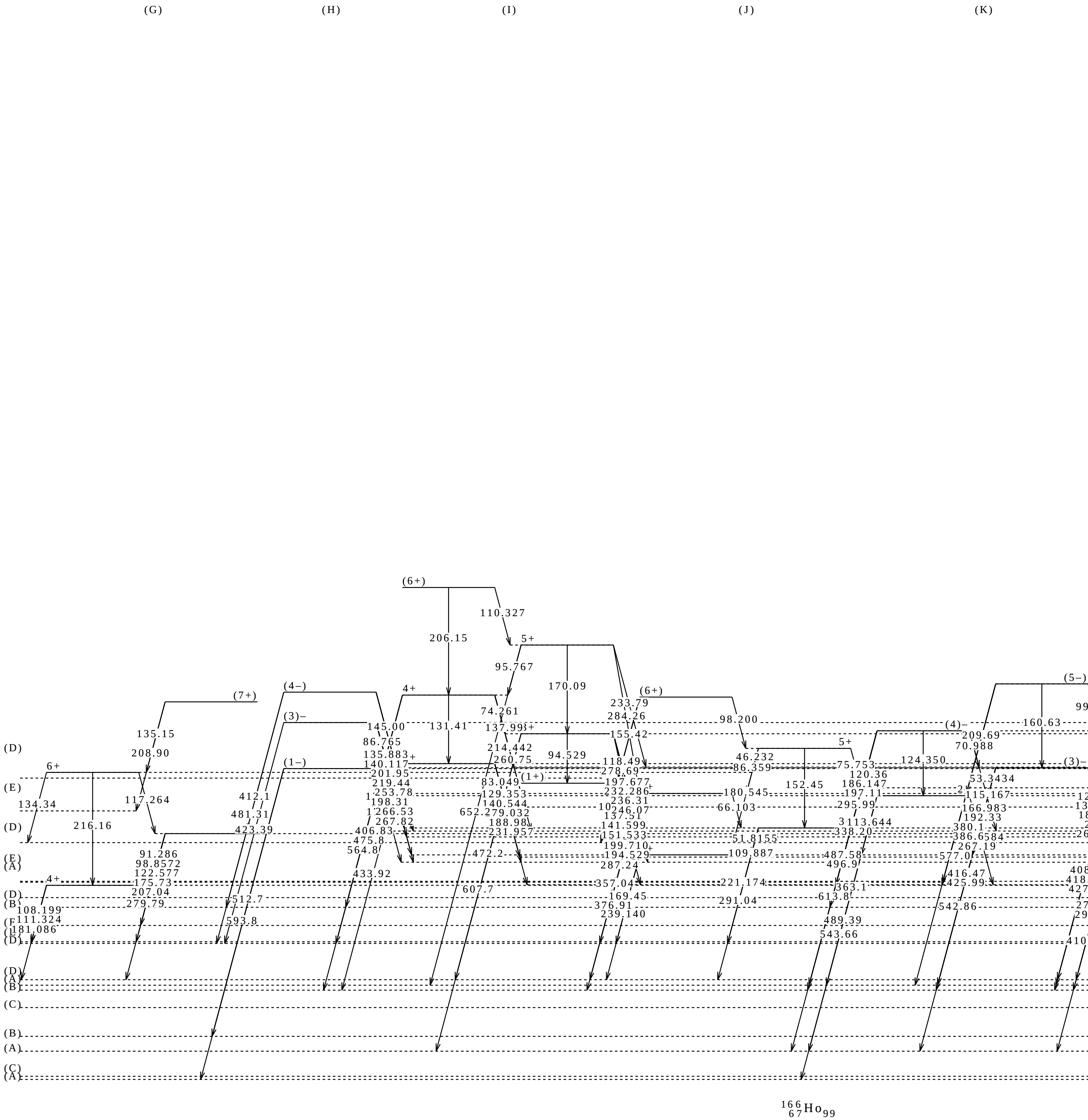


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Ho

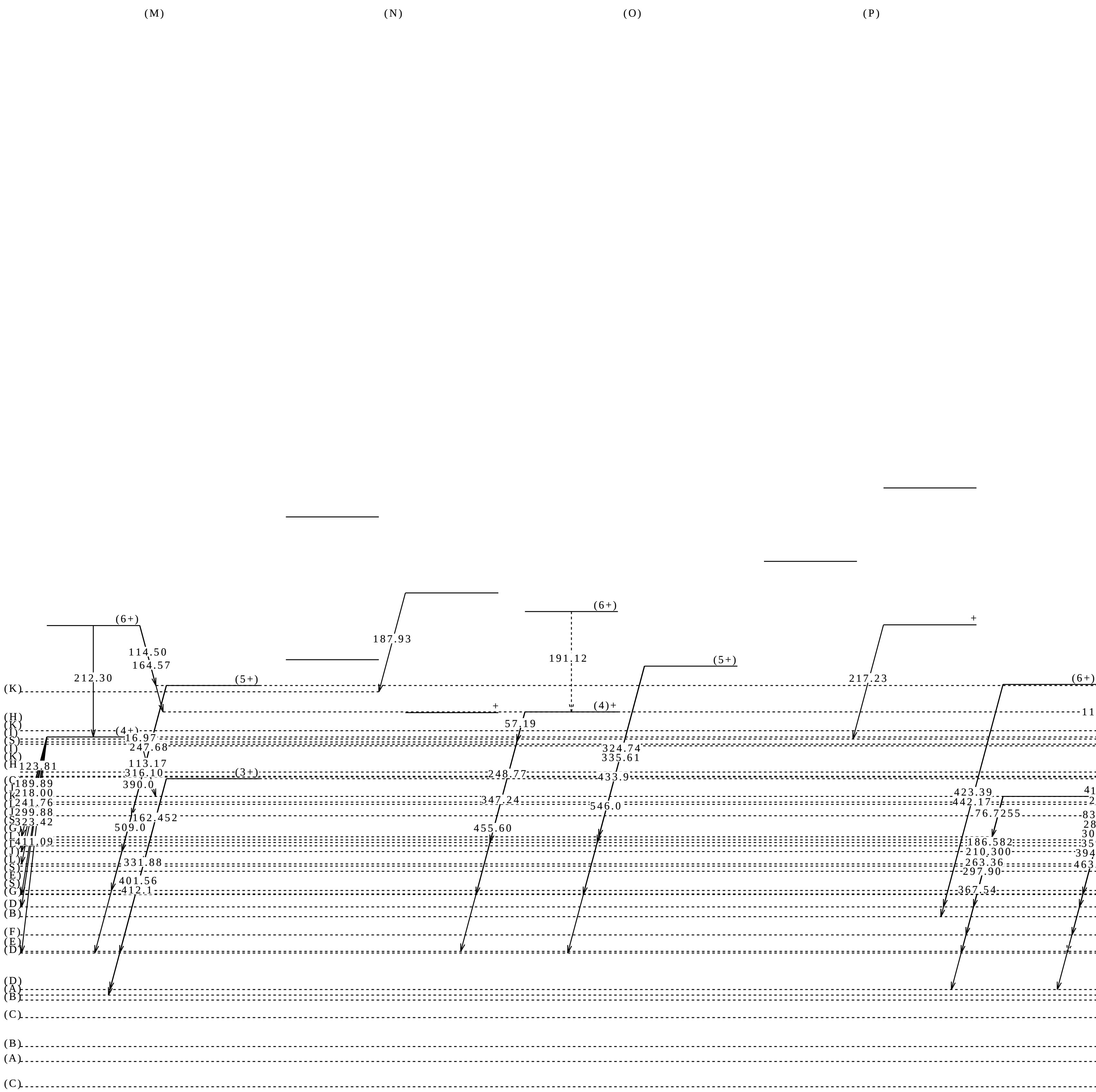


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Ho



$^{166}_{67}Ho_{99}$

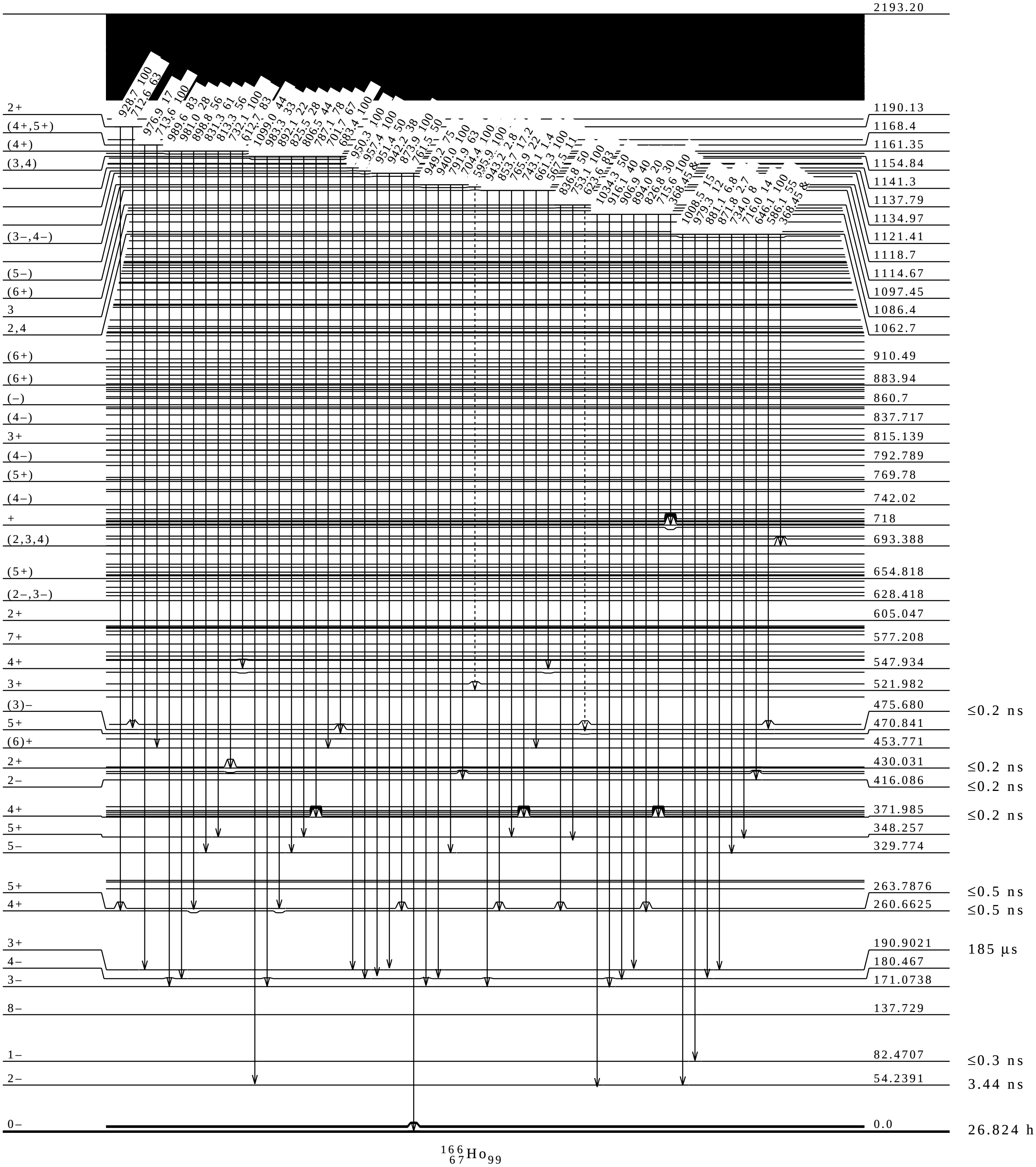
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



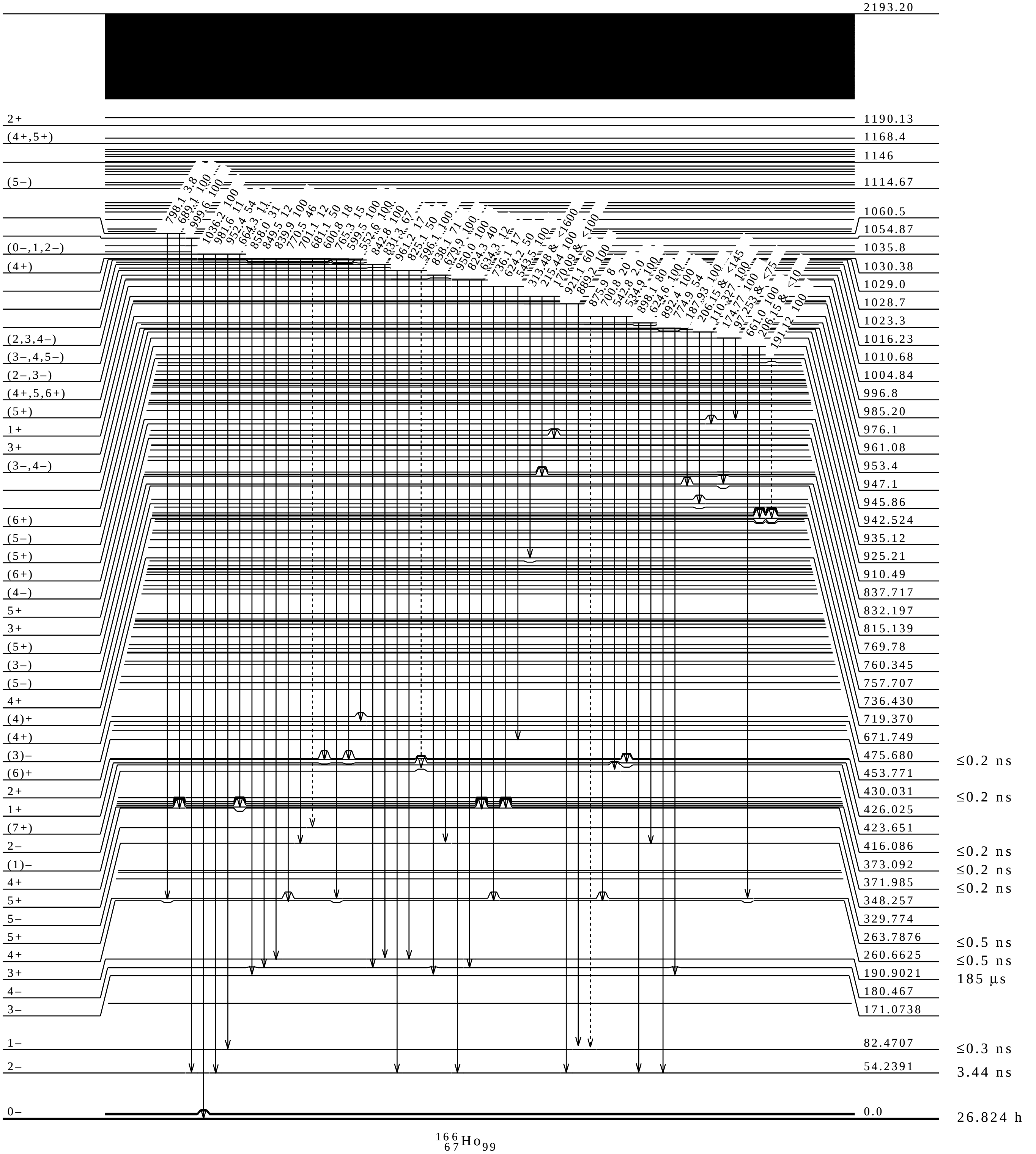
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{67}Ho_{99}$

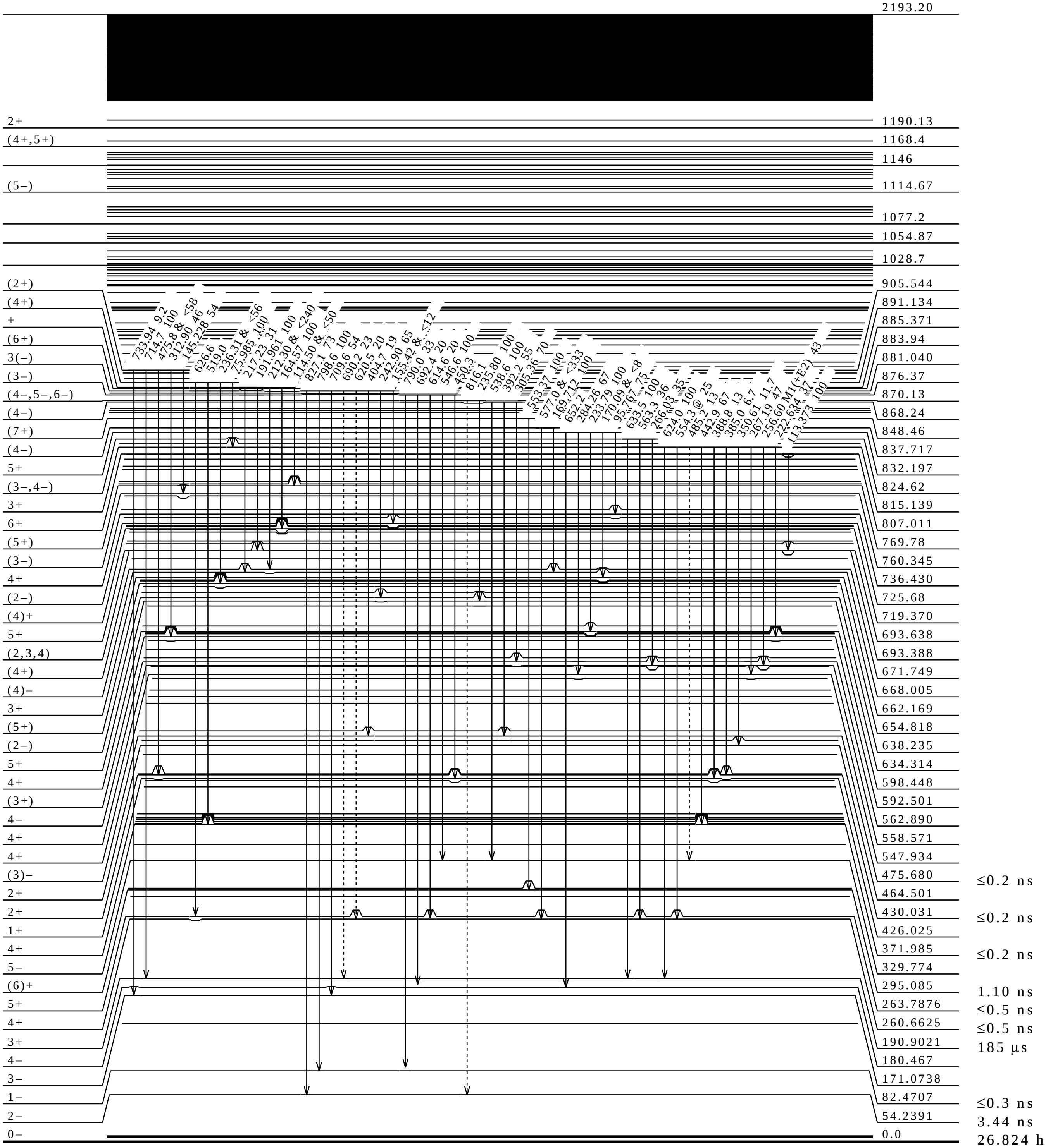
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided

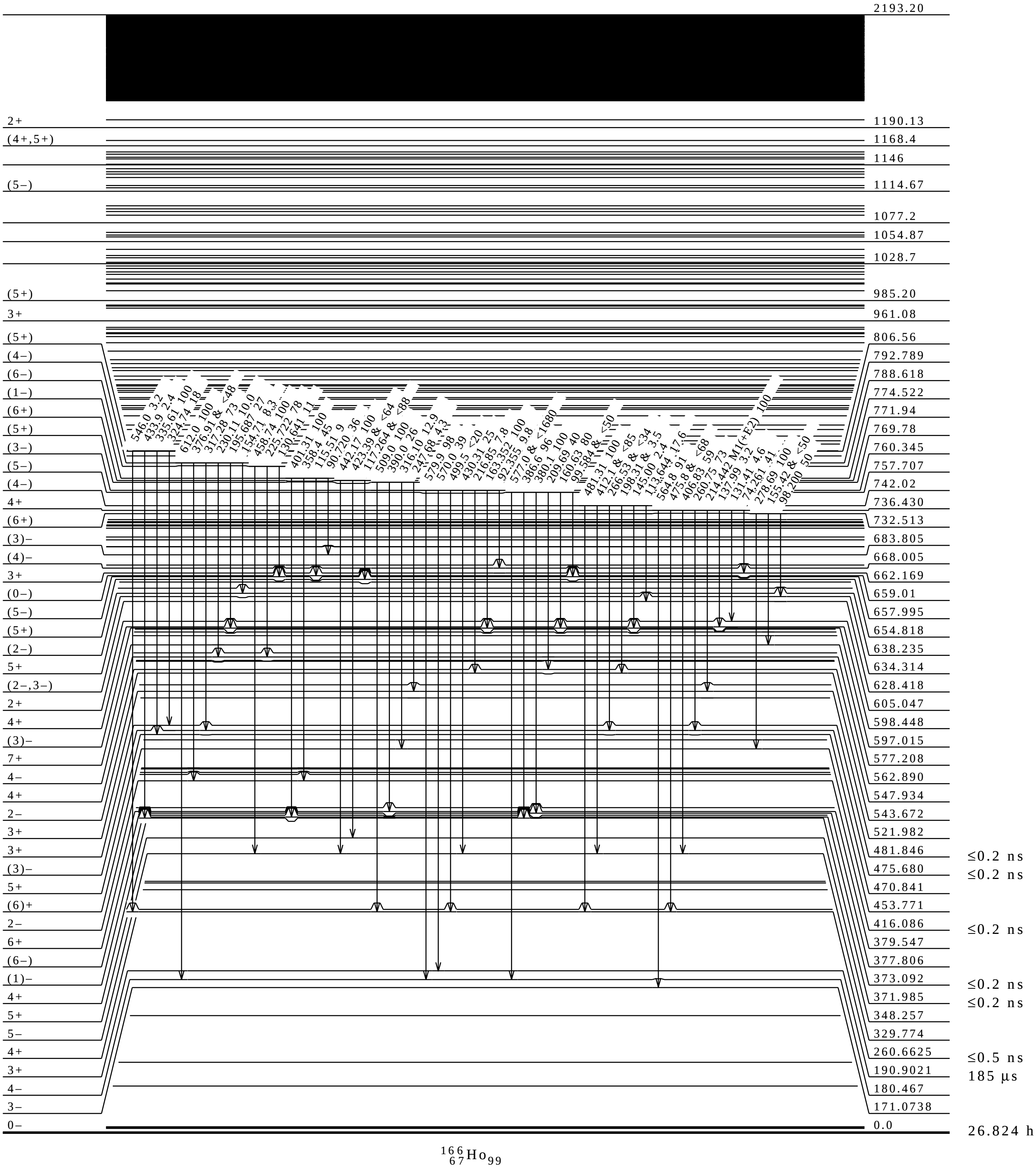


$^{166}_{67}Ho_{99}$

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



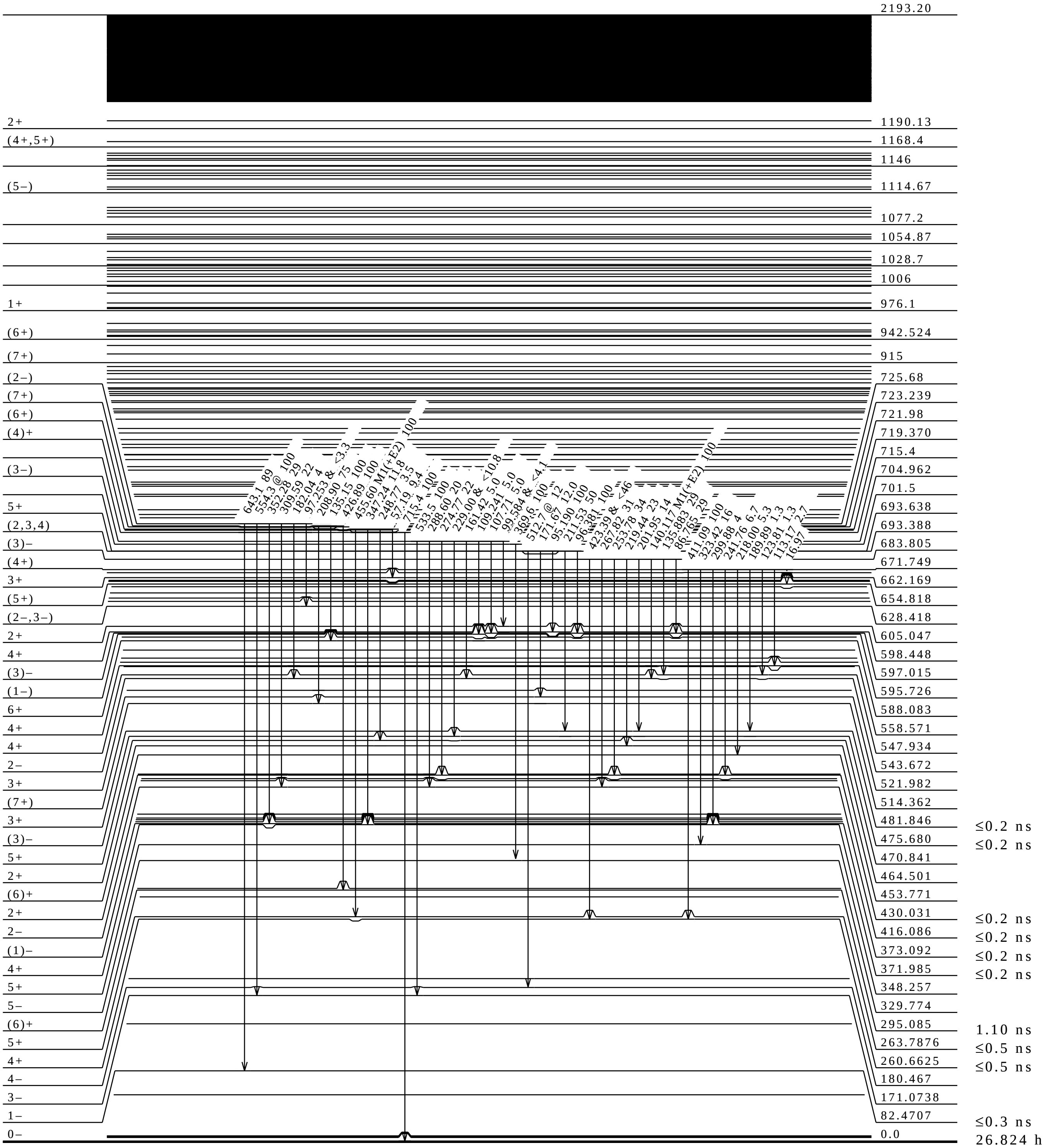
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{67}Ho_{99}$

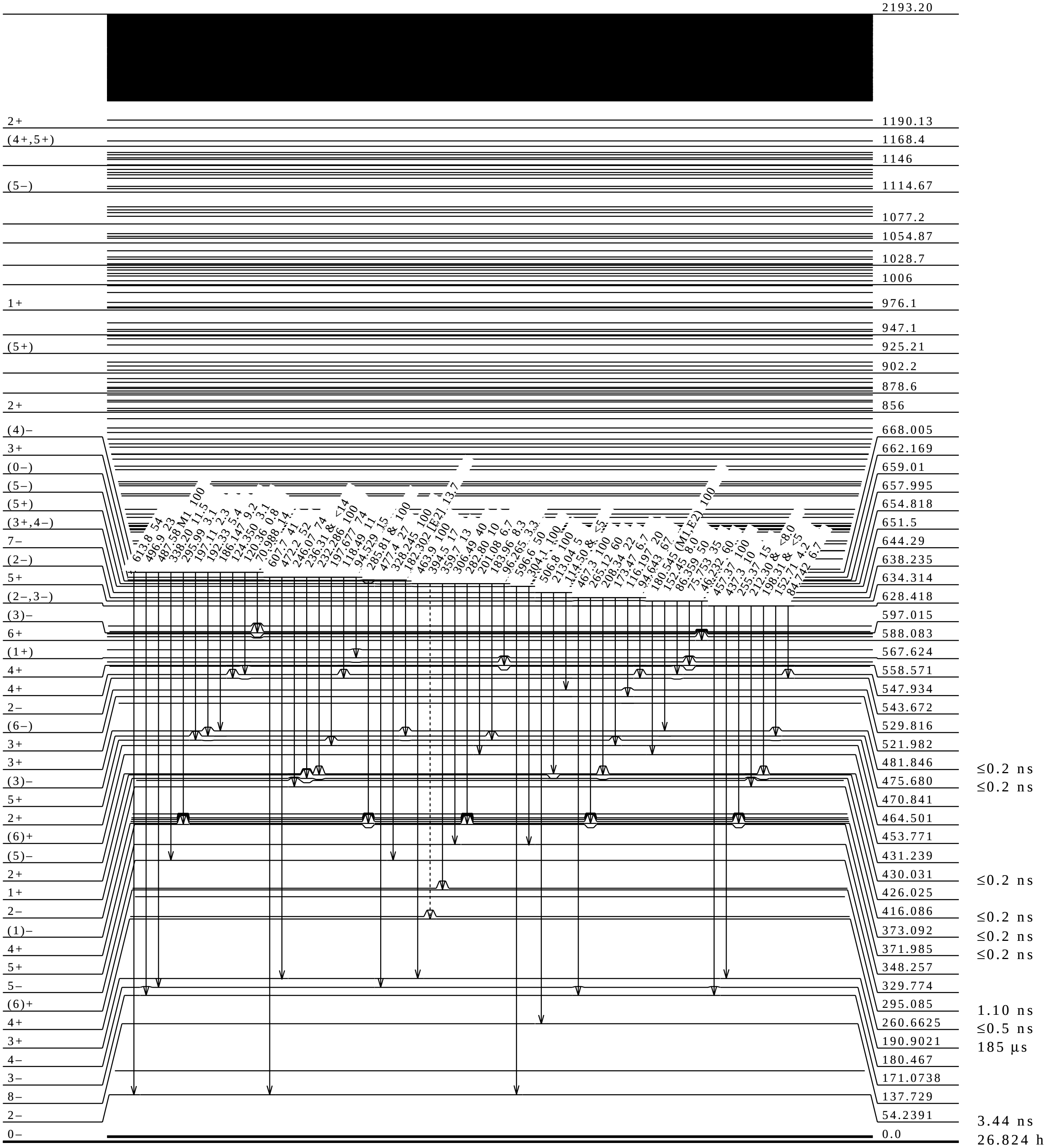
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{67}Ho_{99}$

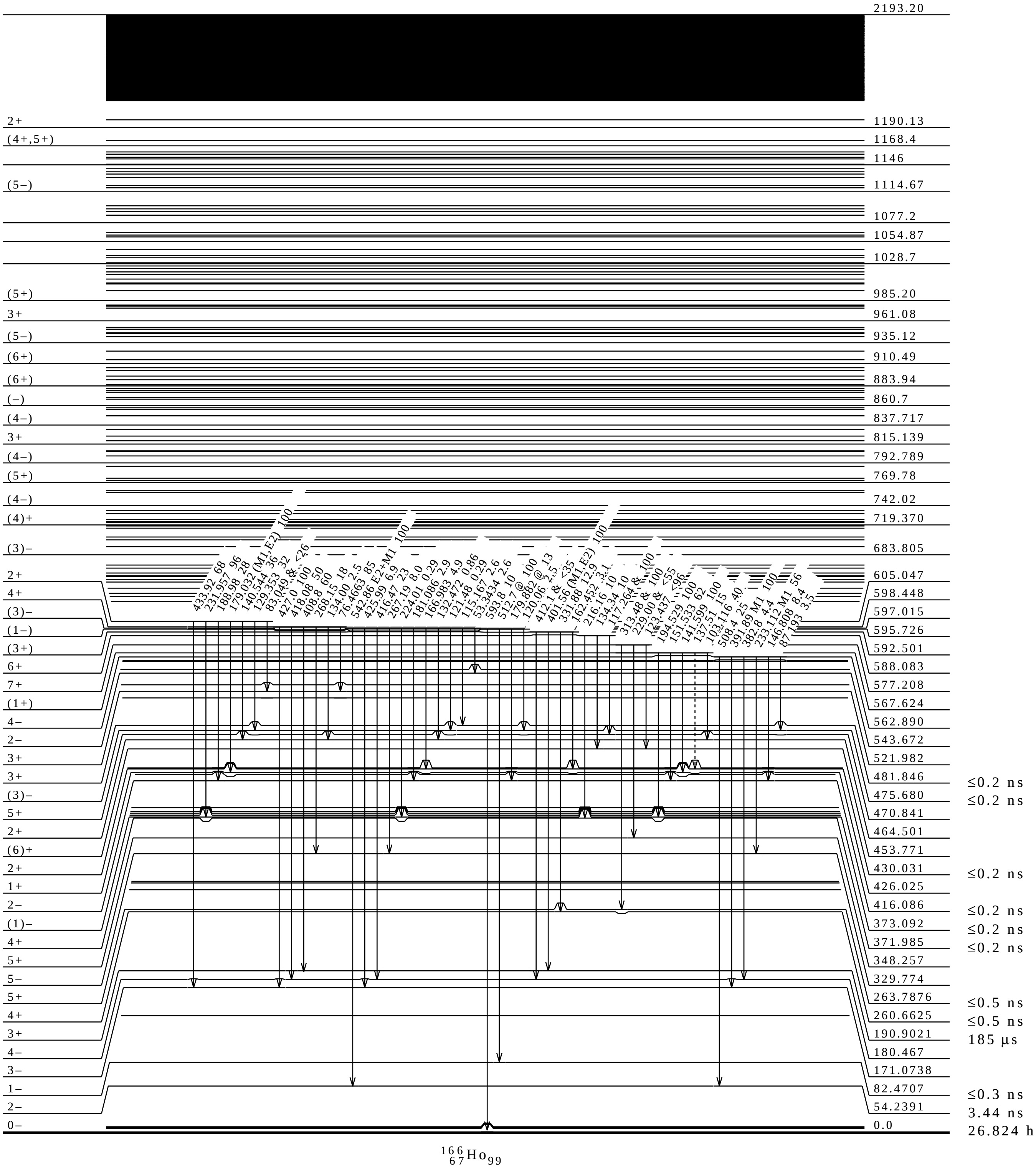
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



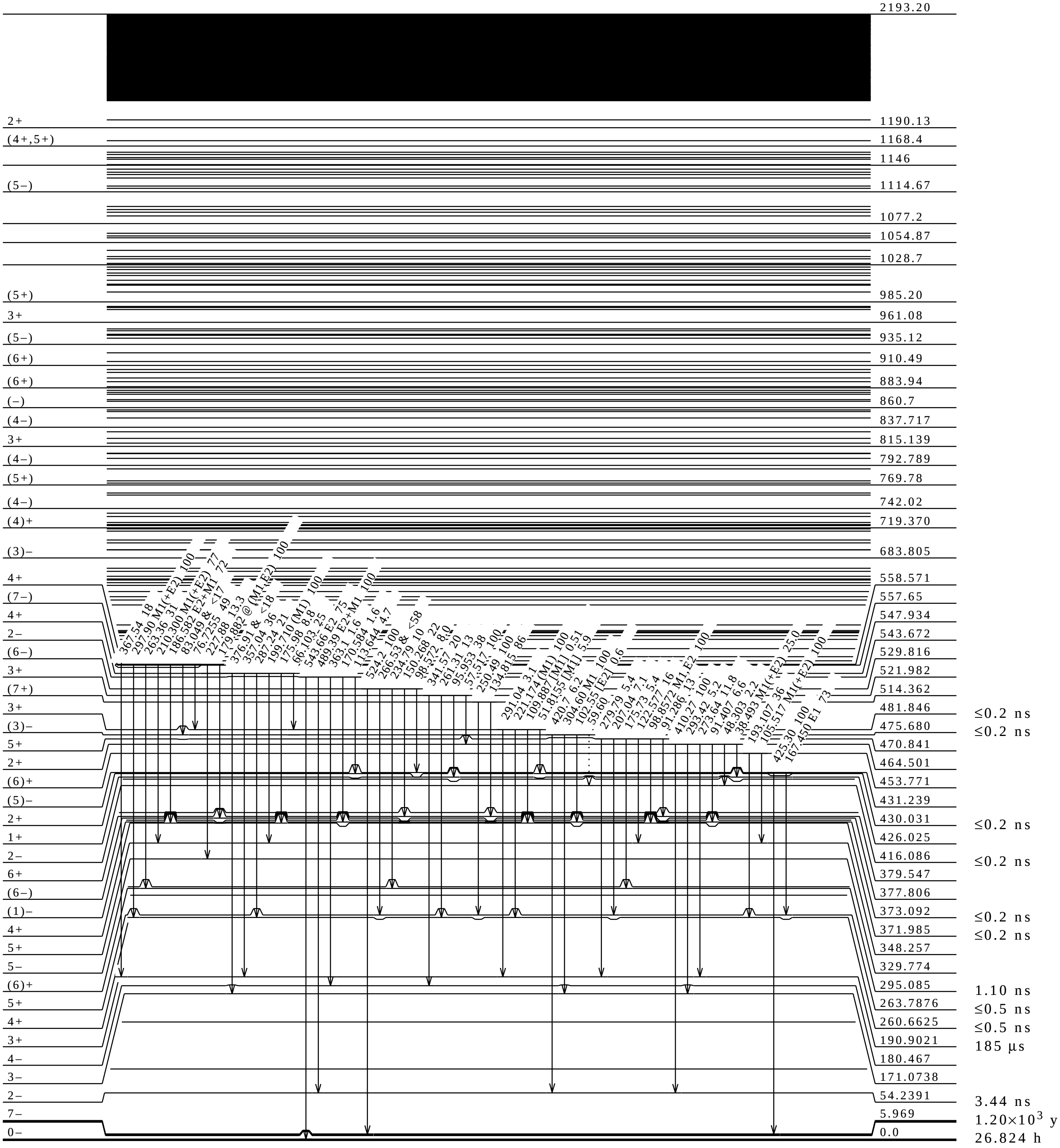
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{67}Ho_{99}$

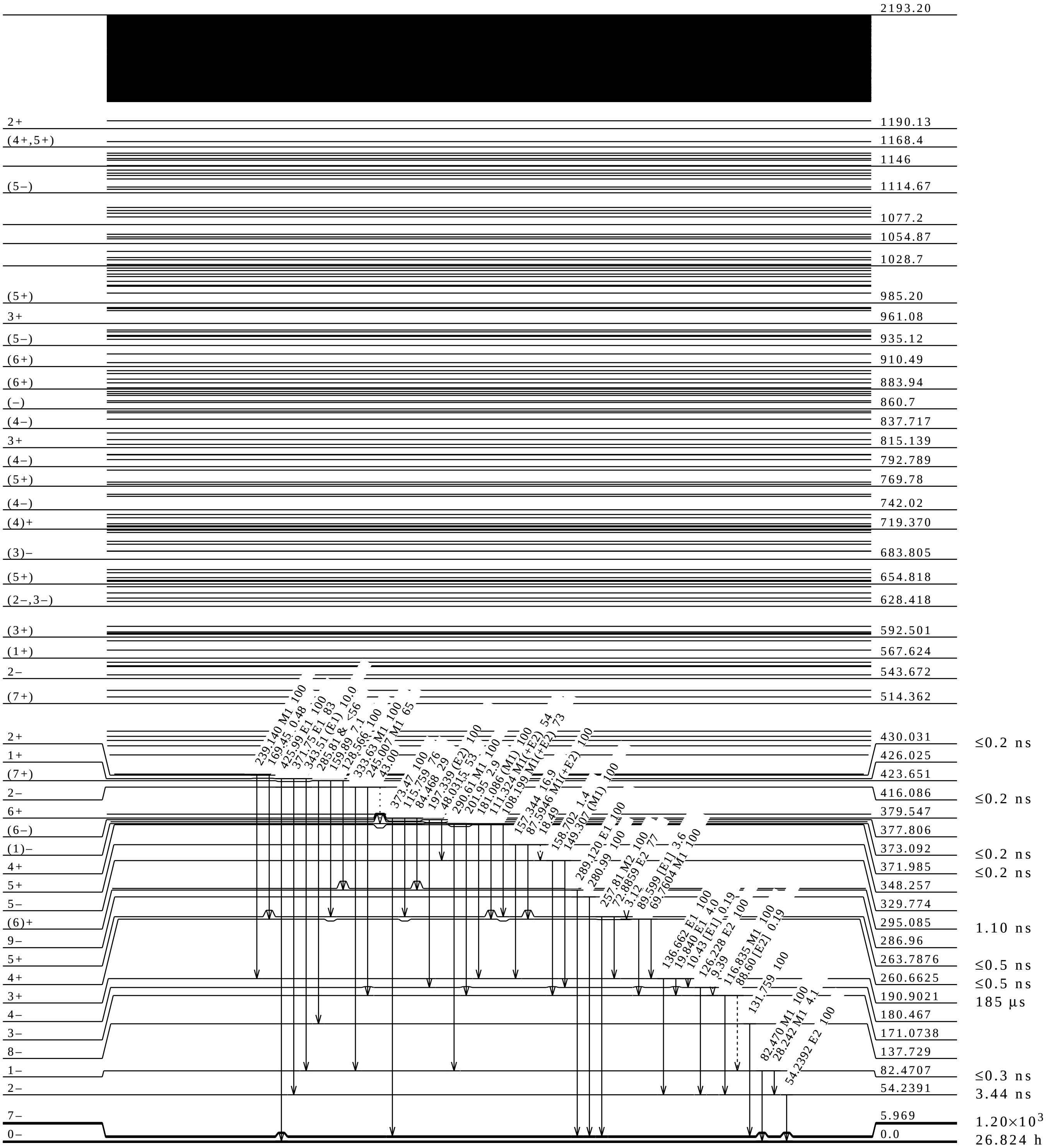
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Dy β^- Decay 1979Ba40,1967Mo05

Parent ^{166}Dy: E=0.0; Jπ=0+; $T_{1/2}$=81.6 h *1*; Q(g.s.)=486.8 *10*; %β^- decay=100.
The values of the angular correlation coefficients for the 28.23γ–54.239γ cascade are A_2=−0.242 *15*, A_4=+0.031 *34*; these are in agreement with a 1(D)2(Q)0 spin sequence for the cascade (1979Ba40).

^{166}Ho Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0−	26.824 h *12*	$T_{1/2}$: from Adopted Levels.
54.2391 *10*	2−	3.44 ns *12*	g=0.034 *5* (1979Ba40). $T_{1/2}$: from β(ce 54.24γ)(t) (1961Ge14 scin s ce). Other: 1950Mc22.
82.4695 *19*	1−	≤0.3 ns	$T_{1/2}$: from β(ce 82.47γ)(t) (1961Ge14 scin s ce).
373.13 *10*	(1)−		
425.987 *18*	1+		

† From least–squares fit to Eγ.
‡ From Adopted Levels.

β^- radiations

Eβ measured by 1949Ke22, 1950Bu30, 1960He09, 1960Ge12, 1962Gu03.

Eβ⁻	E(level)	Iβ⁻†‡	Log *ft*	Comments
(60.8 *10*)	425.987	1.17 *18*	5.25 *7*	av Eβ=15.60 *27*.
(113.7 *10*)	373.13	0.016 *5*	7.94 *14*	av Eβ=29.87 *28*.
399 *5*	82.4695	97 *6*	5.91 *3*	av Eβ=118.43 *33*. Eβ is weighted average from 400 *8* (1960Ge12 s); 402 *5* (1960He09 s); 385 *10* (1962Gu03 scin β–γ). Iβ from 1960Ge12 (Iβ=99 *6* from intensity balance).
(432.6 *10*)	54.2391	5 *5*	7.2^{1u} *5*	av Eβ=141.26 *34*. Iβ⁻: from intensity balance. Iβ<0.3 if log $f^{1u}t$>8.5.
481 *10*	0.0	<4	>7.6	av Eβ=146.22 *35*. Eβ,Iβ from 1960He09 (Iβ≤2 from intensity balance).

† From intensity balance, unless otherwise noted.
‡ Absolute intensity per 100 decays.

γ(^{166}Ho)

β⁻ γ coin, γ–γ coin: 1960Ge04, 1960He09, 1960Ru05, 1962Gu03.
Iγ normalization: The intensity normalization (0.138 *7*) is based on I(82.47γ)=13.8% *7* (1981Se09). Iγ normalization=0.131 *6* if Σ(I(γ+ce) to g.s.)=100%.

Eγ†	E(level)	Iγ‡§	Mult.	α	Comments
28.227 *5*	82.4695	8.2 *6*	M1	17.02	α(L)=13.29 *19*; α(M)=2.94 *5*; α(N+..)=0.786 *11*. α(N)=0.682 *10*; α(O)=0.0989 *14*; α(P)=0.00551 *8*. Mult.: from L1:L2:L3=100:9.3:1.6 (1960Ge04); 100 *3*:9.5 (1960Ru05); 100 *24*:7.6 *24*:<4 (1964Br10). Eγ: from 1964Br10.
54.239 *1*	54.2391	5.9 *9*	E2	31.3	α(L)=24.0 *4*; α(M)=5.81 *9*; α(N+..)=1.457 *21*. α(N)=1.305 *19*; α(O)=0.1519 *22*; α(P)=0.0001670 *24*. Mult.: from L1:L2:L3:M2:M3:M4=3.4 *20*:89 *5*:100 *5*:19 *2*:20 *2*:1.1 *2* (1964Br10). Others: 1960Ge04, 1960Ru05.
82.470 *2*	82.4695	100	M1	4.55	α(K)=3.82 *6*; α(L)=0.569 *8*; α(M)=0.1257 *18*; α(N+..)=0.0337 *5*. α(N)=0.0292 *4*; α(O)=0.00424 *6*; α(P)=0.000237 *4*. Mult.: from K:L1:L2:L3:M1=100:13.7:1.2:0.19:3.4 (1960Ge04); 100 *8*:11.6 *7*:0.99 *11*:0.13 *4* (1964Br10).
290.66 *10*	373.13	0.10 *3*	M1	0.1336	α(K)=0.1126 *16*; α(L)=0.01639 *23*; α(M)=0.00361 *5*; α(N+..)=0.000968 *14*. α(N)=0.000839 *12*; α(O)=0.0001222 *18*; α(P)=6.91×10^{-6} *10*. Mult.: from Adopted Gammas.
343.51 *3*	425.987	0.4 *1*	(E1)	0.01281	α(K)=0.01085 *16*; α(L)=0.001538 *22*; α(M)=0.000337 *5*; α(N+..)=8.93×10^{-5} *13*. α(N)=7.77×10^{-5} *11*; α(O)=1.104×10^{-5} *16*; α(P)=5.72×10^{-7} *8*. Mult.: from α(K)exp<0.038 (1964Br10).

Continued on next page (footnotes at end of table)

^{166}Dy β^- Decay 1979Ba40,1967Mo05 (continued)

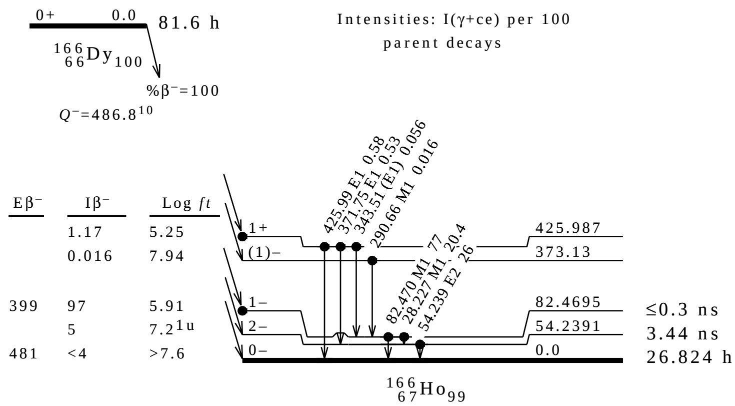
γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ‡§	Mult.	α	Comments
371.75 *3*	425.987	3.8 *8*	E1	0.01060	α(K)=0.00898 *13*; α(L)=0.001267 *18*; α(M)=0.000278 *4*; α(N+..)=7.36×10^{-5} *11*. α(N)=6.40×10^{-5} *9*; α(O)=9.12×10^{-6} *13*; α(P)=4.77×10^{-7} *7*. Mult.: from α(K)exp=0.0088 *25* (1964Br10).
425.99 *3*	425.987	4.2 *9*	E1	0.00770	α(K)=0.00653 *10*; α(L)=0.000914 *13*; α(M)=0.000200 *3*; α(N+..)=5.32×10^{-5} *8*. α(N)=4.62×10^{-5} *7*; α(O)=6.61×10^{-6} *10*; α(P)=3.50×10^{-7} *5*. Mult.: from α(K)exp=0.0065 *18* (1964Br10).

† From 1967Mo05, unless otherwise noted.
‡ From 1979Ba40 for Eγ<100. Other Iγ are from 1964Br10 normalized to Iγ(82γ)=100 with authors' ΔIγ(82γ)=20% added in quadrature to the uncertainties for Eγ>100. Measured Iγ are I(28.23γ):I(54.24γ):I(82.47γ)=8.2 *6*:5.9 *9*:100 (1979Ba40); I(82.47γ):I(290.66γ):I(343.51γ):I(371.75γ):I(425.99γ)=100 *20*:0.12<: 0.4 *1*:3.8 *3*:4.2 *3* (1964Br10); I(290.66γ):I(343.51γ):I(371.75γ): I(425.99γ)=0.097 *16*:0.43 *9*:3.4 *5*:(4.2 *6*) (1967Mo05).
§ For absolute intensity per 100 decays, multiply by 0.138 *7*.

^{166}Dy β^- Decay 1979Ba40,1967Mo05 (continued)

Decay Scheme



^{166}Ho IT Decay (185 μs) 1965Bj03

Parent ^{166}Ho: E=190.9021 *20*; Jπ=3+; $T_{1/2}$=185 μs *15*; %IT decay=100.

^{166}Ho Levels

E(level)	Jπ†	$T_{1/2}$	Comments
0.0	0−	26.824 h *12*	$T_{1/2}$: from Adopted Levels.
54.239 *2*	2−	3.44 ns *12*	$T_{1/2}$: from Adopted Levels.
171.072 *4*	3−		
190.904 *4*	3+	185 μs *15*	$T_{1/2}$: from 1965Bj03. Others: 214 μs *10* (1960Al27); 158 μs *14* (1964KaZZ); 207 μs (1965Mc03); see also 1961Kr01, 1962En04.

† From Adopted Levels.

γ(^{166}Ho)

I(K x ray)+I(54.2γ)=24 *4*.
Iγ normalization: Iγ was normalized against the conversion electron spectrum by assuming (I(K x ray)+Iγ(54.2γ))= ω(K) ΣI(ce(K)) + I(54.2γ) with ω(K)=0.93.

Eγ§	E(level)	Iγ†#	Mult.‡	α	Comments
19.840 *6*	190.904	7 *3*	E1	4.79	α(L)=3.74 *6*; α(M)=0.847 *12*; α(N+..)=0.206 *3*. α(N)=0.185 *3*; α(O)=0.0204 *3*; α(P)=0.000514 *8*. ce(L)<<130 (1965Bj03). Eγ: from Adopted Gammas.
54.239 *2*	54.239	3.0 *5*	E2	31.3	α(L)=24.0 *4*; α(M)=5.81 *9*; α(N+..)=1.457 *21*. α(N)=1.305 *19*; α(O)=0.1519 *22*; α(P)=0.0001670 *24*. Iγ: calculated from the intensity of the L line using α(L)(E2 theory). ce(L)=73 *15*.
116.835 *3*	171.072	13 *5*	M1	1.673	α(K)=1.406 *20*; α(L)=0.209 *3*; α(M)=0.0460 *7*; α(N+..)=0.01233 *18*. α(N)=0.01069 *15*; α(O)=0.001555 *22*; α(P)=8.71×10^{-5} *13*. ce(K)=16 *3* and ce(L)=3.0 *6* (1965Bj03).
136.662 *4*	190.904	50 *10*	E1	0.1378	α(K)=0.1155 *17*; α(L)=0.01749 *25*; α(M)=0.00385 *6*; α(N+..)=0.001007 *14*. α(N)=0.000880 *13*; α(O)=0.0001210 *17*; α(P)=5.50×10^{-6} *8*. ce(K)=7 *2* and ce(L)=1.1 *2* (1965Bj03).

† From 1965Bj03, except as noted.
‡ From Adopted Gammas, unless otherwise noted.
§ From ^{165}Ho(n,γ) measured by 1965Bj03.
\# Absolute intensity per 100 decays.

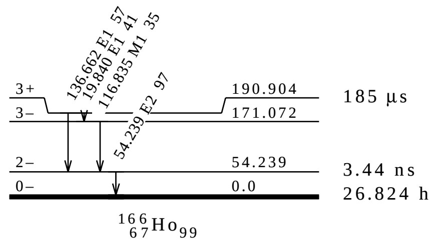
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Ho IT Decay (185 μs) 1965Bj03 (continued)

Decay Scheme

Intensities: I(γ+ce) per
100 parent decays
%IT=100



^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03

Other measurements: 1958Sk59, 1959Dr75, 1959Jo33, 1960Al27, 1961Es02, 1961Kr01, 1963Gi03, 1963Or02, 1973He15, 1973PrZI, 1979Bo08, 1988Ba79, 1989Du03, 2003ChZS, 2007ChZX.

Includes (pol n,γ) E=0.065 eV.

Jπ(target)=7/2−.

σ_n=61.2 *11* (2006MuZX). Abundance(^{165}Ho)=100%.

2007ChZX: provides an evaluation of experimental data including new Eγ and elemental cross section measurements using Ge(Li) detector for 148 primary and 73 secondary transitions (herein referred to as 'Budapest data', and taken from the EGAF section of the CD that is part of this publication). Supersedes 2003ChZS.

2000Pr03: three–crystal pair spectrometer, FWHM≈5.5 keV at 6.5 MeV; calibration based on S(n) and pattern of primary transitions to several well–established low–lying levels; measured Eγ, γγ coin; deduced band structure.

1984Ke15: >99.9% Ho target; Ge detector inside quadrisected NaI(Tl) annulus (FWHM=3.1–4.5 keV for Eγ=4000–6200); measured Eγ, Iγ for 270 transitions with Eγ>4050; ^{14}N(n,γ) reaction used for calibration.

1979Bo08: (pol n,γ); polarized E=0.065 eV neutrons and polarized single–crystal ^{165}Ho target; measured γ(θ) for 15 primary gammas; deduced J.

1967Mo05: 99.8% Ho target; measured primary Eγ, Iγ using Ge(Li) detector as two–escape pair spectrometer (FWHM=8.0 keV; Eγ=5000–6200); measured secondary Eγ, Iγ using Riso curved–crystal spectrometer (Eγ=30–750) or Iγ using Ge(Li) detector (Eγ=70–550); measured conversion electrons (E=29–500) using Elephant spectrometer at Munich (FWHM=0.6% at 100 keV, 0.3% at 200 keV; thick source) and the Studsvik β^- spectrometer (FWHM=0.2%; thin source).

The level scheme includes refinements made by 2000Pr03 to the schemes proposed by 1967Mo05 and others, in which γ placements were based on the Ritz principle (somewhat unreliable at this level density); γγ coin data from 2000Pr03 led to the placement or relocation of many transitions and the elucidation of a number of additional bands.

^{166}Ho Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$
0.0[a]	0−[x]	26.824 h[y] *12*
5.969[b] *12*	7−	1.20×10^3 y *18*
54.2391[a] *7*	2−	
82.4707[a] *20*	1−	
137.729[b] *13*	8−	
171.0738[a] *12*	3−	
180.467[a] *3*	4−	
190.9021[c] *20*	3+[#]	
260.6625[c] *23*	4+[#]	≤0.5 ns[§]
263.7876[d] *24*	5+	≤0.5 ns[§]
286.96[b] *13*	9−	
295.085[e] *9*	6+	1.10 ns[§] *15*
329.774[a] *4*	5−	
348.257[c] *3*	5+	
371.985[f] *3*	4+[#]	≤0.2 ns[§]
373.092[p] *8*	1−	≤0.2 ns[§]
377.806[a] *4*	6−	
379.547[d] *4*	6+	
416.086[p] *6*	2−	≤0.2 ns[§]
423.651[e] *10*	7+	
426.025[k] *6*	1+	
430.031[j] *4*	2+[z]	≤0.2 ns[§]
431.239[r] *6*	5−	
453.771[c] *4*	6+	
464.501[k] *6*	2+	
470.841[f] *3*	5+	
475.680[p] *7*	3−	≤0.2 ns[§]
481.846[j] *4*	3+[α]	≤0.2 ns[§]
514.362[d] *7*	7+	
521.982[k] *6*	3+	
529.816[r] *8*	6−	
543.672[i] *4*	2−	
547.934[j] *5*	4+	
557.65[a] *7*	7−	
558.571[n] *4*	4+[#]	
562.890[p] *7*	4−	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
567.624[h] *7*	1+	1016.23 *15*		1448.92 *5*	
577.208[c] *7*	7+	1019.2 *5*		1458.8 *5*	
588.083[f] *7*	6+	1023.4 *23*		1461.6 *4*	
592.501[l] *9*	3+	1026.1 *5*		1463.91 *14*	
595.726[g] *15*	1−	1030.38[v] *3*	4+	1467.3 *5*	
597.015[i] *4*	3−	1054.87 *22*		1471.7 *4*	
598.448[k] *6*	4+	1061.788 *22*	2,4[#]	1474.4 *6*	
605.047[h] *7*	2+	1087.91 *4*	3[#]	1478.49 *13*	
628.418[g] *13*	2−	1097.45[o] *5*	6+	1487.15 *13*	
634.314[j] *6*	5+	1114.67 *3*	3,(5)[#]	1494.59 *18*	
638.235[q] *9*	4−	1121.41 *7*		1498.1 *4*	
644.29[r] *6*	7−	1131.0 *3*		1505.5 *3*	
654.818[n] *14*	5+	1134.97 *11*		1510.60 *7*	
657.995[p] *11*	5−	1137.79 *12*		1521.2 *4*	
659.01[s] *4*	0−	1141.3 *3*		1526.86 *17*	
662.169[h] *8*	3+	1146.7 *4*		1532.12 *6*	
668.005[i] *6*	4−	1154.84 *4*		1537.62 *11*	
671.746[l] *12*	4+	1161.35 *3*	4[#]	1540.9 *5*	
683.805[g] *5*	3−	1174.9 *5*		1544.4 *10*	
693.388 *17*	(2+)	1190.13 *4*		1547.49 *12*	
693.638[k] *7*	5+	1199.4 *13*		1552.95 *13*	
704.962[q] *14*	3−	1202.11 *14*		1558.90 *17*	
719.370[m] *11*	4+[β]	1208.61 *9*		1561.0 *4*	
721.98[u] *15*	6+	1214.93 *23*		1566.5 *5*	
723.239[f] *19*	7+	1217.2 *3*		1570.75 *7*	
725.68[s] *4*	2−	1221.61 *13*		1576.89 *12*	
732.513[j] *16*	6+	1230.04 *4*		1588.79 *13*	
736.430[h] *9*	4+	1234.86 *12*		1592.47 *18*	
742.02[g] *3*	4−	1240.70 *6*		1599.98 *9*	
757.707[i] *18*	5−	1244.24 *7*		1603.81 *15*	
760.345[t] *7*	3−	1248.19 *10*		1606.25 *24*	
769.78[l] *4*	5+	1252.69 *14*		1614.0 *4*	
771.94[n] *8*	6+	1256.87 *12*		1616.0 *3*	
774.522[s] *16*	1−	1263.84 *4*		1620.3 *3*	
788.618[p] *11*	6−	1271.44 *19*		1628.1 *4*	
792.789[q] *12*	4−	1289.29 *11*		1629.9 *3*	
806.56[m] *5*	5+	1293.79 *7*		1635.51 *9*	
807.011[k] *8*	6+	1298.45 *7*		1638.97 *16*	
815.139[o] *10*	3+[#]	1301.07 *9*		1644.49 *15*	
824.62 *4*	3−	1304.81 *13*		1655.0 *5*	
832.197[h] *9*	5+	1310.54 *15*		1657.5 *3*	
837.717[t] *8*	4−	1318.0 *3*		1661.57 *21*	
848.46[u] *21*	7+	1322.0 *3*		1666.15 *9*	
868.24[s] *14*	4−	1327.55 *21*		1671.64 *8*	
870.13 *5*	(−)	1332.1 *6*		1676.69 *12*	
876.37 *22*		1338.75 *6*		1681.2 *5*	
881.040[s] *20*	3−[#]	1343.06 *8*		1683.5 *4*	
883.94[l] *5*	6+	1349.93 *5*		1687.3 *5*	
885.345 *20*	(3+)	1355.02 *5*		1695.01 *7*	
891.124[o] *12*	4+	1362.73 *11*		1704.31 *8*	
905.544[v] *10*	2+[#]	1367.31 *16*		1710.6 *3*	
910.49?[m] *4*	(6+)	1371.4 *10*		1713.24 *23*	
925.0[w] *5*	5+	1376.81 *6*		1716.65 *20*	
935.12[t] *4*	5−	1380.15 *19*		1723.8 *6*	
942.524[h] *15*	6+	1387.75 *5*		1731.10 *11*	
945.86 *5*		1391.93 *11*		1742.26 *12*	
951.1 *3*		1396.77 *7*		1752.4 *3*	
961.08[v] *6*	3+	1401.77 *11*		1756.8 *6*	
977.2 *7*		1405.8 *3*		1759.6 *3*	
979.8 *10*		1415.80 *4*		1763.59 *9*	
985.20[o] *8*	5+	1421.48 *13*		1769.46 *18*	
1004.84 *5*		1429.80 *7*		1776.76 *7*	
1010.68 *18*		1433.64 *12*		1785.5 *3*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
1794.18 *15*		1957.52 *21*		2090.96 *20*	
1798.8 *4*		1960.67 *14*		2094.4 *4*	
1805.5 *3*		1969.8 *3*		2098.37 *15*	
1816.98 *9*		1972.9 *8*		2103.7 *4*	
1823.86 *10*		1975.5 *4*		2105.7 *6*	
1829.53 *24*		1978.33 *18*		2109.2 *6*	
1835.60 *16*		1985.98 *12*		2111.7 *4*	
1838.6 *11*		1995.37 *16*		2115.82 *23*	
1842.99 *9*		1998.94 *20*		2118.7 *5*	
1851.1 *3*		2004.89 *10*		2122.5 *3*	
1854.98 *13*		2010.77 *13*		2127.47 *18*	
1859.34 *11*		2015.07 *21*		2131.19 *16*	
1864.8 *6*		2017.6 *4*		2137.2 *4*	
1870.3 *4*		2023.0 *3*		2139.3 *5*	
1876.86 *9*		2025.63 *19*		2145.43 *17*	
1882.99 *18*		2029.8 *3*		2148.5 *3*	
1890.85 *11*		2032.05 *23*		2151.68 *16*	
1895.28 *11*		2037.44 *17*		2157.34 *14*	
1898.96 *15*		2040.4 *3*		2161.1 *3*	
1907.67 *11*		2051.3 *4*		2163.80 *24*	
1914.0 *4*		2054.4 *3*		2167.7 *4*	
1916.3 *6*		2056.7 *5*		2169.8 *4*	
1919.32 *15*		2058.7 *3*		2172.1 *5*	
1928.17 *10*		2062.1 *5*		2180.0 *3*	
1933.09 *16*		2065.20 *15*		2182.92 *22*	
1938.88 *10*		2072.60 *20*		2193.20 *15*	
1945.97 *16*		2075.3 *5*		(6243.714[@] *8*)	3−,4−[&]
1950.87 *12*		2077.77 *21*			
1954.3 *7*		2087.76 *18*			

† From least–squares fit to Eγ, excluding data for multiply placed transitions and for the 48.303γ and 232.286γ, both of which fit their placements particularly poorly. However, it should be noted that 28 of the remaining 570 Eγ data deviate by at least 3σ from the least–squares prediction and, of those, 12 deviate by at least 5σ. The latter are noted in comments on the relevant γ.

‡ Recommended value from 2000Pr03, unless otherwise noted; based on transition multipolarity and deduced band structure.

§ From 1978Sc10.

\# Spin from the angular distribution measurements of the primary γ feeding level (1979Bo08).

@ From least–squares fit to Eγ (cf. S(n)=6243.64 *2* in 2003Au03).

& s–wave capture on Jπ=7/2− target.

a (A): Kπ=0−, (π 7/2[523])−(ν 7/2[633]) band.

b (B): Kπ=7−, (π 7/2[523])+(ν 7/2[633]) band.

c (C): Kπ=3+, (π 7/2[523])−(ν 1/2[521]) band.

d (D): Kπ=5+ band. Configuration: (π 3/2[411]+ν 7/2[633])+(π 7/2[523]+ν 3/2[521]).

e (E): Kπ=6+, (π 7/2[523])+(ν 5/2[512]) band.

f (F): Kπ=4+, (π 7/2[523])+(ν 1/2[521]) band.

g (G): Kπ=1−, (π 1/2[411])+(ν 1/2[521]) band.

h (H): Kπ=1+, (π 7/2[523])−(ν 5/2[523]) band.

i (I): Kπ=2−, (π 7/2[523])−(ν 7/2[633])+Q_{22} band.

j (J): Kπ=2+ band. Configuration: (π 3/2[411]−ν 7/2[633])+(π 7/2[523]−ν 3/2[521]).

k (K): Kπ=1+, (π 7/2[523])−(ν 5/2[512]) band.

l (L): Kπ=3+, (π 1/2[411])−(ν 7/2[633]) band.

m (M): Kπ=4+, (π 1/2[411])+(ν 7/2[633]) band.

n (N): Kπ=4+, (π 7/2[523])+(ν 1/2[510]) band.

o (O): Kπ=3+, (π 7/2[523])−(ν 1/2[510]) band.

p (P): Kπ=1−, (π 3/2[411])−(ν 1/2[521]) band.

q (Q): Kπ=2−, (π 3/2[411])+(ν 1/2[521]) band.

r (R): Kπ=5−, (π 7/2[523])+(ν 7/2[633])−Q_{22} band.

s (S): Kπ=0−, (π 1/2[411])−(ν 1/2[521]) band.

t (T): Kπ=3− band. Configuration (π 1/2[541])−(ν 7/2[633]) or (π 1/2[411])+(ν 5/2[512]).

u (U): Kπ=6+, (π 7/2[523])+(ν 5/2[523]) band.

v (V): Kπ=2+, (π 7/2[523])−(ν 3/2[521]) band.

w (W): Kπ=5+, (π 7/2[523])+(ν 3/2[521]) band.

x From Adopted Levels.

Footnotes continued on next page

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

^{166}Ho Levels (continued)

y From Adopted Levels.
z 2 or possibly 4 from 5812γ(θ), not 4 from 5812γ circular polarization (1979Bo08).
α J=3,4 from 5761γ(θ) (1979Bo08).
β 4 or possibly 3 from 5523γ(θ) (1979Bo08).

γ(^{166}Ho)

Iγ normalization: from 1967Mo05. If, instead, one obtained Iγ normalization by requiring that Σ(I(γ+ce) to g.s.)=100, a value of 1.02 *9* would be obtained, in excellent agreement with the normalization recommended by 1967Mo05. The ratio R=Iγ(2007ChZX, 'Budapest data')/Iγ(1967Mo05) varies widely but, if cases where the intensities differ by at least a factor of 3 are removed from consideration, the average value of R is 0.93 for secondary lines and 1.10 for primary transitions. Some, but not all, of the inconsistencies may stem from the poorer energy resolution of the 2007ChZX measurement or from the presence of unidentified impurities. For the strong 116.8γ, 136.7γ, 5181γ, 5212γ and 5813γ, Iγ(2007ChZX)/Iγ(1967Mo05) is 0.83 *9*, 0.85 *10*, 0.95 *9*, 1.04 *11* and 0.93 *8*, respectively. With the adopted normalization, the total observed primary γ intensity is 16%.

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	I(γ+ce)[c]	Comments
(3.1)	263.7876				4.1 *7*	Eγ: from level energy difference; transition expected but not observed (see 1978Ba78). I(γ+ce): from I(γ+ce) imbalance at 264 level.
(9.393)	180.467				12.3 *10*	Eγ: from level energy difference; transition expected but not observed (see 1978Ba78). I(γ+ce): from I(γ+ce) imbalance at 180 level.
10.43[@] *2*	190.9021	0.052[&] *9*	[E1]	27.2		α(L)=21.0 *4*; α(M)=5.02 *8*; α(N+..)=1.158 *18*. α(N)=1.059 *16*; α(O)=0.0972 *15*; α(P)=0.00186 *3*.
(16.97)	671.746					
(18.483)	348.257					Eγ: from level energy difference; γ expected but not observed.
19.840[@] *6*	190.9021	1.09[&] *9*	E1	4.79		α(L)=3.74 *6*; α(M)=0.847 *12*; α(N+..)=0.206 *3*. α(N)=0.185 *3*; α(O)=0.0204 *3*; α(P)=0.000514 *8*. Mult.: from Adopted Gammas.
28.242[@] *9*	82.4707	0.040[&] *3*	M1	16.99		α(L)=13.27 *19*; α(M)=2.93 *5*; α(N+..)=0.785 *11*. α(N)=0.681 *10*; α(O)=0.0987 *14*; α(P)=0.00551 *8*. Mult.: from Adopted Gammas.
[x]37.42[@] *4*		0.014[&] *3*				Placement from 605 and 672 levels rejected in 2000Pr03.
38.493 *6*	464.501	0.34 *2*	M1(+E2)	90 *80*		α(L)=7.E1 7; α(M)=16 *15*; α(N+..)=4 *4*. α(N)=4 *4*; α(O)=0.4 *4*; α(P)=0.0013 *10*. Iγ: from 1989Du03. Other: 0.30 *9* (1967Mo05). Mult.: from α(L1)exp=4.6 *27* (1967Mo05) using Iγ value of 1989Du03. Other Eγ: 38.492 *8* (1989Du03).
(42.994)	416.086					Eγ: from level energy difference; γ expected but not observed.
46.232[b] *4*	634.314	0.12 *2*				Iγ: from 1989Du03. Other: 0.02 (1967Mo05).
48.0315 *7*	377.806	0.17 *3*				
48.303[§ba] *4*	464.501	0.03				
51.8155 *7*	481.846	0.23 *3*	[M1]	2.83		
53.3434 *7*	597.015	0.090 *14*				

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CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
54.2392 *7*	54.2391	2.50 *25*	E2	31.3	α(L)=24.0 *4*; α(M)=5.81 *9*; α(N+..)=1.457 *21*. α(N)=1.305 *19*; α(O)=0.1519 *22*; α(P)=0.0001670 *24*. Mult.: from L12:L3:M:N=20:20:14:2 (1973PrZI); α(L12)exp=7.8 *31*, α(L3)exp=7.8 *31*, α(M)exp=5.9 *29*, α(N)exp=0.8 *5* (1973PrZI). α(L3)exp=14 *5*, L2:L3:M:N=125 *38*:138 *41*:54 *16*:16 *5* (1967Mo05).
57.190# *10*	719.370	0.16			
x57.469 *10*		0.07			Placement from 725 level rejected in 2000Pr03.
57.517 *8*	521.982	0.32 *6*			
x57.83§ *2*		0.02			
(59.594)	475.680				Eγ: from level energy difference; γ expected but not observed.
66.103 *7*	547.934	0.20 *4*			Other: Eγ=66.31 *8*, Iγ=0.18 *3* ('Budapest data', 2007ChZX).
69.7604 *14*	260.6625	2.8 *3*	M1	7.37	α(K)=6.19 *9*; α(L)=0.926 *13*; α(M)=0.205 *3*; α(N+..)=0.0548 *8*. α(N)=0.0475 *7*; α(O)=0.00690 *10*; α(P)=0.000386 *6*. L12:M:N=5:<1:<1 (1973PrZI); α(L12)exp=1.9 *10* (1973PrZI); α(L1)exp=0.47 *20* from 1967Mo05 and 0.80 *15* quoted by 1967Mo05 from other work. Other: Eγ=69.79 *4*, Iγ=1.76 *10* ('Budapest data', 2007ChZX).
70.988 *10*	668.005	0.18 *4*			
72.8859 *15*	263.7876	0.20 *4*	E2	9.62	α(K)=2.05 *3*; α(L)=5.81 *9*; α(M)=1.405 *20*; α(N+..)=0.353 *5*. α(N)=0.316 *5*; α(O)=0.0371 *6*; α(P)=9.27×10^{-5} *13*. Mult.: from α(L2)exp=2.8 *15*, α(L3)exp=4.5 *24* (1967Mo05) one obtains mult=E2(+M1), δ>1.6. The level scheme requires ΔJ=2. E1+M2 would require δ>1.2 and thus is excluded by RUL. Other: Eγ=72.89 *7*, Iγ=0.27 *5* ('Budapest data', 2007ChZX).
74.261b *16*	736.430	0.09 *3*			Placement from 979 level rejected in 2000Pr03. Other: Eγ=74.93 *6*, Iγ=0.50 *5* ('Budapest data', 2007ChZX); discrepant data suggest presence of an impurity and/or a multiplet in that study.
75.753 *16*	634.314	0.070 *21*			
75.985 *8*	891.124	0.070 *21*			
76.4663b *14*	598.448	0.34 *3*			Placement from 947 level rejected in 2000Pr03.
76.7258b *14*	558.571	0.19 *3*			Other: Eγ=76.69 *6*, Iγ=0.53 *5* ('Budapest data', 2007ChZX); possibly an unresolved doublet. Placement from 1023 level rejected in 2000Pr03.
x78.871 *12*		0.05			
82.470 *2*	82.4707	0.97 *10*	M1	4.55	α(K)=3.82 *6*; α(L)=0.569 *8*; α(M)=0.1257 *18*; α(N+..)=0.0337 *5*. α(N)=0.0292 *4*; α(O)=0.00424 *6*; α(P)=0.000237 *4*. Mult.: from α(L1)exp=1.0 *5* (1973PrZI); α(K)exp=2.8 *14*, α(L1)exp=0.5 *3* (1967Mo05). Other: Eγ=82.49 *5*, Iγ=0.68 *5* ('Budapest data', 2007ChZX).
83.049be *14*	558.571	0.050e *15*			Placement from 1087 level rejected in 2000Pr03.
	605.047	0.050e *15*			Placement from 1087 level rejected in 2000Pr03.
84.468b *10*	379.547	0.13 *3*			Other Eγ: 84.68 *7*, Iγ=0.229 *26* ('Budapest data', 2007ChZX); possibly for unresolved doublet. Placement from 348 level rejected in 2000Pr03.
84.742 *14*	628.418	0.040 *12*			
86.359 *11*	634.314	0.100 *25*			
86.765b *11*	683.805	0.100 *25*			Placement from 1097 level rejected in 2000Pr03.
87.193 *15*	562.890	0.040 *12*			

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
87.5946 16	348.257	1.24 12	M1(+E2)	4.2 5	α(K)=2.3 9; α(L)=1.5 10; α(M)=0.35 25; α(N+..)=0.09 6. α(N)=0.08 6; α(O)=0.010 6; α(P)=0.00013 7. K:L1:M=100 30:21 10:9 5 and α(K)exp=3.0 10 (1967Mo05). Other: Eγ=87.47 4, Iγ=1.14 6 ('Budapest data', 2007ChZX).
88.60 3	171.0738	0.03	[E2]	4.466	
89.599 13	260.6625	0.100 15	[E1]	0.424	α(K)=0.352 5; α(L)=0.0564 8; α(M)=0.01245 18; α(N+..)=0.00323 5. α(N)=0.00283 4; α(O)=0.000380 6; α(P)=1.580×10^{-5} 23.
90.720[b] 15	774.522	0.04			Other: Eγ=90.8 7, Iγ=0.026 23 ('Budapest data', 2007ChZX).
91.286[b] 13	470.841	0.070 18			Placement from 1115 level rejected in 2000Pr03.
91.407 13	464.501	0.090 18			
92.355[b] 13	760.345	0.050 10			
[x]92.819[§] 15		0.05			
94.529 11	662.169	0.040 12			
94.643[a] 11	638.235	0.20 3			Other: Eγ=94.87 9, Iγ=0.25 4 ('Budapest data', 2007ChZX).
95.190[b] 3	693.638	0.25 4			
95.767 3	832.197	0.090 10			
95.953[b] 2	521.982	0.120 12			Other: Eγ=95.78 11, Iγ=0.18 3 ('Budapest data', 2007ChZX).
96.265 20	654.818	0.020 6			
96.381 20	693.388	0.020 6			
97.253[be] 20	725.68	0.015[e]			
	935.12	0.015[e]			
98.200[b] 15	732.513	0.030 8			Placement from 1023 level rejected in 2000Pr03.
98.572[b] 16	529.816	0.040 8			Placement from 905 level rejected in 2000Pr03.
98.8572 15	470.841	0.56 6	M1,E2	2.82 13	α(K)=1.7 6; α(L)=0.9 6; α(M)=0.21 14; α(N+..)=0.05 4. α(N)=0.05 3; α(O)=0.006 4; α(P)=9.×10^{-5} 5. α(L12)exp<2 (1973PrZI); α(L12)exp=0.6 4 (1967Mo05). Other: Eγ=98.86 5, Iγ=0.43 3 ('Budapest data', 2007ChZX).
[x]99.293[§] 14		0.015			
99.584[be] 16	704.962	0.020[e] 5			
	757.707	0.020[e] 5			
102.55 4	475.680	0.016	[E2]	2.57	
103.116 15	567.624	0.052 8			
[x]104.295 15		0.049 7			
105.517 4	453.771	0.52 5	M1(+E2)	2.27 5	α(K)=1.4 5; α(L)=0.7 4; α(M)=0.16 10; α(N+..)=0.040 24. α(N)=0.035 21; α(O)=0.0044 23; α(P)=8.×10^{-5} 4. K/L12=9 6 and α(K)exp=2.6 10 (1967Mo05). Other: Eγ=105.54 5, Iγ=0.377 26 ('Budapest data', 2007ChZX).
[x]106.869 4		0.160 24			Placement from 655 level rejected in 2000Pr03. Other: Eγ=107.07 19, Iγ=0.108 24 ('Budapest data', 2007ChZX).
[x]107.181 16		0.040 8			
107.71[a] 3	704.962	0.030 8			
108.199 2	371.985	0.85 9	M1(+E2)	2.09 4	α(K)=1.3 5; α(L)=0.6 4; α(M)=0.14 9; α(N+..)=0.036 21. α(N)=0.032 19; α(O)=0.0040 21; α(P)=7.×10^{-5} 4. α(L12)exp=0.26 14 (1967Mo05). Other: Eγ=108.22 5, Iγ=0.64 5 ('Budapest data', 2007ChZX).
109.241[b] 12	704.962	0.030 6			
109.887 18	481.846	0.020 5	[M1]	1.99	
110.327[b] 12	942.524	0.040 8			Placement from 658 level rejected in 2000Pr03.
111.324 2	371.985	0.63 6	M1(+E2)	1.91	α(K)=1.2 4; α(L)=0.5 3; α(M)=0.12 8; α(N+..)=0.032 18. α(N)=0.028 16; α(O)=0.0035 18; α(P)=7.×10^{-5} 4. Mult.: α(K)exp=1.8 8, K:L12=178 71:36 18 (1967Mo05). Other: Eγ=111.30 4, Iγ=0.47 3 ('Budapest data', 2007ChZX).

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
x112.869 *12*		0.020 *6*			Placement from 832 level rejected in 2000Pr03.
113.17§b *2*	671.746	0.02			
113.373b *3*	807.011	0.120 *18*			
113.644e *4*	543.672	0.150e *23*			Other: Eγ=113.63 *6*, Iγ=0.198 *23* ('Budapest data', 2007ChZX).
	742.02	0.15e *2*			
114.50be *3*	644.29	0.01e			
	883.94	0.01e			
115.167 *4*	597.015	0.090 *14*			
115.51b *3*	774.522	0.01			Placement from 885 level rejected in 2000Pr03.
115.759b *3*	379.547	0.34 *5*			
116.197b *13*	638.235	0.060 *15*			
116.835 *1*	171.0738	15.8 *16*	M1	1.673	α(K)=1.406 *20*; α(L)=0.209 *3*; α(M)=0.0460 *7*; α(N+..)=0.01233 *18*. α(N)=0.01069 *15*; α(O)=0.001555 *22*; α(P)=8.71×10^{-5} *13*. K:L1:M:N=100 *15*:15 *2*:4.7 *14*:1.6 *5* (1967Mo05); K:L1:L2:L3=100 *15*:13 *2*:1.7 *5*:<0.9 (1967Mo05, thin source); K:L12:M:N=24:5:2:<1 (1973PrZI). α(K)exp=1.5 *4*, α(L12)exp=0.29 *15*, α(M)exp=0.13 *6*, α(N)exp<0.06 (1973PrZI). Other: Eγ=116.84 *4*, Iγ=13.0 *6* ('Budapest data', 2007ChZX).
117.264e *3*	588.083	0.20e *2*			
	771.94	0.200e *20*			
x118.41 *3*		0.02			Placement from 925 level rejected in 2000Pr03.
118.49 *2*	662.169	0.03			
x118.78 *5*		0.02			
120.06b *2*	595.726	0.020 *6*			Placement from 668 level rejected in 2000Pr03.
120.36§ba *3*	668.005	0.01			
121.48b *3*	597.015	0.01			
122.577b *4*	470.841	0.090 *18*			Placement from 598 level rejected in 2000Pr03.
x122.89 *2*		0.01			
123.437 *5*	577.208	0.100 *15*			Other: Eγ=123.25 *19*, Iγ=0.11 *3* ('Budapest data', 2007ChZX).
123.81 *2*	671.746	0.01			
124.350 *15*	668.005	0.040 *8*			
126.228 *3*	180.467	1.06 *11*	E2	1.200	α(K)=0.601 *9*; α(L)=0.460 *7*; α(M)=0.1105 *16*; α(N+..)=0.0280 *4*. α(N)=0.0249 *4*; α(O)=0.00300 *5*; α(P)=2.56×10^{-5} *4*. K:L2:L3=100 *30*:29 *14*:29 *14*; α(K)exp=0.74 *24* (1967Mo05). Other: Eγ=126.21 *5*, Iγ=0.89 *6* ('Budapest data', 2007ChZX).
128.566b *5*	423.651	0.140 *21*			
129.353 *7*	605.047	0.080 *16*			Other: Eγ=129.19 *16*; Iγ=0.15 *3* ('Budapest data', 2007ChZX).
130.641b *16*	788.618	0.01			
131.41 *3*	736.430	0.01			Other: Eγ=131.27 *4*, Iγ=0.15 *4* ('Budapest data', 2007ChZX); discrepancy suggests presence of an impurity in this study.
131.759 *5*	137.729	0.140 *21*			
132.472b *17*	597.015	0.03			Other: Eγ=132.35 *18*, Iγ=0.17 *3* ('Budapest data', 2007ChZX); may not have resolved a close doublet.
134.00§b *3*	598.448	0.01			Other: Eγ=133.89 *15*; Iγ=0.19 *3* ('Budapest data', 2007ChZX); may be a multiplet, but Iγ suggests the presence of an impurity as well in this study.
134.34 *3*	588.083	0.020 *6*			See comment on 134.0γ.
134.815b *6*	514.362	0.060 *15*			Placement from 693 level rejected in 2000Pr03. See comment on 134.0γ.
135.15b *2*	723.239	0.040 *12*			
135.883 *4*	683.805	0.100 *15*			

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	Comments
136.662 *2*	190.9021	27.5 *28*	E1	0.1378	α(K)=0.1155 *17*; α(L)=0.01749 *25*; α(M)=0.00385 *6*; α(N+..)=0.001007 *14*. α(N)=0.000880 *13*; α(O)=0.0001210 *17*; α(P)=5.50×10^{-6} *8*. K:L12:M:N=4:1:<1:<1 (1973PrZI); K:L12=9.8 *12*:1.1 *2* (1967Mo05); α(K)exp=0.16 *6*, α(L12)exp=0.039 *23* (1973PrZI). Other: Eγ=136.67 *4*, Iγ=23.3 *11* ('Budapest data', 2007ChZX).
[x]137.09[§] *3*		0.01			
137.51[bf] *2*	567.624	0.020 *6*			
137.99[b] *4*	736.430	0.007			Placement from 558 level rejected in 2000Pr03. Other: Eγ=138.85 *22*, Iγ=0.11 *4* ('Budapest data', 2007ChZX); discrepancy suggests presence of an impurity in this study.
140.117[b] *5*	683.805	0.35 *4*	M1+(E2)	0.91 *9*	α(K)exp=0.86 *28* (1967Mo05). α(K)=0.64 *20*; α(L)=0.21 *9*; α(M)=0.048 *21*; α(N+..)=0.012 *6*. α(N)=0.011 *5*; α(O)=0.0014 *5*; α(P)=3.6×10^{-5} *17*. Placement from 662 level rejected in 2000Pr03. Other: Eγ=140.14 *7*, Iγ=0.43 *5* ('Budapest data', 2007ChZX).
140.544 *10*	605.047	0.090 *10*			
141.599 *7*	567.624	0.130 *13*			Other: Eγ=141.55 *14*; Iγ=0.15 *3* ('Budapest data', 2007ChZX).
[x]143.41 *2*		0.015 *5*			Placement from 815 level rejected in 2000Pr03.
145.00 *3*	742.02	0.02			
145.228[b] *7*	905.544	0.140 *10*			Other: Eγ=145.27 *12*; Iγ=0.093 *18* ('Budapest data', 2007ChZX).
146.808 *8*	562.890	0.095 *14*			Other: Eγ=146.61 *16*, Iγ=0.061 *16* ('Budapest data', 2007ChZX).
149.307 *3*	329.774	4.2 *4*	(M1)	0.835	α(K)=0.702 *10*; α(L)=0.1037 *15*; α(M)=0.0229 *4*; α(N+..)=0.00614 *9*. α(N)=0.00532 *8*; α(O)=0.000774 *11*; α(P)=4.34×10^{-5} *6*. K:L12:M:N=5:1:<1:<1 (1973PrZI); K:L1=66 *10*:9.5 *24* (1967Mo05); α(K)exp=1.2 *5*, α(L12)exp=0.2 *1* (1973PrZI). α(K)exp=0.68 *19* and 0.66 *12* (thin source) (1967Mo05). Other: Eγ=149.32 *4*, Iγ=3.62 *19* ('Budapest data', 2007ChZX).
150.268[b] *8*	529.816	0.110 *17*			
151.533 *9*	567.624	0.080 *12*			Other: Eγ=151.19 *19*, Iγ=0.053 *14* ('Budapest data', 2007ChZX).
152.45 *3*	634.314	0.016 *5*			
152.71 *3*	628.418	0.025 *5*			
[x]153.32 *4*		0.006			
154.71[ab] *3*	792.789	0.025 *5*			Placement from 891 level rejected in 2000Pr03.
155.42[be] *3*	732.513	0.025[e] *5*			Placement from 925 level rejected in 2000Pr03.
	881.040	0.025[e] *5*			Placement from 925 level rejected in 2000Pr03.
[x]156.20 *3*		0.014			
[x]156.45 *3*		0.014			Placement from 634 level rejected in 2000Pr03.
157.344 *8*	348.257	0.21 *3*			Other: Eγ=157.38 *7*, Iγ=0.167 *18* ('Budapest data', 2007ChZX).
[x]157.95 *5*		0.014			Placement from 725 level rejected in 2000Pr03.
158.702 *9*	329.774	0.060 *12*			
[x]159.38 *2*		0.050 *10*			
159.89[b] *3*	423.651	0.010 *3*			Placement from 885 level rejected in 2000Pr03.
160.63 *2*	757.707	0.040 *8*			
161.42[ab] *2*	704.962	0.030 *6*			Other: Eγ=161.14 *10*, Iγ=0.114 *14* ('Budapest data', 2007ChZX); inconsistent data may indicate presence of an impurity.
162.452 *10*	592.501	0.065 *13*			

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
163.352[b] 7	760.345	0.51 5			Placement from 791 level rejected in 2000Pr03. Other: Eγ=163.30 5, Iγ=0.359 24 ('Budapest data', 2007ChZX).
164.57[b] 4	883.94	0.020 6			
166.983 5	597.015	0.170 17			
167.450[b] 5	431.239	0.95 10	E1		α(K)exp<0.19 (1967Mo05). Placement from 638 level rejected in 2000Pr03. Other: Eγ=167.40 4, Iγ=0.89 5 ('Budapest data', 2007ChZX).
[x]168.49 3		0.040 12			
169.45[b] 3	430.031	0.02			
169.712[b] 5	837.717	0.240 24			Placement from 825 level rejected in 2000Pr03. Other: Eγ=169.70 7, Iγ=0.242 23 ('Budapest data', 2007ChZX).
170.09[e] 3	832.197	0.01[e]			
	985.20	0.01[e]			
170.584 15	543.672	0.050 10			
171.67[b] 3	693.638	0.030 6			Placement from 947 level rejected in 2000Pr03. Other: Eγ=171.2 4, Iγ=0.042 15 ('Budapest data', 2007ChZX).
173.47[b] 12	638.235	0.02			Placement from 736 level rejected in 2000Pr03.
174.77[b] 4	935.12	0.02			
175.73 4	470.841	0.030 9			See comment on 176.0γ.
175.98 2	547.934	0.070 14			Other: Eγ=175.75 14; Iγ=0.085 18 ('Budapest data', 2007ChZX); may include the 175.7γ.
[x]177.71 4		0.01			
179.032 6	605.047	0.25 4	(M1,E2)	0.43 8	α(K)=0.32 10; α(L)=0.082 20; α(M)=0.019 6; α(N+..)=0.0049 13. α(N)=0.0043 12; α(O)=0.00057 11; α(P)=1.8×10^{-5} 8. α(K)exp=0.32 21, 0.60 20 (1967Mo05). Other data: Eγ=179.28 7, Iγ=0.354 26 ('Budapest data', 2007ChZX).
179.882[d] 4	557.65	0.15[d] 5			α(K)exp=0.32 21, 0.60 20 (1967Mo05), mult=M1,E2 for doublet. Iγ: from γγ coin (2000Pr03); Iγ=0.25 4 for doublet.
	595.726	0.10[d] 3			α(K)exp=0.32 21, 0.60 20 (1967Mo05), mult=M1,E2 for doublet. Iγ: from γγ coin (2000Pr03); Iγ=0.25 4 for doublet.
180.545 5	634.314	0.20 3	(M1,E2)	0.42 8	α(K)exp=0.40 17 (1967Mo05). α(K)=0.31 10; α(L)=0.079 19; α(M)=0.018 5; α(N+..)=0.0048 12. α(N)=0.0042 11; α(O)=0.00055 10; α(P)=1.8×10^{-5} 8.
181.086[d] 5	371.985	1.17[d] 13	(M1)	0.487	α(K)=0.409 6; α(L)=0.0603 9; α(M)=0.01330 19; α(N+..)=0.00357 5. α(N)=0.00309 5; α(O)=0.000450 7; α(P)=2.53×10^{-5} 4. α(K)exp=0.8 3 (1973PrZI), 0.42 14 and 0.43 10 (thin source) (1967Mo05) for doublet dominated by this transition. Iγ: 1.27 13 for doublet minus Iγ=0.10 3 (γγ coin, 2000Pr03) from 597 level. Other: Eγ=180.96 5; Iγ=1.51 8 ('Budapest data', 2007ChZX); probably includes 180.5γ.
	597.015	0.10[d] 3			Iγ: from γγ coin (2000Pr03).
182.04[b] 4	725.68	0.02			
182.302 16	657.995	0.100 15	[E2]	0.3329	
[x]183.11[§] 6		0.01			
183.96 4	654.818	0.050 15			
[x]184.23 2		0.150 15			Other: Eγ=184.04 21; Iγ=0.056 19 ('Budapest data', 2007ChZX).
186.147 6	668.005	0.120 18			

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
186.582 *6*	558.571	0.28 *3*	E2,M1	0.38 *7*	α(K)exp=0.24 *18* (1967Mo05). α(K)=0.29 *9*; α(L)=0.071 *15*; α(M)=0.016 *4*; α(N+..)=0.0042 *10*. α(N)=0.0037 *9*; α(O)=0.00049 *8*; α(P)=1.6×10^{-5} *7*. Other: Eγ=186.53 *6* Iγ=0.32 *4* ('Budapest data', 2007ChZX).
187.93 *5*	945.86	0.01			
188.98 *3*	605.047	0.070 *14*			Other: Eγ=189.02 *18* Iγ=0.071 *26* ('Budapest data', 2007ChZX).
189.89 *5*	671.746	0.01			
191.12[bf] *3*	910.49?	0.030 *6*			
191.961 *11*	885.345	0.130 *20*			
192.33 *2*	668.005	0.070 *14*			
193.107 *6*	453.771	0.190 *19*			Other: Eγ=192.62 *8*, Iγ=0.23 *3* ('Budapest data', 2007ChZX); probably unresolved doublet (193.1γ+192.3γ).
194.529 *10*	567.624	0.130 *20*			Other: Eγ=194.51 *13*, Iγ=0.13 *3* ('Budapest data', 2007ChZX).
195.687[ab] *14*	792.789	0.080 *12*			
197.11 *5*	668.005	0.03			
197.339 *8*	377.806	0.32 *5*	(E2)	0.255	α(K)exp=0.26 *17* (1967Mo05). α(K)=0.1669 *24*; α(L)=0.0679 *10*; α(M)=0.01606 *23*; α(N+..)=0.00410 *6*. α(N)=0.00364 *6*; α(O)=0.000454 *7*; α(P)=7.88×10^{-6} *11*. Other: Eγ=197.58 *5*, Iγ=0.55 *5* ('Budapest data', 2007ChZX); probably a 197.7γ+197.3γ+197.1γ unresolved multiplet.
197.677[b] *10*	662.169	0.20 *3*			
198.31[be] *5*	628.418	0.03[e]			
	742.02	0.03[e]			
[x]199.12 *5*		0.040 *12*			Placement from 757 level rejected in 2000Pr03.
199.710 *8*	547.934	0.80 *8*	(M1)	0.371	α(K)=0.312 *5*; α(L)=0.0459 *7*; α(M)=0.01012 *15*; α(N+..)=0.00271 *4*. α(N)=0.00235 *4*; α(O)=0.000342 *5*; α(P)=1.93×10^{-5} *3*. α(K)exp=1.3 *8* (1973PrZI); α(K)exp=0.26 *11* (1967Mo05). Other: Eγ=199.66 *5*, Iγ=0.77 *5* ('Budapest data', 2007ChZX).
201.08 *3*	654.818	0.040 *8*			
201.95[be] *3*	373.092	0.050[e] *10*			Other: Eγ=201.93 *22*, Iγ=0.060 *24* ('Budapest data', 2007ChZX).
	683.805	0.050[e] *10*			
[x]205.03 *8*		0.02			
206.15[be] *2*	925.0	0.050[e] *8*			Other data: Eγ=206.52 *24*, Iγ=0.071 *16* ('Budapest data', 2007ChZX).
	942.524	0.050[e] *8*			See comment on 206γ from 925 level.
207.04 *2*	470.841	0.040 *6*			
208.34[b] *4*	638.235	0.065 *10*			Placement from 876 level rejected in 2000Pr03. Other: Eγ=208.48 *12*, Iγ=0.129 *18* ('Budapest data', 2007ChZX); probably for unresolved 208.3γ+208.9γ doublet.
208.90[b] *4*	723.239	0.030 *6*			Indicated as multiply–placed (2000Pr03), but no other placement was identified.
209.69 *4*	757.707	0.020 *6*			
210.300 *6*	558.571	0.30 *5*	M1(+E2)	0.26 *6*	α(K)exp=0.40 *23* (1967Mo05). α(K)=0.20 *7*; α(L)=0.046 *7*; α(M)=0.0106 *18*; α(N+..)=0.0028 *4*. α(N)=0.0024 *4*; α(O)=0.00032 *3*; α(P)=1.2×10^{-5} *5*. Other: Eγ=210.36 *6*, Iγ=0.290 *24* ('Budapest data', 2007ChZX).
[x]211.06 *6*		0.030 *6*			
211.53 *6*	693.388	0.01			
212.30[e] *6*	628.418	0.040[e] *8*			Other: Eγ=212.4 *3*, Iγ=0.029 *15* ('Budapest data', 2007ChZX).

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	Comments
212.30[be] 6	883.94	0.040[e] 8			
213.04[b] 6	644.29	0.01			Placement from 683 level rejected in 2000Pr03.
214.442 9	736.430	0.22 3	M1(+E2)		Mult.: α(K)exp=0.40 25 (1967Mo05).
					Other: Eγ=214.46 8, Iγ=0.171 19 ('Budapest data', 2007ChZX).
215.44[§b] 9	985.20	0.01			
216.16 5	588.083	0.020 6			
216.85[b] 6	760.345	0.04			Placement from 815 level rejected in 2000Pr03.
					Other: Eγ=216.79 25, Iγ=0.045 14 ('Budapest data', 2007ChZX). May include 216.1γ.
217.23 6	885.345	0.04			
218.00 6	671.746	0.04			
[x]219.02 6		0.060 18			Placement from 961 level rejected in 2000Pr03.
					Other: Eγ=218.95 14, Iγ=0.084 16 ('Budapest data', 2007ChZX).
219.44[b] 6	683.805	0.080 20			
221.174 9	481.846	3.9 4	(M1)	0.280	α(K)=0.236 4; α(L)=0.0346 5; α(M)=0.00763 11; α(N+..)=0.00204 3.
					α(N)=0.001772 25; α(O)=0.000258 4; α(P)=1.454×10^{-5} 21.
					α(K)exp=0.21 3, K:L12=21.0 25:3.6 7 (1967Mo05, thin source).
					Other: Eγ=221.18 4, Iγ=3.30 18 ('Budapest data', 2007ChZX).
222.634 7	815.139	0.220 22			Other: Eγ=222.66 10, Iγ=0.201 23 ('Budapest data', 2007ChZX).
224.01 15	597.015	0.01			
225.722[b] 9	788.618	0.070 14			Placement from 951 level rejected in 2000Pr03.
					Other: Eγ=225.81 22, Iγ=0.050 18 ('Budapest data', 2007ChZX).
227.88 7	557.65	0.02			
[x]228.53 7		0.050 15			
229.00[e] 7	577.208	0.050[e] 15			
	704.962	0.050[e] 15			
230.11[b] 5	792.789	0.030 6			Placement from 807 level rejected in 2000Pr03.
[x]230.89 8		0.030 6			
231.957 14	605.047	0.24 5			Eγ=232.02 15, Iγ=0.37 8 ('Budapest data', 2007ChZX); possibly for a 232.0γ+232.3γ doublet.
232.286[ab] 9	662.169	0.27 5			Placement from 658 level rejected in 2000Pr03.
					See comment on 232.0γ.
233.112 14	562.890	0.63 6	M1	0.243	α(K)=0.204 3; α(L)=0.0299 5; α(M)=0.00660 10; α(N+..)=0.001769 25.
					α(N)=0.001533 22; α(O)=0.000223 4; α(P)=1.259×10^{-5} 18.
					Mult.: from α(K)exp=0.30 5 (1988Ba79). Other: 0.26 9 (1967Mo05).
					Other: Eγ=233.15 14, Iγ=0.61 6 ('Budapest data', 2007ChZX).
233.79[b] 5	832.197	0.120 24			
234.79[b] 5	529.816	0.05			
235.80 5	870.13	0.060 18			
236.31[e] 8	662.169	0.030[e] 9			
	891.124	0.030[e] 9			
239.140 11	430.031	4.2 4	M1	0.226	α(K)=0.191 3; α(L)=0.0279 4; α(M)=0.00615 9; α(N+..)=0.001649 23.
					α(N)=0.001429 20; α(O)=0.000208 3; α(P)=1.174×10^{-5} 17.
					α(K)exp=0.18 3 (1967Mo05, thin source); α(K)exp=0.33 13 (1973PrZI); K:(L1+L2)=17 6:3.0 15 (1967Mo05).
					Other: Eγ=239.13 4, Iγ=3.62 19 ('Budapest data', 2007ChZX).
241.76 5	671.746	0.050 10			Other: Eγ=242.8 3, Iγ=0.060 28 ('Budapest data', 2007ChZX); may be a 242.9γ+241.8γ doublet, but Iγ is consistent with that for the 241.8γ alone whereas Eγ matches that for the stronger 242.9γ.

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	Comments
242.90[b] *2*	881.040	0.17 *3*			Other: Eγ=242.8 *3*, Iγ=0.060 *28* ('Budapest data', 2007ChZX); may be a 242.9γ+241.8γ doublet, but Iγ is closer to that from 1967Mo05 for the weaker 241.8γ alone.
245.007 *7*	416.086	1.04 *10*	M1	0.212	α(K)=0.1785 *25*; α(L)=0.0261 *4*; α(M)=0.00576 *8*; α(N+..)=0.001543 *22*. α(N)=0.001337 *19*; α(O)=0.000195 *3*; α(P)=1.099×10^{-5} *16*. α(K)exp=0.17 *7* (1967Mo05); 0.18 *3* (1988Ba79). Other: Eγ=245.00 *7*, Iγ=0.76 *8* ('Budapest data', 2007ChZX).
246.07 *2*	662.169	0.20 *4*			
247.68[b] *9*	769.78	0.030 *9*			
248.77[b] *9*	719.370	0.060 *12*			Placement from 420 level rejected in 2000Pr03.
250.49 *9*	514.362	0.070 *14*			Placement from 905 level rejected in 2000Pr03.
253.78[b] *3*	683.805	0.120 *24*			Other: Eγ=253.87 *18*, Iγ=0.090 *26* ('Budapest data', 2007ChZX).
255.37 *3*	628.418	0.090 *18*			
256.60 *2*	815.139	0.26 *4*	M1(+E2)		Mult.: α(K)exp=0.24 *17* (1967Mo05). Other: Eγ=256.23 *24*, Iγ=0.148 *18* ('Budapest data', 2007ChZX).
257.81 *2*	263.7876	0.26 *4*	M2	0.844	α(K)exp=0.5 *3* (1967Mo05). α(K)=0.674 *10*; α(L)=0.1313 *19*; α(M)=0.0300 *5*; α(N+..)=0.00805 *12*. α(N)=0.00699 *10*; α(O)=0.001001 *14*; α(P)=5.22×10^{-5} *8*. Other: Eγ=257.54 *12*, Iγ=0.29 *6* ('Budapest data', 2007ChZX).
260.75 *2*	736.430	0.160 *24*			Other: Eγ=260.81 *12*, Iγ=0.124 *23* ('Budapest data', 2007ChZX).
261.31 *7*	521.982	0.040 *12*			
[x]261.96 *7*		0.05			
[x]262.93[§] *9*		0.3			
263.36[b] *5*	558.571	0.120 *18*			Placement from 693 level rejected in 2000Pr03. Other: Eγ=263.14 *20*, Iγ=0.077 *21* ('Budapest data', 2007ChZX).
265.12[b] *5*	638.235	0.18 *4*			Placement from 870 level rejected in 2000Pr03.
266.03 *5*	824.62	0.28 *6*			Other: Eγ=265.76 *13*, Iγ=0.274 *23* ('Budapest data', 2007ChZX).
266.53[be] *5*	529.816	0.24[e] *5*			
	742.02	0.24[e] *5*			
267.19[b] *5*	815.139	0.28 *6*			Placement from 597 level rejected in 2000Pr03. Other: Eγ=267.14 *13*, Iγ=0.320 *24* ('Budapest data', 2007ChZX).
267.82 *9*	683.805	0.110 *22*			
268.15[ab] *9*	598.448	0.070 *21*			
[x]269.38 *9*		0.070 *21*			Placement from 832 level rejected in 2000Pr03. Other: Eγ=268.99 *22*, Iγ=0.087 *16* ('Budapest data', 2007ChZX).
273.64 *7*	464.501	0.16 *3*			Other: Eγ=273.56 *18*, Iγ=0.10 *3* ('Budapest data', 2007ChZX).
274.77 *7*	704.962	0.130 *26*			
[x]276.83 *2*		0.03			Placement from 906 level rejected in 2000Pr03.
278.69[b] *10*	732.513	0.060 *18*			Placement from 705 level rejected in 2000Pr03.
279.79 *10*	470.841	0.030 *9*			
280.99 *10*	286.96	0.030 *9*			Placement from 825 level rejected in 2000Pr03.
282.80 *8*	654.818	0.060 *18*			
284.26 *12*	832.197	0.080 *24*			
285.81[be] *8*	423.651	0.060[e] *18*			
	659.01	0.060[e] *18*			
287.24 *3*	547.934	0.170 *26*			Other: Eγ=287.11 *15*, Iγ=0.090 *13* ('Budapest data', 2007ChZX).
288.60 *7*	704.962	0.12			

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
289.120 *15*	295.085	2.30 *23*	E1	0.0196	α(K)exp<0.03 (1967Mo05). α(K)=0.01655 *24*; α(L)=0.00237 *4*; α(M)=0.000520 *8*; α(N+..)=0.0001375 *20*. α(N)=0.0001197 *17*; α(O)=1.693×10^{-5} *24*; α(P)=8.61×10^{-7} *12*. Other: Eγ=289.04 *4*, Iγ=1.87 *10* ('Budapest data', 2007ChZX).
290.61 *3*	373.092	1.70 *17*	M1	0.1337	α(K)=0.1127 *16*; α(L)=0.01640 *23*; α(M)=0.00361 *5*; α(N+..)=0.000969 *14*. α(N)=0.000839 *12*; α(O)=0.0001223 *18*; α(P)=6.91×10^{-6} *10*. α(K)exp=0.10 *4* (1967Mo05); 0.11 *2* (1988Ba79). Other: Eγ=290.61 *4*, Iγ=1.55 *8* ('Budapest data', 2007ChZX).
291.04 *8*	481.846	0.12			
293.42 *8*	464.501	0.070 *14*			
295.99 *8*	668.005	0.040 *12*			
297.90 *3*	558.571	0.39 *8*	M1(+E2)	0.10 *3*	α(K)exp=0.15 *9* (1967Mo05). α(K)=0.08 *3*; α(L)=0.0145 *9*; α(M)=0.00328 *11*; α(N+..)=0.00087 *5*. α(N)=0.00076 *3*; α(O)=0.000104 *10*; α(P)=4.5×10^{-6} *20*. Other: Eγ=297.94 *6*, Iγ=0.303 *23* ('Budapest data', 2007ChZX).
299.88 *17*	671.746	0.03			
304.60 *2*	475.680	2.60 *26*	M1	0.1179	α(K)=0.0994 *14*; α(L)=0.01444 *21*; α(M)=0.00318 *5*; α(N+..)=0.000853 *12*. α(N)=0.000739 *11*; α(O)=0.0001077 *15*; α(P)=6.09×10^{-6} *9*. α(K)exp<0.4 (1973PrZI), 0.09 *3* (1967Mo05); 0.11 *2* (1988Ba79). α(L12)exp=0.023 *5* (1988Ba79). Other: Eγ=304.63 *4*, Iγ=2.16 *11* ('Budapest data', 2007ChZX).
305.36[b] *15*	868.24	0.14 *4*			Eγ,Iγ: from low–energy γγ coin (2000Pr03).
306.49[b] *3*	654.818	0.24 *5*			Placement from 736 level rejected in 2000Pr03. Other: Eγ=306.55 *9*, Iγ=0.177 *16* ('Budapest data', 2007ChZX).
x307.65[§] *15*		0.03			
309.59[b] *6*	725.68	0.10 *2*			Placement from 867 level rejected in 2000Pr03.
x310.89 *3*		0.30 *5*			Other: Eγ=310.78 *11*, Iγ=0.21 *3* ('Budapest data', 2007ChZX).
312.90 *8*	905.544	0.12 *4*			Placement from 951 level rejected in 2000Pr03.
313.48[e] *6*	577.208	0.12[e] *4*			Other: Eγ=313.35 *9*, Iγ=0.114 *16* ('Budapest data', 2007ChZX).
	985.20	0.12[e] *4*			
316.10 *9*	769.78	0.09			Other: Eγ=315.96 *15*, Iγ=0.110 *23* ('Budapest data', 2007ChZX).
317.28[ab] *3*	792.789	0.22 *3*			Placement from 1011 level rejected in 2000Pr03. Other: Eγ=317.18 *12*, Iγ=0.143 *22* ('Budapest data', 2007ChZX).
x321.62[§] *10*		0.09			
323.42 *7*	671.746	0.120 *24*			Other: Eγ=323.19 *13*, Iγ=0.103 *16* ('Budapest data', 2007ChZX).
324.74 *7*	806.56	0.110 *22*			Other: Eγ=324.69 *17*, Iγ=0.071 *14* ('Budapest data', 2007ChZX).
328.245 *15*	657.995	0.73 *7*			Other: Eγ=328.19 *4*, Iγ=0.63 *4* ('Budapest data', 2007ChZX).
331.88 *3*	592.501	0.27 *4*			Other: Eγ=331.77 *9*, Iγ=0.193 *19* ('Budapest data', 2007ChZX).

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
333.62 *2*	416.086	1.60 *24*	M1	0.0925	α(K)=0.0780 *11*; α(L)=0.01131 *16*; α(M)=0.00249 *4*; α(N+..)=0.000668 *10*. α(N)=0.000579 *9*; α(O)=8.43×10^{-5} *12*; α(P)=4.78×10^{-6} *7*. α(K)exp=0.08 *4* (1967Mo05); 0.11 *3* (1988Ba79). α(L12)exp=0.019 *6* (1988Ba79). Other: Eγ=333.61 *4*, Iγ=1.67 *10* ('Budapest data', 2007ChZX).
335.61[b] *8*	806.56	0.62 *12*			Placement from 684 level rejected in 2000Pr03. Iγ: Iγ=0.052 *18* for Eγ=335.89 *19* line ('Budapest data', 2007ChZX) but Iγ=0.62 *13* (crystal data) and 0.32 *8* (Ge(Li) data) in 1967Mo05. Unless there is a typographical error in Iγ from 2007ChZX, it seems likely that the 336γ branching adopted here is much too high.
338.20 *4*	668.005	0.150 *23*			Other: Eγ=338.31 *10*, Iγ=0.106 *21* ('Budapest data', 2007ChZX).
341.57 *3*	521.982	0.064 *13*			Iγ: 0.064 *13* ('Budapest data' for Eγ=341.54 *19*, 2007ChZX) but 0.28 *6* (1967Mo05) suggests presence of contaminant in 1967Mo05 datum, so evaluator adopts the former datum.
343.51 *3*	426.025	0.39 *8*	(E1)	0.01281	α(K)exp<0.038. α(K)=0.01085 *16*; α(L)=0.001538 *22*; α(M)=0.000337 *5*; α(N+..)=8.93×10^{-5} *13*. α(N)=7.77×10^{-5} *11*; α(O)=1.104×10^{-5} *16*; α(P)=5.72×10^{-7} *8*. Other: Eγ=343.49 *5*; Iγ=0.327 *21* ('Budapest data', 2007ChZX).
[x]346.3 *3*		0.04			
347.24 *8*	719.370	0.20 *4*			Other: Eγ=347.42 *7*, Iγ=0.132 *16* ('Budapest data', 2007ChZX).
350.61 *12*	815.139	0.070 *14*			Other: Eγ=351.1 *3*, Iγ=0.048 *18* ('Budapest data', 2007ChZX).
352.28 *12*	725.68	0.130 *26*			Other: Eγ=352.46 *12*, Iγ=0.119 *21* ('Budapest data', 2007ChZX).
357.04 *4*	547.934	0.29 *6*			Other: Eγ=357.11 *5*, Iγ=0.261 *19* ('Budapest data', 2007ChZX).
358.4[b] *3*	774.522	0.05			Placement from 881 level rejected in 2000Pr03.
359.7 *2*	654.818	0.080 *24*			Other: Eγ=359.64 *17*, Iγ=0.060 *15* ('Budapest data', 2007ChZX).
363.1 *3*	543.672	0.05			Other: Eγ=362.4 *3*, Iγ=0.047 *14* ('Budapest data', 2007ChZX).
367.54 *16*	558.571	0.07			
368.45[e] *16*	1061.788	0.12[e] *3*			Other: Eγ=368.26 *11*, Iγ=0.118 *19* ('Budapest data', 2007ChZX).
	1087.91	0.12[e] *3*			
371.75[#] *3*	426.025	3.0 *3*	E1	0.01060	α(K)exp<0.016 (1967Mo05). α(K)=0.00898 *13*; α(L)=0.001267 *18*; α(M)=0.000278 *4*; α(N+..)=7.36×10^{-5} *11*. α(N)=6.40×10^{-5} *9*; α(O)=9.12×10^{-6} *13*; α(P)=4.77×10^{-7} *7*. Other: Eγ=371.74 *4*; Iγ=2.51 *13* ('Budapest data', 2007ChZX).
373.47[b] *7*	379.547	0.45 *7*			
376.91[e] *14*	547.934	0.120[e] *24*			Other: Eγ=376.89 *17*, Iγ=0.063 *18* ('Budapest data', 2007ChZX).
	792.789	0.120[e] *24*			
380.1 *2*	757.707	0.050 *15*			
382.8[b] *2*	562.890	0.05			
385.0 *2*	815.139	0.04			
386.6[b] *3*	757.707	0.048 *8*			Eγ,Iγ: from 2000Pr03. Eγ=386.3 *3*, Iγ=0.04 in 1967Mo05.
388.8[b] *3*	815.139	0.08 *3*			Eγ,Iγ: from γγ coin (2000Pr03).
390.0[b] *2*	769.78	0.18 *4*			Placement from 1062 level rejected in 2000Pr03. Other: Eγ=389.72 *16*; Iγ=0.12 *3* ('Budapest data', 2007ChZX).

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	Comments
391.89 *4*	562.890	1.13 *11*	M1	0.0605	α(K)=0.0511 *8*; α(L)=0.00737 *11*; α(M)=0.001622 *23*; α(N+..)=0.000435 *6*. α(N)=0.000377 *6*; α(O)=5.50×10^{-5} *8*; α(P)=3.12×10^{-6} *5*. Mult.: from α(K)exp=0.08 *2* (1988Ba79). Other: Eγ=391.86 *4*; Iγ=0.82 *8* ('Budapest data', 2007ChZX).
392.2[b] *5*	868.24	0.11 *3*			Eγ,Iγ: from low–energy γγ coin (2000Pr03).
394.5[bf] *2*	654.818	0.10			Placement from 870 level rejected in 2000Pr03. Absent in 'Budapest data' in 2007ChZX so placement is shown here as questionable.
[x]398.6 *2*		0.09 *3*			Placement from 881 level rejected in 2000Pr03. Other: Eγ=398.83 *21*; Iγ=0.06 *5* ('Budapest data', 2007ChZX).
401.31[b] *10*	774.522	0.11 *3*			Eγ,Iγ: from γγ coin (2000Pr03).
401.56 *6*	592.501	2.1 *3*	(M1,E2)	0.043 *15*	α(K)exp=0.030 *22* (1967Mo05). α(K)=0.035 *13*; α(L)=0.0059 *11*; α(M)=0.00132 *21*; α(N+..)=0.00035 *6*. α(N)=0.00030 *5*; α(O)=4.3×10^{-5} *9*; α(P)=2.1×10^{-6} *9*. Other: Eγ=401.57 *4*; Iγ=1.72 *14* ('Budapest data', 2007ChZX).
404.7[b] *6*	881.040	0.05 *2*			Eγ,Iγ: from low–energy γγ coin (2000Pr03).
406.83[b] *16*	736.430	0.130 *26*			Placement from 1062 level rejected in 2000Pr03. Other: Eγ=406.53 *14*; Iγ=0.17 *3* ('Budapest data', 2007ChZX).
410.27 *2*	464.501	1.36 *27*			Other: Eγ=410.45 *4*, Iγ=1.98 *11* ('Budapest data', 2007ChZX); probably an unresolved doublet (410.3γ+411.1γ).
411.09 *3*	671.746	0.75 *23*			
412.1[e] *2*	592.501	0.60[e] *12*			Other: Eγ=412.27 *9*; Iγ=0.48 *5* ('Budapest data', 2007ChZX).
	742.02	0.60[e] *12*			
[x]413.69 *15*		0.15			Placement from 420 level rejected in 2000Pr03. Other: Eγ=414.24 *19*, Iγ=0.14 *3* ('Budapest data', 2007ChZX); it is unclear whether this is the γ reported in 1967Mo05.
416.47 *5*	597.015	0.80 *16*			Other: Eγ=416.52 *6*; Iγ=0.68 *6* ('Budapest data', 2007ChZX).
418.08[b] *18*	598.448	0.20 *6*			
420.7 *6*	475.680	0.16 *5*			Eγ,Iγ: from γγ coin (2000Pr03).
421.13[bf] *5*	769.78	0.70 *11*			Absent in 'Budapest data' in 2007ChZX and far too strong to have been overlooked there if this were a ^{166}Ho line; not included in Adopted Gammas.
423.39[be] *18*	683.805	0.16[e]			Placement from 905 level rejected in 2000Pr03. Other: Eγ=423.52 *16*; Iγ=0.23 *5* ('Budapest data', 2007ChZX).
	771.94	0.16[e]			Placement from 905 level rejected in 2000Pr03.
425.30[b] *3*	431.239	1.30 *26*			Placement from 638 level rejected in 2000Pr03.
425.99 *3*	426.025	3.7 *6*	E1	0.00770	α(K)exp=0.0065 *18*. α(K)=0.00653 *10*; α(L)=0.000914 *13*; α(M)=0.000200 *3*; α(N+..)=5.32×10^{-5} *8*. α(N)=4.62×10^{-5} *7*; α(O)=6.61×10^{-6} *10*; α(P)=3.50×10^{-7} *5*. Other: Eγ=425.90 *4*; Iγ=4.64 *24* ('Budapest data', 2007ChZX).
	597.015	0.24 *7*			Eγ,Iγ: doublet; from γγ coin (2000Pr03).
426.89[b] *15*	721.98	0.13 *4*			Eγ,Iγ: from γγ coin (2000Pr03).
427.0 *2*	598.448	0.4			
430.31[b] *18*	760.345	0.13			
[x]432.14 *18*		0.13			Placement from 757 level rejected in 2000Pr03. Other: Eγ=432.19 *18*; Iγ=0.095 *16* ('Budapest data', 2007ChZX).
433.9[b] *9*	806.56	0.015 *5*			Eγ,Iγ: from 2000Pr03.
433.92 *18*	605.047	0.17			Other: Eγ=433.05 *8*, Iγ=0.140 *19* ('Budapest data', 2007ChZX).

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^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Mult.[‡]	α	Comments
437.3 3	628.418	0.06			Other: Eγ=437.0 3, Iγ=0.045 14 ('Budapest data', 2007ChZX).
x439.6 3		0.04			Placement from 577 level rejected in 2000Pr03. Other: Eγ=439.39 7, Iγ=0.195 19 ('Budapest data', 2007ChZX); suggests presence of a contaminant.
x442.0 3		0.40 12			Placement from 1031 level rejected in 2000Pr03. Other: Eγ=442.05 9, Iγ=0.35 5 ('Budapest data', 2007ChZX); possibly a 442.0γ+442.2γ doublet.
442.17 8	771.94	0.25 7			Eγ,Iγ: from γγ coin (2000Pr03). Other: Eγ=442.05 9, Iγ=0.35 5 ('Budapest data', 2007ChZX); possibly a 442.0γ+442.2γ doublet.
442.9 3	815.139	0.40 12			Other: Eγ=443.22 10, Iγ=0.264 19 ('Budapest data', 2007ChZX).
450.3 3	876.37	0.05			
x454.96 20		0.3			
455.60 6	719.370	1.70 26	M1(+E2)		Mult.: α(K)exp=0.030 19 (1967Mo05). Other: Eγ=455.53 4, Iγ=1.26 6 ('Budapest data', 2007ChZX).
457.37 7	628.418	0.60 12			Other: Eγ=457.55 9, Iγ=0.34 3 ('Budapest data', 2007ChZX).
458.74[b] 22	788.618	0.09 3			Eγ,Iγ: from γγ coin (2000Pr03).
463.9 3	654.818	0.60 12			Other: Eγ=463.88 6, Iγ=0.39 3 ('Budapest data', 2007ChZX).
467.3 3	638.235	0.30 9			Other: Eγ=467.36 8, Iγ=0.26 3 ('Budapest data', 2007ChZX).
472.2[b] 5	662.169	0.14			Placement from 736 level rejected in 2000Pr03. Other: Eγ=471.53 15, Iγ=0.068 16 ('Budapest data', 2007ChZX).
475.8[e] 3	736.430	0.15[e]			Other: Eγ=475.98 17, Iγ=0.081 18 ('Budapest data', 2007ChZX).
	905.544	0.15[e]			
477.4 3	657.995	0.2			Other: Eγ=477.70 12, Iγ=0.116 18 ('Budapest data', 2007ChZX).
481.31[#] 8	742.02	0.85 17			
487.58 6	668.005	1.30 20	M1	0.0343	α(K)=0.0290 4; α(L)=0.00416 6; α(M)=0.000914 13; α(N+..)=0.000245 4. α(N)=0.000212 3; α(O)=3.10×10^{-5} 5; α(P)=1.765×10^{-6} 25. Mult.: from α(K)exp=0.03 1 (1988Ba79). Other: Eγ=487.45 5, Iγ=0.63 4 ('Budapest data', 2007ChZX).
489.39 5	543.672	3.2 3	E2+M1	0.025 9	α(K)=0.021 8; α(L)=0.0034 8; α(M)=0.00075 16; α(N+..)=0.00020 5. α(N)=0.00017 4; α(O)=2.5×10^{-5} 6; α(P)=1.2×10^{-6} 5. Mult.: from α(K)exp=0.019 4 (1988Ba79). Other α(K)exp: 0.020 13 (1967Mo05). Other: Eγ=489.45 4, Iγ=1.85 10 ('Budapest data', 2007ChZX).
496.9 2	668.005	0.3			Other: Eγ=497.14 8, Iγ=0.180 19 ('Budapest data', 2007ChZX).
499.5[#b] 4	760.345	0.1			
x504.3 2		0.2			
506.8[§b] 3	644.29	0.2			
508.4 8	562.890	0.28 8			Eγ,Iγ: from γγ coin (2000Pr03). Other: Eγ=508.83 7, Iγ=0.53 4 ('Budapest data', 2007ChZX); possibly γ is complex in this study.
509.0 2	769.78	0.7			Placement from 905 level rejected in 2000Pr03.
512.7[bd] 3	595.726	0.80[d] 16			Iγ=0.80 16 for doublet; Iγ=0.03 from γγ coin (2000Pr03) for other placement. Other: Eγ=512.76 8, Iγ=0.52 4 ('Budapest data', 2007ChZX); presumably this also is for a doublet.
	693.638	0.03[d]			Iγ: from γγ coin (2000Pr03). Iγ=0.80 16 for doublet (1967Mo05).

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Mult.‡	α	Comments
524.2[b] 3	529.816	0.50 10			Other: Eγ=524.35 6, Iγ=0.42 3 ('Budapest data', 2007ChZX). Placement from 705 level rejected in 2000Pr03.
x530.1 3		0.4			
533.5 3	704.962	0.60 18			Other: Eγ=533.55 6, Iγ=0.49 3 ('Budapest data', 2007ChZX).
534.9[b] 4	961.08	0.3			Placement from 725 level rejected in 2000Pr03. Other: Eγ=535.89 16, Iγ=0.137 23 ('Budapest data', 2007ChZX).
x538.4 3		0.3			Placement from 593 level rejected in 2000Pr03. Other: Eγ=538.32 9, Iγ=0.24 3 ('Budapest data', 2007ChZX).
538.6[b] 4	868.24	0.20 6			Eγ,Iγ: from low–energy γγ coin (2000Pr03).
542.8[b] 8	961.08	0.006 2			Eγ,Iγ: from high–energy γγ coin (2000Pr03).
542.86 20	597.015	3.5 9	E2+M1	0.019 7	α(K)=0.016 6; α(L)=0.0025 7; α(M)=0.00056 13; α(N+..)=0.00015 4. α(N)=0.00013 3; α(O)=1.9×10^{-5} 5; α(P)=1.0×10^{-6} 4. Mult.: from α(K)exp=0.011 3 (1988Ba79). Other: Eγ=542.74 4, Iγ=3.12 21 ('Budapest data', 2007ChZX).
543.66 20	543.672	2.4 6	E2	0.01275	α(K)=0.01030 15; α(L)=0.00191 3; α(M)=0.000432 6; α(N+..)=0.0001135 16. α(N)=9.93×10^{-5} 14; α(O)=1.366×10^{-5} 20; α(P)=5.77×10^{-7} 8. Mult.: from α(K)exp=0.012 3 (1988Ba79). Other: Eγ=543.69 4, Iγ=1.61 8 ('Budapest data', 2007ChZX).
546.0[b] 5	806.56	0.020 6			Eγ,Iγ: from 2000Pr03.
x550.5 3		0.3			
553.37[b] 21	848.46	0.07 2			Eγ,Iγ: from γγ coin (2000Pr03).
554.3[d] 4	725.68	0.45[d] 14			Iγ: from γγ coin. Iγ=0.60 for doublet (1967Mo05). See comment on 554γ from 815 level.
	815.139	0.15[d] 5			Iγ: from γγ coin; Iγ=0.60 for doublet (1967Mo05). The 'Budapest data' in 2007ChZX include two 555 keV transitions from the 815 level: Eγ=554.00 16, Iγ=0.31 5 and Eγ=555.30 20, Iγ=0.21 5, but the latter energy does not fit placement.
564.8[b] 3	736.430	0.2			
570.0[b] 3	760.345	0.2			
577.0[e] 3	757.707	0.70[e] 14			Other: Eγ=577.06 6, Iγ=0.327 27 ('Budapest data', 2007ChZX).
	837.717	0.70[e] 14			
579.9[b] 7	760.345	0.5 3			Eγ,Iγ: from 2000Pr03.
x585.6 7		0.40 12			Placement from 757 level rejected in 2000Pr03. Other: Eγ=585.93 12, Iγ=0.148 21 ('Budapest data', 2007ChZX).
x589.4 7		0.30 9			
593.8[b] 7	595.726	0.08			
600.8[b] 7	1030.38	0.024 6			Iγ: from γγ coin (2000Pr03). Iγ=0.3 in 1967Mo05.
607.7 7	662.169	0.11			Other: Eγ=608.61 25, Iγ=0.055 19 ('Budapest data', 2007ChZX).
612.0[b] 5	792.789	0.3			
613.8 4	668.005	0.70 21			Other: Eγ=613.70 5, Iγ=0.53 4 ('Budapest data', 2007ChZX).
x618.5 7		0.3			
624.0 4	815.139	0.60 18			Other: Eγ=624.13 6, Iγ=0.341 26 ('Budapest data', 2007ChZX).
633.5 4	824.62	0.80 24			Other: Eγ=633.62 5, Iγ=0.58 5 ('Budapest data', 2007ChZX).
643.1 8	725.68	0.40 12			Other: Eγ=643.03 10, Iγ=0.164 23 ('Budapest data', 2007ChZX).
x653.4 8		0.2			
x658.9 6		0.60 18			

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Comments
661.0[b] 6	925.0	0.60 18	
[x]681.7 5		0.40 12	
[x]689.7 9		0.80 24	Placement from 881 level rejected in 2000Pr03. Other: Eγ=689.51 6, Iγ=0.71 5 ('Budapest data', 2007ChZX).
[x]699.4 9		0.50 15	
700.8[b] 3	961.08	0.06 2	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
701.1[b] 5	1030.38	0.016 5	Eγ,Iγ: from γγ coin (2000Pr03).
[x]708.9 6		0.3	
709.6 6	881.040	0.14 4	Eγ,Iγ: from γγ coin (2000Pr03).
714.7[b] 2	905.544	0.26 8	Eγ,Iγ: from γγ coin (2000Pr03).
[x]715.3 6		0.60 18	
733.94[b] 21	905.544	0.024 7	Eγ,Iγ: from γγ coin (2000Pr03).
[x]734.4 10		0.3	Placement from 925 level rejected in 2000Pr03. Other: Eγ=734.45 6, Iγ=0.41 3 ('Budapest data', 2007ChZX).
770.5[b] 4	1030.38	0.06 2	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
798.6 4	881.040	0.26 8	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
827.1 3	881.040	0.19 6	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
839.9[b] 7	1030.38	0.13 4	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
849.5[b] 7	1030.38	0.015 5	Eγ,Iγ: from high−energy γγ coin (2000Pr03).
858.0[b] 5	1030.38	0.04 1	Eγ,Iγ: from γγ coin (2000Pr03).
4050.46 15	(6243.714)	0.097 6	Other: Eγ=4049.4 5, Iγ=0.193 23 ('Budapest data', 2007ChZX).
4060.74 22	(6243.714)	0.037 3	
4063.66 25	(6243.714)	0.029 3	
4071.6 5	(6243.714)	0.019 4	
4073.9 4	(6243.714)	0.102 9	
4076.0 4	(6243.714)	0.028 5	
4079.86 24	(6243.714)	0.044 3	
4082.6 3	(6243.714)	0.030 3	
4086.32 14	(6243.714)	0.090 5	
4091.98 16	(6243.714)	0.088 5	
4095.2 3	(6243.714)	0.030 3	
4098.23 17	(6243.714)	0.072 4	
4104.4 5	(6243.714)	0.024 5	
4106.5 4	(6243.714)	0.028 5	
4112.47 16	(6243.714)	0.046 3	
4116.19 18	(6243.714)	0.035 2	
4121.2 3	(6243.714)	0.015 2	
4125.0 5	(6243.714)	0.012 2	
4127.84 23	(6243.714)	0.041 3	
4132.0 4	(6243.714)	0.017 3	
4134.5 6	(6243.714)	0.012 3	
4138.0 6	(6243.714)	0.020 5	
4140.0 4	(6243.714)	0.027 5	
4145.29 15	(6243.714)	0.048 3	
4149.3 4	(6243.714)	0.015 2	
4152.70 20	(6243.714)	0.051 3	
4155.90 18	(6243.714)	0.045 3	
4165.89 21	(6243.714)	0.075 5	
4168.4 5	(6243.714)	0.020 4	
4171.06 20	(6243.714)	0.064 4	
4178.46 15	(6243.714)	0.096 6	
4181.6 5	(6243.714)	0.012 2	
4185.0 3	(6243.714)	0.073 7	
4187.0 5	(6243.714)	0.038 7	
4189.3 3	(6243.714)	0.046 5	
4192.4 4	(6243.714)	0.014 2	
4203.3 3	(6243.714)	0.024 2	
4206.22 17	(6243.714)	0.064 4	
4211.61 23	(6243.714)	0.077 6	
4213.9 3	(6243.714)	0.040 6	
4218.03 19	(6243.714)	0.085 5	
4220.7 3	(6243.714)	0.024 3	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Comments
4226.1 *4*	(6243.714)	0.020 *3*	Other: Eγ=4227.2 *5*, Iγ=0.058 *26* ('Budapest data', 2007ChZX); possibly a 4226γ+4229γ doublet.
4228.59 *21*	(6243.714)	0.065 *5*	
4232.89 *13*	(6243.714)	0.047 *3*	
4238.77 *10*	(6243.714)	0.179 *10*	Other: Eγ=4238.2 *3*, Iγ=0.14 *3* ('Budapest data', 2007ChZX).
4244.72 *20*	(6243.714)	0.026 *2*	
4248.29 *16*	(6243.714)	0.037 *2*	
4257.68 *12*	(6243.714)	0.038 *2*	
4265.33 *18*	(6243.714)	0.050 *3*	
4268.2 *4*	(6243.714)	0.020 *3*	
4270.8 *8*	(6243.714)	0.009 *3*	
4273.9 *3*	(6243.714)	0.020 *2*	
4282.98 *14*	(6243.714)	0.069 *4*	Other: Eγ=4282.7 *5*, Iγ=0.064 *16* ('Budapest data', 2007ChZX).
4286.13 *21*	(6243.714)	0.038 *3*	
4289.4 *7*	(6243.714)	0.007 *2*	
4292.78 *12*	(6243.714)	0.138 *8*	Other: Eγ=4292.1 *3*, Iγ=0.100 *18* ('Budapest data', 2007ChZX).
4297.68 *16*	(6243.714)	0.026 *2*	
4304.77 *10*	(6243.714)	0.058 *3*	
4310.56 *16*	(6243.714)	0.024 *2*	
4315.48 *10*	(6243.714)	0.062 *4*	
4324.33 *15*	(6243.714)	0.061 *4*	Other: Eγ=4323.3 *4*, Iγ=0.074 *19* ('Budapest data', 2007ChZX).
4327.4 *6*	(6243.714)	0.015 *3*	Other: Eγ=4327.3 *5*, Iγ=0.055 *19* ('Budapest data', 2007ChZX).
4329.7 *4*	(6243.714)	0.021 *3*	
4335.98 *11*	(6243.714)	0.047 *3*	Other: Eγ=4336.1 *4*, Iγ=0.061 *18* ('Budapest data', 2007ChZX).
4344.69 *15*	(6243.714)	0.034 *2*	Other: Eγ=4344.3 *6*, Iγ=0.058 *23* ('Budapest data', 2007ChZX).
4348.37 *11*	(6243.714)	0.151 *8*	Other: Eγ=4347.5 *3*, Iγ=0.135 *24* ('Budapest data', 2007ChZX).
4352.80 *11*	(6243.714)	0.047 *3*	
4360.66 *18*	(6243.714)	0.019 *2*	
4366.79 *9*	(6243.714)	0.064 *4*	
4373.4 *4*	(6243.714)	0.009 *1*	
4378.9 *6*	(6243.714)	0.005 *1*	
4384.31 *11*	(6243.714)	0.057 *3*	Other: Eγ=4384.0 *20*, Iγ=0.06 *4* ('Budapest data', 2007ChZX).
4388.67 *13*	(6243.714)	0.048 *3*	
4392.6 *3*	(6243.714)	0.014 *1*	
4400.66 *9*	(6243.714)	0.118 *7*	Other: Eγ=4400.8 *6*, Iγ=0.08 *6* ('Budapest data', 2007ChZX).
4405.1 *11*	(6243.714)	0.005 *2*	
4408.05 *16*	(6243.714)	0.056 *4*	
4414.12 *24*	(6243.714)	0.017 *2*	
4419.79 *10*	(6243.714)	0.063 *4*	
4426.67 *9*	(6243.714)	0.073 *4*	
4438.2 *3*	(6243.714)	0.011 *1*	
4444.9 *4*	(6243.714)	0.009 *1*	
4449.47 *15*	(6243.714)	0.027 *2*	
4458.1 *3*	(6243.714)	0.011 *1*	
4466.89 *7*	(6243.714)	0.150 *8*	Other: Eγ=4467.0 *3*, Iγ=0.19 *3* ('Budapest data', 2007ChZX).
4474.19 *18*	(6243.714)	0.018 *1*	
4480.06 *9*	(6243.714)	0.082 *5*	Other: Eγ=4479.8 *7*, Iγ=0.093 *23* ('Budapest data', 2007ChZX).
4484.0 *3*	(6243.714)	0.020 *2*	
4486.8 *6*	(6243.714)	0.009 *2*	
4491.2 *3*	(6243.714)	0.011 *1*	
4501.39 *12*	(6243.714)	0.028 *2*	
4512.55 *11*	(6243.714)	0.035 *2*	
4519.8 *6*	(6243.714)	0.004 *1*	
4527.00 *20*	(6243.714)	0.021 *2*	
4530.41 *23*	(6243.714)	0.035 *3*	
4533.0 *3*	(6243.714)	0.019 *3*	
4539.34 *8*	(6243.714)	0.054 *3*	
4548.64 *7*	(6243.714)	0.073 *4*	Other: Eγ=4548.3 *5*, Iγ=0.066 *19* ('Budapest data', 2007ChZX).
4556.3 *5*	(6243.714)	0.007 *1*	
4560.1 *4*	(6243.714)	0.019 *3*	
4562.4 *5*	(6243.714)	0.014 *3*	
4566.96 *12*	(6243.714)	0.032 *2*	
4572.01 *8*	(6243.714)	0.064 *4*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ†	E(level)	Iγ†c	Comments
4577.50 *9*	(6243.714)	0.055 *3*	
4582.08 *21*	(6243.714)	0.018 *1*	
4586.1 *3*	(6243.714)	0.024 *3*	
4588.6 *5*	(6243.714)	0.011 *2*	
4599.16 *15*	(6243.714)	0.020 *1*	
4604.68 *16*	(6243.714)	0.028 *2*	
4608.14 *9*	(6243.714)	0.087 *5*	Other: Eγ=4608.0 *4*, Iγ=0.110 *21* ('Budapest data', 2007ChZX).
4613.7 *3*	(6243.714)	0.047 *8*	
4615.5 *4*	(6243.714)	0.027 *7*	Other: Eγ=4615.2 *6*, Iγ=0.092 *21* ('Budapest data', 2007ChZX); possibly a 4614γ+4616γ doublet.
4623.3 *3*	(6243.714)	0.011 *1*	
4627.62 *25*	(6243.714)	0.052 *6*	Other: Eγ=4627.5 *6*, Iγ=0.090 *23* ('Budapest data', 2007ChZX).
4629.6 *4*	(6243.714)	0.021 *5*	
4637.39 *24*	(6243.714)	0.029 *3*	
4639.83 *15*	(6243.714)	0.085 *6*	Other: Eγ=4638.2 *6*, Iγ=0.081 *23* ('Budapest data', 2007ChZX).
4643.66 *9*	(6243.714)	0.062 *4*	Other: Eγ=4643.8 *4*, Iγ=0.097 *19* ('Budapest data', 2007ChZX).
4651.17 *18*	(6243.714)	0.022 *2*	
4654.85 *13*	(6243.714)	0.031 *2*	
4666.75 *12*	(6243.714)	0.025 *2*	Other: Eγ=4667.8 *4*, Iγ=0.053 *14* ('Budapest data', 2007ChZX); data suggest presence of a contaminant.
4672.89 *7*	(6243.714)	0.102 *6*	Other: Eγ=4672.7 *3*, Iγ=0.124 *19* ('Budapest data', 2007ChZX).
4677.1 *5*	(6243.714)	0.007 *1*	
4682.6 *4*	(6243.714)	0.024 *5*	
4684.74 *17*	(6243.714)	0.088 *7*	Other: Eγ=4684.6 *4*, Iγ=0.082 *16* ('Budapest data', 2007ChZX).
4690.69 *13*	(6243.714)	0.025 *2*	
4696.15 *12*	(6243.714)	0.059 *4*	Other: Eγ=4695.4 *4*, Iγ=0.084 *18* ('Budapest data', 2007ChZX).
4699.2 *10*	(6243.714)	0.005 *2*	
4702.7 *5*	(6243.714)	0.009 *2*	Other: Eγ=4702.9 *7*, Iγ=0.060 *16* ('Budapest data', 2007ChZX); data suggest presence of a contaminant.
4706.02 *11*	(6243.714)	0.052 *3*	
4711.52 *6*	(6243.714)	0.123 *7*	Other: Eγ=4711.7 *4*, Iγ=0.098 *19* ('Budapest data', 2007ChZX).
4716.78 *17*	(6243.714)	0.018 *1*	
4722.4 *4*	(6243.714)	0.007 *1*	Other: Eγ=4722.0 *12*, Iγ=0.006 *15* ('Budapest data', 2007ChZX).
4733.04 *7*	(6243.714)	0.066 *4*	Other: Eγ=4732.8 *4*, Iγ=0.071 *18* ('Budapest data', 2007ChZX).
4738.11 *26*	(6243.714)	0.011 *1*	
4745.5 *4*	(6243.714)	0.010 *1*	
4749.05 *18*	(6243.714)	0.023 *2*	
4756.49 *13*	(6243.714)	0.024 *2*	
4765.15 *13*	(6243.714)	0.030 *2*	
4769.2 *6*	(6243.714)	0.011 *2*	
4771.9 *4*	(6243.714)	0.016 *2*	
4776.3 *5*	(6243.714)	0.008 *1*	
4779.73 *14*	(6243.714)	0.122 *8*	Other: Eγ=4780.0 *4*, Iγ=0.130 *24* ('Budapest data', 2007ChZX).
4782.0 *4*	(6243.714)	0.023 *5*	
4784.8 *5*	(6243.714)	0.011 *2*	
4794.72 *5*	(6243.714)	0.098 *5*	Other: Eγ=4794.2 *4*, Iγ=0.103 *21* ('Budapest data', 2007ChZX).
4810.00 *12*	(6243.714)	0.035 *2*	
4813.84 *7*	(6243.714)	0.076 *4*	Other: Eγ=4813.2 *7*, Iγ=0.095 *23* ('Budapest data', 2007ChZX).
4822.16 *13*	(6243.714)	0.023 *2*	
4827.84 *4*	(6243.714)	0.273 *15*	Other: Eγ=4827.9 *5*, Iγ=0.21 *5* ('Budapest data', 2007ChZX).
4837.8 *3*	(6243.714)	0.010 *1*	
4841.87 *11*	(6243.714)	0.035 *2*	
4846.87 *7*	(6243.714)	0.062 *4*	
4851.71 *11*	(6243.714)	0.036 *2*	
4855.89 *5*	(6243.714)	0.311 *17*	Other: Eγ=4855.88 *20* Iγ=0.24 *3* ('Budapest data', 2007ChZX).
4863.49 *19*	(6243.714)	0.023 *2*	Other: Eγ=4863.6 *6*, Iγ=0.034 *16* ('Budapest data', 2007ChZX).
4866.83 *6*	(6243.714)	0.180 *10*	Other: Eγ=4867.38 *25* Iγ=0.134 *21* ('Budapest data', 2007ChZX).
4872.2 *10*	(6243.714)	0.003 *1*	
4876.33 *16*	(6243.714)	0.024 *2*	
4880.91 *11*	(6243.714)	0.029 *2*	
4888.62 *5*	(6243.714)	0.092 *5*	Other: Eγ=4888.4 *4*, Iγ=0.101 *16* ('Budapest data', 2007ChZX).
4893.71 *5*	(6243.714)	0.092 *5*	Other: Eγ=4893.5 *4*, Iγ=0.097 *15* ('Budapest data', 2007ChZX).
4900.58 *8*	(6243.714)	0.047 *3*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Comments
4904.89 *6*	(6243.714)	0.086 *5*	Other: Eγ=4903.4 *3*, Iγ=0.150 *18* ('Budapest data', 2007ChZX); data suggest line may be complex.
4911.5 *6*	(6243.714)	0.005 *1*	
4916.09 *21*	(6243.714)	0.015 *1*	Other: Eγ=4916.7 *5*, Iγ=0.060 *18* ('Budapest data', 2007ChZX).
4921.59 *25*	(6243.714)	0.014 *1*	
4925.6 *3*	(6243.714)	0.011 *1*	
4933.10 *15*	(6243.714)	0.019 *1*	
4938.83 *13*	(6243.714)	0.031 *2*	
4942.56 *9*	(6243.714)	0.124 *8*	
4945.18 *7*	(6243.714)	0.405 *22*	
4949.84 *7*	(6243.714)	0.068 *4*	
4954.34 *11*	(6243.714)	0.030 *2*	
4972.19 *19*	(6243.714)	0.014 *1*	
4979.79 *4*	(6243.714)	0.097 *5*	
4986.76 *12*	(6243.714)	0.028 *2*	
4990.94 *14*	(6243.714)	0.026 *2*	
4995.44 *10*	(6243.714)	0.043 *3*	Other: Eγ=4995.1 *7*, Iγ=0.027 *16* ('Budapest data', 2007ChZX).
4999.39 *7*	(6243.714)	0.087 *5*	Other: Eγ=5000.7 *5*, Iγ=0.108 *21* ('Budapest data', 2007ChZX).
5002.93 *6*	(6243.714)	0.089 *5*	
5008.77 *12*	(6243.714)	0.024 *2*	
5013.59 *4*	(6243.714)	0.147 *8*	Other: Eγ=5013.7 *4*, Iγ=0.134 *23* ('Budapest data', 2007ChZX).
5022.02 *13*	(6243.714)	0.023 *2*	
5026.4 *3*	(6243.714)	0.026 *4*	
5028.70 *23*	(6243.714)	0.033 *4*	
5035.02 *9*	(6243.714)	0.032 *2*	
5041.52 *14*	(6243.714)	0.045 *4*	Other: Eγ=5040.6 *7*, Iγ=0.048 *18* ('Budapest data', 2007ChZX).
5044.2 *13*	(6243.714)	0.004 *2*	
5053.50 *4*	(6243.714)	0.113 *6*	Other: Eγ=5053.4 *4*, Iγ=0.132 *24* ('Budapest data', 2007ChZX).
5068.7 *5*	(6243.714)	0.004 *1*	
5082.28 *3*	(6243.714)	0.332 *18*	Other: Eγ=5081.3 *4*, Iγ=0.22 *4* ('Budapest data', 2007ChZX).
5088.79 *4*	(6243.714)	0.074 *4*	
5096.9 *4*	(6243.714)	0.007 *1*	
5102.3 *3*	(6243.714)	0.014 *1*	
5105.84 *12*	(6243.714)	0.061 *4*	
5108.66 *11*	(6243.714)	0.62 *4*	Strong transition, but not reported in 'Budapest data' in 2007ChZX.
5112.6 *3*	(6243.714)	0.011 *1*	
5122.22 *7*	(6243.714)	0.040 *2*	Other: Eγ=5123.8 *5*, Iγ=0.055 *15* ('Budapest data', 2007ChZX).
5128.96 *3*	(6243.714)	0.265 *14*	Other: Eγ=5129.00 *25*, Iγ=0.28 *3* ('Budapest data', 2007ChZX).
5146.18 *5*	(6243.714)	0.066 *4*	Other: Eγ=5146.2 *3*, Iγ=0.093 *16* ('Budapest data', 2007ChZX).
5155.71 *4*	(6243.714)	0.088 *5*	Other: Eγ=5154.9 *4*, Iγ=0.090 *14* ('Budapest data', 2007ChZX).
5181.84 *2*	(6243.714)	0.429 *23*	Other: Eγ=5181.40 *18* Iγ=0.41 *3* ('Budapest data', 2007ChZX).
5188.76 *22*	(6243.714)	0.011 *1*	Other: Eγ=5188.1 *6*, Iγ=0.027 *10* ('Budapest data', 2007ChZX).
5213.25 *3*	(6243.714)	0.403 *22*	Other: Eγ=5212.79 *20* Iγ=0.42 *4* ('Budapest data', 2007ChZX).
5217.5 *5*	(6243.714)	0.010 *2*	
5220.2 *23*	(6243.714)	0.002 *2*	
5224.4 *5*	(6243.714)	0.010 *2*	
5227.40 *15*	(6243.714)	0.033 *3*	
5232.95 *18*	(6243.714)	0.014 *1*	
5238.79 *5*	(6243.714)	0.064 *4*	Other: Eγ=5239.0 *3*, Iγ=0.093 *14* ('Budapest data', 2007ChZX).
5258.45 *14*	(6243.714)	0.017 *1*	
5263.8 *10*	(6243.714)	0.006 *2*	
5266.4 *7*	(6243.714)	0.008 *2*	
5282.54 *6*	(6243.714)	0.046 *3*	
5292.5 *3*	(6243.714)	0.009 *1*	
5296.86[a] *10*	(6243.714)	0.031 *2*	
5318.3 *7*	(6243.714)	0.003 *1*	
5338.30[a] *2*	(6243.714)	0.182 *10*	Other: Eγ=5338.5 *3*, Iγ=0.177 *24* ('Budapest data', 2007ChZX).
5352.50 *4*	(6243.714)	0.078 *4*	Other: Eγ=5352.9 *4*, Iγ=0.068 *16* ('Budapest data', 2007ChZX).
5358.18 *17*	(6243.714)	0.016 *1*	
5362.96[a] *4*	(6243.714)	0.106 *6*	Other: Eγ=5362.6 *4*, Iγ=0.118 *19* ('Budapest data', 2007ChZX).
5367.2 *3*	(6243.714)	0.009 *1*	
5373.43 *9*	(6243.714)	0.025 *2*	
5411.40 *5*	(6243.714)	0.056 *3*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

Eγ[†]	E(level)	Iγ[†c]	Comments
5418.99 *5*	(6243.714)	0.049 *3*	Other: Eγ=5419.0 *5*, Iγ=0.052 *18* ('Budapest data', 2007ChZX).
5428.47 *2*	(6243.714)	0.420 *23*	Other: Eγ=5428.21 *20*, Iγ=0.36 *4* ('Budapest data', 2007ChZX).
5436.90 *12*	(6243.714)	0.020 *1*	
5451.6 *4*	(6243.714)	0.013 *2*	
5454.3 *15*	(6243.714)	0.003 *2*	
5473.82 *4*	(6243.714)	0.062 *3*	Other: Eγ=5473.4 *4*, Iγ=0.061 *16* ('Budapest data', 2007ChZX).
5484.71[a] *11*	(6243.714)	0.022 *1*	
5501.55 *8*	(6243.714)	0.031 *2*	
5507.09 *21*	(6243.714)	0.011 *1*	
5517.6 *8*	(6243.714)	0.004 *1*	
5524.21 *2*	(6243.714)	0.257 *14*	Other: Eγ=5524.16 *24*, Iγ=0.31 *3* ('Budapest data', 2007ChZX).
5538.7 *6*	(6243.714)	0.005 *1*	
5550.21 *4*	(6243.714)	0.065 *4*	Other: Eγ=5549.0 *5*, Iγ=0.082 *16* ('Budapest data', 2007ChZX).
5559.73 *16*	(6243.714)	0.015 *1*	
5575.50 *6*	(6243.714)	0.046 *3*	
5581.52 *10*	(6243.714)	0.039 *2*	
5585.28 *17*	(6243.714)	0.035 *3*	
5588.2 *3*	(6243.714)	0.015 *2*	
5605.27 *8*	(6243.714)	0.050 *3*	
5609.3 *11*	(6243.714)	0.008 *1*	
5614.8 *5*	(6243.714)	0.005 *1*	
5638.7 *6*	(6243.714)	0.005 *1*	
5645.39 *5*	(6243.714)	0.073 *4*	
5651.04 *4*	(6243.714)	0.101 *6*	
5680.50 *21*	(6243.714)	0.040 *2*	
5685.01 *4*	(6243.714)	0.191 *10*	Other: Eγ=5684.5 *3*, Iγ=0.156 *21* ('Budapest data', 2007ChZX).
5695.47 *10*	(6243.714)	0.043 *3*	Other: Eγ=5697.3 *6*, Iγ=0.061 *24* ('Budapest data', 2007ChZX); possibly a 5695γ+5700γ doublet.
5699.89 *15*	(6243.714)	0.033 *2*	
5721.62 *7*	(6243.714)	0.038 *2*	Other: Eγ=5721.3 *3*, Iγ=0.047 *10* ('Budapest data', 2007ChZX).
5761.71 *3*	(6243.714)	0.223 *12*	Other: Eγ=5761.9 *3*, Iγ=0.172 *21* ('Budapest data', 2007ChZX).
5767.92 *4*	(6243.714)	0.124 *7*	Other: Eγ=5767.5 *8*, Iγ=0.060 *13* ('Budapest data', 2007ChZX).
5772.78 *4*	(6243.714)	0.144 *8*	Other: Eγ=5772.8 *3*, Iγ=0.145 *19* ('Budapest data', 2007ChZX).
5779.02 *13*	(6243.714)	0.029 *2*	
5813.55 *2*	(6243.714)	0.94 *5*	Other: Eγ=5813.43 *17*, Iγ=0.87 *6* ('Budapest data', 2007ChZX).
5823.5 *5*	(6243.714)	0.006 *1*	Eγ implies the existence of a level at 420.2, but no other evidence exists for such a level so it is not included in Adopted Levels.
5827.28 *15*	(6243.714)	0.025 *2*	
5871.54 *3*	(6243.714)	0.372 *20*	Other: Eγ=5871.07 *21*, Iγ=0.36 *3* ('Budapest data', 2007ChZX).
5895.57 *24*	(6243.714)	0.008 *1*	
5914.0 *3*	(6243.714)	0.006 *1*	
5982.84 *3*	(6243.714)	0.141 *8*	Other: Eγ=5983.38 *23* Iγ=0.150 *18* ('Budapest data', 2007ChZX).
6052.66 *3*	(6243.714)	0.374 *20*	Other: Eγ=6052.31 *22* Iγ=0.30 *3* ('Budapest data', 2007ChZX).
6063.21 *16*	(6243.714)	0.014 *1*	
6072.46 *4*	(6243.714)	0.063 *3*	Other: Eγ=6072.7 *4*, Iγ=0.047 *13* ('Budapest data', 2007ChZX).
6189.33 *19*	(6243.714)	0.006 *1*	

† Eγ data are from 1984Ke15 if E>4050, and E<4050 data are from 1967Mo05 (cryst.), except as noted. 1967Mo05 also report two separate Ge(Li) detector measurements of Eγ and/or Iγ for a number of γ rays. Eγ data from 2007ChZX (Budapest data) are, in general, less precise and less extensive, but in reasonable agreement with the crystal data; Iγ data show poor to fair agreement with the crystal data. The evaluator gives the latter Eγ, Iγ data in comments; the possible existence of complex lines (due to poorer resolution or presence of impurities) makes it difficult to combine these data with the crystal data. The Eγ data of 1967Mo05 are from wavelength measurements and probably need to be increased by about 9 ppm to correspond to a scale on which Eγ(^{198}Au)=411.80205 *17*. Also, the uncertainties do not include an uncertainty of 0.3 ppm in the conversion of wavelength to energy (see, e.g., 2000He14).

‡ From conversion electron data (1967Mo05,1973PrZI), except as noted. The photon and electron intensity scales were normalized by 1967Mo05 assuming α(K)(116γ)=1.46, α(L1)(116)=0.18 (from M1 theory) and α(K)(137γ)=0.117 (from E1 theory); current theoretical values are 3.7% lower, 1.3% lower and 5.4% higher, respectively, but in view of the relatively much larger uncertainties in the experimental data, the evaluator has chosen not to renormalize those authors' values.

§ Questionable transition.

Line is complex (1967Mo05).

@ From 1989Du03 (Si(Li)).

& From 1989Du03; a calibration uncertainty of 6% has been added in quadrature with the statistical uncertainty.

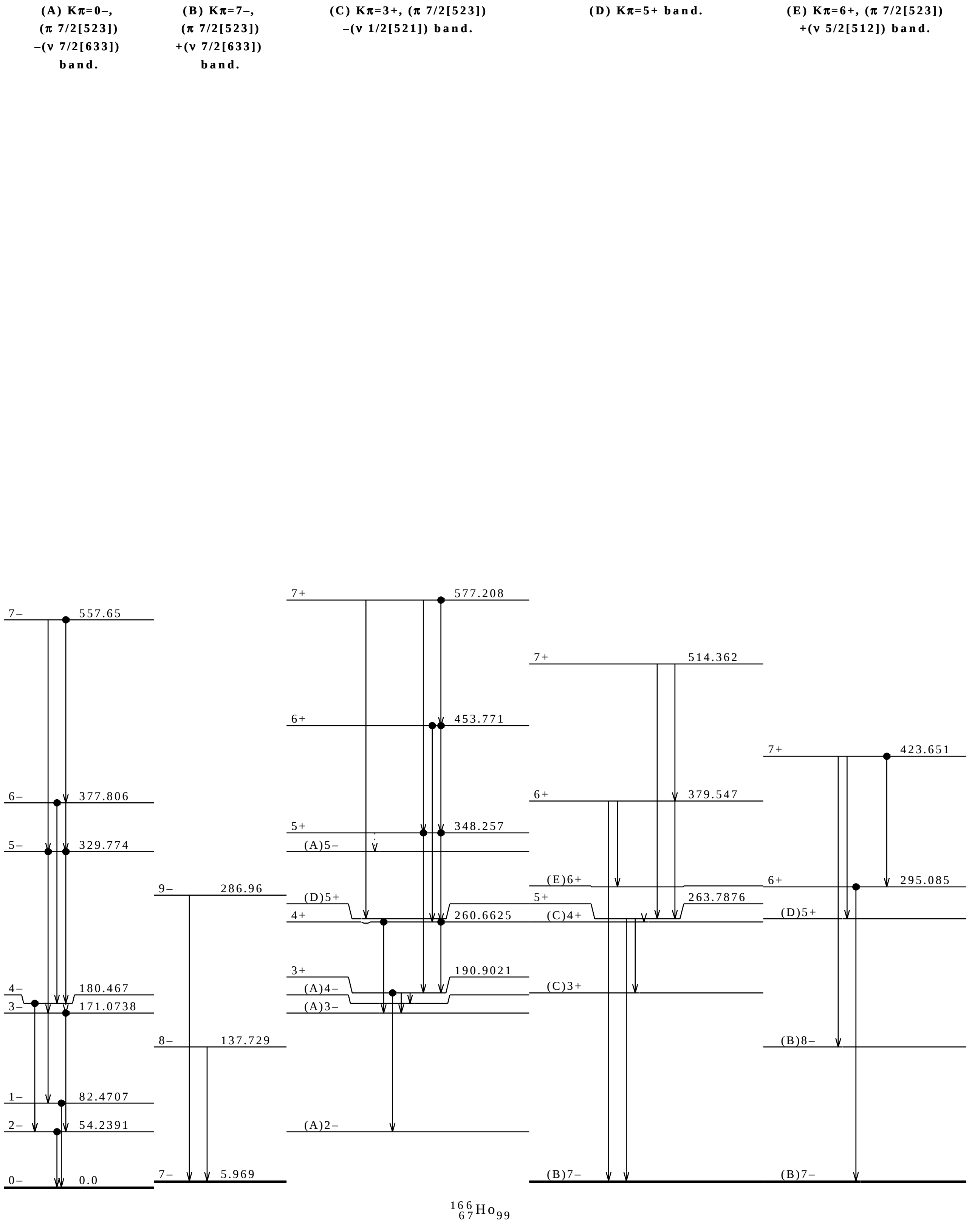
Footnotes continued on next page

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

γ(^{166}Ho) (continued)

[a] Eγ deviates from least–squares prediction by at least 5σ.
[b] Placement from 2000Pr03.
[c] Absolute intensity per 100 neutron captures.
[d] Multiply placed; intensity suitably divided.
[e] Multiply placed; undivided intensity given.
[f] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)



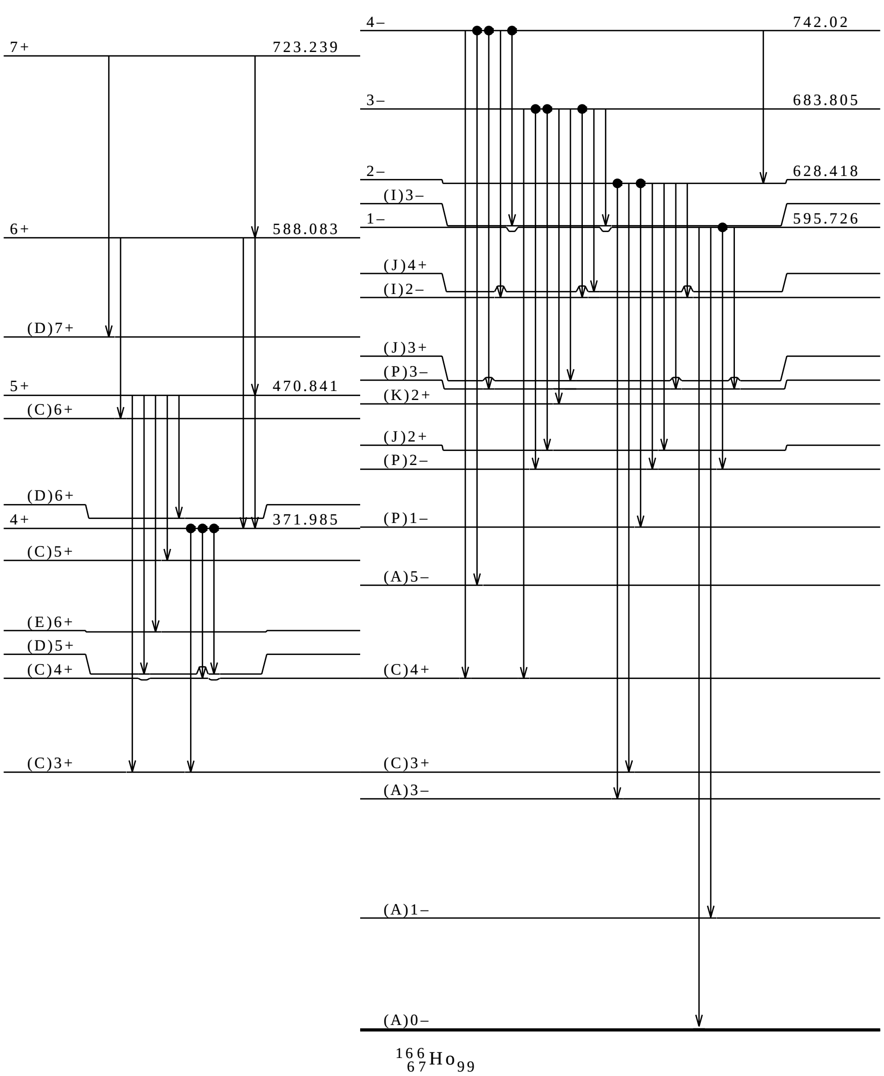
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

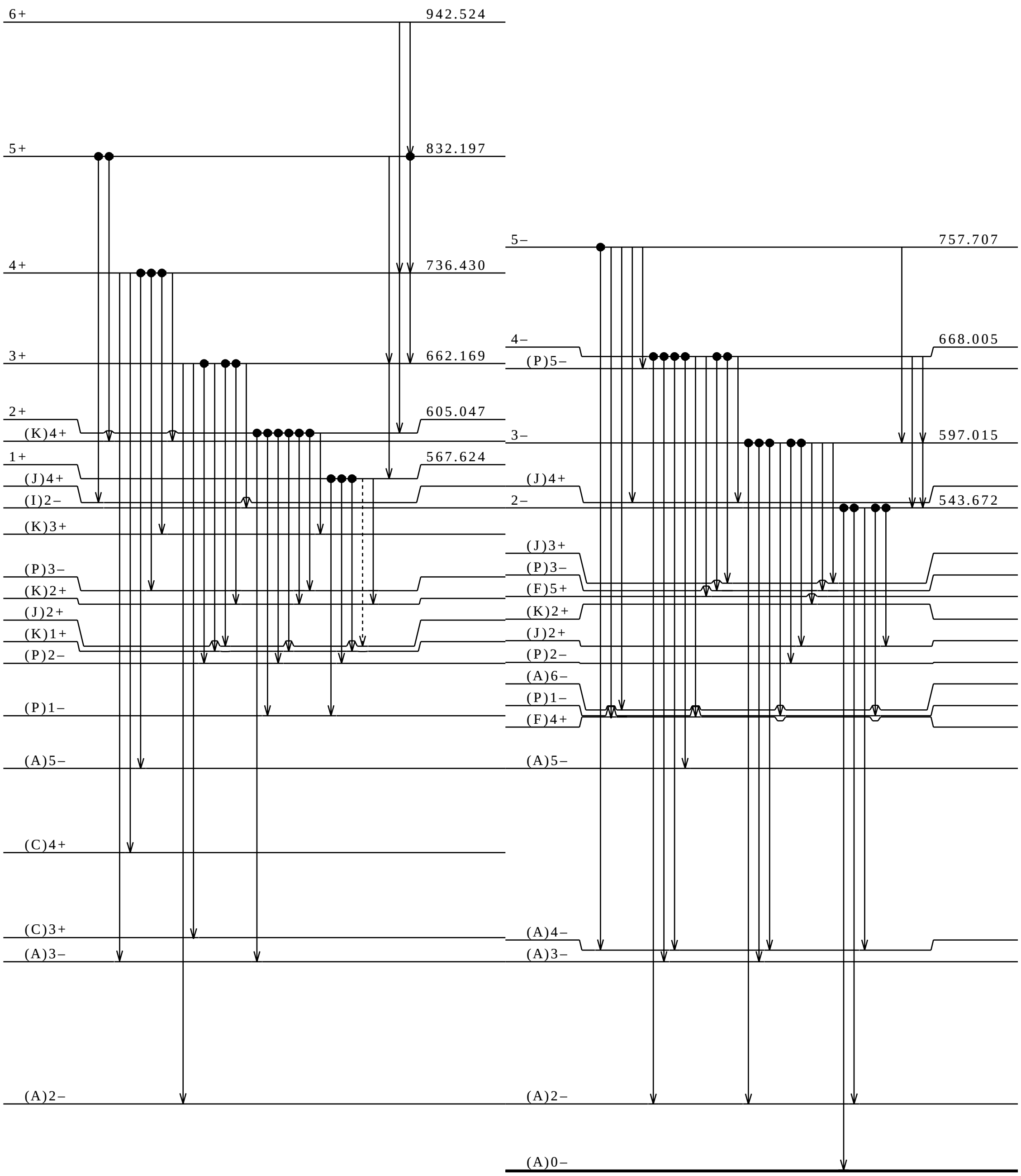
(F) Kπ=4+, (π 7/2[523]) +(ν 1/2[521]) band.

(G) Kπ=1–, (π 1/2[411])+(ν 1/2[521]) band.



^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

(H) Kπ=1+, (π 7/2[523])–(ν 5/2[523]) band. **(I) Kπ=2–, (π 7/2[523])–(ν 7/2[633])+Q_{22} band.**



$^{166}_{67}Ho_{99}$

CITATION:
Nuclear Data Sheets (1992)

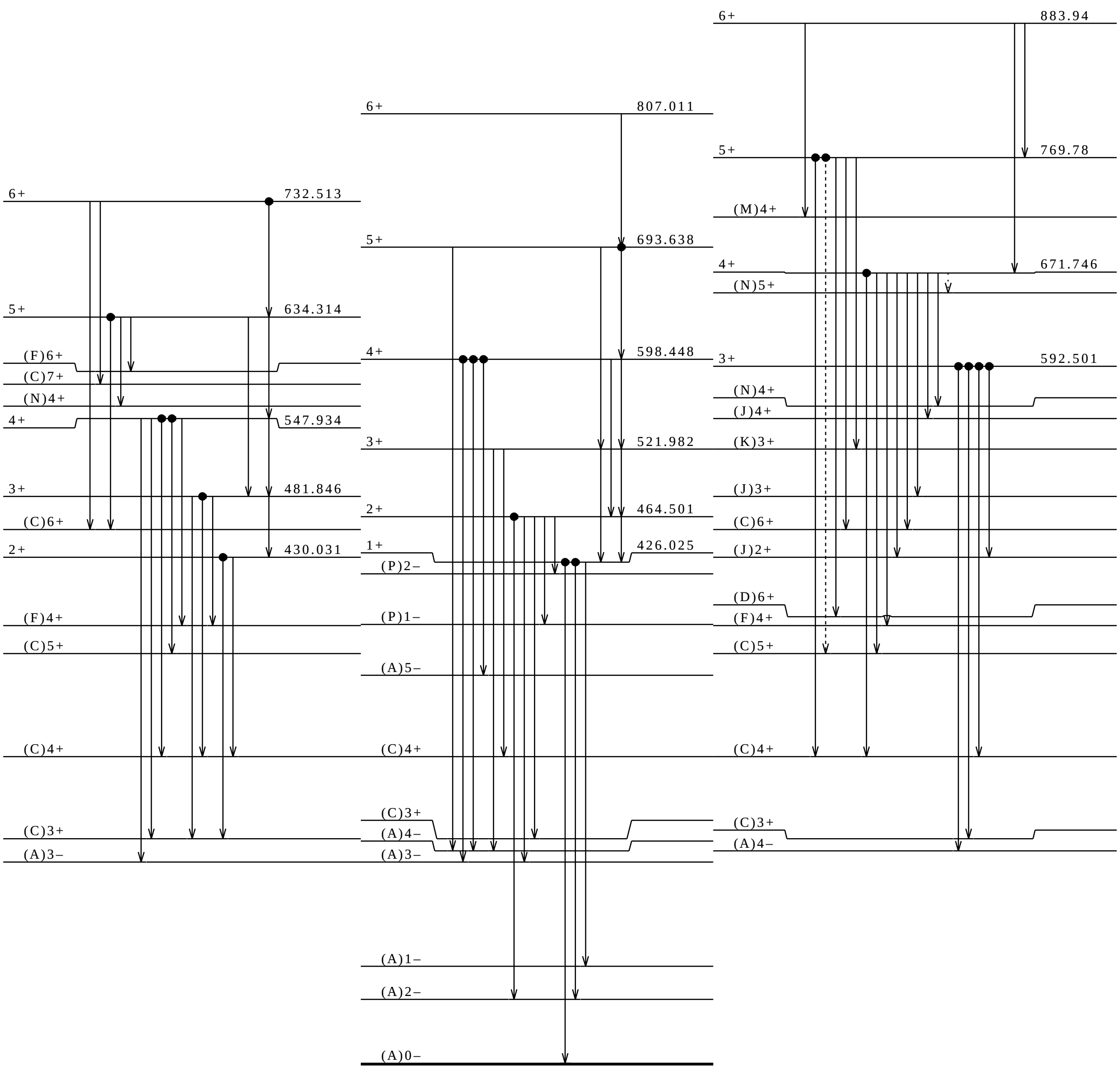
From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

(J) Kπ=2+ band.

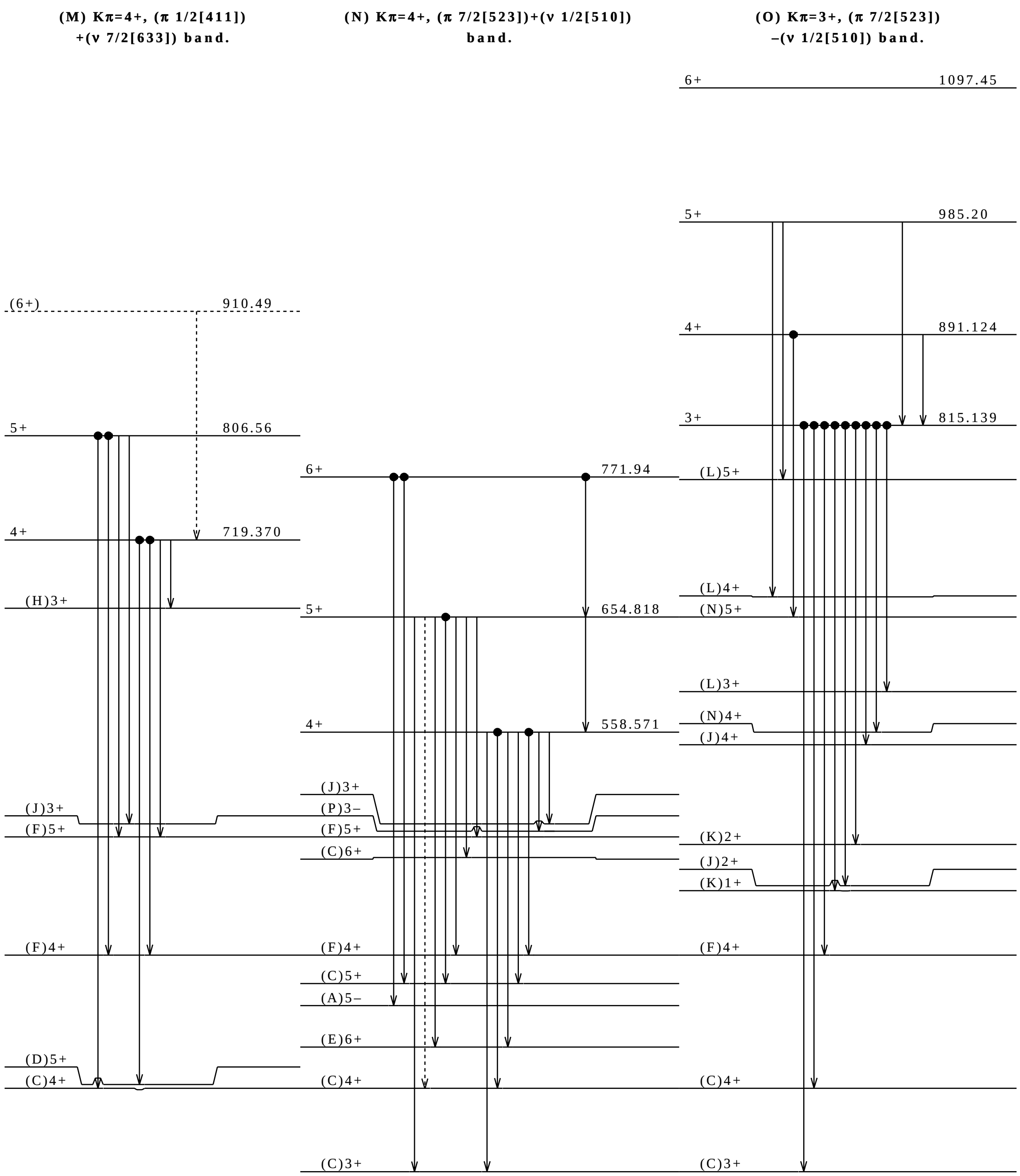
(K) Kπ=1+, (π 7/2[523])–(ν 5/2[512]) band.

(L) Kπ=3+, (π 1/2[411])–(ν 7/2[633]) band.



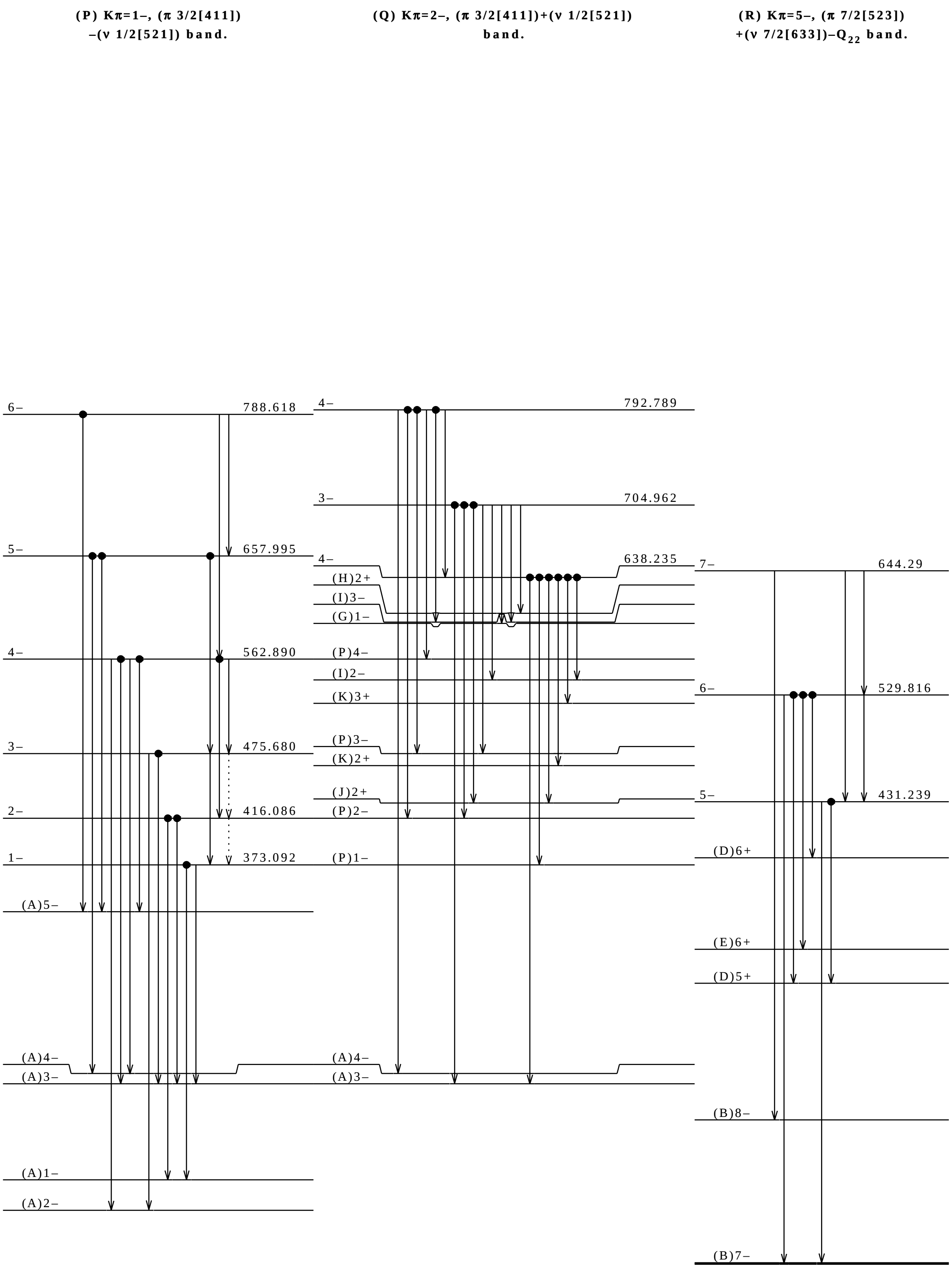
$^{166}_{67}Ho_{99}$

$^{165}Ho(n,\gamma)$ E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)



$^{166}_{67}Ho_{99}$

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

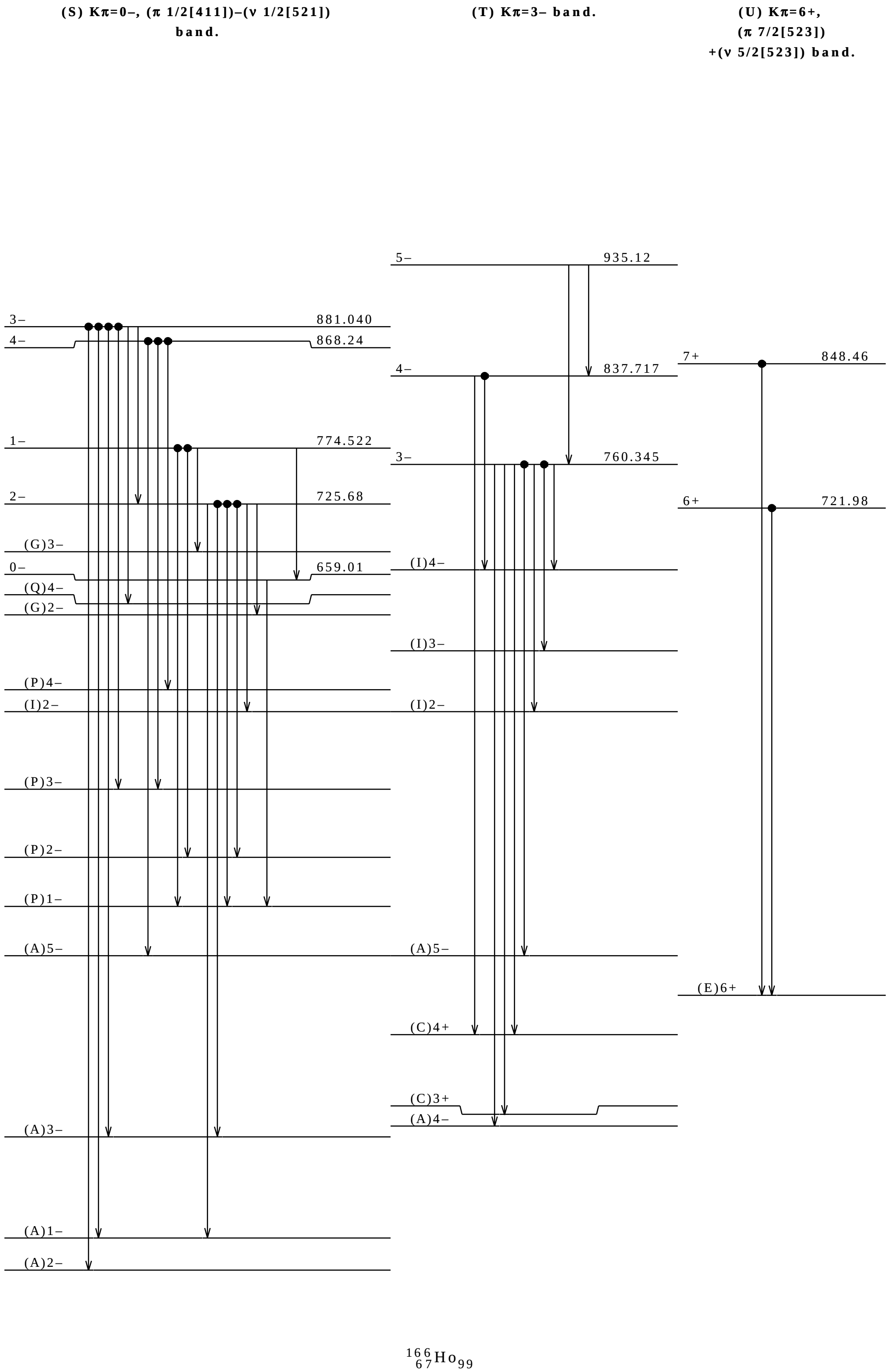


$^{166}_{67}Ho_{99}$

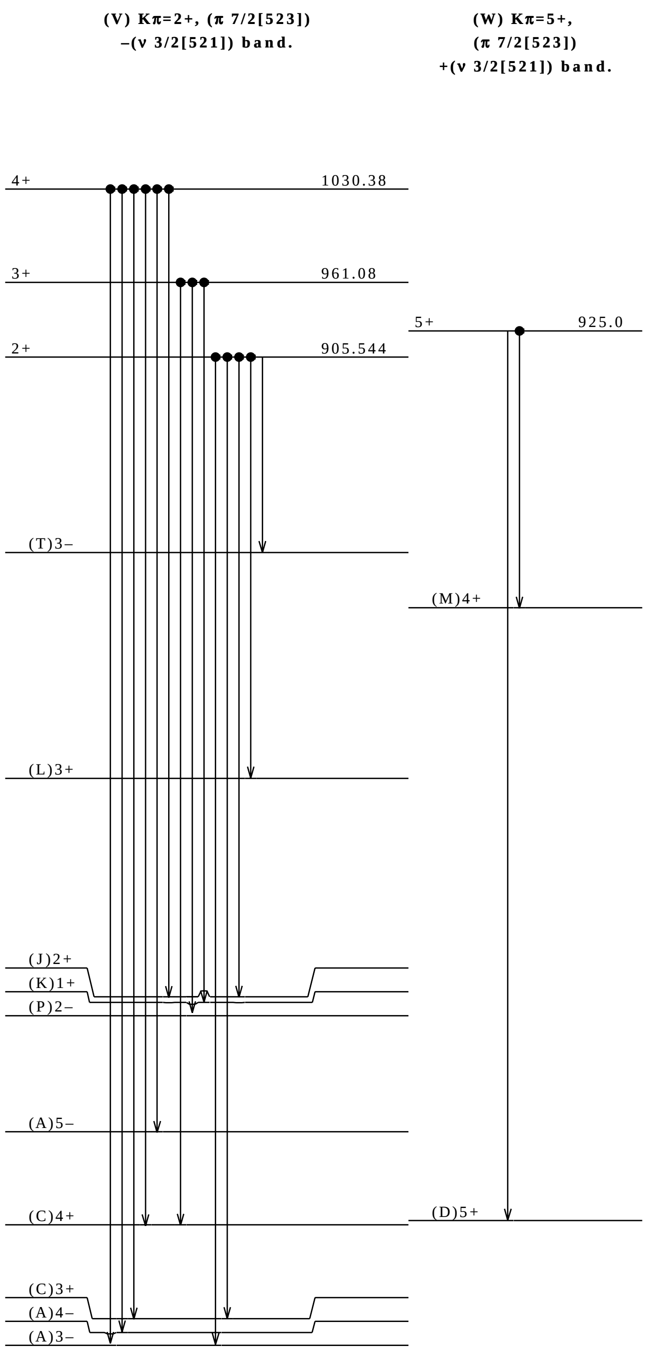
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)



^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

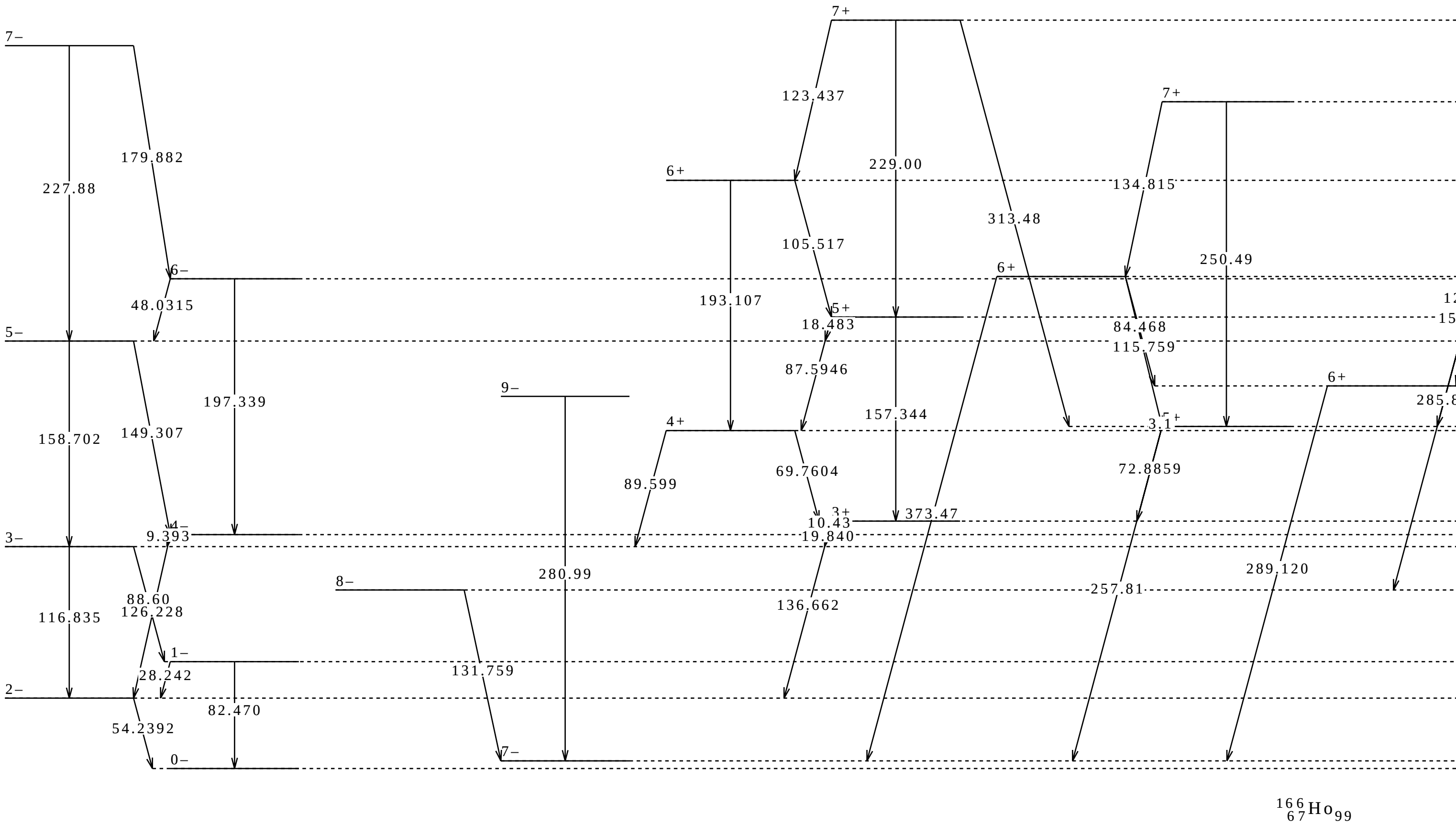


$^{166}_{67}Ho_{99}$

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Bands for ^{166}Ho

(A) (B) (C) (D)

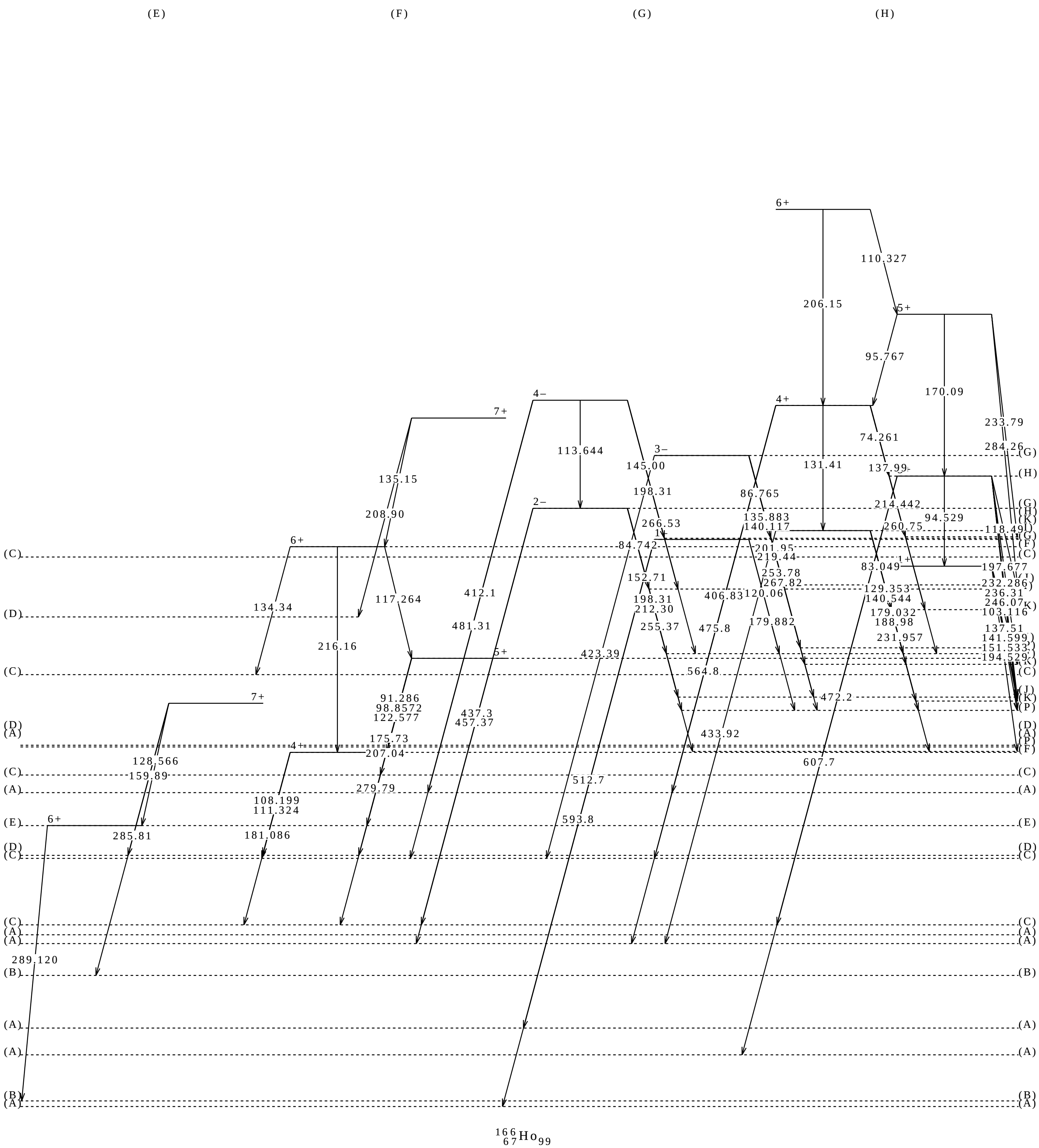


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Bands for ^{166}Ho

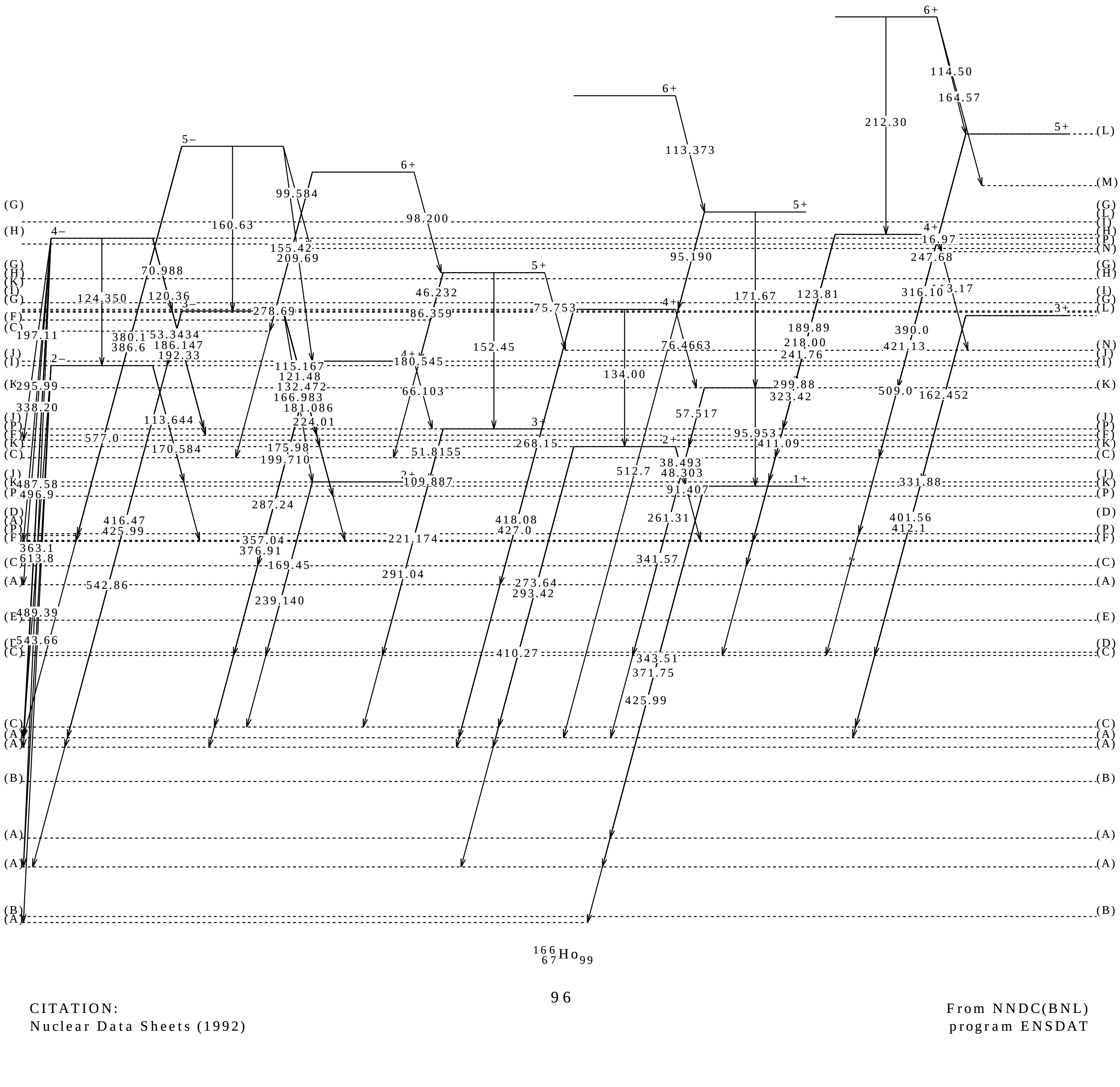


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Bands for ^{166}Ho



$^{166}_{67}Ho_{99}$

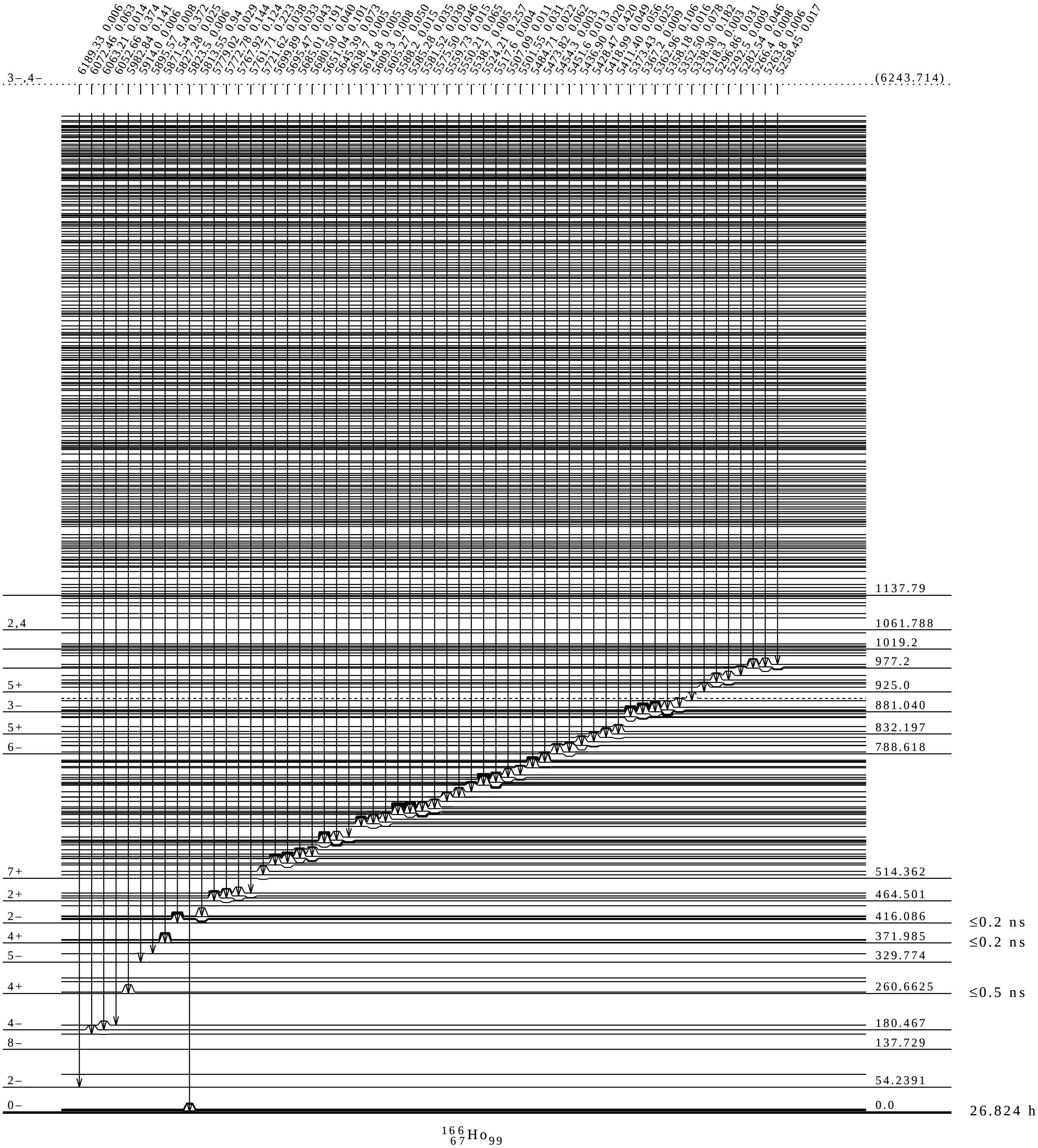
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



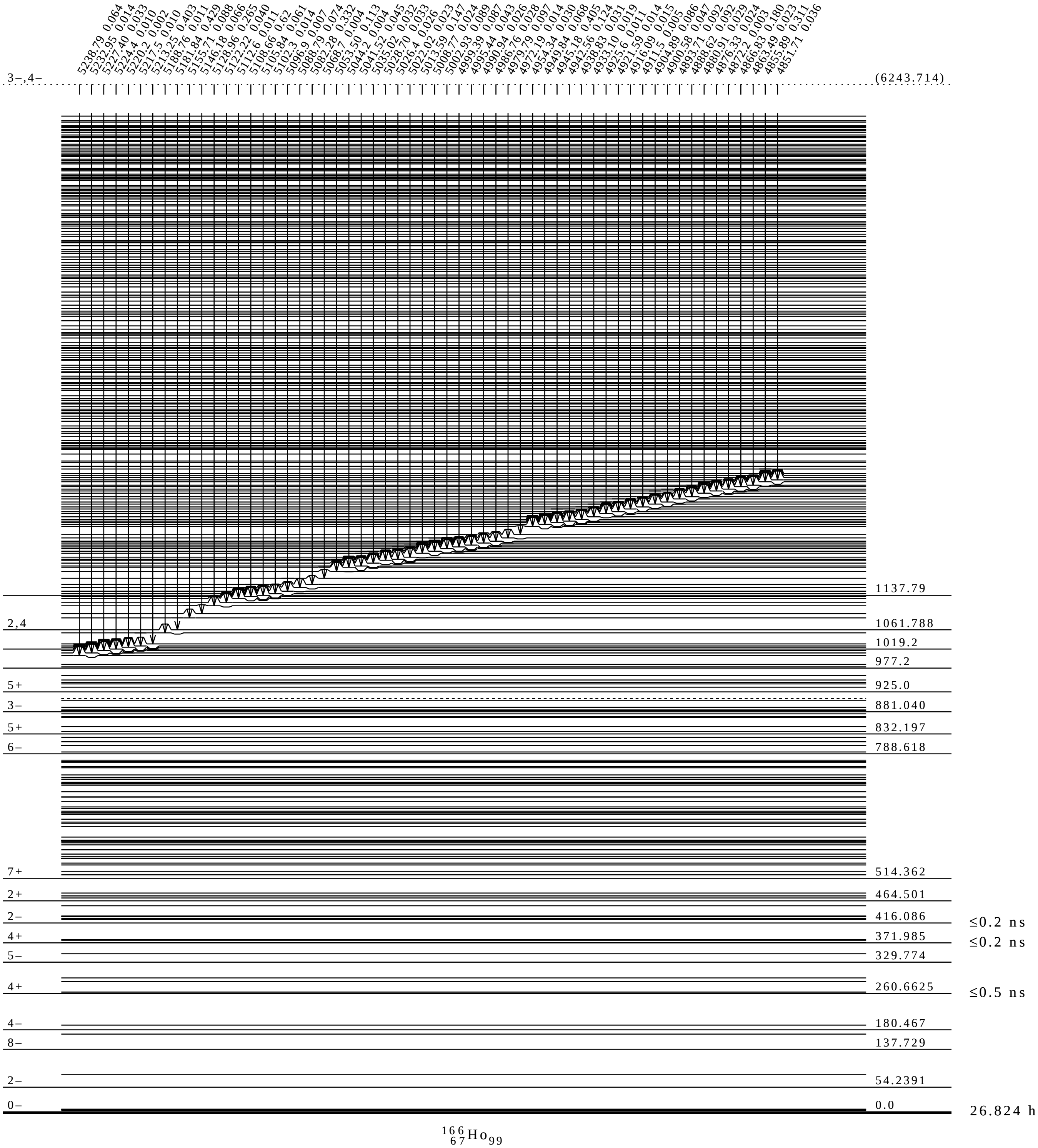
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

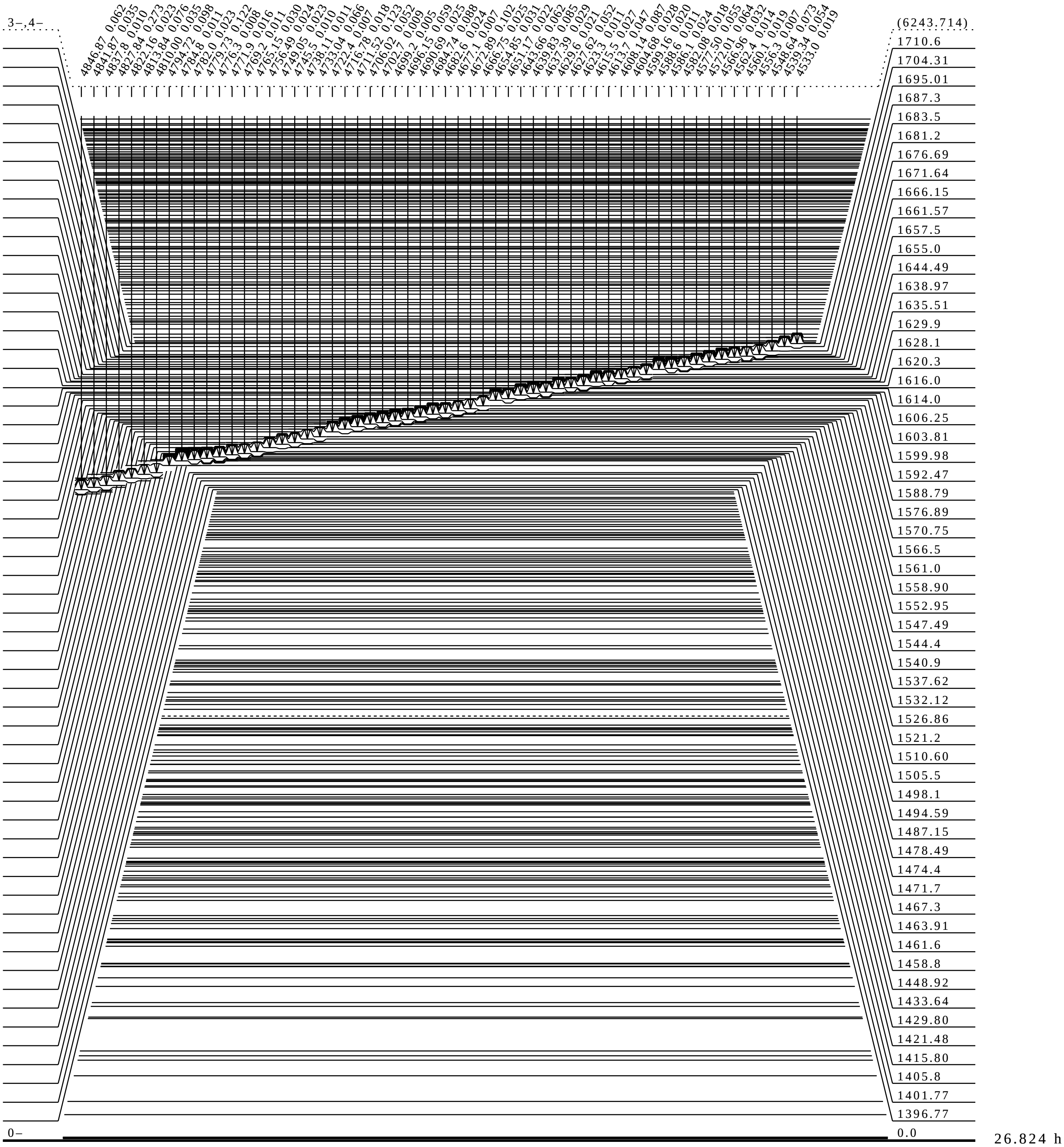
Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



$^{166}_{67}Ho_{99}$

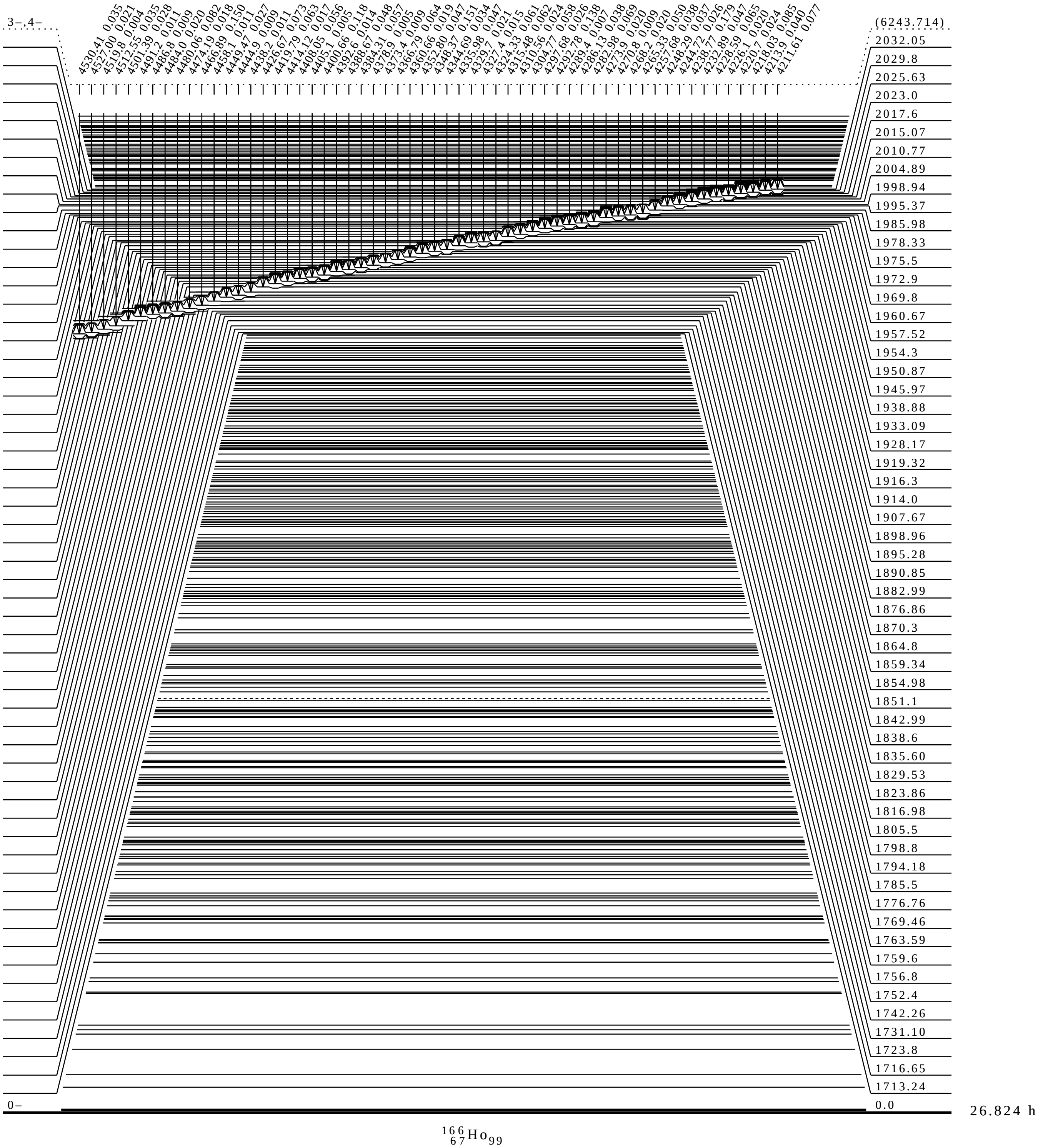
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

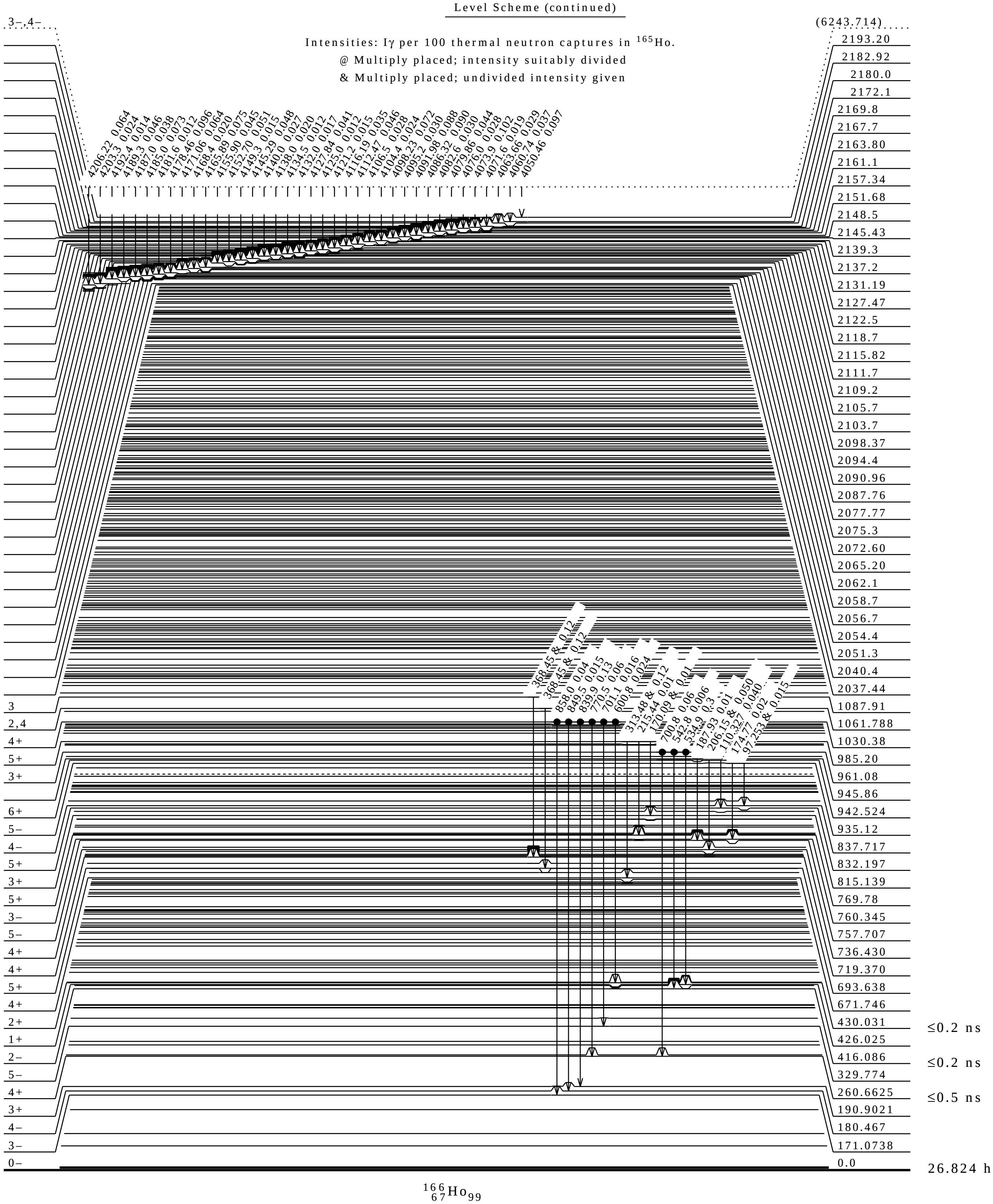


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)



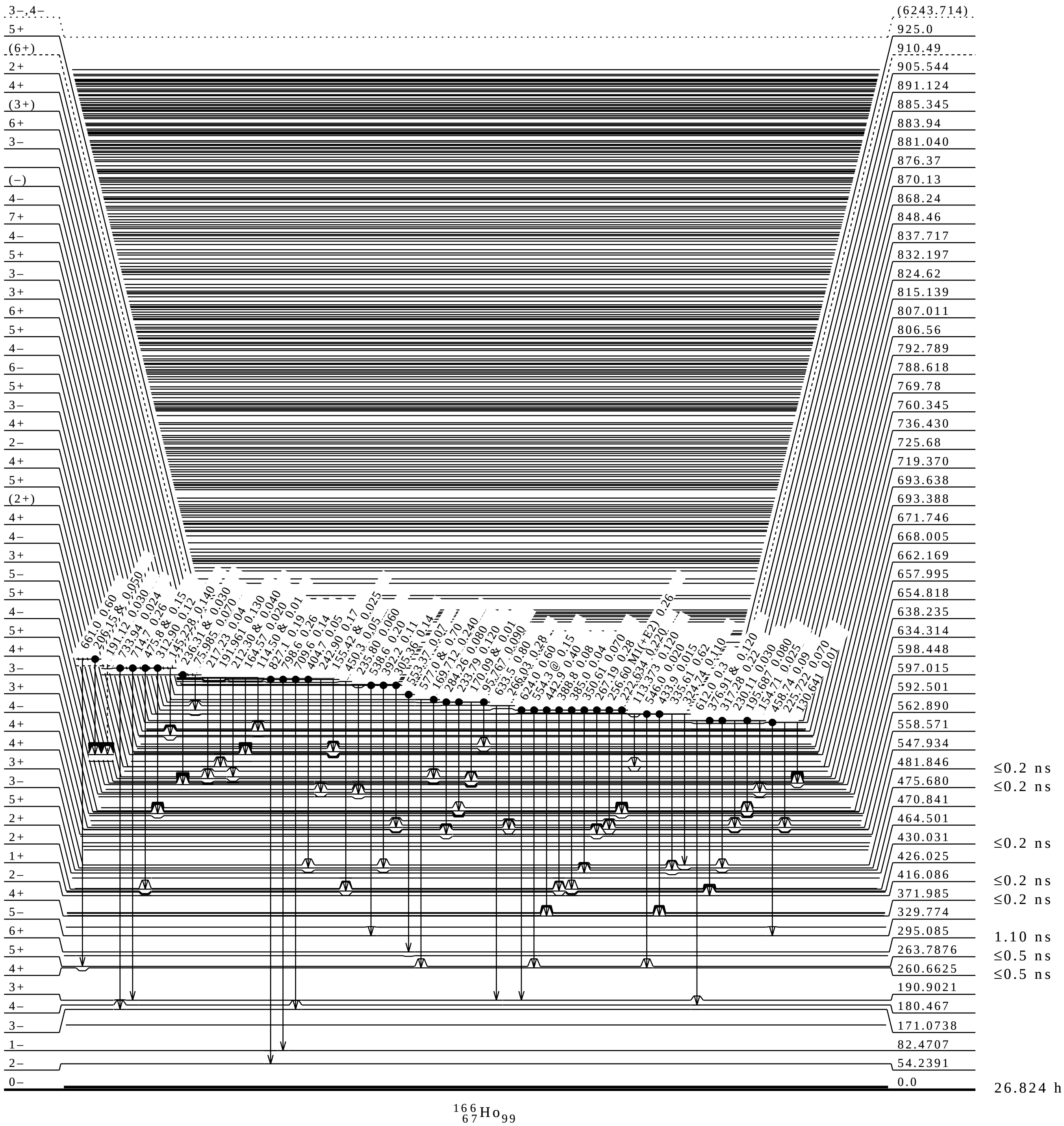
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

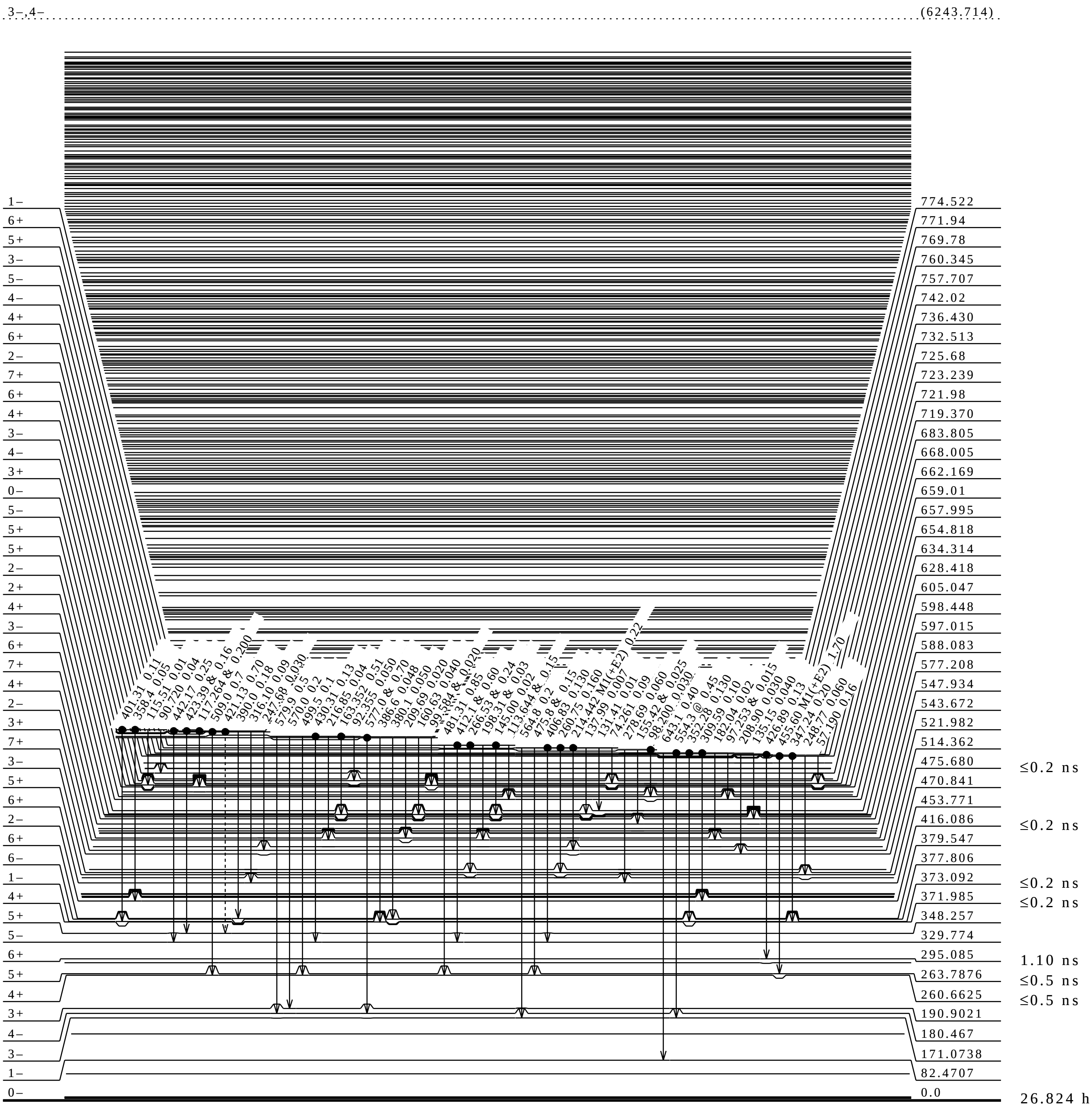


CITATION:
Nuclear Data Sheets (1992)

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

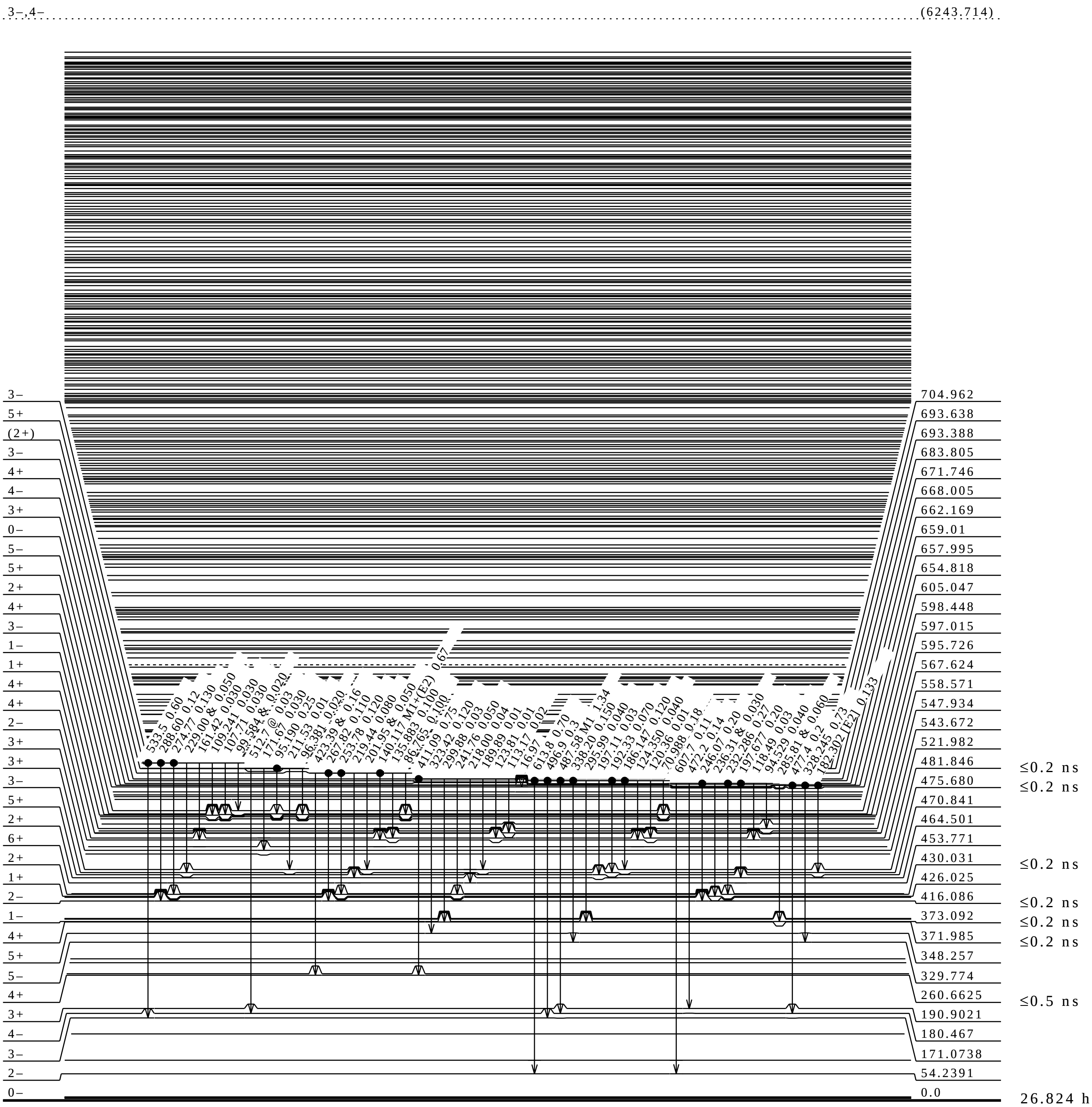


$^{166}_{67}Ho_{99}$

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



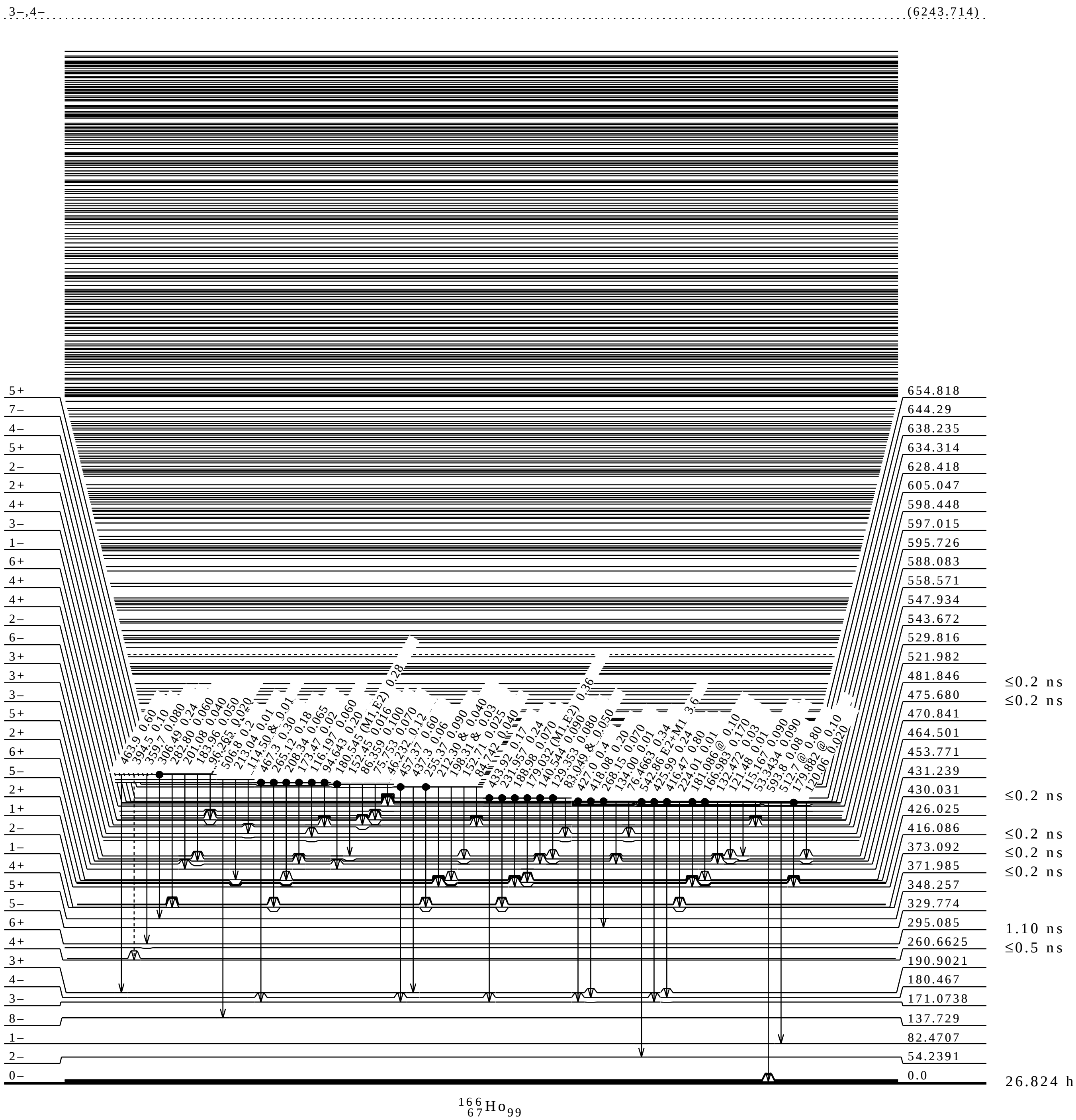
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



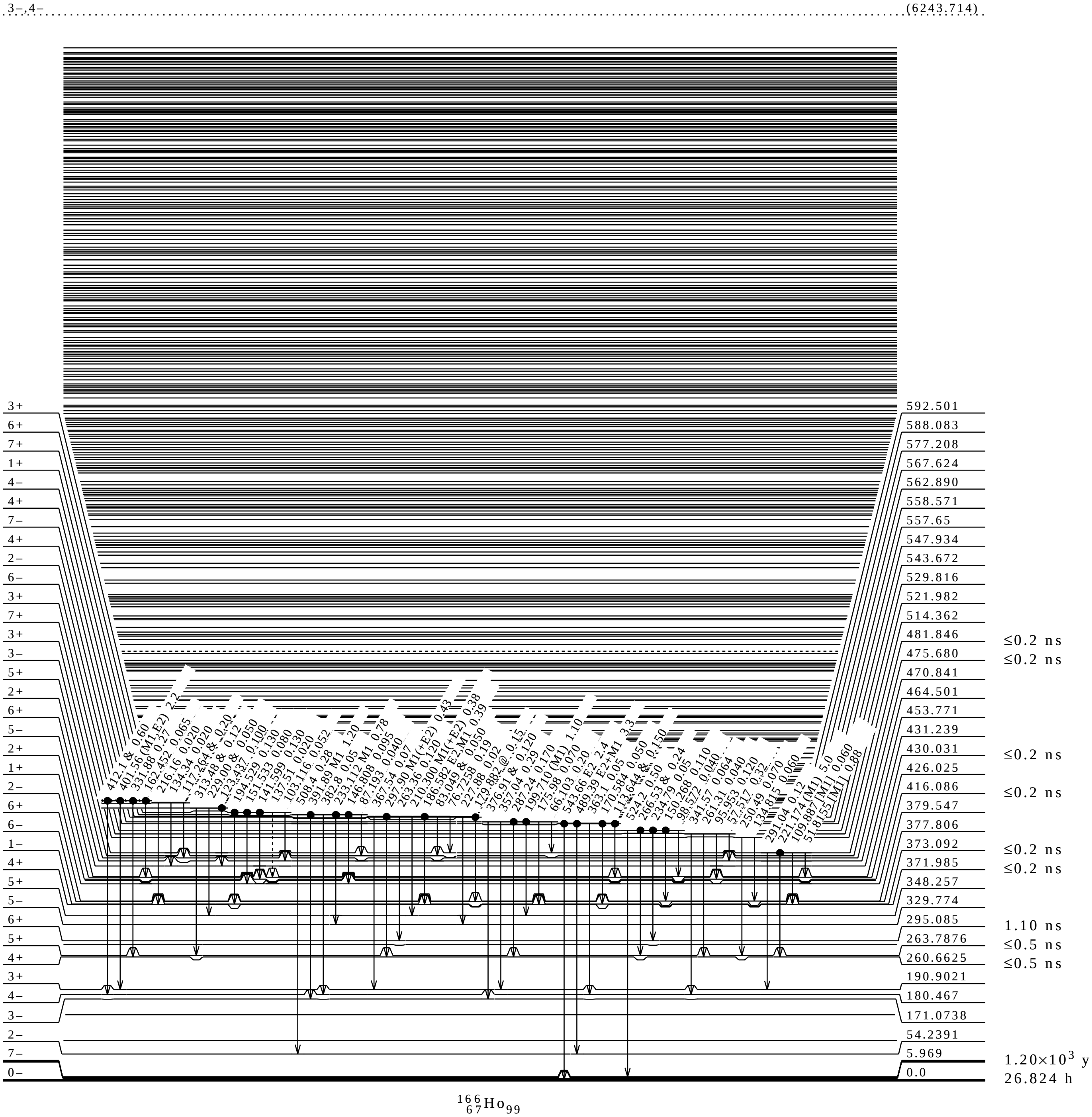
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



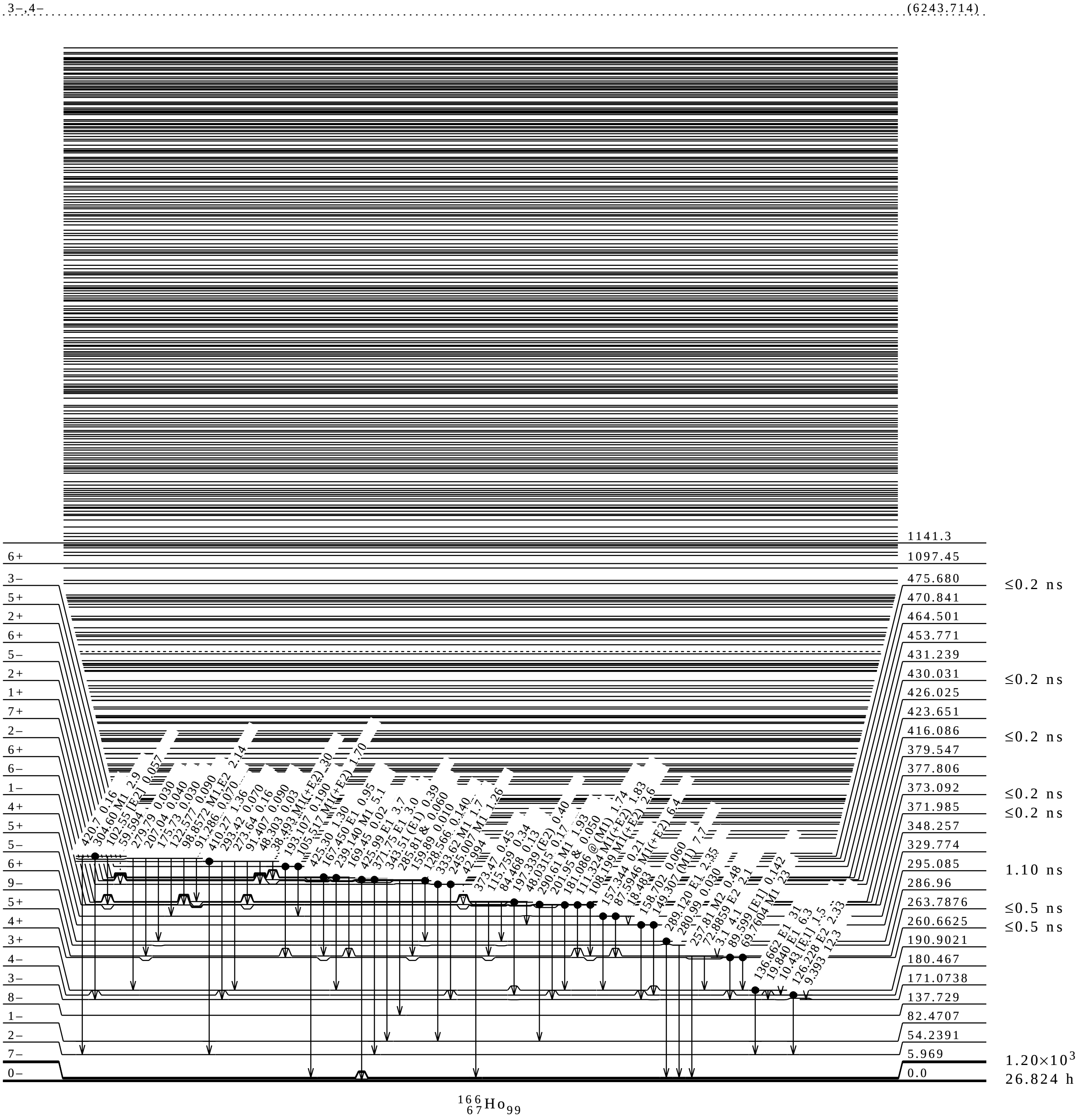
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

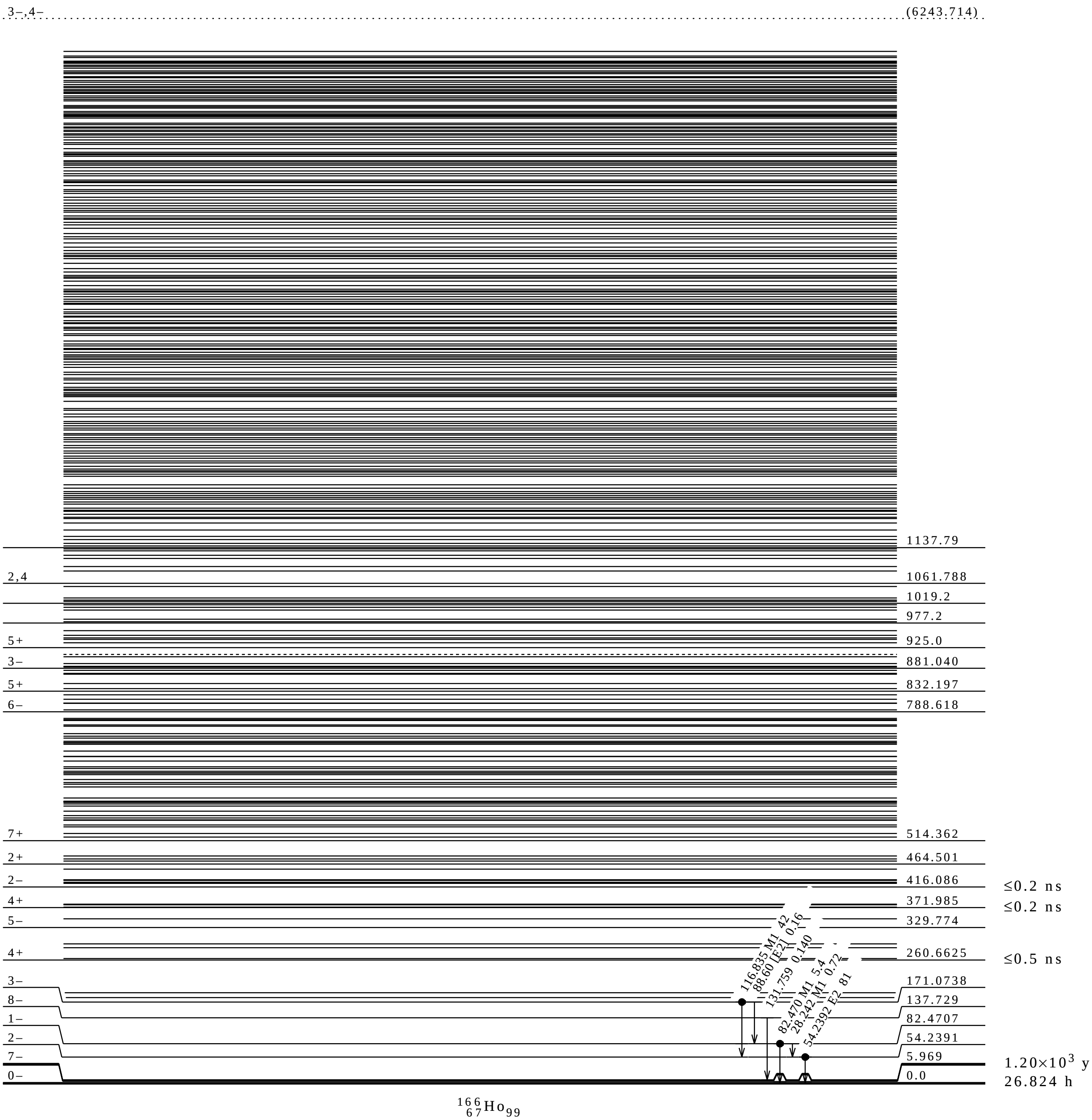
Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{165}Ho(n,γ) E=thermal 1967Mo05,1984Ke15,2000Pr03 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 thermal neutron captures in ^{165}Ho.
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10

2000Pr10: 99% purity Ho metal target; Ge x–ray detector (Eγ=20–465 keV; FWHM=1.39 keV at 305 keV), Ge detector (Eγ=59–760 keV; FWHM=2.2 keV at 305 keV); measured γγ coin (resolving time 23 ns). Additional data taken using 99.99% purity Ho oxide target; HPGe and Ge(Li) detectors (FWHM=1.9 and 2.1 keV, respectively, at 1332 keV). Measured Eγ, Iγ, γγ coin; deduced intermediate level energies for two–photon cascades to known low–energy states. See also 2000Pr03 (included in ^{165}Ho(n,γ) E=thermal data set) which incorporates some of these results.

^{166}Ho Levels

E(level)†	Comments
0.0	
54.3‡	
82.6‡	
171.1‡	
180.5‡	
191.7‡	
262.1‡	E(level): probably includes both the 260.7 and 263.8 levels from Adopted Levels.
329.9‡	
348.4‡	
372.1‡	E(level): probably includes both the 372.0 and 373.1 levels from Adopted Levels.
416.2‡	
430.1 *10*	
453.9‡	
475.9 *12*	
483.1 *11*	
522.2‡	
543.0 *8*	
548.1‡	
563.7 *11*	
593.8 *7*	Corresponds to adopted level at 592.5.
599.5 *18*	E(level): probably a multiplet including the adopted 597.0 and 598.4 levels.
651.5 *8*	
658.1 *5*	
668.3 *4*	
683.3 *15*	
701.5 *16*	No other evidence exists for this level.
717.0 *14*	
719.7 *15*	
757.7 *10*	
770.3 *7*	
790.1 *20*	Possibly a doublet including the adopted 788.6 and 792.8 levels, but γ deexcitation pattern agrees with neither.
807.9 *20*	Probable multiplet; levels adopted at 806.6 and 807.0 could not have been resolved in this experiment and the presence of an additional level cannot be ruled out. A 434γ and 546γ are known to deexcite the adopted 806.6 level but they should be accompanied by much stronger 336γ and 325γ, neither of which is seen here.
816.0 *10*	
826.1 *16*	
832.7 *12*	
873.6 *24*	Probable multiplet including levels adopted at 870 and 876.
881.9 *9*	Possible multiplet including levels adopted at 881.2 and 884.0.
891 *5*	Possible multiplet including levels adopted at 885.4, 891.1 and 895.5.
906.0 *10*	
947.1 *6*	
953.4 *11*	
960.3 *18*	
973.7 *18*	
996.8 *8*	
1004.9 *9*	
1010.5 *6*	
1014.6 *19*	
1023.3 *7*	
1028.7 *15*	
1029.0 *12*	
1030.2 *7*	
1035.8 *6*	
1053.9 *7*	
1060.8 *6*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

^{166}Ho Levels (continued)

E(level)†	Comments
1062.7 *9*	Adopted J=2,4 for this level but the proposed deexciting gammas feed levels with Jπ including 5+ and 4– and 1–, so some placements are presumably incorrect.
1087.8 *10*	
1099.8 *11*	
1115.3 *12*	Possible doublet; levels are adopted at 1114.7 and 1118.7.
1121.2 *7*	
1134.3 *15*	This may be a doublet; levels are adopted at 1131.0 and 1135.0.
1137.9 *5*	
1143.4 *16*	
1155.5 *27*	
1161.5 *10*	
1166.2 *18*	Possible doublet; Eγ values for deexciting transitions consistent with levels at 1164 and 1167 keV.
1189.9 *11*	

† Authors' values. These have larger and more realistic uncertainties than would be obtained from a least–squares fit to the Eγ data. Further, it should be noted that the level density is high and, in some cases, the energies are for multiplets.
‡ Difference between capture state energy and energy of gate for sum spectrum (2000Pr10).

γ(^{166}Ho)

E(level)	Eγ†	Iγ‡	Comments
	x405.4 *6*	0.4 *1*	E(primary γ)=5656.5, E(sum gate)=6062.2.
	x426.8 *12*	0.2 *1*	E(primary γ)=5635.1, E(sum gate)=6062.2.
	x427.4 *9*	0.8 *2*	E(primary γ)=5443.4, E(sum gate)=5870.6.
	x516.4 *7*	0.5 *2*	E(primary γ)=5534.6, E(sum gate)=6051.0.
	x593.1 *9*	0.5 *2*	E(primary γ)=5173.5, E(sum gate)=5766.6.
	x596.1 *9*	0.7 *3*	E(primary γ)=5564.0, E(sum gate)=6160.1.
	x773.8 *11*	0.5 *2*	E(primary γ)=5386.3, E(sum gate)=6160.1.
	x892.6 *6*	0.5 *1*	E(primary γ)=5179.0, E(sum gate)=6071.6.
	x945.4 *13*	0.5 *2*	E(primary γ)=5116.3, E(sum gate)=6062.2.
430.1	238.5 *1*	5.7 *4*	
475.9	304.2 *2*	2.5 *3*	
	420.5 *6*	0.5 *2*	
483.1	220.1 *4*	0.6 *1*	Probably feeds the adopted 260.7 level.
	303.6 *5*	0.5 *1*	Placement not adopted; Eγ expected from Adopted Gammas is 301.4 and I(304γ)/I(220γ) here is much too large for the 304γ to have been unnoticed in independent studies in which the 220γ was observed.
543.0	488.0 *8*	0.3 *1*	
	543.8 *7*	5.0 *15*	I(544γ)/I(488γ) is much larger than the adopted value; possibly, γ is contaminated in this experiment.
563.7	391.6 *6*	0.4 *1*	
	508.2 *8*	0.3 *1*	
593.8	401.5 *2*	2.3 *3*	
	414.0 *6*	0.3 *1*	
599.5	408.8 *6*	0.5 *1*	Based on Eγ, this γ probably deexcites the 598.4 level.
	421.7 *7*	0.3 *1*	Not included in Adopted Gammas; this Eγ implies a level at 602.2 *7* for which no other evidence exists.
	426.7 *4*	0.9 *2*	Probably a doublet deexciting both the adopted 597.0 and 598.4 levels. From adopted branching for 597 level, I(427γ)/I(543γ)=0.069 *27*, so I(427γ) from 597 level expected here is 0.07 *3* leaving 0.83 *20* to deexcite the 598 level.
	543.1 *4*	1.0 *2*	Deexcites 597.0 level.
651.5	304.1 *7*	0.8 *3*	
	596.6 *6*	0.4 *1*	
658.1	328.2 *4*	1.3 *3*	
	477.5 *7*	0.3 *1*	
668.3	488.0 *5*	0.3 *1*	
	613.9 *6*	0.5 *1*	Iγ: I(614γ)/I(488γ) is much larger than the adopted value; possibly, γ is contaminated in this reaction.
683.3	491.6 *7*	0.3 *1*	Not included in Adopted Gammas; none of the previously–known transitions from the 683 level is present and no γ with this energy has been reported in (n,γ) E=thermal.
701.5	369.6 *10*	0.7 *3*	

Continued on next page (footnotes at end of table)

From NNDC(BNL) program ENSDAT

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ‡	Comments
717.0	456.0 *1*	7.1 *5*	Probably deexcites the 719.7 level instead; see comment on 347.6γ. Eγ would be consistent with placement from the 719.7 level if γ fed the 263.8 (rather than the 260.7) member of the 262.1–keV doublet.
	715.4 *8*	3.3 *11*	
719.7	347.6 *7*	0.8 *3*	Based on Adopted Gammas, this γ should be accompanied by an order of magnitude stronger 455.6γ; probably the 456.0γ which 2000Pr10 place from a separate 717.0 level.
757.7	426.9 *9*	0.6 *3*	Omitted from Adopted Gammas; Iγ too large for transition to have been missed in (n,γ) E=thermal.
	578.1 *7*	0.3 *1*	
770.3	421.9 *5*	1.9 *5*	
790.1	598.4 *7*	0.2 *1*	May deexcite the adopted 788.6 or 792.8 level but other gammas known to deexcite those levels are not seen here and no γ with the appropriate energy for the former placement has been reported in (n,γ) E=thermal. Not included in Adopted Gammas.
807.9	394.8 *9*	0.9 *3*	Presumably does not deexcite either 806.6 or 807.0 level because those placements would imply E3 or M4 multipolarity, respectively. Omitted from Adopted Levels, Gammas.
	433.1 *8*	0.3 *1*	Deexcites the 806.6 level in Adopted Levels, Gammas.
	479.2 *11*	0.4 *2*	Not included in Adopted Gammas because it is unclear which member of a probable 808 multiplet is deexcited by it.
	545.4 *5*	0.5 *1*	Deexcites the 806.6 level in Adopted Levels, Gammas.
	628.4 *8*	0.4 *2*	Not included in Adopted Gammas because it is unclear which member of a probable 808 multiplet is deexcited by it.
816.0	401.4 *2*	5.8 *8*	Not included in Adopted Gammas; Eγ fits placement poorly and γ is far too strong to have been overlooked in other studies that excited this level.
	442.6 *2*	2.4 *3*	
	485.2 *10*	0.5 *2*	The evaluator considers this placement to be doubtful since it implies M2 multipolarity for the 485γ.
	554.4 *3*	1.1 *2*	
	624.1 *1*	3.9 *3*	
826.1	456.3 *4*	0.7 *2*	Placement not adopted. This Eγ would imply the existence of a level for which no other evidence exists.
	563.3 *5*	0.5 *1*	
	633.2 *3*	1.4 *2*	
832.7	652.2 *7*	0.3 *1*	
873.6	546.6 *5*	1.5 *3*	
	614.6 *9*	0.3 *1*	
	692.4 *7*	0.3 *1*	
	790.0 *10*	0.5 *2*	
	816.1 *4*	1.0 *2*	Based on Eγ, this γ probably deexcites the 870 level in Adopted Levels.
881.9	511.5 *2*	4.9 *5*	Not included in Adopted Levels, Gammas. Presumably does not deexcite 882 level because it is too strong to have been overlooked in other studies; also Eγ fits placement poorly.
	620.5 *7*	0.6 *2*	
	690.2 *4*	0.7 *2*	
	708.9 *6*	0.5 *1*	Deexcites level adopted at 881.1 keV.
	798.3 *4*	3.0 *5*	Deexcites level adopted at 881.1 keV.
	826.9 *3*	2.0 *3*	Deexcites level adopted at 881.1 keV.
891	519.0 *7*	0.6 *2*	
	545.7 *6*	1.2 *4*	Eγ suggests that this γ deexcites the level adopted at 895.5. Not included in Adopted Gammas.
	626.6 *7*	0.4 *1*	
	708.6 *10*	0.3 *2*	Not included in Adopted Gammas; Eγ implies that it deexcites a level at 899.5 keV.
	714.7 *5*	0.7 *2*	Eγ suggests that this γ deexcites the level adopted at 885.4. Not included in Adopted Gammas.
	716.1 *7*	0.8 *3*	Eγ suggests that this γ deexcites the level adopted at 895.5. Not included in Adopted Gammas.
	805.4 *7*	1.2 *3*	Not included in Adopted Gammas; E3 multipolarity required if γ deexcites the 891.1 level.
906.0	714.3 *1*	5.1 *4*	
	734.4 *3*	0.6 *1*	
947.1	774.9 *3*	0.7 *1*	
	892.4 *5*	1.3 *3*	
953.4	624.6 *10*	0.5 *2*	
	898.1 *10*	0.4 *2*	
960.3	542.6 *7*	1.0 *3*	
	700.1 *3*	1.3 *2*	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ‡	Comments
960.3	875.9 *9*	0.5 *2*	From Adopted Levels, Gammas, this placement implies M2 multipolarity and that seems unlikely.
973.7	889.2 *10*	0.5 *2*	
	921.1 *9*	0.3 *1*	
996.8	543.5 *10*	1.2 *5*	
	624.2 *5*	0.6 *2*	
	736.1 *10*	0.2 *1*	
1004.9	634.3 *8*	0.3 *1*	
	824.3 *4*	1.0 *2*	
	950.0 *4*	2.5 *5*	
1010.5	679.9 *8*	0.7 *2*	
	838.1 *6*	0.5 *1*	
1014.6	596.1 *7*	1.0 *3*	
	825.1 *11*	0.2 *1*	
	961.2 *5*	1.6 *3*	
1023.3	831.3 *12*	0.2 *1*	
	842.8 *7*	0.3 *1*	
1028.7	552.6 *9*	0.6 *3*	
1029.0	599.5 *4*	2.6 *5*	
	765.3 *11*	0.4 *2*	
1030.2	614.5 *4*	1.9 *4*	Not included in Adopted Levels, Gammas because proposed placement implies M2 multipolarity.
	657.5 *4*	0.9 *2*	Not included in Adopted Levels, Gammas because proposed placement implies E3 multipolarity.
	681.1 *6*	1.1 *3*	
	700.8 *4*	1.7 *3*	
	769.9 *4*	1.4 *3*	
	838.9 *7*	2.2 *9*	
	849.2 *7*	0.4 *1*	
	857.3 *4*	0.9 *2*	
	947.7 *2*	13.5 *13*	Not included in Adopted Levels, Gammas because proposed placement implies E3 multipolarity.
	975.4 *6*	0.8 *2*	Not included in Adopted Levels, Gammas because proposed placement implies M2 multipolarity.
1035.8	664.3 *8*	0.4 *1*	
	952.4 *9*	1.9 *8*	
	981.6 *9*	0.4 *2*	
	1036.2 *8*	3.5 *3*	
1053.9	999.6 *11*	0.3 *1*	
1060.8	689.1 *1*	5.3 *4*	
	798.1 *9*	0.2 *1*	
1062.7	586.1 *2*	4.0 *5*	
	646.1 *2*	7.3 *9*	
	716.0 *7*	1.0 *3*	
	734.0 *7*	0.6 *2*	
	871.8 *9*	0.2 *1*	
	881.1 *9*	0.5 *2*	
	979.3 *7*	0.9 *3*	
	1008.5 *4*	1.1 *2*	
1087.8	715.6 *3*	1.0 *2*	
	826.8 *9*	0.3 *1*	
	894.0 *9*	0.2 *1*	
	906.9 *7*	0.4 *1*	
	916.1 *7*	0.4 *1*	
	1034.3 *7*	0.5 *2*	
1099.8	623.6 *8*	0.5 *2*	May be misplaced; Adopted Levels, Gammas implies that this would be an E3 transition.
	753.1 *10*	0.6 *3*	
	836.8 *8*	0.3 *1*	
1115.3	567.5 *5*	1.6 *5*	
	595.9 *14*	0.8 *4*	Tentatively placed from a 1118.7 level in Adopted Levels, gammas.
	661.3 *2*	14.5 *15*	
	743.1 *10*	0.2 *1*	
	765.9 *3*	3.2 *5*	
	853.7 *3*	2.5 *3*	
	943.2 *9*	0.4 *1*	
1121.2	704.4 *9*	0.8 *3*	
	791.9 *11*	0.5 *2*	

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^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

γ(^{166}Ho) (continued)

E(level)	Eγ†	Iγ‡	Comments
1121.2	940.0 *6*	0.8 *2*	
	949.2 *6*	0.6 *2*	
1134.3	761.5 *6*	0.4 *1*	
	873.9 *6*	0.8 *2*	
	942.2 *7*	0.3 *1*	
	951.4 *12*	0.4 *1*	
1137.9	957.4 *3*	1.4 *2*	
1143.4	816.2 *10*	0.5 *2*	Not included in Adopted Levels, Gammas; fits placement from known 1141.3 level very poorly.
	950.3 *6*	0.4 *1*	
1155.5	683.4 *4*	1.8 *3*	
	701.7 *9*	1.2 *5*	
	787.1 *4*	1.4 *3*	
	806.5 *7*	0.8 *3*	
	825.5 *11*	0.5 *2*	
	892.1 *8*	0.4 *2*	
	959.0 *7*	0.3 *1*	Not included in Adopted Levels, Gammas; fits placement very poorly.
	983.3 *6*	0.6 *2*	
	1099.0 *5*	0.8 *2*	
1161.5	612.7 *6*	1.5 *4*	
	732.1 *5*	1.8 *4*	
	813.3 *6*	1.0 *3*	
	831.3 *7*	1.1 *3*	
	898.8 *5*	1.0 *2*	
	981.0 *7*	0.5 *1*	
	989.6 *3*	1.5 *3*	
1166.2	689.1 *5*	1.4 *3*	Not included in Adopted Levels, Gammas; fits placement from known 1168.4 level very poorly.
	713.6 *6*	2.4 *6*	
	791.8 *7*	0.8 *2*	Not included in Adopted Levels, Gammas; fits placement from known 1168.4 level very poorly.
	976.9 *7*	0.4 *1*	
1189.9	712.6 *7*	0.5 *2*	
	928.7 *5*	0.8 *2*	

† From 2000Pr10. Uncertainties may have been underestimated. This experiment reports a number of transitions with energies above the 735 keV cutoff for data from the (n,γ) E=thermal study in 1967Mo05 but is insensitive to the lowest energy transitions.

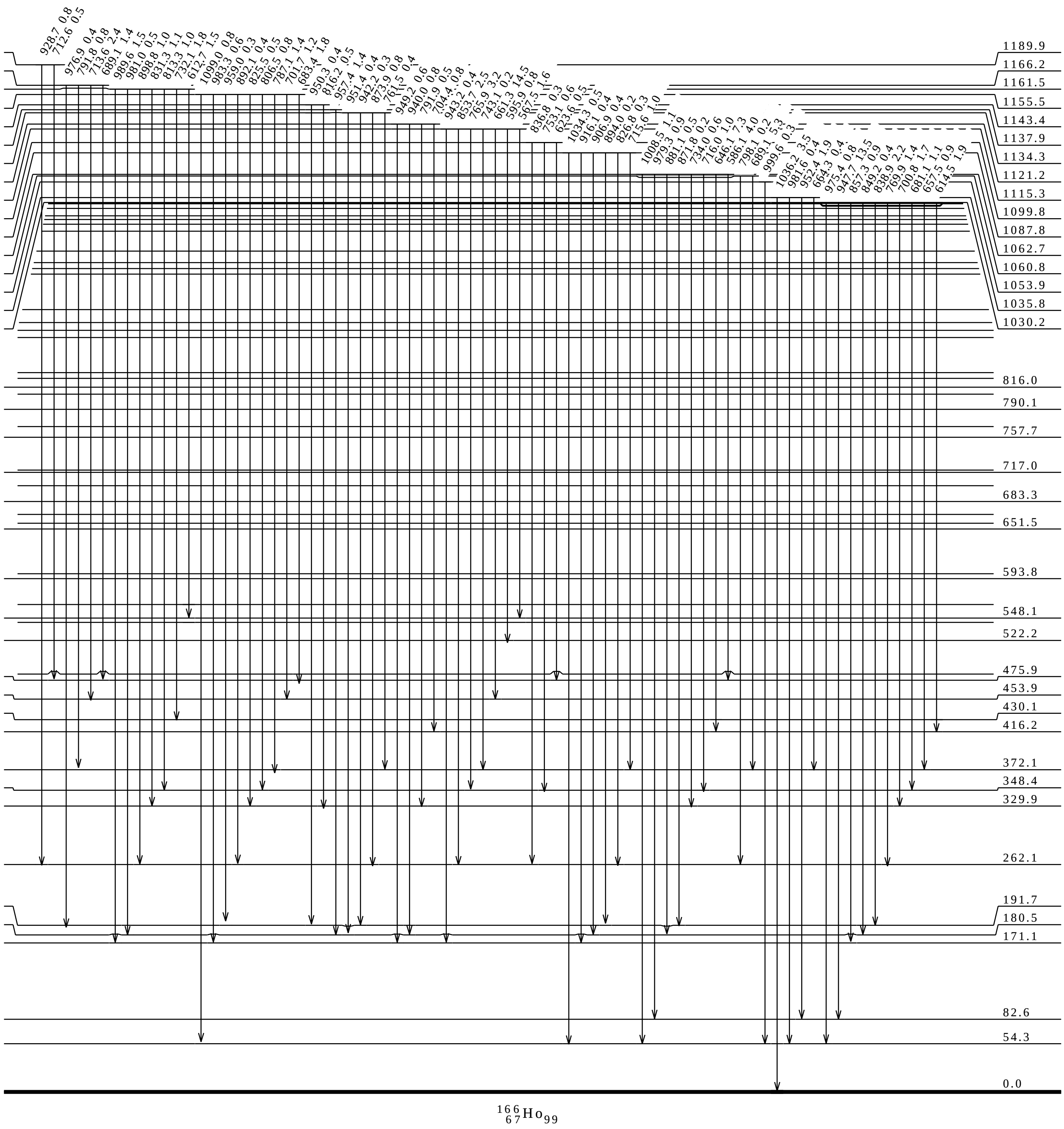
‡ Two–photon cascade intensity normalized so that area of experimental spectrum in range 520<Eγ<(cascade energy−520) was 100% for each final level.

x γ ray not placed in level scheme.

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

Level Scheme

Intensities: relative photon branching from each level

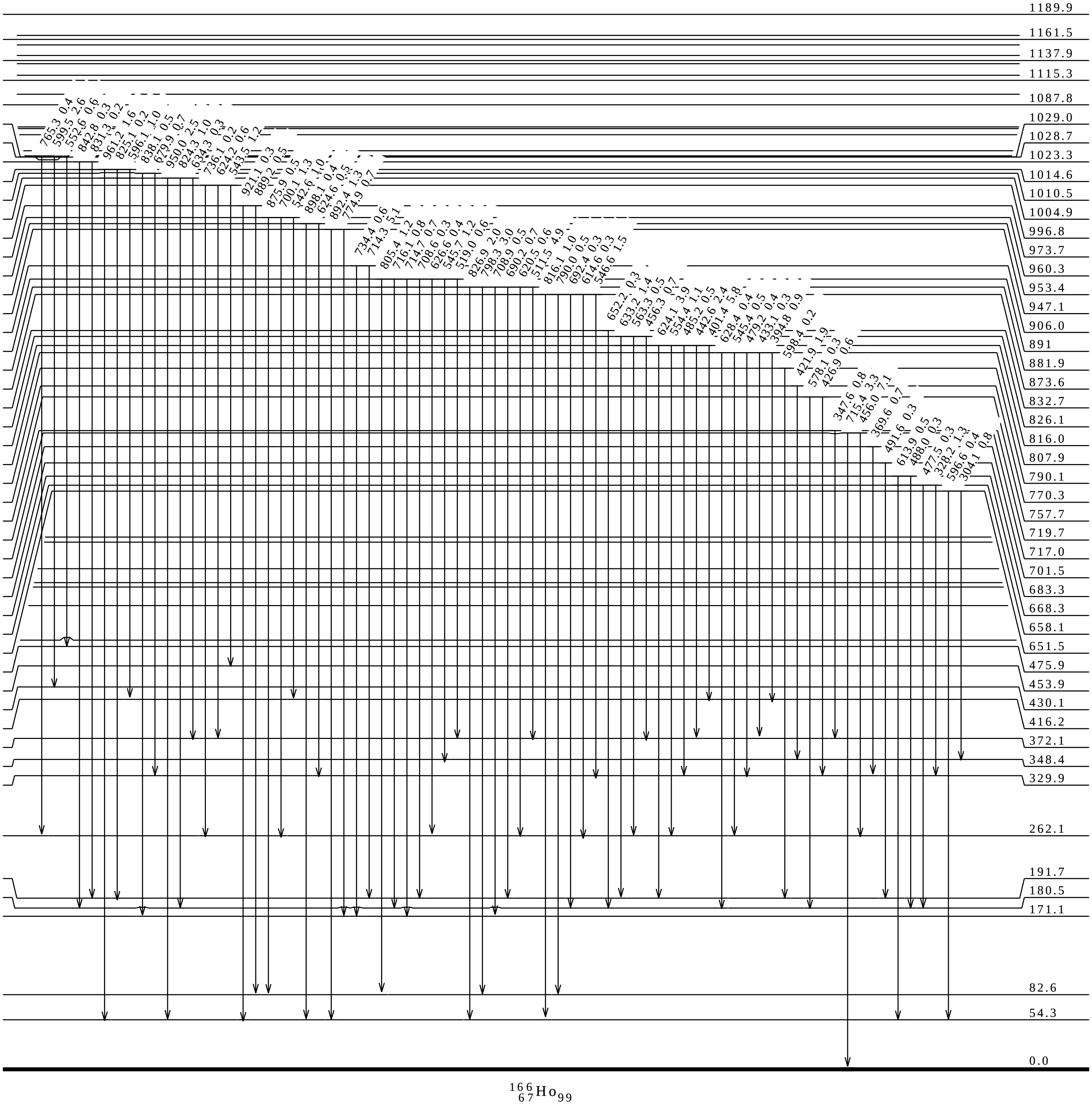


From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level

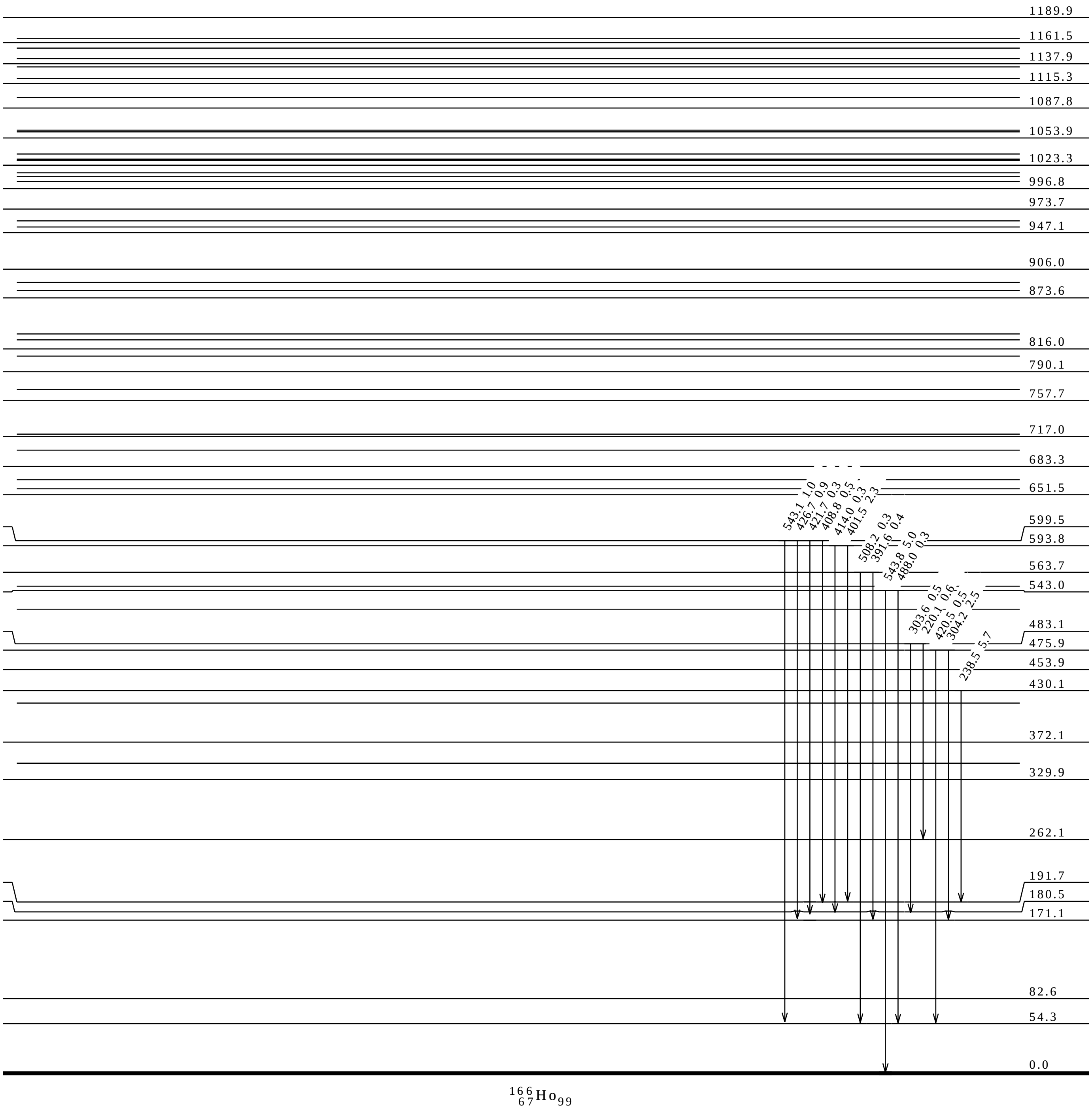


From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=thermal: γγ Coin 2000Pr10 (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=2 keV 1970Bo29,2000Pr03

Jπ(target)=7/2−.
2000Pr03: three−crystal pair spectrometer, FWHM≈5.5 keV at 6.5 MeV. calibration based on S(n) and pattern of primary transitions to several well−established low−lying levels; measured Eγ, Iγ for primary transitions.
1970Bo29: annihilation−pair spectrometer with high−resolution Ge(Li) detector, calibrated using ^{14}N(n,γ) reaction; measured Eγ, Iγ for primary transitions.

^{166}Ho Levels

E(level)†	Jπ‡	Comments
54.2 *2*	2−,5−	
82.0 *10*	(1−,6−)	
170.9 *2*	3−,4−	
180.7 *2*	3−,4−	
190.7 *2*	3+,4+	
260.6 *2*	3+,4+	
263.6 *2*	2+,5+	
278.2? *10*	(1−,6−)	
295.7? *15*	1−,6−	
330.1 *10*	2−,5−	
348.2 *2*	2+,5+	
371.9 *2*	3+,4+	
416.3 *4*	2−,5−	
430.1 *2*	2+,5+	
452.0? *10*	(1−,6−)	
464.0 *5*	2+,5+	
470.7 *2*	2+,5+	
475.5 *10*	−	
481.6 *2*	3+,4+	
521.9 *2*	3+,4+	
542.9 *10*	−	
547.6 *2*	3+,4+	Jπ: 2+,5+ from (2000Pr03) inconsistent with adopted Jπ=4+.
558.3 *2*	3+,4+	
562.5 *7*	−	
592.0 *3*	3+,4+	
597.9 *3*	3+,4+	
604.8 *3*	2+,5+	
628.0 *10*	−	
634.2? *25*	(−)	
634.20 *20*	(2+,5+)	
638.1 *15*	−	
654.9 *5*	2+,5+	Jπ: from 2000Pr03.
658.1 *15*	−	
662.3 *5*	3+,4+	Jπ: from 2000Pr03.
667.7 *10*	−	
671.1 *5*	+	
683.4 *3*	−	
693.0? *25*	(−)	
693.00 *20*	(2+,5+)	
704.3 *3*	−	
719.0 *2*	3+,4+	
725.8 *15*	−	
736.0 *2*	3+,4+	
741.3 *4*	−	
756.0 *10*	−	
759.0 *10*	−	
768.8 *3*	2+,5+	
771.3 *15*	−	
783.5 *15*	−	
789.5 *10*	−	
792.3 *10*	−	
805.8 *2*	2+,5+	
814.3 *2*	3+,4+	
823.7 *4*	−	
831.1 *2*	2+,5+	Jπ: from 2000Pr03; (2+,5+) in 1970Bo29.
836.5 *15*	−	
858.1 *15*	−	

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=2 keV 1970Bo29,2000Pr03 (continued)

^{166}Ho Levels (continued)

E(level)†	Jπ‡	Comments
860.7 *15*	–	E=860.3 *8* from 2000Pr03; may be 858+861 doublet.
867.1 *15*	–	
868.7 *15*	–	E(level): E=869.5 *5*, Jπ=2+,5+ in 2000Pr03 may be 867+869 doublet.
874.8 *15*	–	
878.6 *10*		
881.6 *15*		E=880.2 *1* from 2000Pr03 may be for 879+882 doublet.
884.2 *15*		Jπ: 2+,5+ from 2000Pr03 differs from adopted value.
889.8 *3*	3+,4+	Jπ: from 2000Pr03.
902.2 *10*		
904.0 *5*	2+,5+	Jπ: from 2000Pr03.
924.4 *2*	2+,5+	Jπ: from 2000Pr03.
946.2 *7*	2+,5+	Jπ: from 2000Pr03.
950.6 *7*		
960.6 *3*	3+,4+	Jπ: from 2000Pr03.
976.1 *5*		
979.0 *10*		E=978.6 *5*, Jπ=3+,4+ from 2000Pr03 may be 976+979 doublet.
984.6 *5*	2+,5+	Jπ: from 2000Pr03.
998.8 *5*		
1003.5 *3*		
1008.9 *3*		
1016.1 *10*		
1020.0 *15*		
1024.5 *15*		
1028.3 *4*		
1032.3 *7*		
1040.9 *15*		
1045.7 *15*		
1053.0 *2*		
1060.5 *2*		
1077.2 *2*		
1086.4 *3*		
1090.7 *15*		
1096.3 *10*		
1113.9 *2*		
1118.7 *10*		
1120.9 *15*		
1129.6 *7*		
1134.0 *15*		
1136.6 *10*		
1146.7 *5*		
1153.0 *5*		
1155.4 *15*		
1158.5 *10*		
1160.6 *10*		
(6242.6 *6*)	3–,4–	E(level): deduced from Eγ=6188.3 assuming E=54.2 for the first excited state of ^{166}Ho. This differs from S(n)=6243.64 *2* (2003Au03); all primary γ energies from 1970Bo29 appear to be approximately 1 keV low. Jπ: assuming s–wave capture by Jπ=7/2– target; p–wave capture is expected to be relatively small (1970Bo29).

† From 1970Bo29, except as noted.

‡ The assignments are from 1970Bo29, except as noted. They are based on the measured reduced intensities in average resonance capture, coupled with empirical reduced intensities to final states with known Jπ values.

^{165}Ho(n,γ) E=2 keV 1970Bo29,2000Pr03 (continued)

γ(^{166}Ho)

1970Bo29 and 2003Pr03 have measured the average γ spectrum that results when neutrons in a relatively broad band of energy (FWHM of the order of several hundred eV) are captured in many resonances. From the γ–ray line shapes, 1970Bo29 conclude that all the γ rays they observed are primary γ rays.

1970Bo29 state that their data suggested that more than six γ rays are present in the 5559.1γ–5584.4γ range.

Eγ†	E(level)	Iγ‡	Comments
5081.9 *12*	(6242.6)	352 *10*	
5084.0 *12*	(6242.6)	351 *10*	
5087.1 *16*	(6242.6)	118 *47*	
5089.5 *8*	(6242.6)	317 *32*	
5095.8 *8*	(6242.6)	235 *47*	
5105.9 *12*	(6242.6)	255 *25*	
5108.5 *16*	(6242.6)	237 *47*	
5112.9 *9*	(6242.6)	338 *23*	
5121.6 *16*	(6242.6)	49 *17*	
5123.8 *12*	(6242.6)	130 *32*	
5128.6 *6*	(6242.6)	372 *18*	
5146.2 *12*	(6242.6)	60 *3*	
5151.8 *16*	(6242.6)	48 *16*	
5156.1 *7*	(6242.6)	281 *14*	
5165.3 *6*	(6242.6)	112 *5*	
5182.0 *6*	(6242.6)	510 *25*	
5189.5 *6*	(6242.6)	351 *17*	
5196.8 *16*	(6242.6)	30 *10*	
5201.6 *16*	(6242.6)	20 *5*	
5210.2 *9*	(6242.6)	271 *41*	
5214.2 *7*	(6242.6)	676 *10*	
5218.0 *16*	(6242.6)	122 *42*	
5222.5 *16*	(6242.6)	63 *22*	
5226.4 *12*	(6242.6)	71 *14*	
5233.6 *7*	(6242.6)	272 *13*	
5239.0 *7*	(6242.6)	321 *16*	
5243.7 *8*	(6242.6)	132 *13*	
5257.9 *8*	(6242.6)	182 *13*	Eγ=5258.8 *6*, Iγ/Eγ^5=63 *10* (2000Pr03).
5263.5 *12*	(6242.6)	170 *25*	Eγ=5265.1 *5*, Iγ/Eγ^5=91 *10* (2000Pr03).
5266.4 *8*	(6242.6)	284 *20*	
5281.9 *7*	(6242.6)	302 *15*	Eγ=5282.5 *3*, Iγ/Eγ^5=96 *8* (2000Pr03).
5291.9 *9*	(6242.6)	77 *8*	
5296.3 *9*	(6242.6)	109 *11*	Eγ=5296.6 *5*, Iγ/Eγ^5=51 *6* (2000Pr03).
5318.1 *6*	(6242.6)	192 *10*	Eγ=5318.5 *4*, Iγ/Eγ^5=71 *6* (2000Pr03).
5338.5 *8*	(6242.6)	165 *50*	Eγ=5338.5 *3*, Iγ/Eγ^5=83 *6* (2000Pr03).
5340.3 *12*	(6242.6)	119 *36*	
5352.7 *7*	(6242.6)	322 *16*	Eγ=5352.9 *3*, Iγ/Eγ^5=119 *8* (2000Pr03).
5358.3 *16*	(6242.6)	112 *39*	Eγ=5358.8 *1*, Iγ/Eγ^5=39 *9* (2000Pr03).
5360.9 *16*	(6242.6)	115 *46*	Eγ=5363.5 *1*, Iγ/Eγ^5=39 *6* (2000Pr03).
5363.9 *12*	(6242.6)	106 *26*	
5367.7 *16*	(6242.6)	50 *20*	
5373.8 *16*	(6242.6)	63 *17*	Eγ=5384.2 *5*, Iγ/Eγ^5=59 *6* (2000Pr03).
5375.4 *16*	(6242.6)	65 *17*	
5381.8 *16*	(6242.6)	18 *5*	Eγ=5383.4 *8*, Iγ/Eγ^5=36 *5* (2000Pr03).
5384.4 *16*	(6242.6)	27 *6*	
5406.0 *16*	(6242.6)	47 *12*	Eγ=5406.7 *13*, Iγ/Eγ^5=29 *12* (2000Pr03).
5411.4 *6*	(6242.6)	252 *7*	Eγ=5411.8 *7*, Iγ/Eγ^5=67 *12* (2000Pr03).
5418.8 *7*	(6242.6)	91 *6*	Eγ=5419.1 *1*, Iγ/Eγ^5=32 *6* (2000Pr03).
5428.2 *6*	(6242.6)	416 *12*	Eγ=5428.7 *2*, Iγ/Eγ^5=106 *6* (2000Pr03).
5436.7 *6*	(6242.6)	225 *7*	Eγ=5437.8 *4*, Iγ/Eγ^5=53 *5* (2000Pr03).
5450.2 *12*	(6242.6)	94 *20*	Eγ=5450.7 *1*, Iγ/Eγ^5=30 *9* (2000Pr03).
5453.0 *12*	(6242.6)	86 *20*	Eγ=5455.2 *7*, Iγ/Eγ^5=32 *8* (2000Pr03).
5459.0 *16*	(6242.6)		Eγ=5462.1 *10*, Iγ/Eγ^5=13 *5* (2000Pr03).
5471.2 *16*	(6242.6)	51 *20*	
5473.7 *7*	(6242.6)	199 *10*	Eγ=5473.8 *3*, Iγ/Eγ^5=72 *6* (2000Pr03).
5483.5 *12*	(6242.6)	75 *20*	Eγ=5484.2 *1*, Iγ/Eγ^5=17 *11* (2000Pr03).
5486.5 *12*	(6242.6)	50 *20*	Eγ=5486.0 *1*, Iγ/Eγ^5=22 *11* (2000Pr03).
5501.2 *7*	(6242.6)	93 *18*	Eγ=5501.6 *1*, Iγ/Eγ^5=32 *6* (2000Pr03).
5506.5 *6*	(6242.6)	380 *11*	Eγ=5507.2 *3*, Iγ/Eγ^5=87 *6* (2000Pr03).

Continued on next page (footnotes at end of table)

^{165}Ho(n,γ) E=2 keV 1970Bo29,2000Pr03 (continued)

γ(^{166}Ho) (continued)

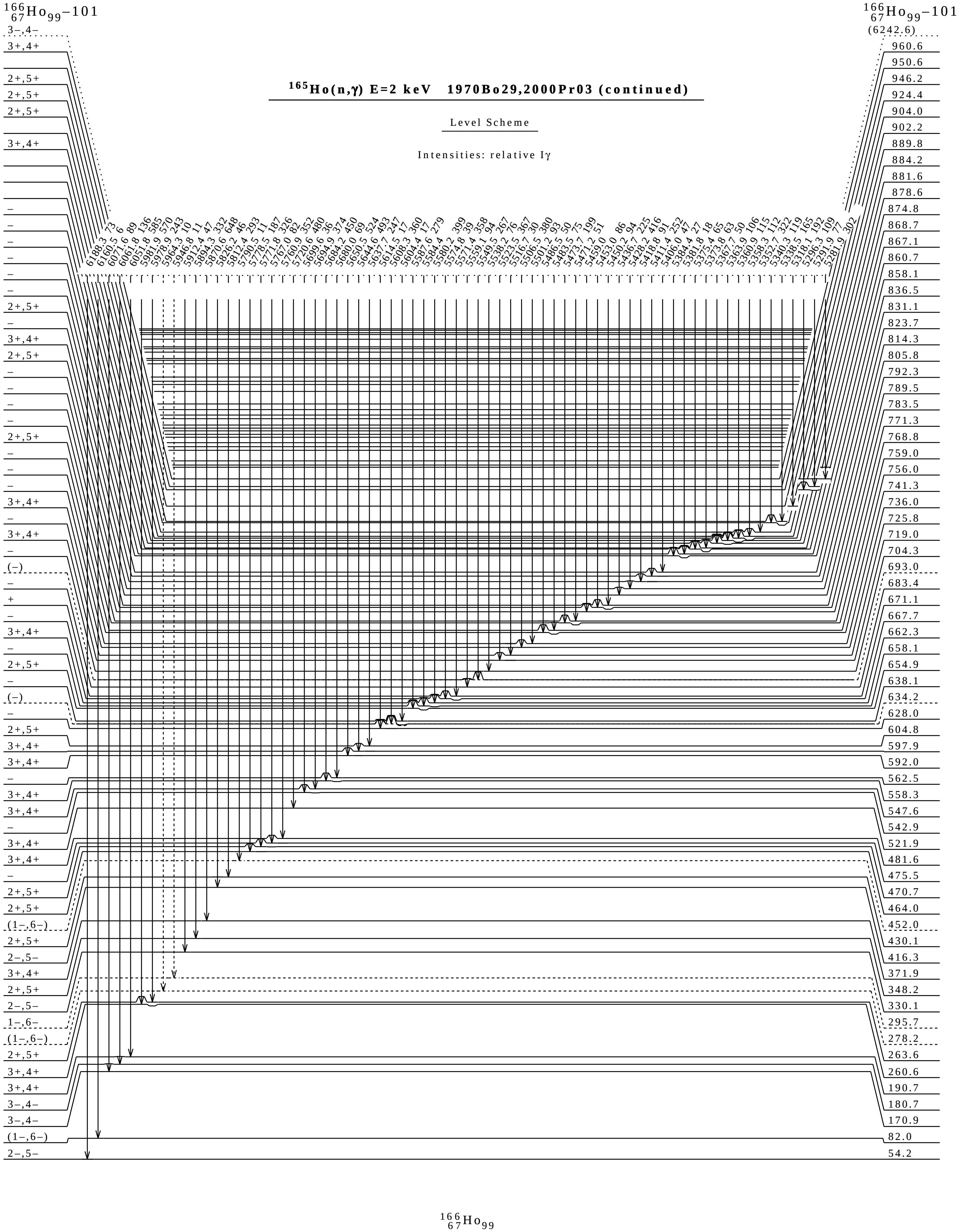
Eγ†	E(level)	Iγ‡	Comments
5516.7 *16*	(6242.6)	30 *7*	
5523.5 *6*	(6242.6)	367 *11*	Eγ=5524.0 *3*, Iγ/Eγ^5=99 *7* (2000Pr03).
5538.2 *7*	(6242.6)	76 *5*	Eγ=5538.2 *10*, Iγ/Eγ^5=14 *4* (2000Pr03).
5549.5§ *6*	(6242.6)	267 *8*	Eγ=5550.4 *3*, Iγ/Eγ^5=78 *5* (2000Pr03).
5559.1 *7*	(6242.6)	94 *6*	Eγ=5562.4 *9*, Iγ/Eγ^5=26 *4* (2000Pr03).
5571.4 *8*	(6242.6)	358 *15*	Eγ=5571.5 *7*, Iγ/Eγ^5=84 *13* (2000Pr03).
5574.8 *12*	(6242.6)	39 *10*	Eγ=5576.2 *10*, Iγ/Eγ^5=25 *12* (2000Pr03).
5580.2 *8*	(6242.6)	399 *20*	Eγ=5581.8 *9*, Iγ/Eγ^5=95 *13* (2000Pr03).
5584.4 *16*	(6242.6)		
5587.6 *8*	(6242.6)	279 *15*	Eγ=5588.8 *5*, Iγ/Eγ^5=54 *8* (2000Pr03).
5604.4 *16*	(6242.6)	17 *10*	Eγ=5605.5 *1*, Iγ/Eγ^5=20 *9* (2000Pr03).
5608.3§ *6*	(6242.6)	360 *18*	Eγ=5610.1 *6*, Iγ/Eγ^5=68 *9* (2000Pr03).
5614.5 *12*	(6242.6)	17 *9*	Eγ=5615.3 *1*, Iγ/Eγ^5=12 *8* (2000Pr03).
5637.7 *7*	(6242.6)	247 *12*	Eγ=5638.1 *4*, Iγ/Eγ^5=59 *5* (2000Pr03).
5644.6 *7*	(6242.6)	493 *25*	Eγ=5645.2 *1*, Iγ/Eγ^5=106 *10* (2000Pr03).
5650.5 *7*	(6242.6)	524 *25*	Eγ=5651.2 *2*, Iγ/Eγ^5=139 *8* (2000Pr03).
5680.0 *9*	(6242.6)	69 *17*	Eγ=5681.1 *10*, Iγ/Eγ^5=25 *13* (2000Pr03).
5684.2 *6*	(6242.6)	450 *13*	Eγ=5685.7 *6*, Iγ/Eγ^5=96 *13* (2000Pr03).
5694.9 *6*	(6242.6)	374 *12*	Eγ=5695.7 *1*, Iγ/Eγ^5=71 *7* (2000Pr03).
5699.6 *12*	(6242.6)	36 *12*	Eγ=5700.0 *1*, Iγ/Eγ^5=18 *5* (2000Pr03).
5720.6 *6*	(6242.6)	480 *15*	Eγ=5721.9 *2*, Iγ/Eγ^5=110 *7* (2000Pr03).
5760.9 *6*	(6242.6)	352 *7*	Eγ=5762.0 *3*, Iγ/Eγ^5=83 *5* (2000Pr03).
5767.0 *12*	(6242.6)	82 *16*	Eγ=5768.0 *1*, Iγ/Eγ^5=28 *8* (2000Pr03).
5771.8 *6*	(6242.6)	326 *23*	Eγ=5772.8 *1*, Iγ/Eγ^5=66 *8* (2000Pr03).
5778.5 *8*	(6242.6)	187 *13*	Eγ=5779.3 *4*, Iγ/Eγ^5=63 *6* (2000Pr03).
5790.5 *12*	(6242.6)	11 *4*	
5812.4 *6*	(6242.6)	293 *5*	Eγ=5813.5 *2*, Iγ/Eγ^5=72 *4* (2000Pr03).
5826.2 *7*	(6242.6)	46 *5*	Eγ=5827.6 *1*, Iγ/Eγ^5=13 *2* (2000Pr03).
5870.6 *6*	(6242.6)	648 *12*	Eγ=5871.9 *2*, Iγ/Eγ^5=124 *5* (2000Pr03).
5894.3 *6*	(6242.6)	332 *9*	Eγ=5895.3 *2*, Iγ/Eγ^5=75 *5* (2000Pr03).
5912.4 *12*	(6242.6)	47 *5*	Eγ=5914.0 *5*, Iγ/Eγ^5=24 *4* (2000Pr03).
5946.8# *16*	(6242.6)	11 *4*	
5964.3# *12*	(6242.6)	10 *3*	
5978.9 *6*	(6242.6)	243 *45*	Eγ=5979.9 *1*, Iγ/Eγ^5=45 *6* (2000Pr03).
5981.9 *6*	(6242.6)	570 *40*	Eγ=5983.0 *1*, Iγ/Eγ^5=112 *6* (2000Pr03).
6051.8 *6*	(6242.6)	585 *17*	Eγ=6052.5 *2*, Iγ/Eγ^5=122 *5* (2000Pr03).
6061.8 *6*	(6242.6)	136 *6*	Eγ=6063.4 *7*, Iγ/Eγ^5=20 *3* (2000Pr03).
6071.6 *6*	(6242.6)	89 *4*	Eγ=6072.9 *5*, Iγ/Eγ^5=23 *3* (2000Pr03).
6160.5 *12*	(6242.6)	6 *3*	
6188.3 *6*	(6242.6)	73 *3*	Eγ=6189.8 *4*, Iγ/Eγ^5=17 *2* (2000Pr03).

† From 1970Bo29; the authors have corrected for the 0.65 keV shift due to the non–zero energies of the captured resonance neutrons; thus, the energies they reported are those that would be expected in thermal–neutron capture. However, they are consistently lower than the similarly–corrected Eγ from 2000Pr03 by about 1 keV. Uncertainties include 0.6 keV systematic uncertainty.

‡ Relative reduced photon intensity, IγEγ^{-3}, from 1970Bo29 for a ^{10}B absorber thickness of 0.107 g/cm^2; see 1970Bo29 for reduced intensities for ^{10}B absorber thicknesses of 0.036 and 0.418 g/cm^2. Relative reduced intensities from 2000Pr03, defined instead as IγEγ^{-5}, are given in comments; values for M1 transitions are about a factor of 6 lower than those for E1 transitions.

§ Probably a doublet.

Placement of transition in the level scheme is uncertain.



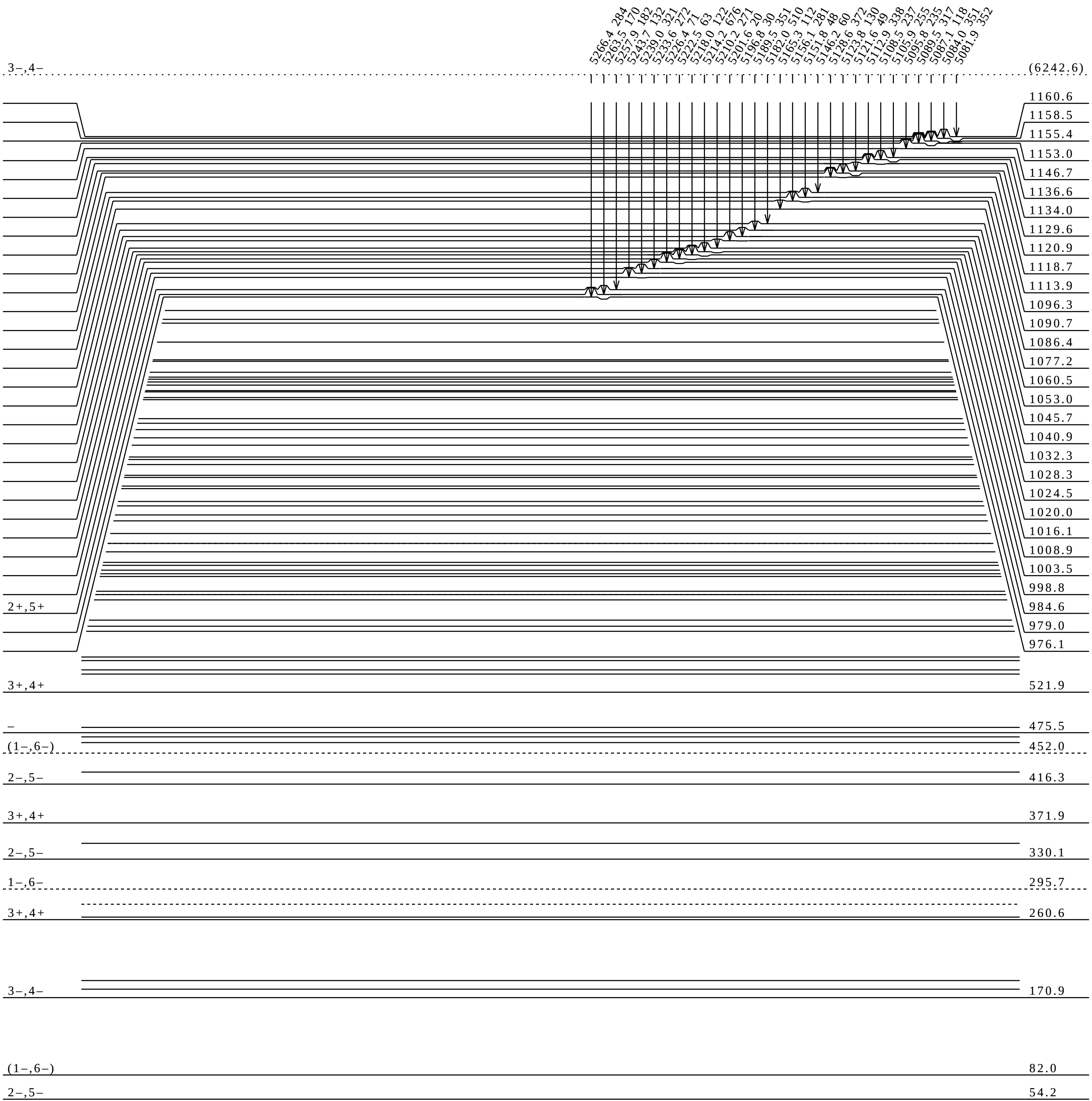
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(n,γ) E=2 keV 1970Bo29,2000Pr03 (continued)

Level Scheme (continued)

Intensities: relative Iγ



$^{166}_{67}Ho_{99}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(d,p) 2000Pr03,1965St06

Target Jπ=7/2−.
2000Pr03: E(d)=17 MeV; Q3D spectrograph with proportional chamber (cathode strip readout) and scin, FWHM≈5 keV; θ(lab)=15°, 30°, 45°; E(level)≤1.8 MeV; DWBA and Nilsson model calculations.
1965St06: E(d)=11, 12 MeV; metal and oxide Ho targets; magnetic spectrograph with nuclear emulsions, typical FWHM=8–13 keV, θ(lab)=35°, 45°, 60°, 65°, 90° and 95°; measured E(p), I(p). Detailed report of (d,p) data summarized in 1967Mo05.

^{166}Ho Levels

E(level)[†]	Jπ[§]	I(p) (45°)[‡]	Comments
6.21[@] *25*	7−	6.1 *8*	
54.3[#] *4*	2−	3.3 *7*	
82.6[#] *11*	1−		
138.02[@] *16*	8−	20.7 *18*	
171.42[#] *26*	3−	5.2 *8*	Other E: 167.6 *20* (1965St06).
180.62[#] *19*	4−	9.8 *9*	
190.87[&] *8*	3+	126 *4*	
260.67[&] *11*	4+	80 *7*	
264.65[a] *27*	5+	23 *6*	I(p): poorly resolved from 261−keV peak.
287.5[@] *5*	9−	13 *3*	
295.42[b] *11*	6+	69 *4*	
329.83[#] *24*	5−	23 *3*	
348.28[&] *10*	5+	65 *4*	
372.1[c] *4*	4+	213 *4*	
378.90 *20*		77 *3*	E(level): possible doublet.
384.23 *16*		12.4 *18*	
423.58[b] *20*	7+	70 *4*	
426.04[f] *20*	1+	35 *4*	
430.5[e] *5*	2+	15.6 *18*	
453.77[&] *10*	6+	28 *2*	Other E: 457 *2* (1965St06).
464.50[f] *13*	2+	54 *3*	
470.88[c] *25*	5+	72 *3*	
476.5[@] *4*	3−	12 *2*	
482.2[e] *6*	3+	4.6 *14*	
514.42[a] *15*	7+	48 *3*	
522.1[f] *4*	3+	80 *3*	
529.01[k] *24*	6−	11 *2*	
547.96[e] *5*	4+	38 *2*	
558.55[h] *9*	4+	62 *3*	
562.6[@] *4*	4−		
567.92[d] *21*	1+	10.9 *11*	
576.5[&] *4*	7+	6.2 *9*	
588.13[c] *8*	6+	42 *3*	
592.52[g] *18*	3+	35 *1*	
598.36[f] *22*	4+	64 *3*	
604.88[d] *12*	2+	15 *2*	Other E: 610 *2* (1965St06).
634.91[e] *19*	5+	22 *2*	
644.0[k] *4*	7−	7.5 *13*	
655.13[h] *11*	5+	46 *2*	
662.5[d] *5*	3+	15 *2*	
671.31[g] *24*	4+	13 *1*	
694.1[f] *3*	5+	23 *3*	
722.95[c] *18*	7+	10.3 *12*	
737.21[d] *18*	4+	20 *1*	
769.72 *10*		18 *1*	
807.01[f] *16*	6+	6.9 *12*	
814.86[j] *27*	3+	99 *5*	
819.06 *20*		17 *2*	
824.6 *4*			
831.44[d] *23*	5+	5.9 *11*	
837.9 *3*		3.5 *10*	
848.46[l] *16*	7+	7.7 *9*	
884.0[g] *6*	6+	3.6 *8*	
890.64[j] *17*	4+	82 *3*	
895.5 *6*		10.5 *18*	
904.64[m] *13*	2+	23 *1*	

Continued on next page (footnotes at end of table)

^{165}Ho(d,p) 2000Pr03,1965St06 (continued)

^{166}Ho Levels (continued)

E(level)[†]	Jπ[§]	I(p) (45°)[‡]	Comments
911.4[i] 3	6+	4.7 8	
925.21 16		22 1	
961.23[m] 16	3+	11.6 12	
978.55 24		20 2	
985.74[j] 18	5+	38 2	
1003.8 6		1.8 8	
1009.8 4		3.8 9	
1030.3[m] 2	4+	8.8 10	
1038.4 3		12.3 11	
1055.4 4		9.9 10	
1088.6 7		2.3 7	Other E: 1080 2 (1965St06).
1098.6[j] 7	6+	8.2 10	
1114.7 8		3.3 8	
1130.4 10		6.5 6	
1138.4 10		8.3 6	
1148.5 11		6.0 8	Other E: 1154 3 (1965St06).
1161.1 11		1.9 5	
1168.4 11		4.7 6	
1174.0 11		14.7 9	
1190.1 14		4.9 5	
1202.3 13		10.7 7	
1209.6 14		2.5 5	
1216.6 14		4.1 5	
1226.9 15		2.9 6	Other E: 1221 2 (1965St06).
1240.4 15		8.4 9	
1245.1 16		7.2 9	
1264.9 18			
1271.2 17		19.0 11	
1280.7 18		17.3 11	
1290.9 18		16.7 12	
1297.1 19		15.5 12	
1303.7 19		7.5 11	
1326.9 21			
1334.5 21		15 2	
1341.7 21		13 2	
1350.2 22		13.8 12	
1358.8 22		29 2	Other E: 1361 1 (1965St06).
1367.1 23		45 2	
1376.6 22		17 2	
1382.6 24		9.3 12	
1388.4 25		10.4 11	
1397.2 25		3.0 7	
1417 3		17.6 9	
1426 3		38.5 13	
1432 3		24.3 12	
1440 3		15.0 9	
1445 3		3.8 7	
1458 3		3.9 6	
1465 3		5.2 6	
1471 3		3.5 6	
1487 3		4.8 6	
1499 3		7.3 6	
1508 3		8.6 11	
1513 3		31 2	Other E: 1518 1 (1965St06).
1528 3		12.0 11	
1533 3		14 2	
1537 1		10 2	E(level): from 1965St06; 1537 3 in 2000Pr03.
1547 3		2.3 9	
1559 1		10 1	E(level): from 1965St06; 1558 3 in 2000Pr03.
1569 4		4.7 7	
1577 4		10 1	
1593 4		3.8 8	
1601 4		8 2	

Continued on next page (footnotes at end of table)

^{165}Ho(d,p) 2000Pr03,1965St06 (continued)

^{166}Ho Levels (continued)

E(level)[†]	I(p) (45°)[‡]	Comments
1605 *4*	5 *2*	Other E: 1604 *1* (1965St06).
1615 *4*	8 *1*	
1623 *2*	10 *1*	E(level): from 1965St06; 1623 *4* in 2000Pr03.
1636 *4*	9 *1*	
1642 *1*	6 *1*	E(level): from 1965St06; 1643 *4* in 2000Pr03.
1654 *4*	8 *1*	
1677 *4*	5 *1*	
1686 *4*	4 *1*	
1692 *4*	38 *2*	
1697	12 *1*	E(level): reported energy (1687 *4*) appears to be a misprint since it is listed out of numerical order. 1697 seems a reasonable possibility.
1702 *4*	5 *1*	
1717 *4*	10 *1*	
1723 *5*	8 *1*	
1731 *5*	20 *1*	
1745 *5*	27 *2*	
1753 *5*	16 *1*	
1759 *5*	14 *10*	
1765 *5*	54 *20*	
1779 *5*	22 *3*	
1784 *5*	21 *3*	
1788 *5*	35 *3*	

[†] From 2000Pr03, except as noted. 1965St06 reported additional levels at 308 *3*, 401 *2*?, 942 *3*, 1105 *1*, 1122 *2*, 1312 *1*, 1661 *1*; since they were not confirmed in 2000Pr03, either they do not belong in ^{166}Ho or are unresolved doublets.
[‡] Relative proton intensity at 45°. See 2000Pr03 for relative proton intensities at 15° and 30°.
[§] From 2000Pr03, based on band structure deduced from comparison between the experimental cross section and theoretical cross sections calculated for available low–lying Nilsson orbitals and the DWBA.
[#] (A): Kπ=0−, (π 7/2[523])−(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=1 through 5 members of this configuration.
[@] (B): Kπ=7−, (π 7/2[523])+(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=7 through 9 members of this configuration.
[&] (C): Kπ=3+, (π 7/2[523])−(ν 1/2[521]) band. Jπ established by cross section fingerprint for J=3 through 7 members of this configuration.
[a] (D): Kπ=5+ band. Configuration: (π 3/2[411]+ν 7/2[633])+(π 7/2[523]+ν 3/2[521]).
[b] (E): Kπ=6+, (π 7/2[523])+(ν 5/2[512]) band.
[c] (F): Kπ=4+, (π 7/2[523])+(ν 1/2[521]) band. Jπ established by cross section fingerprint for J=4 through 6 members of this configuration.
[d] (G): Kπ=1+, (π 7/2[523])−(ν 5/2[523]) band. Jπ established by cross section fingerprint for J=1 through 5 members of this configuration.
[e] (H): Kπ=2+ band. (π 3/2[411]−ν 7/2[633])+(π 7/2[523]−ν 3/2[521]) band.
[f] (I): Kπ=1+, (π 7/2[523])−(ν 5/2[512]) band. Jπ established by cross section fingerprint for J=1 through 6 members of this configuration.
[g] (J): Kπ=3+, (π 1/2[411])−(ν 7/2[633]) band.
[h] (K): Kπ=4+, (π 7/2[523])+(ν 1/2[510]) band.
[i] (L): Kπ=4+, (π 1/2[411])+(ν 7/2[633]) band.
[j] (M): Kπ=3+, (π 7/2[523])−(ν 1/2[510]) band.
[k] (N): Kπ=5−, (π 7/2[523])+(ν 7/2[633])−Q_{22} band.
[l] (O): Kπ=6+, (π 7/2[523])+(ν 5/2[523]) band.
[m] (P): Kπ=2+, (π 7/2[523])−(ν 3/2[521]) band.

^{167}Er(d,^{3}He) 2000Pr03

Target Jπ=7/2+.
E(d)=27 MeV; Q3D spectrograph with proportional chamber (cathode strip readout) and scin, FWHM≈9 keV; 95.6% ^{167}Er target; θ(lab)=30°, 40°, 50°; E(level)≤1.2 MeV; DWBA and Nilsson model calculations.

^{166}Ho Levels

E(level)	I(^{3}He) (40°)[†]	Comments
5.7[§] *3*	4.8 *6*	
54.3[‡] *9*	1.3 *3*	
85[‡] *3*		
138.21[§] *24*	8.2 *7*	
171.6[‡] *7*	3.1 *6*	
180.2[‡] *6*	4.0 *7*	
190.8[#] *6*	2.8 *6*	
263.76[@] *18*	22.2 *11*	
273.1 *16*	2.2 *6*	
286.5[§] *6*	5.1 *7*	
296.8[&] *12*		
330.8[‡] *7*	2.2 *4*	
347.7[#] *9*	1.2 *3*	
380.2[@] *5*	12.4 *9*	
430.14[a] *22*	11.1 *11*	
454.5[#] *13*	0.7 *4*	Intensity questionable.
481.65[a] *20*	12.1 *11*	
548.1[a] *4*	5.6 *7*	
558.5[c] *4*	4.0 *7*	
591.7[b] *6*	2.0 *6*	
635.1[a] *6*	2.4 *6*	
651.9[c] *14*	1.6 *4*	Identification questionable.
670.8[b] *6*	1.6 *4*	
719.1[d] *4*	3.8 *6*	
730[a] *3*	1.2 *4*	
805.0 *11*	2.0 *6*	Doublet.
820.7 *13*	1.8 *4*	
884.8 *16*	1.2 *4*	
926.5 *13*	1.9 *4*	
1010.2 *22*	0.8 *4*	
1093.7 *19*	0.4 *2*	
1142.2 *21*	0.6 *2*	

† Relative ^{3}He intensity at 40°. See 2000Pr03 for relative ^{3}He intensities at 30° and 50°.
‡ (A): Kπ=0−, (π 7/2[523])−(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=2 through 5 members of this configuration.
§ (B): Kπ=7−, (π 7/2[523])+(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=7 through 9 members of this configuration.
# (C): Kπ=3+, (π 7/2[523])−(ν 1/2[521]) band.
@ (D): Kπ=5+, (π 3/2[411]+ν 7/2[633])+(π 7/2[523]+ν 3/2[521]) band.
& (E): Kπ=6+, (π 7/2[523])+(ν 5/2[512]) band.
a (F): Kπ=2+, (π 3/2[411]−ν 7/2[633])+(π 7/2[523]−ν 3/2[521]) band. Jπ established by cross section fingerprint for J=3 through 6 members of this configuration.
b (G): Kπ=3+, (π 1/2[411])−(ν 7/2[633]) band.
c (H): Kπ=4+, (π 7/2[523])+(ν 1/2[510]) band.
d (I): Kπ=4+, (π 1/2[411])+(ν 7/2[633]) band.

^{167}Er(t,α) 1982De37

Target Jπ=7/2+.
1982De37: E(t)=17.0 MeV; 87.2% ^{167}Er target; Q3D magnetic spectrometer (FWHM≈20 keV), particle identification; θ(lab)= 25°, 30°, 35°, 40°, 50°; measured Eα, dσ/dΩ; DWBA calculations.

^{166}Ho Levels

E(level)	Jπ[†]	L[‡]	dσ/dΩ(35°) μb/sr[§]	Comments
0.0[#]	0−		≈1	dσ/dΩ(35°) μb/sr: estimated for unresolved doublet.
5[@] 5	7−	5	≈21	dσ/dΩ(35°) μb/sr: estimated for unresolved doublet.
57[#] 7	2−		4.6	
86.5[#] 25	1−			
136.0[@] 7	8−	5	37	
173.1[#] 14	3−		23	
187.3[#] 21	4−		14	
259.3[&] 12	5+		58	
283.3[@] 13	9−	5	27	
323[#] 4	5−		21	
375.3[&] 14	6+	2	≈38	E(level): for unresolved doublet.
375.3[#] 14	6−		≈6	E(level): for unresolved doublet.
425.0[a] 20	2+		34	
478[a] 3	3+		38	
514.4[&] 17	7+		5.1	
547[a] 3	4+		≈33	
562[#] 4	7−		3	
589.9 16			13	
636[a] 3	5+		8.6	
718[b] 3	3+[i]	2	29	
731.8[a] 25	6+		0.9	
801[c] 4	0+		2	
818[b] 3	4+[i]		24	
856[c] 6	2+	4	4.4	
884.0[d] 20	4+[i]	2	14	
915[e] 3	7+	4	15	
946[b] 4	5+[i]		4.7	
974[c] 9	1+		2.4	
1006[d] 4	5+[i]		11	
1037 7			8.1	
1066[c] 5	3+		1.9	
1091[b] 4	6+[i]		2.5	
1126 8			1.1	
1146[d] 5	6+[i]		13	E(level),dσ/dΩ(35°) μb/sr: for unresolved doublet.
1146[f] 5	1+		13	E(level),dσ/dΩ(35°) μb/sr: for unresolved doublet.
1187[f] 6	2+		11	
1205 18			2.8	
1238[f] 3	3+	4	19	
1272.0[g] 20	6+	4	32	
1305[f] 4	4+	4	11	
1356 5			7.7	
1379[f] 14	5+		14	
1417[g] 3	7+	4	24	
1460 17			5.6	
1487 11			15	
1519 11			5.8	
1560[h] 5	6−		12	
1585 8			6.6	
1604.0 20			3.8	
1628? 10				
1645 3			26	
1692[h] 4	7−		21	
1743 8			19	
1790 6			25	
1834[h]	8−		26	
1998[h] 6	9−		16	
2160 6			34	

Footnotes continued on next page

^{167}Er(t,α) 1982De37 (continued)

^{166}Ho Levels (continued)

† From 1982De37, based on comparison of measured cross sections with DWBA calculations for specific Nilsson orbitals, unless otherwise noted.
‡ From comparison of σ(θ)(exp) and σ(θ)(DWBA).
§ dσ/dΩ at 35° in μb/sr.
# (A): Kπ=0−, (π 7/2[523])−(ν 7/2[633]) band.
@ (B): Kπ=7−, (π 7/2[523])+(ν 7/2[633]) band.
& (C): Kπ=5+ band. (π 3/2[411])+(ν 7/2[633]) and (π 7/2[523])+(ν 3/2[521]).
a (D): Kπ=2+ band. (π 3/2[411])−(ν 7/2[633]) and (π 7/2[523])−(ν 3/2[521]).
b (E): π=+ band 1. Configuration of (π 1/2[411])−(ν 7/2[633]) assigned to this band in 1982De37 is assigned to a different band in Adopted Levels.
c (F): Kπ=0+, (π 7/2[404])−(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=0 through 3 members of this configuration.
d (G): π=+ band 2. Configuration of (π 1/2[411])+(ν 7/2[633]) assigned to this band by 1982De37 is assigned to a different band in Adopted Levels.
e (H): Kπ=7+, (π 7/2[404])+(ν 7/2[633]) band.
f (I): Kπ=1+, (π 5/2[413])−(ν 7/2[633]) band. Jπ established by cross section fingerprint for J=1 through 5 members of this configuration.
g (J): Kπ=6+, (π 5/2[413])+(ν 7/2[633]) band.
h (K): Kπ=6−, (π 5/2[532])+(ν 7/2[633]) band.
i Not adopted; configuration nominated in 1982De37 is now assigned to a different level sequence.

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas

Q(β⁻)=–3038 *12*; S(n)=8474.6 *19*; S(p)=7316.0 *9*; Q(α)=830.3 *12* 2003Au03.
For finestructure, hyperfine structure and isotope shift data see, e.g., 1989Kr16, 2000As04.

Other Reactions:.
^{167}Er(^{3}He,αγ), E=45 MeV: measured primary γ spectra; deduced level density and γ–ray strength function; see, e.g., 2001Me07. Observed pygmy resonance at E=2.98 *8* MeV with Γ=1.3 *3* MeV.
^{148}Nd(^{18}O,γ), E=78 MeV: measured γ(θ) for gammas emitted by the GDR in hot ^{166}Er at moderate excitation energy and spin (1993Br09, 1994Ca11).

^{166}Er Levels

The evaluator has not included the 1784.8 level from (n,n'γ). A comparison of branching of 1704γ and 1889γ, placed from 1969 level in ε decay, suggests that this level is being seen in both reactions and that entire Iγ(1704γ) in (n,n'γ) can be assigned to the 1969 level. The 1784γ is placed only from the 1865 level in ε decay with assignment of the 1704γ entirely to the 1969 level, the alternative placement of the 1784γ from a possible 1785 level is less convincing.
For discussion of structure of one–phonon states see, e.g., 2006De30.

Cross Reference (XREF) Flags

A ^{166}Tm ε Decay	F ^{165}Ho(^{3}He,d),(α,t)	K ^{164}Er(t,p)
B ^{166}Ho β⁻ Decay (1200 y)	G ^{166}Er(γ,γ')	L ^{168}Er(p,t)
C ^{166}Ho β⁻ Decay (26.824 h)	H ^{166}Er(d,d')	M ^{166}Er(pol p,p'),(^{3}He,^{3}He')...
D ^{166}Er(n,n'γ)	I ^{167}Er(d,t),(^{3}He,α)	
E Coulomb Excitation	J ^{164}Dy(α,2nγ)	

E(level)†	Jπ	XREF	$T_{1/2}$‡	S	Comments
0.0[a]	0+§	ABCDEFGHIJKLM	stable		
80.5776[a] *20*	2+§	ABCDEFGHIJKLM	1.815 ns *23*		μ=+0.641 *10*; Q=–1.9 *4* (1965Hu01). μ: mean of +0.649 *10* (1981Ho31) and +0.632 *10* (1968Mu01); Mossbauer effect. Q: from Mossbauer effect; Sternheimer correction applied. Others: –2.7 *9* (1970McZQ), –2.9 *10* (1970Ka45); from Coulomb excitation reorientation. <r^{2}>$^{1/2}$(charge)=5.251 *3* (2004An14). $T_{1/2}$: weighted average of 1.76 ns *5* (1963De21), 1.80 ns *5* (1963Fo02) in β⁻ decay (26.824 h); 1.83 ns *6* (1963Li04), 1.83 ns *5* (1968Ku03) in β⁻ decay (1.20 E3 y); 1.86 ns *5* from B(E2) in Coulomb excitation and adopted γ properties. Others: 1.98 ns *21* (1961Bo05) in β decay(26.824 h), 1961Ge14, 1967Ku07. Jπ: E2 91γ to 0+ g.s.
264.990[a] *3*	4+§	ABCDEF HIJKLM	118 ps *4*		μ=+1.19 *4*; Q=–2.7 *9* (1969McZS). $T_{1/2}$: from γγ(t) (^{166}Ho β⁻ decay (1200 y)). Other: 120 ps *7* from measured B(E2) and adopted γ properties. μ: unweighted average of +1.26 *6* (1985Al22, IPAC), and +1.14 *8* (1996Br09) and 1.18 *5* (1986Do13), transient field IPAC. Q: from Coulomb excitation reorientation. Jπ: E2 184γ to 2+ 81.
545.454[a] *4*	6+§	AB DEF HIJKLM	15.0 ps *8*		μ=+1.60 *6*. $T_{1/2}$: from RDM in Coulomb excitation. Other value: 17.7 ps +*10*–*14* from measured B(E2) and adopted γ properties. μ: weighted average of +1.55 *7* (1985Al22, IPAC), +1.51 *16* (1986Do13, transient field IPAC) and +1.72 *9* (1996Br09, transient field IPAC).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)†	Jπ	XREF	$T_{1/2}$‡	S	Comments
785.905[b] *6*	2+[&]	A CDEF HIJKLM	3.12 ps *10*		μ=0.69 *8*; Q=2.13 *15*. μ: weighted average of +0.54 *9* (1986Do13, transient field IPAC) and +0.74 *5* (1996Br09, transient field IPAC). Q: weighted average of 2.2 *2* (1983Hu01), 2.1 *4* (1977Mc11) and 2.0 *3* (1970McZQ); from Coulomb excitation reorientation. $T_{1/2}$: from B(E2)↑=0.140 *4* in Coulomb excitation and adopted γ properties. Jπ: E2 786γ to 0+ g.s.
859.389[b] *5*	3+[&]	AB DEF IJKL	4.5 ps *8*		Jπ: M1 73γ to 2+ 786, E2+M1 594γ to 4+ 265. $T_{1/2}$: from B(E2)(594γ) in Coulomb excitation and adopted γ properties.
911.208[a] *6*	8+[§]	B DEF IJ M	4.12 ps *15*		μ=+2.1 *2*. $T_{1/2}$: from Coulomb excitation. μ: weighted average of +2.1 *4* (1985Al22, IPAC), +1.8 *3* (1986Do13, transient field IPAC) and +2.2 *2* (1996Br09, transient field IPAC).
956.232[b] *5*	4+[&]	AB DEF HIJKLM	3.5 ps *2*		Jπ: E2 170γ to 2+, E2 411γ to 6+. $T_{1/2}$: from Coulomb excitation (measured B(E2) and RDM).
1075.277[b] *4*	5+[&]	AB DEF IJ	2.7 ps *3*		Jπ: γ's to 4+ and 6+ are E2+M1. $T_{1/2}$: from measured B(E2) in Coulomb excitation and adopted transition properties. Other datum: ≤60 ps from γγ(t) (^{166}Ho β^- decay (1200 y)).
1215.968[b] *5*	6+[&]	B DEF IJ	4.4 ps *3*		μ=+1.52 *19* (1985Al22). Jπ: M1+E2 671γ to 6+, E2 951γ to 4+ 265. γγ(θ) data of 1965Re02 consistent with J=6. μ: from 1985Al22 (IPAC). $T_{1/2}$: from Coulomb excitation (RDM).
1349.53[a] *7*	10+[§]	E J	1.62 ps *7*		μ=+2.6 *3*. Jπ: continuation of established g.s. band. $T_{1/2}$: from Coulomb excitation; weighted average of 1.59 ps *8* (RDM) and 1.72 ps *14* (B(E2) and adopted γ properties). μ: weighted average of +1.9 *7* (1986Do13) and +2.8 *4* (1996Br09); from transient field IPAC.
1376.035[b] *5*	7+[&]	B DE IJ	4.9 ps *9*		Jπ: γ's to 6+ and 8+ are E2+M1. $T_{1/2}$: from B(E2)(301γ) in Coulomb excitation and adopted transition properties.
1458.154[c] *9*	(2)−	A D F I			XREF: F(1452). Jπ: γ to 2+ and 3+ are E1, fit to a band.
1460.031[e] *6*	0+	CD JKL	0.76 ps *28*		Jπ: the 1460γ is E0 to 0+ g.s. $T_{1/2}$: from DSAM in (n,n'γ).
1513.751[c] *9*	3−	A DE H JKLM			XREF: J(1515). B(E3)↑=0.061 *10* (1978Mc02). B(E3)↑: from Coulomb excitation; B(E3)(W.u.)↑=37 *6*. Jπ: γ's to 2+ and 4+ are E1.
1528.401[e] *10*	2+	A CDEF JKL	45 fs *6*		Jπ: γ to 0+ is E2. $T_{1/2}$: from B(E2)↑=0.018 *2* in Coulomb excitation and adopted transition properties assuming negligible 572.2 branch.
1555.737[b] *10*	8+[&]	B DEF J	3.7 ps *3*		Jπ: E2 γ's to 6+ and 8+. $T_{1/2}$: from Coulomb excitation (RDM).
1572.183[d] *7*	(4)−	AB D F I			Jπ: γ to 3+ is E1, γ to 5+ is (E1).
1596.241[c] *7*	(4)−	AB D F IJ			Jπ: E1 γ from 3+; γ from 6−.
1662.435[f] *5*	1−	A CD FGH	5.2 fs *5*		XREF: F(1651). Jπ: E1 γ to 0+. $T_{1/2}$: from $\Gamma_{\gamma0}^2/\Gamma$=13.9 *16* in (γ,γ') and adopted $\Gamma_{\gamma0}/\Gamma$=0.397 *7*. K=(0) (1996Ma18) from (γ,γ').

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$[‡]	S	Comments
1665.799[d] *6*	5(–)	B D F I JKL			Jπ: J=5 from γγ(θ) (^{166}Ho β$^-$ decay (1200 y)).
1673.70 *10*		D J			
1678.765[e] *24*	(4)+[&]	A D F I J			XREF: F(1680)I(1679)J(1674). Jπ: M1(+E2+E0) 1414γ to 4+ 265.
1692.297[c] *5*	5–	B D F HIJK			XREF: H(1698). Jπ: J=5 from γγ(θ) (^{166}Ho β$^-$ decay (1200 y)); E1(+M2) γ 1427 to 4+ 265.
1703.050 *18*	(2,3,4)+	A D I KL			XREF: I(1700)K(1704). Jπ: M1 γ from 3+.
1713.4 *7*	0+	D KL	>0.97 ps		Jπ: L(p,t)=0. $T_{1/2}$: from DSAM in (n,n'γ) (1997Ga13).
1721.7[f] *6*	3–[&]	DEF HI			XREF: F(1720). B(E3)↑=0.032 *5* (1978Mc02). B(E3)↑: from Coulomb excitation; B(E3)(W.u.)↑=20 *3*. Jπ: E1(+M2) 1641γ to 2+ 81, D(+Q) 1457γ to 4+ 265.
1751.36[b] *7*	9+[&]	E J	2.4 ps *5*		Jπ: γ to 8+ is (E2+M1); band assignment. $T_{1/2}$: from B(E2)(375γ) in Coulomb excitation and adopted transition properties.
1760.9 *4*		D F HI KL			XREF: F(1757)H(1759)I(1762).
1786.975[d] *5*	6–	B D F I J			Jπ: J=6 from γγ(θ) in ^{166}Ho β$^-$ decay (1200 y), π=– from E1+(M2) 711.68γ to 5+.
1813.2[k] *3*	1(+)	A D FG I	39 fs *7*		Jπ: D, Δπ=(no) γ to 0+. $T_{1/2}$: from $\Gamma_{\gamma 0}{}^2/\Gamma$ in (γ,γ') and adopted branching. K=1 (1996Ma18) from (γ,γ').
1827.557[c] *5*	6–	B D F I J			XREF: I(1829). Jπ: γ's to 5+ and 7+ levels are E1+M2.
1830.425 *12*	1–	A CD G L	45 fs *8*		Jπ: log *ft*=5.1 from 0–, γ to 0+. $T_{1/2}$: from (γ,γ') assuming adopted branching.
1846.53[a] *12*	12+[§]	E J	0.91 ps *5*		Jπ: continuation of established g.s. band. $T_{1/2}$: from RDM in Coulomb excitation.
1865.17 *4*		A D F I KL			
1894.355 *21*	2+,3+,4+	A			Jπ: M1 238γ from 3+ 2132 level.
1897.27[e] *10*	(6+)[&]	D I J			XREF: I(1896).
1901[f]	(5–)[&]	H KL			
1904.8? *5*	2,3,4	D			Jπ: D+Q γ to 2+ 81.
1908.2[q] *4*	(6–)	D I			Jπ: σ in (d,t).
1917.758[g] *8*	3–	A D F			XREF: F(1915). Jπ: γ's to 2+ and 4+ are E1.
1934.1 *5*	0+	D KL	54 fs *6*		XREF: K(1928). Jπ: L(p,t)=0. $T_{1/2}$: from DSAM in (n,n'γ).
1938.263 *11*	(3)+	A D F I			XREF: I(1940). Jπ: γ's to 2+ and 3+ are M1, Jπ=(3,4)+ from (d,t).
1942.6 *4*	(0+)	DE	0.24 ps *7*		Jπ: Possible Kπ=0+, γγ bandhead. $T_{1/2}$: from DSAM in (n,n'γ) (1997Ga11).
1948		K			
1964.04[b] *8*	10+[&]	E J	1.78 ps *17*		Jπ: γ to 10+ is E2. $T_{1/2}$: from Coulomb excitation (RDM and B(E2)(409γ)).
1969.71 *17*	(2,3,4)	A D I K			Jπ: γ's to 2+ and 4+.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$[‡]	S	Comments
1978.422[h] *13*	4+	A DEF HI L	2.2 ps *+11−9*		XREF: F(1976)H(1973)I(1979). Jπ: M1+E2 154.5γ from 3+ level; (α,t) σ fingerprint for assigned band. Decay pattern to γ band states consistent with that for a state carrying a portion of the Kπ=4+ γγ vibration strength expected at roughly this energy (1998Fa15). $T_{1/2}$: from B(E2)(1193γ) in Coulomb excitation and adopted transition properties assuming 521−keV branch is negligible.
1985.629 *12*	3−	A I			XREF: I(1987). Jπ: γ to 3− is M1, γ's to 4+ and 2+.
1986.2 *7*	(4+)	E			Jπ: γ to 2+ and 3+ levels; decay pattern to γ band states consistent with that for a state carrying a portion of the Kπ=4+ γγ vibration strength expected at roughly this energy (1998Fa15).
1992.70[i] *10*	(7)−	F J			XREF: F(1988). Jπ: E1 1082γ to 8+ 911; band assignment. Suggested as possible J=7 member of Kπ=4− band (1989Ad12), but E is too high for that.
2001.865 *12*	(3)−	A D I L			XREF: I(2003). Jπ: E1 1046γ to 4+ 956, γ to 2+.
2002[@g]	(4−)[#]	F			
2021.348 *12*	(2,3)−	A D f			Jπ: E1(+M2) 1235γ to 2+ 786, E1 1162γ to 3+ 859.
2022[r]	(4−)	f I			E(level): from (d,t),(^{3}He,α). Jπ: band assignment from (d,t).
2022.59 *12*	(4+)	A D f l			Jπ: gammas to 2+ and 6+.
2027.9[t] *5*	(4+)	DE l	0.22 ps *8*		Jπ: D+Q 1169γ to 3+ 859; Q 1243γ to 2+ 786, γ to (4)− 1572; possible γγ band assignment. $T_{1/2}$: from DSAM in (n,n'γ) (1997Ga11). Other value: 0.33 ps *12* from B(E2)(1243γ) and adopted transition properties, assuming negligible 1070 branch.
2031.5 *10*	(5+)	D I			Jπ: σ in (d,t).
2045[@h]	5+	D F			Jπ: from (α,t) σ fingerprint for assigned band. The 1089γ in (n,n'γ) may be a doublet which deexcites this level as well as the 2047 level.
2046.87 *4*	2+,3+	A D			Jπ: ε decay from 2+ is allowed or first−forbidden, M1(+E2) 1188γ to 3+ 859.
2050[q]	(7−)	I			Jπ: σ in (d,t).
2055[p]	(1−)[#]	FG			E(level): from (γ,γ'); 2057−keV J=1, Kπ=1− and J=2, Kπ=2− doublet in (^{3}He,d), (α,t).
2057[@l]	(2−)[#]	F			E(level): 2057−keV J=1, Kπ=1− and J=2, Kπ=2− doublet in (^{3}He,d), (α,t).
2062.1 *17*		I KL			E(level): weighted average from (t,p) and (p,t).
2073.20[c] *7*	(8)−	I			Jπ: γ to 7+ is E1, fit to a band.
2074[@]	(2−)	F			Jπ: σ in (^{3}He,d).
2076.294[s] *20*	(3−)	A I			XREF: I(2080). Jπ: σ in (d,t).
2082.8 *4*		D			
2092.31 *10*	(7,8,9)−	IJKL			XREF: I(2090). Jπ: E1 1181γ to 8+ 911; band assignment. Suggested as possible J=7 member of Kπ=2− octupole band (1989Ad12), but E is too high for that assignment.
2101.6 *3*	(4+)	A C	0.27 ps *19*		Jπ: transitions to J=2,3 and possibly 4 members of γ band; candidate for Kπ=4+ γγ vibration state (1994OsZZ). $T_{1/2}$: from B(E2)(1316γ) in Coulomb excitation and adopted transition properties assuming negligible 1145γ branch.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$[‡]	S	Comments
2116[@]	(6+)	F			Jπ: σ in (^{3}He,d).
2117.8 8	(2+,3,4+)	A			Jπ: γ's to 2+ and 4+.
2117.8 8		D			
2124.7[r] 7	(5−)	D I			Jπ: σ in (d,t).
2132[@l]	(3−)[#]	F			
2132[@h]	6+	F			Jπ: from (α,t) σ fingerprint for assigned band.
2132.941[m] 7	3+	A D F I			XREF: F(2132)I(2128). Jπ: γ's to 2+ and 4+ are M1+E2.
2144.64[d] 10	(8−)[&]	J			
2148.6[s] 5	(4−)	D I			Jπ: σ in (d,t).
2152[@p]	(2−)	F			Jπ: σ in (^{3}He,d).
2155.8 7	(6+)	E			Jπ: γ to 4+ and 5+; possible member of band built on the 4+ 1978 level.
2160.114 9	3+	A D I L			XREF: I(2161). Jπ: γ's to 2+ and 4+ are M1+E2.
2167[@]	(2−)	F			Jπ: σ in (^{3}He,d).
2172.751 17	3+	A D K			XREF: K(2174). Jπ: γ to 2+ is M1+E2, γ to 5+ is E2.
2182		I			
2187	0+	K			Jπ: from L(p,t)=0.
2189.70[b] 10	(11+)[&]	J			
2194.61[e] 10	(8+)[&]	J			
2196.3 17	0+	KL			Jπ: L(p,t)=0. E(level): weighted average from (t,p) and (p,t).
2201.3 6	1(+)	D fG	9.7 fs 12		XREF: f(2204). Jπ: D, Δπ=(no) γ to 0+. $T_{1/2}$: assuming negligible 743γ branch. K=0 (1996Ma18) from (γ,γ').
2207 3		f L			XREF: f(2204). E(level): from (p,t); 2204 in (^{3}He,d),(α,t).
2212.95 12		A			
2215.963 13	2−,3−	A F I			XREF: F(2217). Jπ: 298γ to 3− is M1, 386γ to 1− is E2.
2226[@l]	(4−)[#]	F			
2226[@p]	(3−)[#]	F			
2239[@m]	4+	F			Jπ: from (α,t) σ fingerprint for assigned band.
2240.1[j] 10	(5−)	HI			XREF: H(2238)I(2242). Jπ: σ in (d,t). The 2240 level Jπ=(4+) from (^{3}He,d) might be a separate level.
2243.087 20	3−	A L			Jπ: γ's to 2+ and 4+ are E1.
2246.31[c] 10	(9−)[&]	J			
2260.3[t] 7	(6+)	E			Jπ: from band assignment.
2260.65 3	2(+),3	A L			Jπ: ε decay from 2+ is allowed or first−forbidden, γ to 4+.
2264.31 6	(1,2+)	A D I			Jπ: γ's to 0+ and 2+.
2266[@h]	7+	F			Jπ: from (α,t) σ fingerprint for assigned band.
2273.01 3	3−	A I			XREF: I(2274). Jπ: γ's to 2+ and 4+ are E1.
2282.68 5	2(+),3	A D F			XREF: F(2279). Jπ: ε decay from 2+ is allowed or first−forbidden, γ to 4+.
2290.959 23	(3)+	A D F I L			XREF: F(2289)I(2295). Jπ: (3,4)+ from σ in (d,t), M1(+E2) γ to to 2+ and 4+.
2302 3		L			E(level): from (p,t).
2315	(3,4)+	F I			XREF: F(2312). Jπ: σ in (d,t).
2328.51[d] 10	(9)−	J			Jπ: 1417γ to 8+ 911; band assignment.
2328.69 9	(1,2)	A			Jπ: γ's to 0+ and 2+.
2333[@]		F I			XREF: I(2336).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)†	Jπ	XREF	$T_{1/2}$‡	S	Comments
2352.91 *8*	2(+),3	A F I			XREF: F(2347)I(2353). Jπ: ε decay from 2+ is allowed or first forbidden, γ to 4+.
2359@m	5+	F			Jπ: from (α,t) σ fingerprint for assigned band.
2368@j	(6−)	F I			Jπ: σ in (d,t).
2377.77 *5*	1+	A I			XREF: I(2377). Jπ: γ to 0+ is M1.
2382.26 *4*	(3)+	A F I			XREF: F(2387)I(2386). Jπ: M1(+E2) 1523γ to 3+ 859, 924γ to (2)− 1458, Jπ=(3,4)+ from σ in (d,t).
2389.33a *16*	14+§	E J	0.55 ps *7*		Jπ: continuation of established g.s. band. $T_{1/2}$: from Coulomb excitation (RDM).
2393.129 *15*	2+,3+	A			Jπ: γ to 2+ is M1, γ to 4+.
2402@		F I			
2413.67 *8*	(2,3,4)	A D F I			XREF: F(2418)I(2417). Jπ: γ's to 2+ and 4+. If the 1630γ in (n,n'γ) is correctly placed from this level, its D+Q multipolarity would rule out J=4.
2427		I			
2428.4?c *4*	(10−)&	J			
2428.77b *13*	(12+)&	E J	1.18 ps *21*		$T_{1/2}$: from RDM in Coulomb excitation.
2435.10 *10*	(3,4)+	A F I			XREF: F(2438)I(2438). Jπ: σ in (d,t).
2442.0? *10*	(3+,4+,5+)	D			Jπ: significantly mixed D+Q 2177γ to 4+ 265.
2444.16 *24*		A I			XREF: I(2449).
2453@		F			
2459.0? *10*		D			
2464.51 *10*	1+	A G	43 fs *6*		Jπ: M1 γ to 0+. $T_{1/2}$: from $\Gamma_{\gamma0}^2/\Gamma$=5.1 *5* in (γ,γ') and adopted $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.44 *7*. K=1 (1996Ma18) from (γ,γ').
2475.39 *4*	(1,2)+	A F I			XREF: F(2476)I(2478). Jπ: γ to 0+; E2,M1 γ to 2+.
2479.74?e *12*	(10+)&	J			
2495	(9−)	I			Jπ: σ in (d,t).
2504.6 *10*	(3,4)+	D F I			XREF: F(2504)I(2499). Jπ: σ in (d,t).
2512	(3,4)+	I			Jπ: σ in (d,t).
2525	1	G I	23 fs *3*		XREF: I(2522). Jπ: D γ to 0+. E(level): from (γ,γ'). K=1 from (γ,γ') (1996Ma18).
2534		F I			XREF: F(2536).
2542.87 *5*		A I			XREF: I(2542).
2563m	6+	F I			XREF: F(2568). Jπ: from (α,t) σ fingerprint for assigned band.
2574.0t *10*	(8+)	E			Jπ: band assignment.
2578		I			
2586.06 *12*	(3,4)+	A F I			XREF: F(2583). Jπ: σ in (d,t).
2600.63 *3*	1+	A G I			XREF: G(2601)I(2603). Jπ: M1 γ to 0+. $T_{1/2}$: 12 fs *3* from (γ,γ'), if I(1142γ) is negligible. K=1 from (γ,γ') (1996Ma18).
2608@	(6−)	F			Possible configuration: π^2(7/2[523]+5/2[402]) (1993Li12). Jπ: σ in (^{3}He,d).
2613.50 *17*		A			
2619.6 *6*	(2+)	A I			XREF: I(2622). Jπ: γ's to 0+ and 4+.
2624.8 *3*	(1,2+)	A			Jπ: γ's to 0+ and 2+.
2628.5 *3*	(1,2+)	A			Jπ: γ's to 0+ and 2+.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$[‡]	S	Comments
2632.66 *17*	(3,4)+	A F I			XREF: F(2632)I(2631). Jπ: σ in (d,t).
2649		I			
2654.40?[b] *14*	(13+)[&]	J			
2655		F			
2656.9?[e] *4*	(12+)[&]	J			
2671.98 *17*		A F I			XREF: F(2671)I(2670).
2679.05 *18*	1+	A G I	20 fs *3*		XREF: I(2677). Jπ: M1 γ to 0+. K=1 from (γ,γ') (1996Ma18).
2687		F I			XREF: F(2684).
2713[@m]	7+	F			Jπ: from (α,t) σ fingerprint for assigned band.
2729.090 *17*	(3,4)+	A I			XREF: I(2734). Jπ: σ in (d,t).
2742[@]		F			
2767.8 *7*	1	FG	22 fs *4*		Jπ: from γ(θ) in (γ,γ'). K=0 (1996Ma18) from (γ,γ').
2783.69 *19*	1+	A FG	49 fs *14*		Jπ: M1 γ to 0+. $T_{1/2}$: from $\Gamma_{\gamma0}{}^2/\Gamma$=2.6 *5* from (γ,γ') and adopted $\Gamma_{\gamma0}/\Gamma$=0.53 *6*.
2797.5 *4*	(1,2+)	A F			XREF: F(2808). Jπ: γ's to 0+ and 2+.
2811.98 *11*	1	A G	3.1 fs *3*		Jπ: from γ(θ) in (γ,γ'). $T_{1/2}$: if 2026γ branch is negligible. K=0 (1996Ma18) from (γ,γ').
2858.16 *18*	(1,2+)	A			Jπ: γ's to 0+ and 2+.
2880.07?[b] *17*	(14+)[&]	F J			
2912[@]		F			
2954[@]		F			
2967.3[a] *6*	(16+)[§]	E J	0.49 ps *27*		
2993?[@]		F			
3000[@]		F			
3043[@]		F			
3073	1	G	11 fs *4*		Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=0 (1996Ma18) from (γ,γ').
3077[@n]	(8+)	F			Jπ: σ in (^{3}He,d).
3087[@]		F			
3123	1	G	17 fs *6*		Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=(0) (1996Ma18) from (γ,γ').
3144	1	G	5.4 fs *5*		Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). Other E: 3141 from (γ,γ'). K=1 (1996Ma18) from (γ,γ').
3147[@]		F			
3160[@]		F			
3175	1	G	11.8 fs *15*	14.9 *16*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=(1) (1996Ma18) from (γ,γ').
3187	1	G	11.4 fs *10*		Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=1 (1996Ma18) from (γ,γ').
3197	1	G	7.4 fs *7*		K=1 (1996Ma18) from (γ,γ'). Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). Other E: 3193 in (γ,γ') (1973Me17).
3211[@]		F			
3239[@]		F			
3253[@]		F			
3273[@n]	(9+)	F			Jπ: σ in (^{3}He,d).

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	XREF	$T_{1/2}$[‡]	Comments
3288	1	G	6.0 fs *9*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=(0) (1996Ma18) from (γ,γ').
3296[@]		F		
3322	1	FG	5.8 fs *14*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=0 (1996Ma18) from (γ,γ').
3329	1	G	15.0 fs *25*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=1 (1996Ma18) from (γ,γ').
3345[@]		F		
3371[@]		F		
3386	1	G	5.3 fs *12*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=(0) (1996Ma18) from (γ,γ').
3394[@]		F		
3425	1	fG	38 fs *19*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ').
3430	1	fG	13 fs *3*	Jπ: D γ to 0+ g.s. E(level): from (γ,γ'). K=1 (1996Ma18) from (γ,γ').
3440	1	G	3.4 fs *13*	$T_{1/2}$: from (γ,γ').
3459[@]		F		
3476[@]		F		
3493	1	G		Jπ: D γ to 0+ g.s. E(level): from (γ,γ').
3498	1	FG		XREF: F(3501). Jπ: D γ to 0+ g.s. E(level): from (γ,γ').
3554[@]		F		
3577?[a]	(18+)[§]	E		E(level): from Coulomb excitation.
3579[@]		F		
3600[@]		F		
3627[@]		F		
3663[@]		F		
3721[@]		F		
3751[@]		F		
3783[@]		F		
3808[@]		F		
3838[@]		F		
3856[@]		F		
3881[@]		F		
3907[@]		F		
3932[@]		F		
3978[@]		F		
4002[@o]		F		
4026[@]		F		
4045[@]		F		
4064[@]		F		
4087[@o]		F		
4106[@]		F		
4126[@]		F		
4149[@]		F		
4174[@]		F		
4227[@]		F		
4256[@]		F		
4274[@]		F		
4297[@]		F		
4329[@]		F		
4359[@]		F		
4381[@]		F		
4407[@]		F		
4418[@]		F		

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)†	XREF
4442@	F

† From least–squares fit to Eγ, omitting the 646.8γ from the 2160 level, the 1053γ from the 1964 level, and all three placements for the 1216.173γ because these transitions have Eγ values that deviate from the expected value by at least 5σ. Exceptions are noted.

‡ Deduced from measured $\Gamma_{\gamma0}^2/\Gamma$ and $\Gamma_{\gamma1}/\Gamma_{\gamma0}$, in (γ,γ') assuming $\Gamma=\Gamma_{\gamma1}+\Gamma_{\gamma0}$. Thus, deduced $T_{1/2}$ will be an upper limit if branches exist to levels other than the g.s. and the 81–keV level.

§ Assignments for J<16 g.s. band members are based on known Jπ of g.s., the E2 transition between J=2 and 0 members and large B(E2) for excitation of levels in multiple Coulomb excitation.

\# Assignments based on (^{3}He,d) or (α,t) cross section and (^{3}He,d) to (α,t) cross section ratios.

@ From ^{165}Ho(^{3}He,d),(α,t).

& Fit to a band, unless otherwise noted.

a (A): Kπ=0+ g.s. band. A=13.9, B=–12.8×10^{-3}.

b (B): Kπ=2+ γ–vibrational band. A=12.44, B=–10.4×10^{-3}.

c (C): Kπ=(2)– octupole vibrational band. K=2 octupole–vibrational states are strongly Coriolis mixed with Kπ=4– two–quasiproton 7/2[523]+1/2[411] states for J≥4. K=2 dominates in 1458, 1514,1596 and 1692 levels, K=4 dominates in 1572 and 1666 levels and K=2 and K=4 amplitudes are comparable in E>1692 levels (see 1974Ka02 and 1989Ad12; see also 2000Gr33). Attribution of predominant K=2 character has been based on mixing calculations from 1989Ad12. The 1458, 1514 and 1596 level energies imply A=10.75, B=–0.034.

d (D): Kπ=(4)– band. Kπ=4– two–quasiproton 7/2[523]+1/2[411] states strongly mixed with Kπ=2– octupole vibration states (please see comment on that band). Attribution of predominant K=4 character has been based on mixing calculations from 1989Ad12.

e (E): Kπ=0+ band. A=11.7, B=–0.05.

f (F): Kπ=0– band.

g (G): Kπ=3– band (1993Li12). Configuration: 7/2[523]–1/2[411].

h (H): Kπ=4+ band (1993Li12). Configuration: 7/2[523]+1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.

i (I): Kπ=7– band (1993Li12). Configuration: 7/2[523]+7/2[404].

j (J): Kπ=(5–) band (1975Pa15). Configuration: 7/2[633]+3/2[521].

k (K): Kπ=1+ band.

l (L): Kπ=2– band. Configuration: 7/2[523]–3/2[411].

m (M): Kπ=3+ band. Configuration: 7/2[523]–1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.

n (N): Kπ=8+ band. Configuration: 7/2[523]+9/2[514].

o (O): Kπ=1+? band (1993Li12). Possible configuration: 7/2[523]–9/2[514].

p (P): Kπ=1– band. Configuration: 7/2[523]–5/2[402].

q (Q): Kπ=(6–) band (1975Pa15). Configuration: 7/2[633]+5/2[523].

r (R): Kπ=(4–) band (1975Pa15). Configuration: 7/2[633]+1/2[521].

s (S): Kπ=(3–) band (1975Pa15). Configuration: 7/2[633]–1/2[521].

t (T): Possible Kπ=4+, γγ vibration band (1998Fa15).

γ(^{166}Er)

E(level)	Eγ†	Iγ‡	Mult.§	δ#	α
80.5776	80.576 *2*	100	E2		6.78
	Eγ: from ^{166}Ho β^- decay (26.824 h).				
	Mult.: based on ce data from ^{166}Ho β^- decay (26.824 h).				
	B(E2)(W.u.)=217 *5*.				
264.990	184.4113@ *24*	100	E2		0.331
	B(E2)(W.u.)=312 *11*.				
545.454	280.464@ *2*	100	E2		0.0849
	B(E2)(W.u.)=370 *20*.				
785.905	520.945@ *15*	1.72 *4*	E2		0.01481
	B(E2)(W.u.)=0.78 *4*.				
785.905	705.333 *20*	100.0 *21*	E2+M1	–5 *+3–14*	0.0074 *12*
	δ: from ε decay (1987Kr12). Other δ: –22 *+13–7*, –7 *+23–3* in ε decay; >50 from (n,n'γ); –19 *+9–38*, –38 *+24–∞*, >25 in Coulomb excitation.				
	B(M1)(W.u.)=0.0004 *+5–4*; B(E2)(W.u.)=9.6 *6*.				
785.905	785.904 *15*	88.9 *18*	E2		0.00561
	Iγ: weighted average of 86.3 *15* from β^- decay (26.824 h), 81 *4* from (n,n'γ) and 90.5 *10* from ε decay.				
	B(E2)(W.u.)=5.17 *21*.				
859.389	73.45 *2*	0.04	M1		6.92

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level) I(γ+ce)	Eγ†	Iγ‡	Mult.§	δ#	α	Comments
						Iγ: from Coulomb excitation.
859.389	594.409 *15*	18.82 *17*	E2+M1	−12 *2*	0.01076 *16*	B(M1)(W.u.)=2.5×10^{-5} *10*; B(E2)(W.u.)=4.8 *9*. δ: from ^{166}Tm ε decay; −45 *+19−137* from (n,n'γ), −8 *+3−15* from Ho β⁻ decay (1200 y).
859.389	778.839@ *11*	100.0 *24*	E2+M1	−20 *+2−4*	0.00574	Eγ: from β⁻ decay (1200 y). δ: from β⁻ decay (1200 y). Other δ include: −45 *+8−13* from β⁻ decay (1200 y), <−7 from (α,2nγ), −75 *+26−134* from (n,n'γ); however, data from ε decay range from +8.4 *7* to −6.2 *+10−8* and source of discrepancy is not known.
859.389	859.3@ *1*	1.18 *24*				Eγ: from β⁻ decay (1200 y).
911.208	365.760@ *5*	100	E2		0.0385	Mult.: from ce data in ^{164}Dy(α,2nγ). B(E2)(W.u.)=373 *14*.
956.232	96.85 *5*	0.166@ *8*	E2		3.32	B(E2)(W.u.)=370 *30*.
956.232	170.325 *16*	1.05@ *3*	E2		0.433	B(E2)(W.u.)=138 *9*.
956.232	410.797 *16*	1.25@ *4*	E2		0.0278	B(E2)(W.u.)=2.01 *14*.
956.232	691.251@ *16*	100.0@ *6*	E2+M1	−3.7 *5*	0.00802 *20*	δ: from ^{166}Tm ε decay. Other δ: ≥50 from (n,n'γ), −3.3 *+12−30* from Coulomb excitation, 3.8 *+34−12* and −10 *+4−27* from β⁻ decay (1200 y). However, discrepant data exist, e.g., +5.5 *+28−14* in ε decay or −16 +427 and +566 −522−616 in β⁻ decay (1200 y). B(M1)(W.u.)=0.00082 *22*; B(E2)(W.u.)=11.1 *7*.
956.232	875.650 *15*	54.2@ *4*	E2		0.00444	Other Iγ: 55.0 *10* from ε decay, 57 from Coulomb excitation, 43.9 *24* from (n,n'γ), 70 *7* from (α,2nγ). B(E2)(W.u.)=1.98 *12*.
1075.277	119.041@ *3*	0.298@ *6*	(M1+E2)	+1.94 *+23−21*	1.578 *24*	Mult.,δ: D+Q from 119γ−876γ(θ) for intraband γ in ^{166}Ho β⁻ decay (1200 y). B(M1)(W.u.)=0.0024 *6*; B(E2)(W.u.)=3.1E2 4.
1075.277	215.8887@ *21*	4.52@ *1*	[E2]		0.196	B(E2)(W.u.)=3.0E2 4. Iγ(215.9γ)/Iγ(810.3γ)=0.0502 *22* (^{166}Tm ε decay), 0.109 *11* in (α,2nγ), 0.0432 in Coulomb excitation, <0.029 in (n,n'γ).
1075.277	529.807@ *11*	16.63@ *27*	E2+M1@	−25 *+4−5*	0.01421	Iγ(529.8γ)/Iγ(810.3γ)=0.164 *7* (^{166}Tm ε decay). 0.167 *23* in (α,2nγ), 0.156 in Coulomb excitation, 0.300 *23* in (n,n'γ). δ: other values: see β⁻ decay (1200 y) and (n,n'γ) data sets. B(M1)(W.u.)=1.2×10^{-5} *4*; B(E2)(W.u.)=12.4 *15*.
1075.277	810.293@ *10*	100.0@ *19*	E2+M1@	−21.2 *+18−21*	0.00526	Other δ: −27 *+4−6* in (n,n'γ); <−17 in ε decay. B(M1)(W.u.)=2.8×10^{-5} *6*; B(E2)(W.u.)=8.9 *11*.
1215.968	259.740@ *3*	19.60@ *11*	[E2]		0.1079	Other Iγ: 25.9 *24* in (α,2nγ), 24.8 in Coulomb excitation. B(E2)(W.u.)=225 *16*.
1215.968	304.91@ *5*	0.36@ *5*	[E2]		0.06574	B(E2)(W.u.)=1.9 *3*.
1215.968	670.516@ *14*	100.0@ *17*	E2+M1@	+10.0 *+16−12*	0.00811	Other δ: ≥+11 in (n,n'γ); −6 +∞−3 in (α,2nγ). B(M1)(W.u.)=$9.\times10^{-5}$ *3*; B(E2)(W.u.)=9.9 *7*.
1215.968	950.964@ *9*	50.40@ *24*	E2		0.00373	Mult.: from ce data (^{164}Dy(α,2nγ)). B(E2)(W.u.)=0.88 *6*.
1349.53	438.2ag *1*	100g	[E2]		0.0233	B(E2)(W.u.)=390 *17*.
1376.035	300.755@ *4*	39.16@ *23*	E2(+M3)	−0.018 *+15−16*	0.0691 *19*	B(E2)(W.u.)=220 *40*. δ: B(M3)(W.u.) exceeds RUL, unless δ<0.00003.
1376.035	464.832@ *6*	12.8@ *6*	E2+M1@	−63 *+12−19*	0.0200 *4*	δ: from 1985Al22; however δ=−13 *+5−3* (1981Kr12) also reported. B(M1)(W.u.)=$9.\times10^{-7}$ *4*; B(E2)(W.u.)=8.0 *16*.
1376.035	830.585@ *9*	100.0@ *23*	E2+M1	−16.6 *+15−18*	0.00499	δ: from β⁻ decay (1200 y). Other δ: <−20 in (α,2nγ); −34 *+14−51* in (n,n'γ).

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	I(γ+ce)	Eγ†	Iγ‡	Mult.§	δ#	α	Comments
							B(M1)(W.u.)=1.8×10^{-5} *5*; B(E2)(W.u.)=3.4 *7*.
1458.154		598.764 *19*	34.4 *7*	E1(+M2)	−0.02 *6*	0.0038 *4*	Other Iγ: 51 *9* in (n,n'γ). Mult.,δ: E1 from ε decay; D(+Q), δ=−0.02 *6* or −5.4 *+13−30* from (n,n'γ).
1458.154		672.242 *20*	100.0 *22*	E1		0.00297	δ: −0.01<δ(D,Q)<0 from ^{166}Tm ε decay; mult=D+Q and δ(D,Q)=+0.01 *+7−5* or +2.2 *+3−4* from (n,n'γ).
1460.031		1379.437& *6*	100&	E2		0.00181	Mult.: from ^{166}Ho β$^-$ decay (26.824 h). B(E2)(W.u.)=2.7 *10*.
1460.031	≈0.030	1460.0&		E0			Mult.: from ^{166}Ho β$^-$ decay (26.824 h). ρ^2(E0)=0.0020 *10* (1999Wo07).
1513.751		654.358 *16*	85.7 *17*	E1		0.00314	Other Iγ: 52 *6* in (n,n'γ). Mult.: from ε decay; δ(D,Q)=−0.08 *+9−6* or +1.55 *+21−23* from (n,n'γ).
1513.751		727.858 *20*	91 *4*	E1		0.00253	Other Iγ: 78 *7* in (n,n'γ). δ(D,Q)=+0.01 *+3−4* from (n,n'γ).
1513.751		1248.78 *3*	51.1 *11*	E1+M2	+0.13 *3*	0.00109 *7*	Other Iγ: 41 *7* in (n,n'γ). Mult.,δ: from (n,n'γ).
1513.751		1433.42 *25*	100 *17*	E1+M2	+0.054 *+19−27*	8.85×10^{-4} *18*	Eγ: from ^{166}Ho β$^-$ decay (1200 y). Mult.,δ: from (n,n'γ).
1528.401		1263.412 *16*	100.0 *21*	E2		0.00212	Mult.: from γ(θ) and linear polarization in (n,n'γ); M1,E2 from α(K)exp in ε decay. B(E2)(W.u.)=39 *6*.
1528.401		1447.820 *25*	71.1 *17*	M1+E2+E0	+0.5 *3*	0.00242 *18*	δ: from (n,n'γ). B(M1)(W.u.)=0.013 *13*.
1528.401		1528.38 *4*	4.3 *4*	E2		1.54×10^{-3}	Other Iγ: 5.8 *7* from ^{166}Ho β$^-$ decay (26.824 h), 18 *7* from (n,n'γ). B(E2)(W.u.)=0.66 *8*. B(E2)(W.u.): from measured B(E2)=0.018 *2* in Coulomb excitation.
1555.737		206.0		[E2]		0.2282	Eγ: from Coulomb excitation. B(E2)(W.u.)≈1.5. B(E2)(W.u.) from measured B(E2)(↓)≈0.008 in Coulomb excitation.
1555.737		339.751@ *21*	100.0@ *10*	(E2)		0.0476	B(E2)(W.u.)=250 *23*.
1555.737		644.60@ *5*	86.9@ *27*	E2+M1	+4.9 *+23−11*	0.0092 *3*	Mult.: from α(K)exp in (α,2nγ) and γ(θ,H,t) in β$^-$ decay (1200 y). δ: from γ(θ,H,t) ^{166}Ho β$^-$ decay (1200 y). Other δ: ≤−1 or ≥+4, >+1.4 or <−6 in β$^-$ decay (1200 y); +1.6 *+10−6* or −0.75 *20* in (α,2nγ). B(M1)(W.u.)=0.0003 *3*; B(E2)(W.u.)=8.5 *9*.
1555.737		1010.288@ *11*	48.3@ *6*	E2		0.00329	Other Iγ: 41 *4* from (α,2nγ), 38 from Coulomb excitation. Mult.: from ce data (^{164}Dy(α,2nγ)). B(E2)(W.u.)=0.52 *5*.
1572.183		496.935 *16*	45.2 *9*	(E1)		0.00566	Other Iγ: 26 *5* in (n,n'γ).
1572.183		615.963 *15*	34.8 *8*	(E1(+M2))			Other Iγ: 22 *4* in (n,n'γ). Mult.: D(+Q) from (n,n'γ); Δπ=yes from level scheme. δ(D,Q)=−0.03 *+10−6* or +1.02 *+14−18* from (n,n'γ).
1596.241		520.94@ *3*	66.8 *18*				Iγ: from β$^-$ decay (1200 y). Other Iγ: 44 *6* from ε decay, 36 *7* from (n,n'γ).
1596.241		640.015@ *9*	37.2 *7*				Iγ: weighted average of 37.7 *9* from β$^-$ decay (1200 y) and 36.5 *11* from ε decay. Other Iγ: 48 *7* from (n,n'γ).
1596.241		736.832 *22*	100@ *6*	E1		0.00247	Mult.,δ: from (n,n'γ); δ(D,Q)=+0.002 *+19−25*.
1596.241		1331.17@ *11*	1.7@ *2*				Iγ: based on Iγ(1331.2γ)/Iγ(640γ)=0.041 *6* (^{166}Ho β$^-$ decay (1200 y)).

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Adopted Levels, Gammas (continued)

$\gamma(^{166}Er)$ (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
1662.435	1581.834[&] *7*	100.0[&] *11*	E1(+M2)	−0.027 *27*	8.69×10^{-4} *15*	Mult.,δ: from ^{166}Ho β⁻ decay (26.824 h). Other δ: −0.04 *+8−9* or −3.0 *+7−11* from (n,n'γ). B(E1)(W.u.)=0.0066 *7*; B(M2)(W.u.)=9 *+18−9*.
	1662.439[&] *6*	65.3[&] *7*	E1		8.77×10^{-4}	Iγ: other Iγ: 65.8 *17* in (γ,γ'), 80 *10* in ε decay, 73 *7* in (n,n'γ). Mult.: from (γ,γ'). B(E1)(W.u.)=0.0037 *4*.
1665.799	590.56[@] *3*	4.6[@] *4*				
	1120.330[@] *11*	39.2[@] *4*				Other Iγ: 48 *5* from (α,2nγ), 95 *10* from (n,n'γ).
	1400.770[@] *15*	100.0[@] *7*	E1(+M2)	+0.025 *+18−26*	8.81×10^{-4} *14*	Mult.,δ: from (n,n'γ).
1673.70	1408.7 *1*	100				
1678.765	819.0[b]	49[b] *15*				
	892[b]	<9[b]				
	1413.81 *4*	100 *5*	M1(+E2+E0)	+0.35 *30*	0.0062 *21*	δ: from (n,n'γ).
	1598.2[b]	<21[b]				
1692.297	476.378[@] *19*	7.3[@] *4*				
	617.0[@] *5*	4.5[@] *13*				
	736.02[@] *8*	28[@] *3*				
	1146.825[@] *12*	41.1[@] *4*				
	1427.227[@] *21*	100.0[@] *7*	E1(+M2)	−0.002 *+22−31*	8.72×10^{-4} *14*	Mult.,δ: from (n,n'γ).
1703.050	1622.45 *3*	100	E2,M1		0.0018 *4*	
1713.4	927.4[b]	12.4[b] *6*				
	1632.9[b]	100.0[b] *6*	[E2]			B(E2)(W.u.)<0.83.
1721.7	935[h]					Tentative γ reported in Coulomb excitation only.
	1456.6[b] *10*	78[b] *12*	D(+Q)			Mult.: from (n,n'γ). δ: −0.01 *10* or −8 *+13−12* from (n,n'γ).
	1641.2[b] *7*	100[b] *13*	E1(+M2)	+0.01 *+3−4*	8.74×10^{-4} *14*	Mult.,δ: from (n,n'γ).
1751.36	375.2[a] *1*	100[a] *10*	E2		0.0358	Mult.: from ce data in ^{164}Dy(α,2nγ). B(E2)(W.u.)=370 *150*.
	401.9[a] *1*	5				Iγ: from Coulomb excitation. Other: <16 from (α,2nγ).
	840.2[ag] *1*	90[ag] *9*	(E2+M1)		0.0072 *23*	Mult.: from α(K)exp in ^{164}Dy(α,2nγ). δ(D,Q)=−11 *+3−* infinity from γ(θ) in ^{164}Dy(α,2nγ) for γ that may be doubly placed.
1760.9	1215.5[b] *5*	<95[b]				Eγ,Iγ: for doubly−placed γ.
	1495.7[b] *7*	100[b] *16*	D+Q			Eγ: Eγ=1495.57 *18* for unplaced γ in ^{166}Tm ε decay. Mult.: from (n,n'γ). δ: +0.41 *+7−4* or +4.2 *8* from (n,n'γ).
1786.975	94.674[@] *3*	0.259[@] *4*	[M1]		3.33	
	121.175[@] *3*	0.465[@] *7*	[E2]		1.443	
	190.774[@] *23*	0.395[@] *4*	[E2]		0.295	
	214.807[@] *8*	0.803[@] *11*	[E2]		0.199	

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
1786.975	410.944[@] *8*	20.69[@] *8*	E1+M2[@]	−0.010 *5*	0.00873	
	570.976[@] *18*	9.99[@] *27*	E1+M2[@]	+0.06 *3*	0.0044 *4*	
	711.681[@] *6*	100.0[@] *16*	E1(+M2)	+0.002 *3*	0.00264	Mult.: from α(K)exp in ^{164}Dy(α,2nγ).
	1241.500[@] *14*	1.53[@] *8*	E1+M2[@]	+0.21 *5*	0.00129 *17*	
	1521.86[@] *5*	0.0298[@] *11*				
1813.2	1731.9 *5*	45 *8*	(M1+E2)		0.0016 *3*	Iγ: unweighted average of 32 *11* from ε decay, 48 *5* and 67 *6* from (γ,γ'), and 33 *8* from (n,n'γ) (weighted average is 50 *7*). Mult.: D+Q from (n,n'γ), Δπ=(no) from level scheme. δ: −1.6<δ(D,Q)<−0.28 from (n,n'γ).
	1813.4 *3*	100	(M1)		1.74×10^{-3}	Iγ: from (γ,γ'). Mult.: D, Δπ=(no) from (γ,γ'). B(M1)(W.u.)=0.065 *13*.
1827.557	135.260[@] *4*	0.812[@] *11*	[E2]		0.971	
	161.731[@] *8*	0.893[@] *24*	[M1,E2]		0.62 *11*	
	231.318[@] *8*	1.702[@] *18*	[E2]		0.1561	
	255.20[@] *12*	0.035[@] *8*	[E2]		0.1140	
	451.542[@] *7*	24.05[@] *24*	E1+M2[@]	−0.0023 *22*	0.00702	
	611.555[@] *26*	11.31[@] *11*	E1+M2[@]	−0.18 *7*	0.0054 *16*	
	752.313[@] *12*	100.0[@] *10*	E1(+M2)	+0.005 *4*	0.00237	Mult.: from α(K)exp in ^{164}Dy(α,2nγ).
	1282.058[@] *15*	1.524[@] *24*	E1+M2[@]	0.20 *11*	0.0012 *4*	
	1562.31 *14*	0.0280[@] *24*				
1830.425	1749.836[&] *14*	100.0[&] *14*	(E1(+M2))		0.0023 *15*	Mult.,δ: D(+Q), δ=+0.09 *+25−15* or 1/δ=−0.20 *+25−16* from (n,n'γ); Δπ=yes from level scheme.
	1830.419[&] *23*	30.7[&] *5*	(E1)		9.20×10^{-4}	Mult.: D from (n,n'γ), Δπ=yes from level scheme.. B(E1)(W.u.)=0.00019 *4*.
1846.53	497.0[a] *1*	100	E2		0.01670	Mult.: from α(K)exp in ^{164}Dy(α,2nγ). B(E2)(W.u.)=372 *21*.
1865.17	1079.5[bh] *8*	27[b] *12*				Eγ,Iγ: for doubly−placed transition; Iγ not divided.
	1784.58[b] *4*	100 *13*				
1894.355	1034.79 *13*	100 *17*				
	1629.4[g] *3*	<620[g]				
	1813.4 *3*	<1448				Iγ: undivided intensity for doublet.
1897.27	1351.8[a] *1*	72[b] *20*				
	1632.7[b] *7*	100[b] *32*				
	1817.0[b] *10*	60[b] *32*				
1904.8?	1824.2[h] *5*	100	D+Q			Eγ,Mult.: from (n,n'γ). δ: −0.22 *+4−3* or +4.9 *+7−8* from (n,n'γ).
1908.2	312.0[b]	<14[b]				
	336.0[b] *4*	100[b] *21*				
1917.758	86.84		E2		5.05	
	255.44 *6*	0.21 *2*				

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
1917.758	345.569 *15*	18.3 *5*	M1+E2	−0.57 *+21−25*	0.080 *8*	
	404.004 *13*	31.1 *8*	M1+E2	−0.34 *+17−19*	0.057 *4*	Other Iγ: 21 *4* from (n,n'γ).
	459.600 *15*	100 *2*	M1+E2	−0.16 *4*	0.0428 *7*	Mult.: D+Q from (n,n'γ); M1 from ε decay. δ: weighted average of −0.11 *+5−8* from γ(θ) in (n,n'γ), −0.17 *5* and −0.21 *9* from γγ(θ) in ε decay. Other solution in (n,n'γ) (−2.7 *5*) rejected.
	1131.872 *25*	9.65 *23*	E1		1.09×10^{-3}	
	1652.76 *3*	42.2 *11*	E1		8.75×10^{-4}	δ(D,Q)<−0.03 and −0.05 *8* from ^{166}Tm ε decay.
	1837.17 *3*	29.8 *7*	E1		9.22×10^{-4}	
1934.1	1853.5[b] *5*	100	[E2]			B(E2)(W.u.)=8.8 *10*.
1938.263	982.00 *15*	0.62 *11*				
	1078.876 *22*	30.6 *6*	M1		0.00513	−0.007<δ(D,Q)<+1.3 in (n,n'γ) for γ which may have an additional placement.
	1152.350 *16*	100.0 *26*	M1		0.00438	δ(D,Q)=+0.01 *+3−4* from (n,n'γ).
	1673.5 *4*	0.95 *24*				
	1857.62 *17*	1.2 *4*				
1942.6	1156.7 *4*	100	[E2]		0.00251	Eγ: from Coulomb excitation. Mult.: γ(θ) isotropic in Coulomb excitation. B(E2)(W.u.)=21 *7*.
1964.04	408.5[a] *1*	100[a] *10*	[E2]		0.0282	B(E2)(W.u.)=290 *60*.
	614.3[a] *1*	<30[a]				
	1053.7[ae] *1*	58[a] *6*	[E2]		0.00302	B(E2)(W.u.)=1.5 *3*.
1969.71	1704.7 *3*	100[b] *19*				
	1889.12 *20*	84[b] *16*				
1978.422	464.5 *3*	3.4 *9*				
	903.01 *13*	3.2 *6*				
	1022.175 *23*	33.4 *13*				
	1119.5[i]	≈77[i]				Other Iγ: Iγ(1120γ):Iγ(1193γ) =29 *10*:100 *25* in Coulomb excitation.
	1192.516 *16*	100.0 *23*	E2		0.00236	B(E2)(W.u.)=0.9 *+4−5*.
1985.629	389.38 *3*	45.5 *13*	M1		0.0668	
	413.430 *18*	57.4 *18*	E2		0.0273	
	471.871 *23*	100.0 *23*	M1		0.0405	
	527.58 *10*	27.6 *9*				
	1720.87 *20*	47 *5*	(E1)		8.89×10^{-4}	
	1905.43 *23*	41 *11*				
1986.2	1127					Eγ: from Coulomb excitation.
	1200					Eγ: from Coulomb excitation.
1992.70	1081.5[a] *1*	100[a] *10*	E1		1.18×10^{-3}	
	1447.0[a] *5*	<312[a]				
2001.865	84.11 *2*	7.6 *20*	M1		4.68	
	488.19 *8*	7.2 *16*				Other Iγ: 27 *10* in (n,n'γ).
	543.69 *3*	15.5 *4*	E2,M1		0.021 *8*	

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
2001.865	1045.648 *20*	36.0 *8*	E1		1.26×10^{-3}	
	1142.45[g] *3*	<23.6[g]				
	1216.173[e] *17*	100 *20*				
	1737.09 *20*	16.4 *8*	(E1)		8.93×10^{-4}	
	1921.40 *15*	14.4 *12*				
2021.348	563.21 *3*	3.24 *10*	E2,M1		0.019 *7*	
	1161.955 *16*	38.6 *9*	E1		1.05×10^{-3}	
	1235.433 *16*	100 *2*	E1(+M2)	+0.04 *+9−6*	0.00098 *12*	Mult.,δ: from (n,n'γ). Other δ: +0.05 *10* from ε decay.
2022.59	1475.5[b] *10*	18[b] *7*				
	1758.06 *20*	46 *4*				
	1941.78 *15*	100 *14*				
2027.9	455.7[b]	14.9[b] *21*				
	1070					Eγ: from Coulomb excitation.
	1168.8[b]	97.9[b] *21*	D+Q	4.5 *10*		Mult.,δ: from (n,n'γ). Other Iγ: Iγ(1169γ):Iγ(1243γ) =68 *14*:100 *14* in Coulomb excitation.
	1243.2[b]	100.0[b] *21*	(E2)		0.00218	Mult.: Q from γ(θ) in Coulomb excitation; Δπ=no from level scheme. B(E2)(W.u.)=8 *3*.
2031.5	1486.0[b] *10*	100				
2046.87	1090.70 *6*	20.2 *11*				
	1187.49 *4*	100.0 *25*	M1(+E2)		0.0032 *9*	δ: −0.03 *+12−6* or +1.40 *+23−27* from (n,n'γ).
	1781.40 *15*	19.6 *21*				
2073.20	286.2[a] *1*	<63[a]				
	697.2[a] *1*	100[a] *10*	E1		0.00276	
2076.294	1119.5[i]	≈100[i]				
	1216.173[eh] *17*					
	1290.368 *22*	62.1 *16*				
	1810.6 *5*	15 *4*				
	1996.10 *15*	6.1 *8*				
2082.8	569.2[b] *4*	100[b] *24*				
	1126.0[b] *8*	32[b] *16*				
2092.31	1181.10[a] *10*	100	E1		1.03×10^{-3}	
2101.6	1145.4[h]					Eγ: from one Coulomb excitation study only.
	1242.2 *3*	39 *8*				
	1315.6 *8*	100 *10*	[E2]		0.00197	B(E2)(W.u.)=7 *5*.
2117.8	1853.1 *10*	100 *24*				
	2036.8 *12*	40 *8*				
2117.8	1161.6[g] *8*	100[g]				Eγ: for doubly–placed γ.
2124.7	1168.5[b] *7*	100				
2132.941	130.90 *20*	3.0 *3*	E1		0.1590	
	147.301 *20*	1.97 *8*	E1		0.1162	
	154.508 *25*	1.19 *10*	M1+E2	0.75 *25*	0.75 *4*	
	194.678 *15*	≈4.4	M1		0.433	
	215.185 *14*	30.4 *10*	E1+M2	−0.09 *+7−6*	0.056 *23*	δ: from ^{166}Tm ε decay.
	238.581 *20*	0.21 *1*	M1		0.248	
	429.885 *20*	0.45 *1*	M1		0.0516	
	454.20 *3*	0.189 *22*	(E2)		0.0211	
	536.67 *3*	0.737 *20*	E1		0.00478	
	560.77 *3*	0.399 *13*				
	604.553 *15*	1.15 *3*	E2		0.01025	
	619.49[g] *25*	<0.03[g]				
	674.788 *22*	15.0 *3*	E1		0.00295	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
2132.941	1057.67 *4*	4.02 *13*	E2		0.00300	
	1176.704 *16*	55.5 *11*	M1+E2	+0.20 *4*	0.00410 *7*	δ: from ^{166}Tm ε decay.
	1273.540 *16*	86.4 *18*	M1+E2	−0.11 *8*	0.00344 *6*	δ: from ^{166}Tm ε decay.
	1347.035 *18*	6.36 *13*	M1		0.00304	
	1867.94 *3*	23.5 *6*	M1+E2	+3.49 *+10−3*	1.26×10^{-3}	δ: from ^{166}Tm ε decay (1980Bu26).
	2052.36 *3*	100.0 *20*	M1+E2	+7.0 *5*	1.16×10^{-3}	δ: from ^{166}Tm ε decay.
2144.64	768.60[a] *10*	100				
2148.6	1192.5[a] *7*	<127[b]				Eγ: for doubly−placed γ.
	1883.5[a] *6*	100[b] *33*				
2155.8	1080					Eγ: from Coulomb excitation.
	1200					Eγ: from Coulomb excitation.
2160.114	158.269 *25*	0.56 *3*	E1		0.0961	
	481.33 *10*	0.27 *2*				
	587.90 *16*	0.81 *15*				
	631.62 *10*	1.14 *3*	(E2)		0.00924	
	646.75[e] *4*	≈0.12				
	1084.826 *17*	5.77 *12*	E2		0.00285	
	1203.873 *20*	16.5 *3*	M1+E2		0.0031 *9*	
	1300.725 *16*	21.2 *4*	M1		0.00330	
	1374.194 *25*	88.9 *21*	M1+E2	−0.11 *4*	0.00290 *5*	δ: from ^{166}Tm ε decay.
	1895.12 *3*	19.2 *6*	M1+E2	+2.63 *4*	1.27×10^{-3}	δ: from ^{166}Tm ε decay.
	2079.53 *3*	100.0 *21*	M1+E2	+5.2 *+15−5*	1.16×10^{-3}	δ: from ^{166}Tm ε decay.
2172.751	659.04 *20*	0.35 *7*				
	1097.46 *5*	3.66 *11*	E2		0.00278	
	1216.173[e] *17*	15 *6*				
	1313.37 *3*	13.7 *4*	E2,M1		0.0026 *7*	
	1907.71 *6*	22 *1*	E2,M1		0.00141 *21*	
	2092.13 *3*	100.0 *22*	M1+E2	+3.7 *+19−7*	1.16×10^{-3} *2*	δ: from ^{166}Tm ε decay.
2189.70	438.2[agh] *1*	100.0[ag] *13*				
	840.2[agh] *1*	24.4[ag] *27*				
2194.61	1283.4[a] *1*	100				
2201.3	742.6[b]	<37				Eγ: for doubly−placed γ.
	2120.5[b] *10*	100 *5*	D+Q			Mult.: from (n,n'γ). Iγ: from (γ,γ').
	2202[bc]	54[d]	(M1)		1.42×10^{-3}	Mult.: D, Δπ=(no) from (γ,γ'). B(M1)(W.u.)=0.067 *11*.
2212.95	166.26[g] *20*	<20[g]				
	1256.7 *3*	34 *14*				
	1353.27 *25*	36 *11*				
	1427.06 *20*	100 *29*				
	1948.2[h] *3*	51 *6*				
2215.963	139.64 *4*	0.54 *3*				
	194.678	≈2.8	M1		0.433	
	298.207 *20*	7.70 *16*	M1		0.1355	
	385.54 *4*	0.62 *2*	E2		0.0331	
	619.49[g] *25*	<0.17[g]				
	643.90 *10*	0.97 *5*				
	702.28 *10*	22.0 *6*	M1		0.01475	
	757.798 *17*	100 *2*	M1		0.01220	
	1356.62 *4*	0.7 *5*				
	1430.2 *3*	6.7 *16*				
	2135.36 *4*	1.56 *6*				
2243.087	257.36 *10*	3.8 *11*				
	646.75 *4*	≈18				
	729.38 *3*	100 *9*	M1		0.01342	
	1287.1 *3*	5.1 *13*				
	1383.5 *3*	13 *7*				
	1457.17 *5*	78 *11*				
	1978.12 *20*	96 *7*	E1		9.71×10^{-4}	

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Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
2243.087	2162.54 *5*	61.8 *24*	E1		1.04×10^{-3}	
2246.31	1335.1[a] *1*	100				
2260.3	1185					Eγ: from Coulomb excitation.
	1304					Eγ: from Coulomb excitation.
2260.65	1401.16 *4*	66 *5*				
	1474.84 *4*	100 *3*	M1,E2		0.0021 *5*	
2264.31	2183.68 *7*	100 *6*	Q(+D)			Mult.,δ: from (n,n'γ). δ=−0.47 *+14−19* or 1/δ=0.02 *+12−13*.
	2264.34 *8*	32 *3*				
2273.01	225.9 *5*	0.58 *25*				
	287.1 *3*	0.50 *17*				
	610.8[g] *3*	<1.7[g]				
	814.82 *20*	5.1 *10*				
	1487.01 *15*	3.8 *7*				
	2008.00 *4*	100.0 *25*	E1		9.82×10^{-4}	
	2192.43 *4*	90.1 *25*	E1		1.06×10^{-3}	
2282.68	824.52[g] *11*	<13.8[g]				
	2017.67 *7*	84 *8*				
	2202.09 *6*	100 *4*	E1,E2			
2290.959	118.18 *3*	3.7 *11*	[M1]		1.765	
	312.58 *20*	0.14 *7*				
	832.88 *7*	1.17 *9*				
	1334.74 *21*	0.96 *16*	M1(+E2)		0.0025 *6*	
	1431.6 *3*	41 *7*				
	1505.00 *4*	100.0 *23*	M1(+E2)	−0.2 *+2−3*	0.00237 *14*	δ: from ^{166}Tm ε decay. Other:−0.15 *+5−10* from (n,n'γ).
	2026.06[g] *11*	<3.2[g]				
	2210.49 *6*	7.4 *3*				
2328.51	1417.3[a] *1*	100				
2328.69	2247.90 *20*	52 *8*				
	2328.72 *10*	100 *9*				
2352.91	824.52[g] *11*	<41[g]				
	1396.8 *4*	19 *10*				
	1493.43 *16*	100 *15*				
	2272.33 *15*	28 *3*				
2377.77	1518.8 *9*	3.2 *7*				
	1591.77 *6*	100.0 *22*	E2,M1		0.0018 *4*	
	2297.26 *10*	9.7 *5*	E2,M1		0.00125 *14*	
	2377.84 *8*	12.3 *12*	M1		1.37×10^{-3}	
2382.26	166.26[g] *20*	<5[g]				
	868.47 *12*	9.4 *16*				
	924.21 *11*	11.4 *16*				
	1522.85 *4*	100 *4*	M1(+E2)		0.0019 *4*	
	1596.7 *5*	8 *4*				
2389.33	542.8[a] *1*	100	E2		0.01335	Mult.: from ce data in ^{164}Dy(α,2nγ). B(E2)(W.u.)=400 *50*.
2393.129	797.02 *20*	2.9 *6*				
	1437.3 *3*	38 *5*				
	1533.80 *19*	3.0 *8*				
	1607.18 *3*	100 *5*	E2,M1		0.0018 *4*	
	2128.19 *5*	11.1 *8*				
	2312.57 *9*	10.4 *5*	M1		1.38×10^{-3}	
2413.67	475.36 *25*	34 *6*				
	899.80 *18*	12.5 *25*				
	1554.33 *20*	19 *9*				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	α	Comments
2413.67	1627.8 *3*	100 *19*			If this is the same transition as the 1630γ in (n,n'γ), mult=D+Q, δ=+15 *+31–5*.
	2148.6 *3*	7.5 *19*			
	2333.11 *10*	15.4 *16*			
2428.4?	352.0[ah] *5*				Existence of transition is questionable.
	677.0[ah] *5*				Existence of transition is questionable.
2428.77	464.7[a] *1*		[E2]	0.01990	
	1081.2				Eγ: from from level energy difference in Coulomb excitation.
2435.10	1575.65 *26*	42 *9*			
	1649.19 *10*	100 *18*			
2442.0?	2177[h]	100	D+Q		Eγ,Mult.: from (n,n'γ).
2444.16	1658.4 *3*	100 *21*			
	2363.3 *4*	19.2 *23*			
	2444.0 *10*	8.9 *26*			
2459.0?	2459[bh]	100			
2464.51	2383.91 *10*	44 *7*	E2,M1	0.00124 *13*	Iγ: weighted average of I(2384γ):I(2465γ)=52 *5*:100 *8* in ε decay. And 38 *6*:100 in (γ,γ').
	2464.7 *5*	100	M1	1.35×10^{-3}	Mult.: E2,M1 from α(K)exp in ε decay; D from (γ,γ'). B(M1)(W.u.)=0.024 *4*.
2475.39	1017.29 *6*	50 *3*			
	1615.88 *7*	99 *7*			
	1690.2 *4*	28 *10*			
	2394.81 *8*	100 *5*	E2,M1	0.00124 *13*	
2479.74?	1130.2[a] *1*	100			Existence of transition is questionable.
2504.6	2424[b]	100			δ: δ(D,Q)=+0.36 *+6–4* or +9 *+7–3* in (n,n'γ) (1992Be29) if J(2506 level)=3, but γ(θ) does not rule out stretched Q.
2525	2444[c]	51[d] *5*			
	2525[c]	100[d]	D[f]		
2542.87	946.57 *8*	27 *4*			
	1586.68 *8*	100 *17*			
	1683.3 *3*	56 *21*			
	2277.88 *8*	39.2 *14*			
	2462.5 *5*	59 *6*			
2574.0	1358	100			Eγ: from Coulomb excitation.
2586.06	1629.4[g] *3*	<804[g]			
	1726.3 *5*	94 *36*			
	2321.18 *18*	54 *8*			
	2505.58 *20*	100 *8*			
2600.63	1142.45[g] *3*	<263[g]			
	2520.20 *10*	49 *3*			
	2600.76 *20*	100 *11*	M1	1.34×10^{-3}	Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ').
2613.50	2532.3 *3*	41 *7*			
	2613.75 *20*	100 *10*			
2619.6	2354.6 *10*	43 *19*			
	2538.8 *10*	69 *12*			
	2619.7 *8*	100 *67*			
2624.8	2544.3 *3*	97 *17*			
	2624.4 *7*	100 *10*			
2628.5	2547.1 *10*	37 *14*			
	2628.5 *3*	100 *10*			
2632.66	1846.6 *3*	100 *38*			
	2552.12 *20*	26 *2*			
2654.40?	464.7[ah] *1*	100			Existence of transition is questionable.
2656.9?	810.3[ah] *1*	100			
2671.98	2591.4 *3*	50 *15*			
	2671.95 *20*	100 *7*			
2679.05	2598.2 *4*	52 *10*			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	α	Comments
2679.05	2679.09 *20*	100 *7*	M1	1.34×10^{-3}	Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ'). B(M1)(W.u.)=0.038 *7*.
2729.090	143.2 *6*	0.8 *3*			
	743.8 *5*	2.2 *8*			
	1200.66 *3*	100 *3*	E2,M1	0.0032 *9*	
	1943.6 *15*	3.6 *24*			
	2648.50 *2*	5.5 *4*	E2,M1	0.00123 *12*	
	2728.9 *10*	0.39 *12*			
2767.8	2687	100 *12*			
	2768	67	D[f]		
2783.69	610.8[g] *3*	<60[g]			
	2703.1 *4*	53 *6*			Iγ: from (γ,γ'). 58 *7* from ε decay.
	2783.8 *3*	100 *5*	M1	1.35×10^{-3}	Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ'). B(M1)(W.u.)=0.011 *4*.
2797.5	2716.8 *4*	100 *12*			
	2798.2 *10*	31 *13*			
2811.98	2026.06[g] *11*	<2340[g]			Iγ: from ε decay (for doublet).
	2732.0 *10*	100			
	2811.7 *10*	55 *3*	D[f]		Iγ: from (γ,γ'). Other Iγ: 68 *20* in ε decay.
2858.16	2777.56 *18*	100 *9*			
	2858.1 *10*	28 *12*			
2880.07?	451.3[ah] *1*	100			Existence of transition is questionable.
2967.3	578.0[a] *5*	100	E2	0.01143	B(E2)(W.u.)=330 *180*. Other Eγ: 579.2 in Coulomb excitation.
3073	2992[c]	100[d] *19*			
	3073[c]	31.3[d]	D[f]		
3123	3042[c]	100[d] *33*			
	3123[c]	95[d]	D[f]		
3144	3063	48 *3*			
	3144	100	D[f]		
3175	3094[c]	61[d] *6*			
	3175[c]	100[d]	D[f]		
3187	3106[c]	49[d] *4*			
	3187[c]	100[d]	D[f]		
3197	3116[c]	51[d] *3*			
	3197[c]	100[d]	D[f]		
3288	3207[c]	100[d] *9*			
	3288[c]	66[d]	D[f]		
3322	3241[c]	100[d] *14*			
	3322[c]	45[d]	D[f]		
3329	3248[c]	40[d] *7*			
	3329[c]	100[d]	D[f]		
3386	3305[c]	100[d] *11*			
	3386[c]	68[d]	D[f]		
3425	3425[c]	100[d]	D[f]		
3430	3349[c]	24[d] *6*			
	3430[c]	100[d]	D[f]		
3440	3359[c]	100[d] *18*			
	3440[c]	36[d]	D[f]		
3493	3493[c]	100[d]	D[f]		
3498	3498[c]	100[d]	D[f]		

† From ^{166}Tm ε decay, unless otherwise noted.
‡ Relative photon intensity normalized to 100 for strongest photon deexciting each level; based on data from ^{166}Tm ε decay, unless otherwise noted.
§ From ce data of 1979Ad06 in ε decay, unless otherwise noted.
# From ^{166}Ho β^- decay (1200 y), unless otherwise noted.
@ From ^{166}Ho β^- decay (1200 y).
& From ^{166}Ho β^- decay (26.824 h).
a From ^{164}Dy(α,2nγ).
b From (n,n'γ).

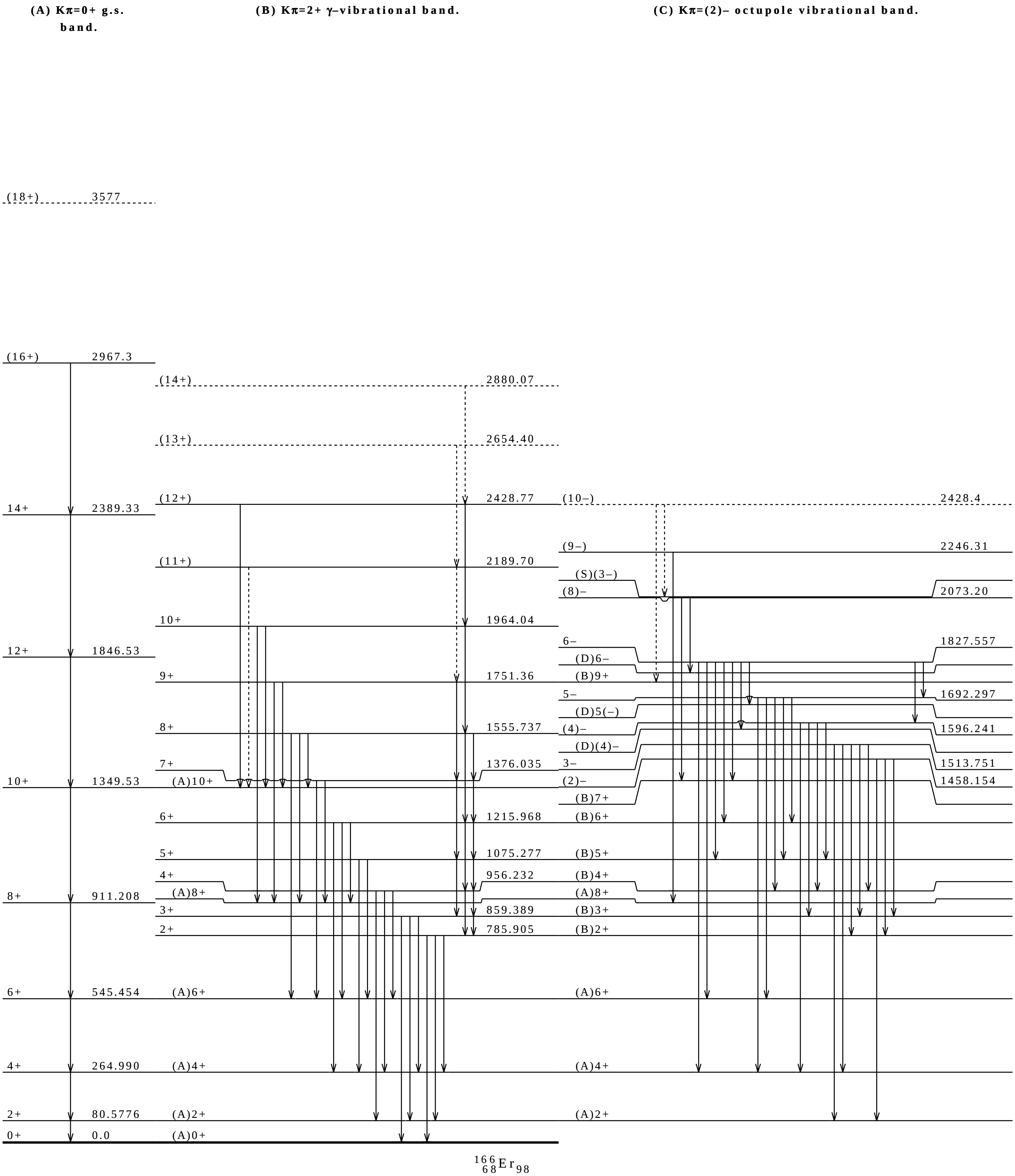
Footnotes continued on next page

Adopted Levels, Gammas (continued)

$\gamma(^{166}Er)$ (continued)

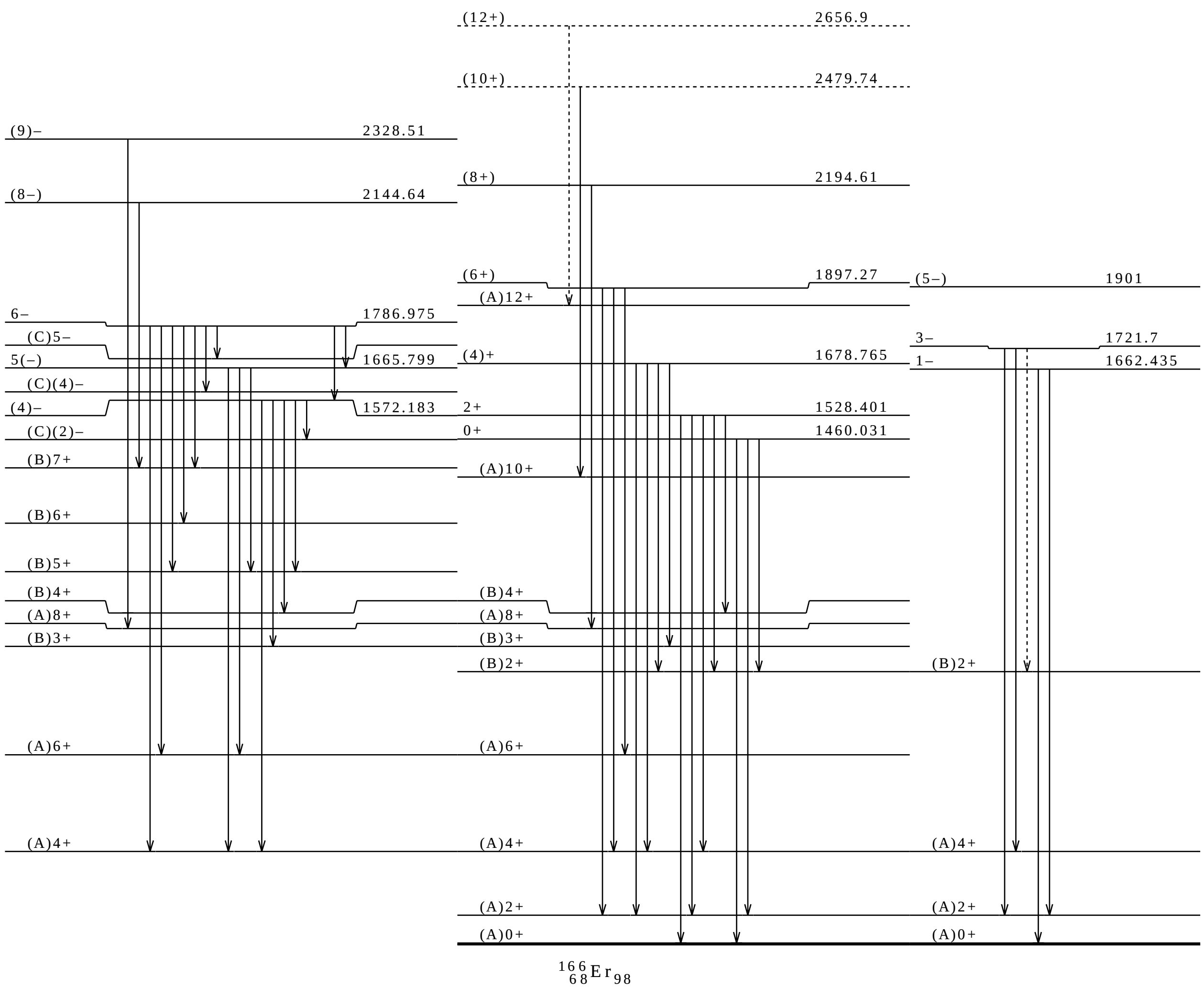
[c] From level energy difference.
[d] From $\Gamma_{\gamma 1}+\Gamma_{\gamma 0}$ in (γ,γ').
[e] Eγ deviates by at least 5σ from value expected for this placement. Datum excluded from least–squares fit.
[f] From γ(θ) in (γ,γ').
[g] Multiply placed; undivided intensity given.
[h] Placement of transition in the level scheme is uncertain.
[i] Multiply placed; intensity suitably divided.

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)

(D) Kπ=(4)− band. **(E) Kπ=0+ band.** **(F) Kπ=0− band.**

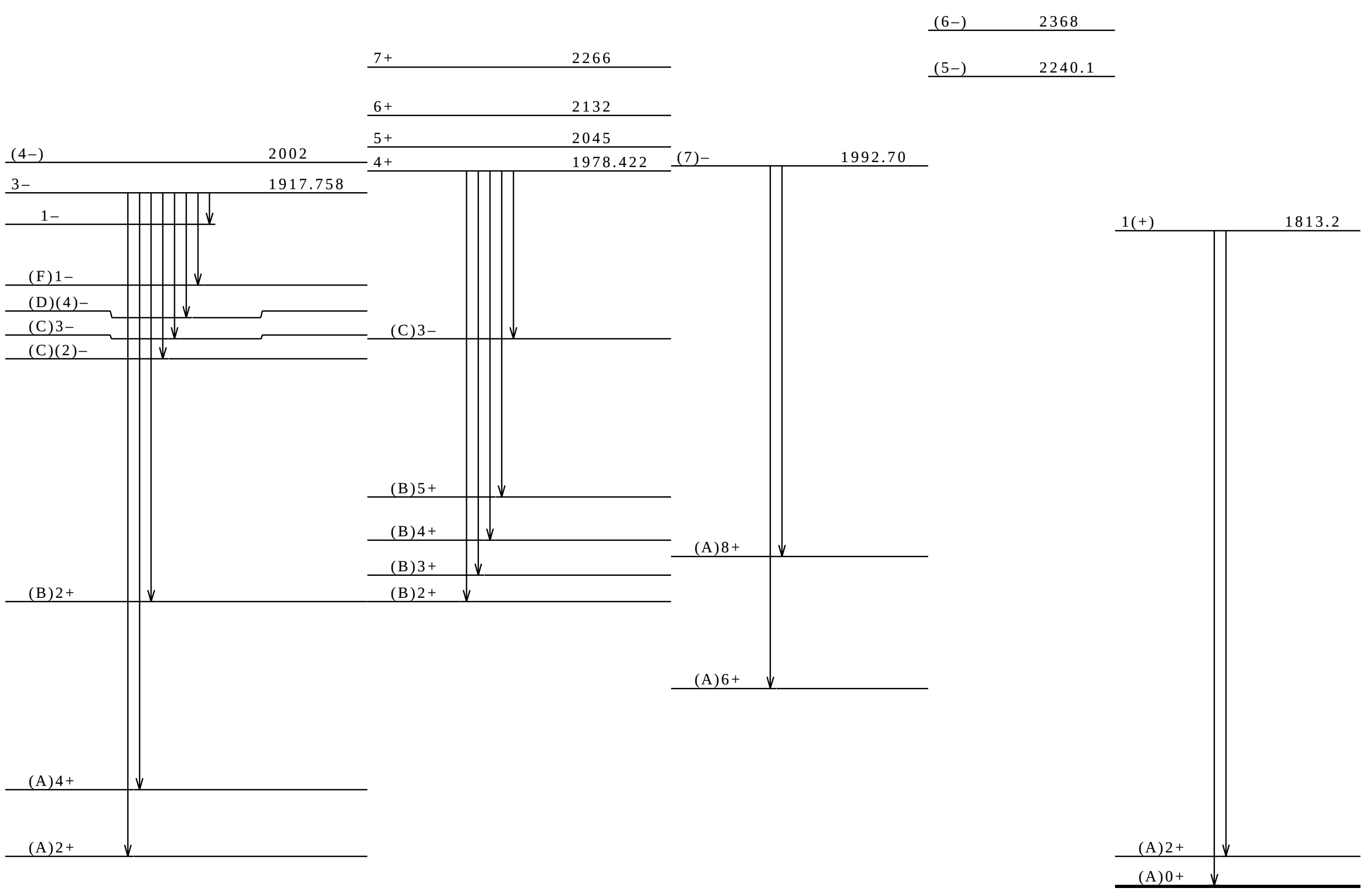


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(G) Kπ=3− band (1993Li12). **(H) Kπ=4+ band (1993Li12).** **(I) Kπ=7− band (1993Li12).** **(J) Kπ=(5−) band (1975Pa15).** **(K) Kπ=1+ band.**



$^{166}_{68}Er_{98}$

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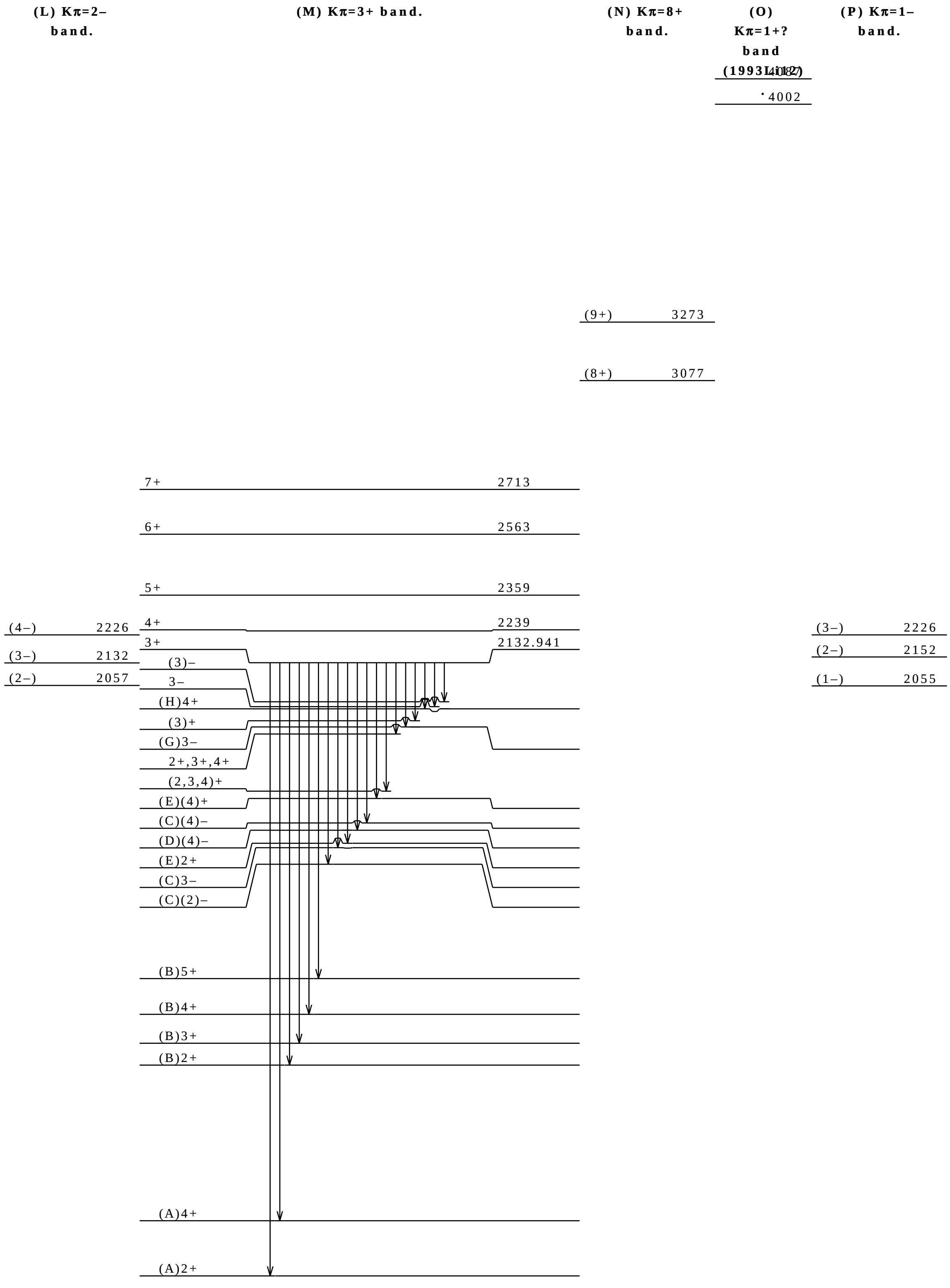
Adopted Levels, Gammas (continued)



$^{166}_{68}Er_{98}$

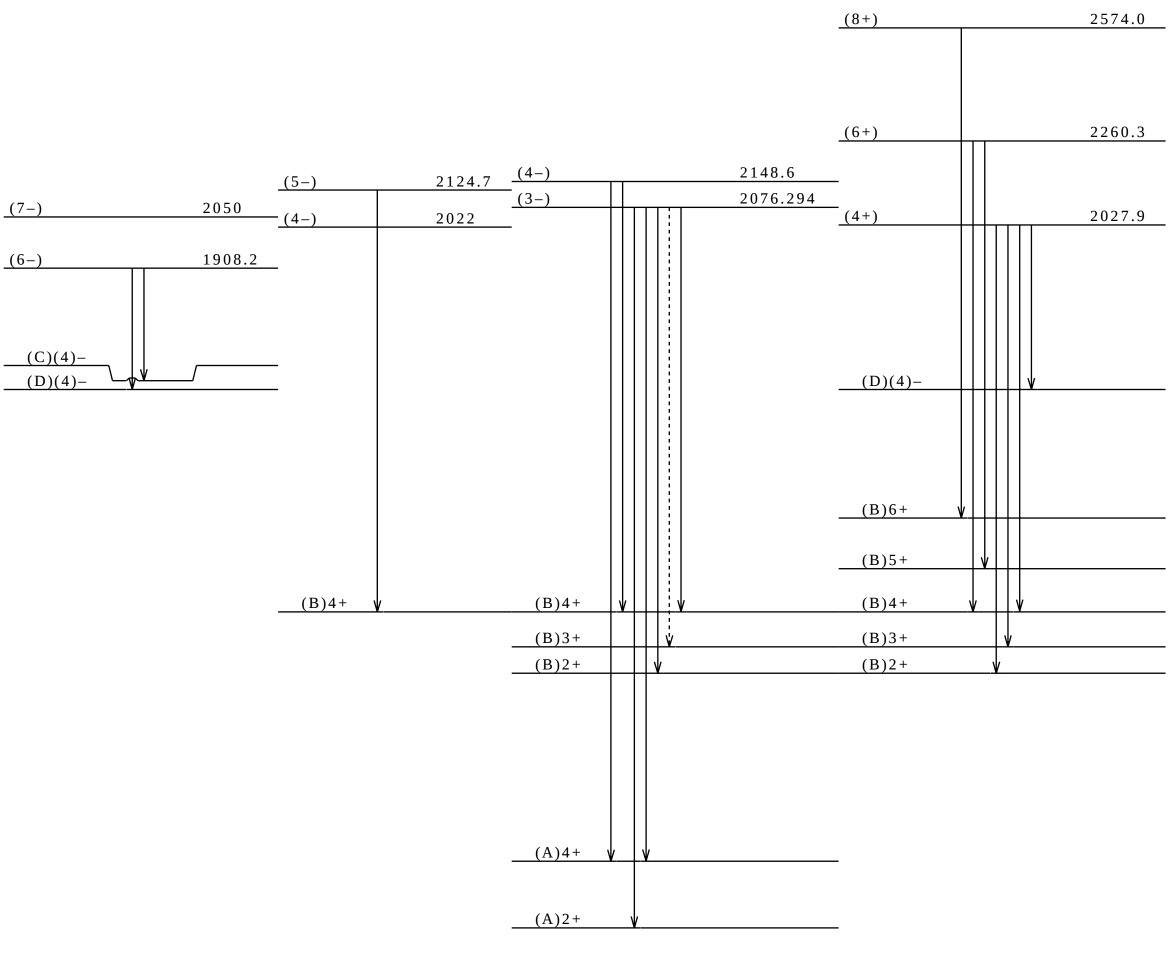
Adopted Levels, Gammas (continued)

(Q) Kπ=(6–) band (1975Pa15).

(R) Kπ=(4–) band (1975Pa15).

(S) Kπ=(3–) band (1975Pa15).

(T) possible Kπ=4+, γγ vibration band (1998Fa15).



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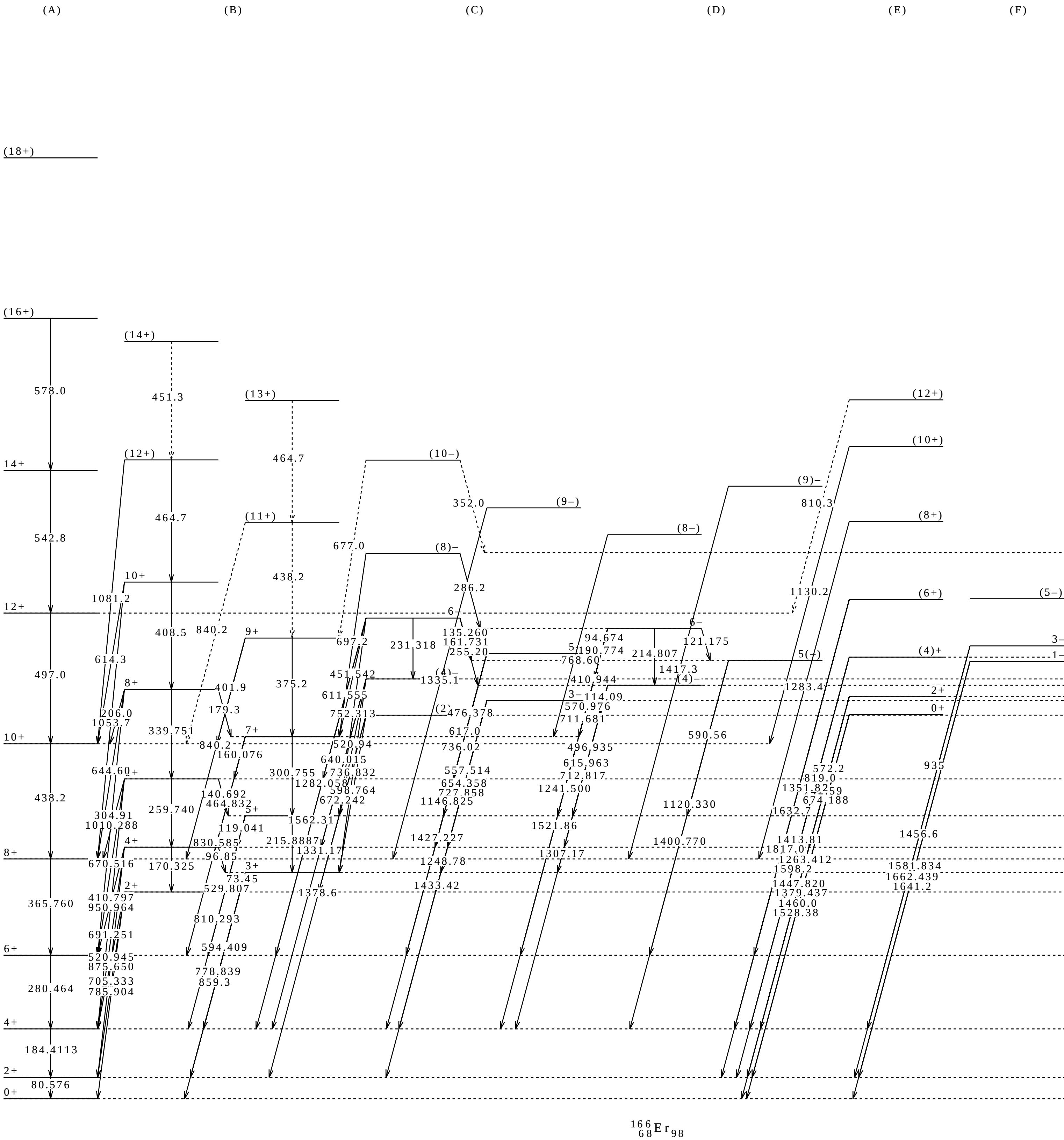
Adopted Levels, Gammas (continued)

Bands for ^{166}Er



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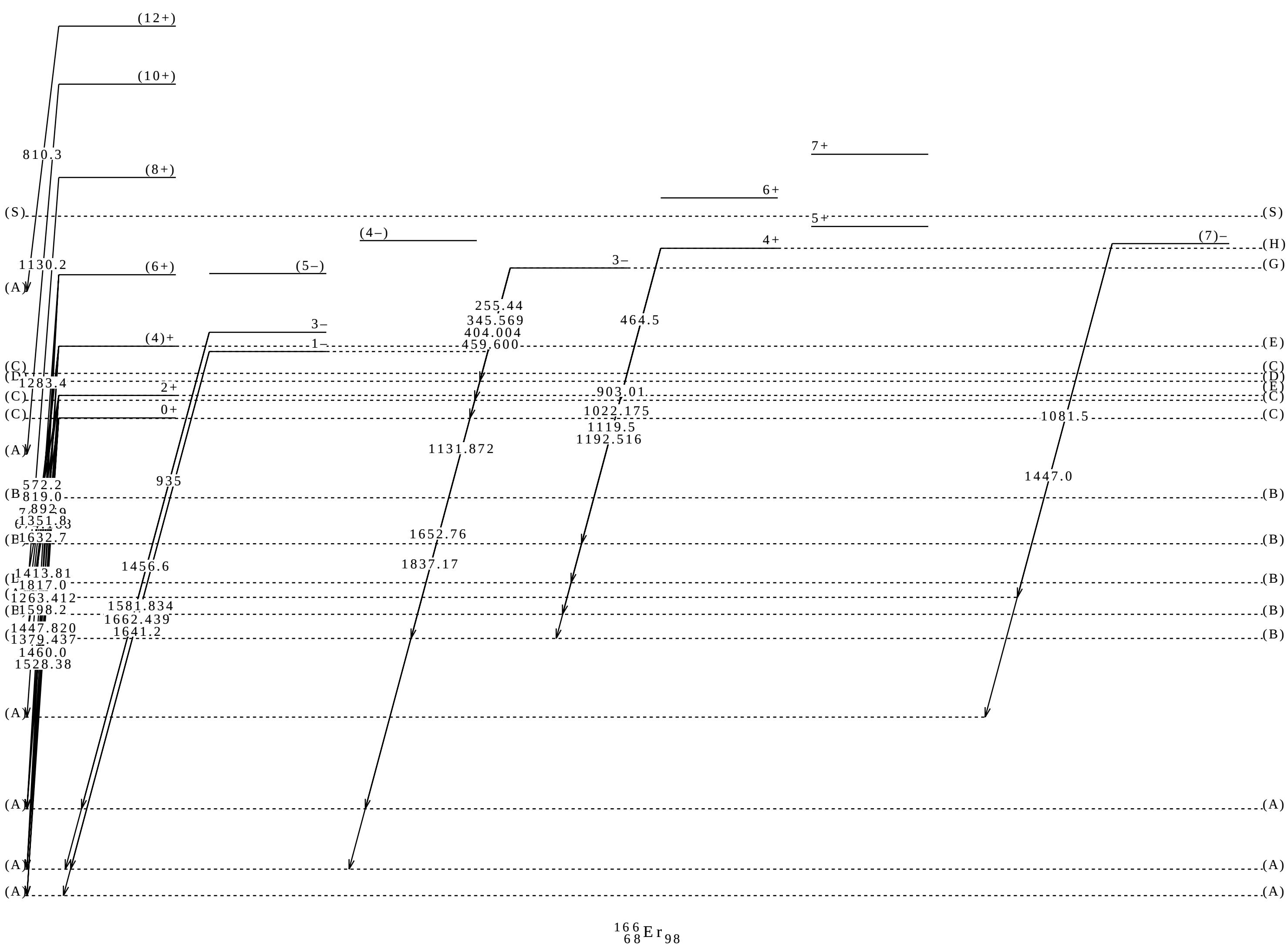
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Er



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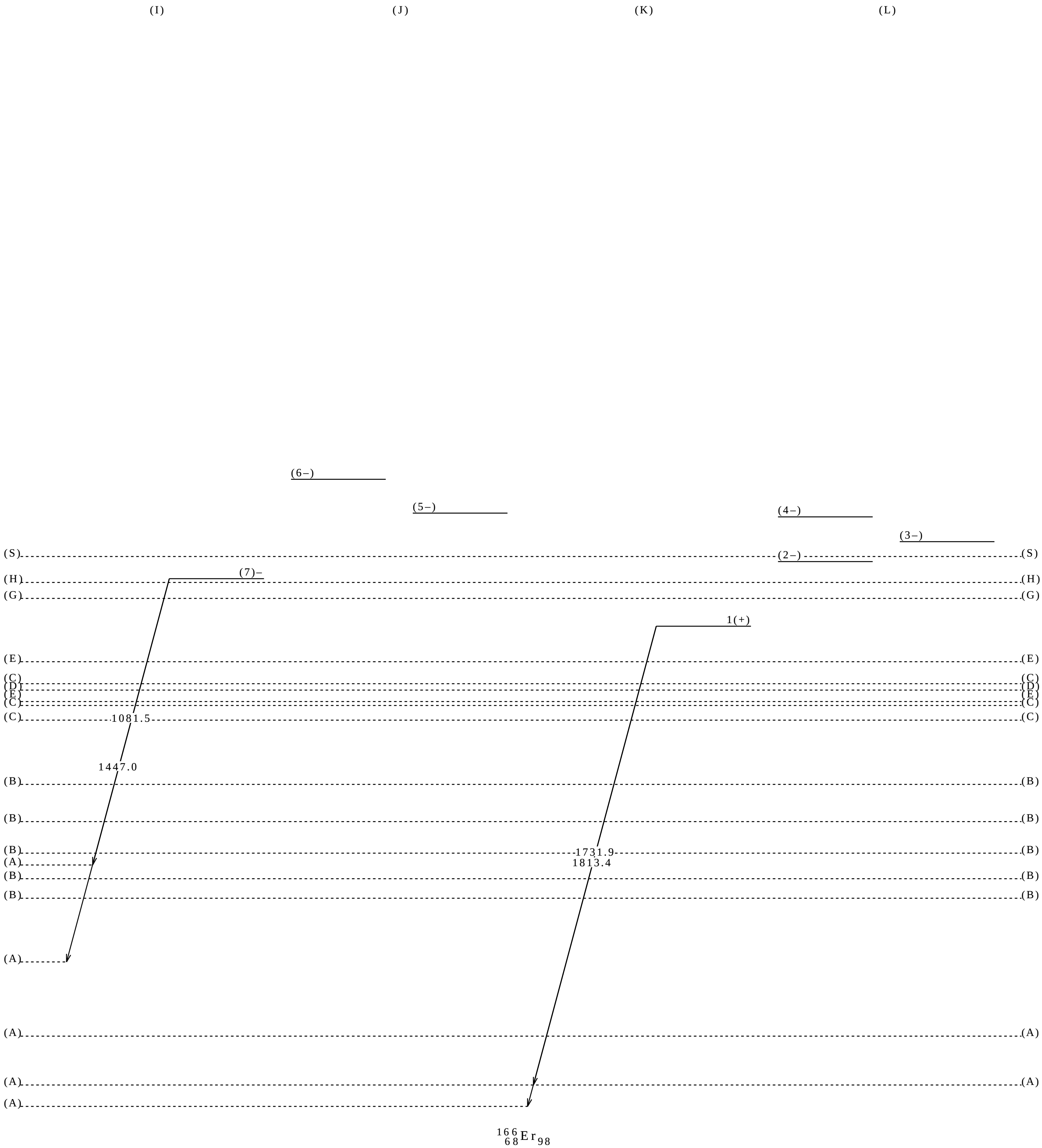
Adopted Levels, Gammas (continued)

Bands for ^{166}Er



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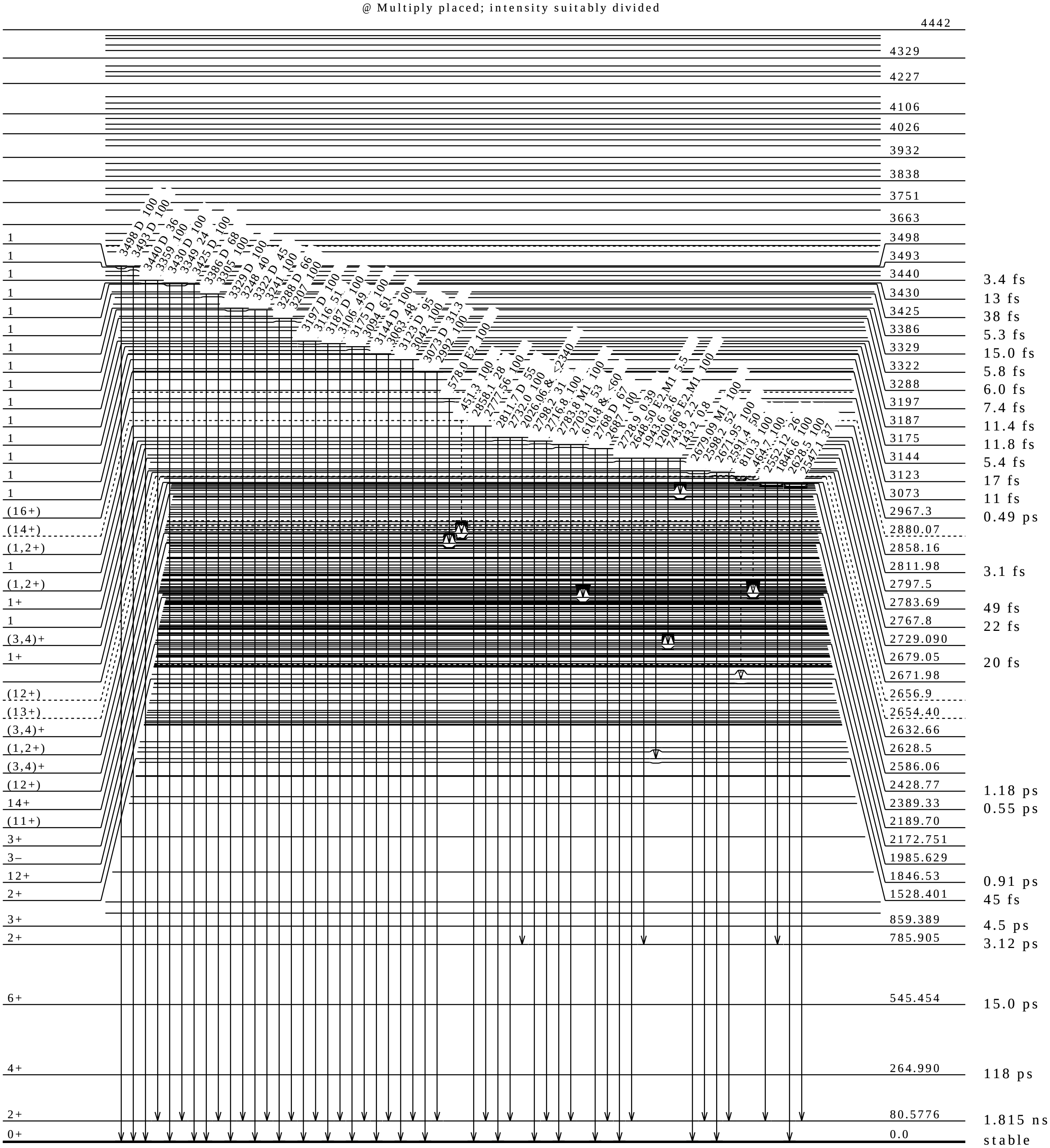
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

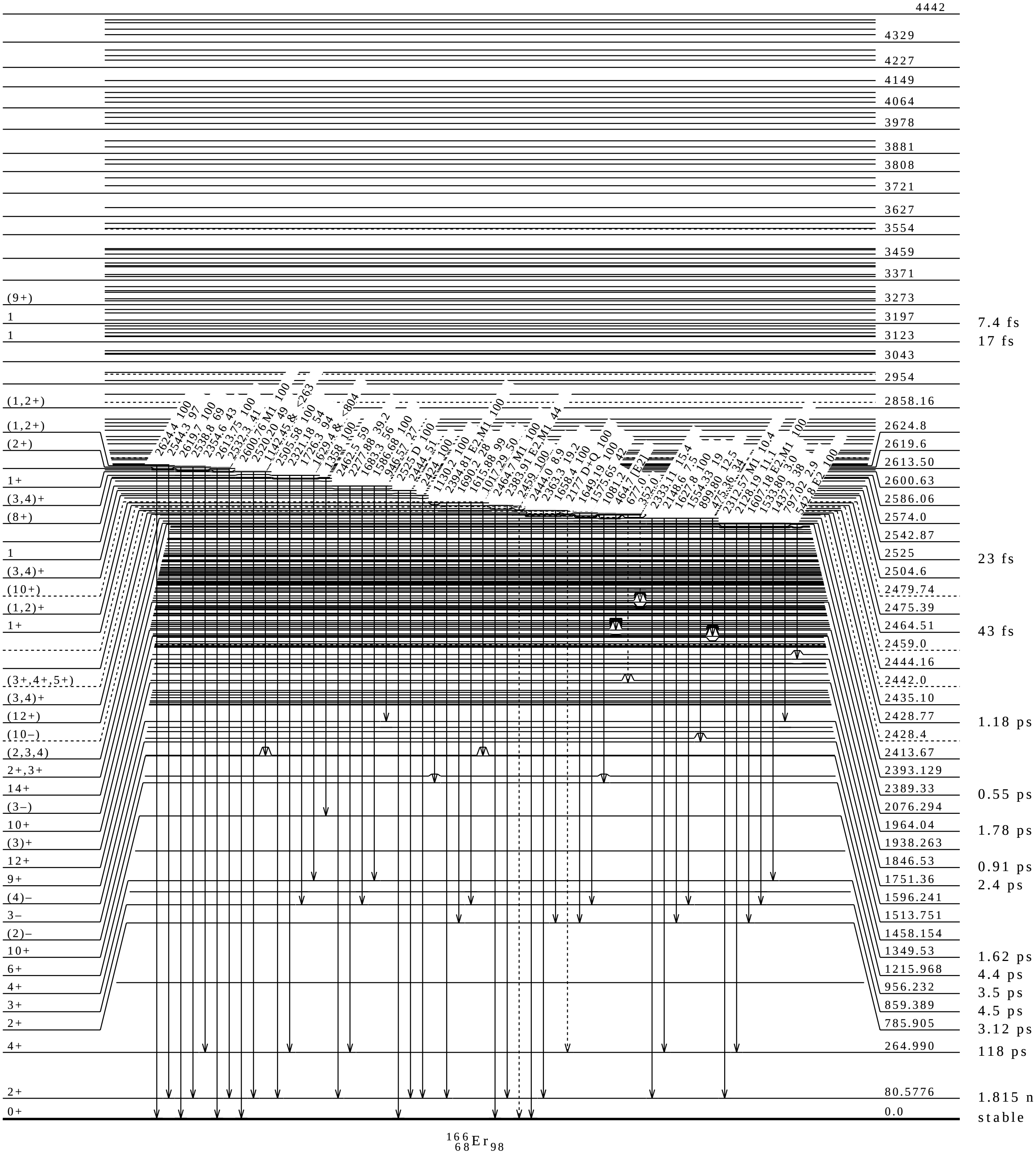
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

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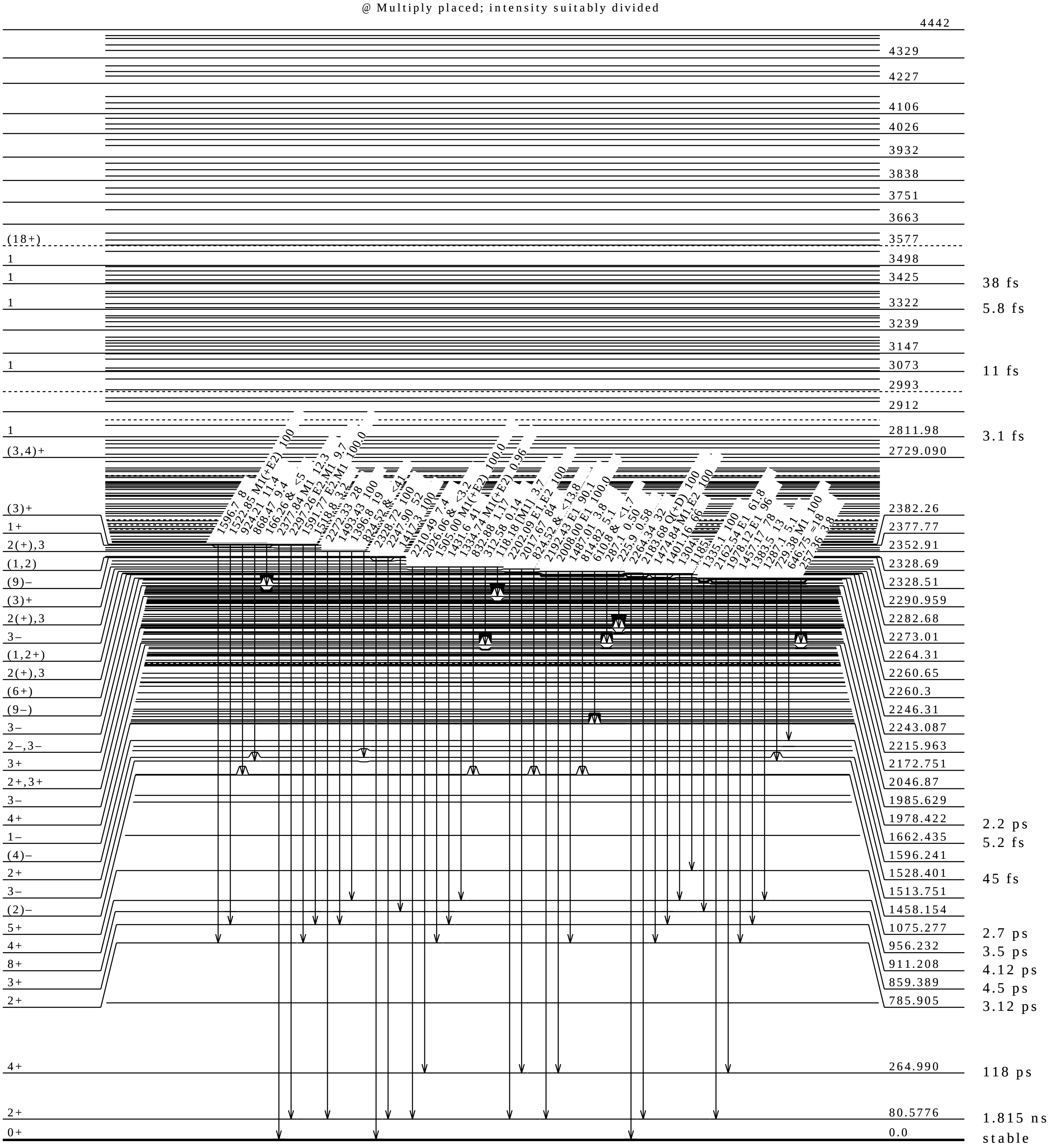
Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

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Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
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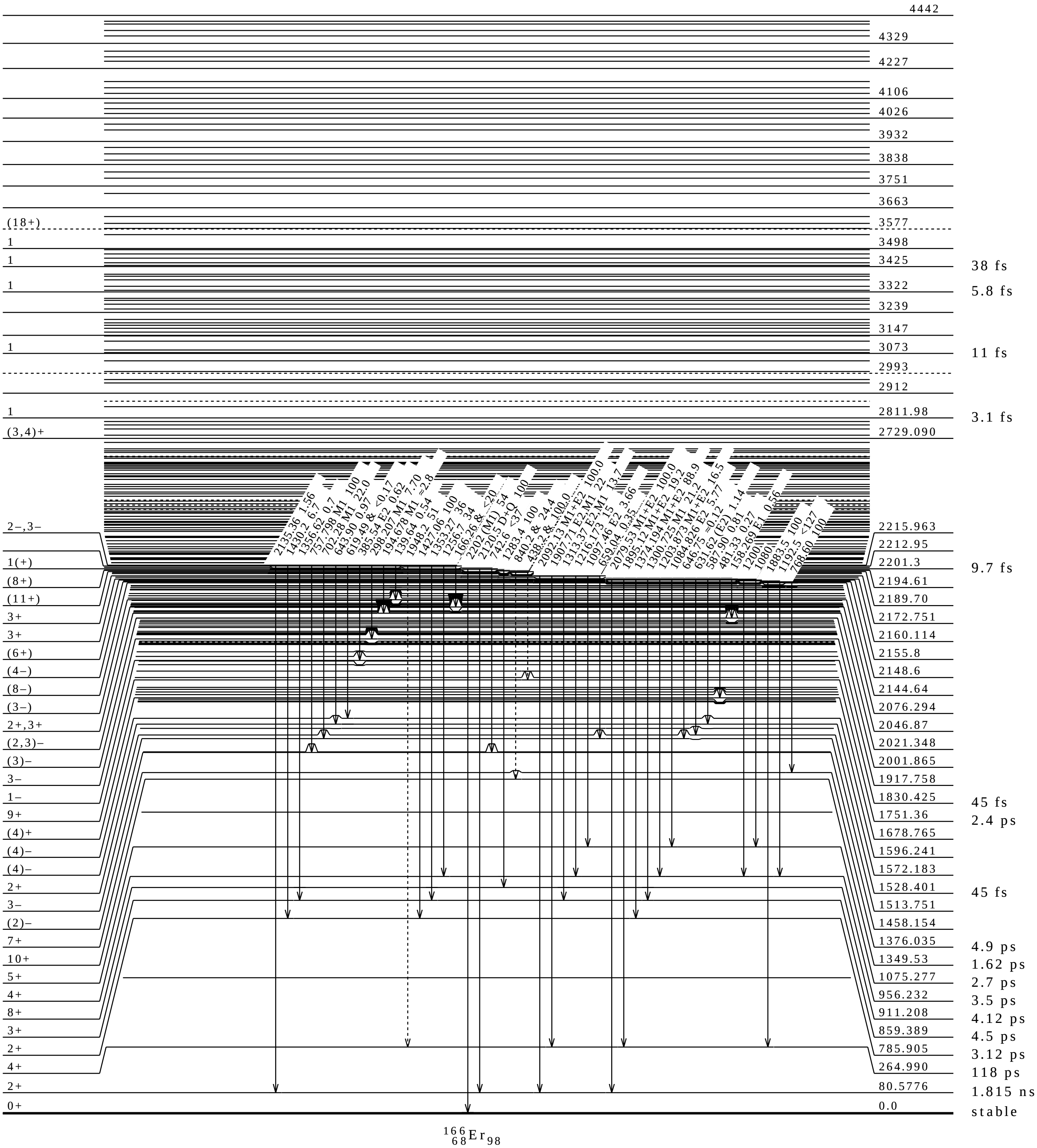
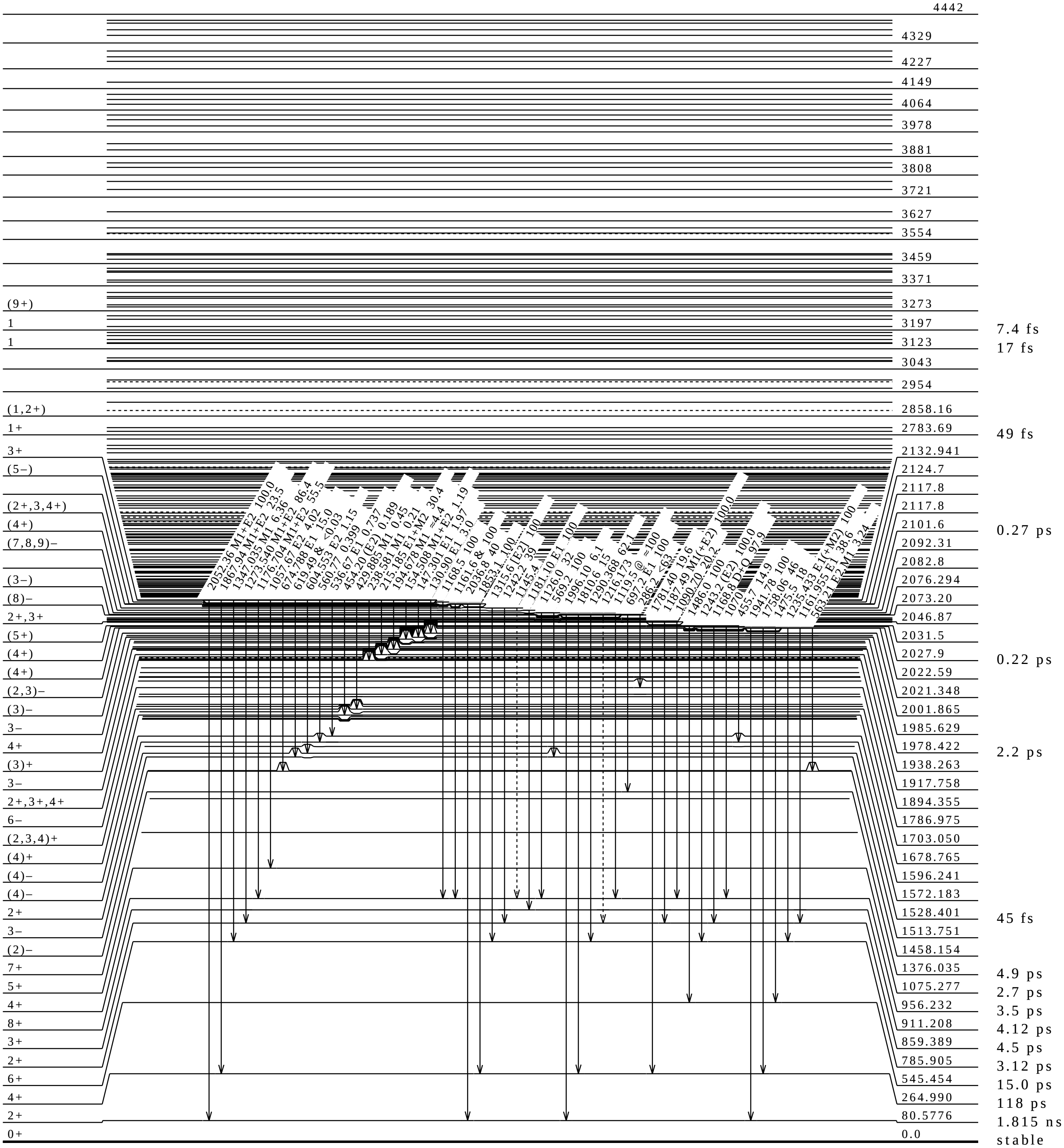


Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
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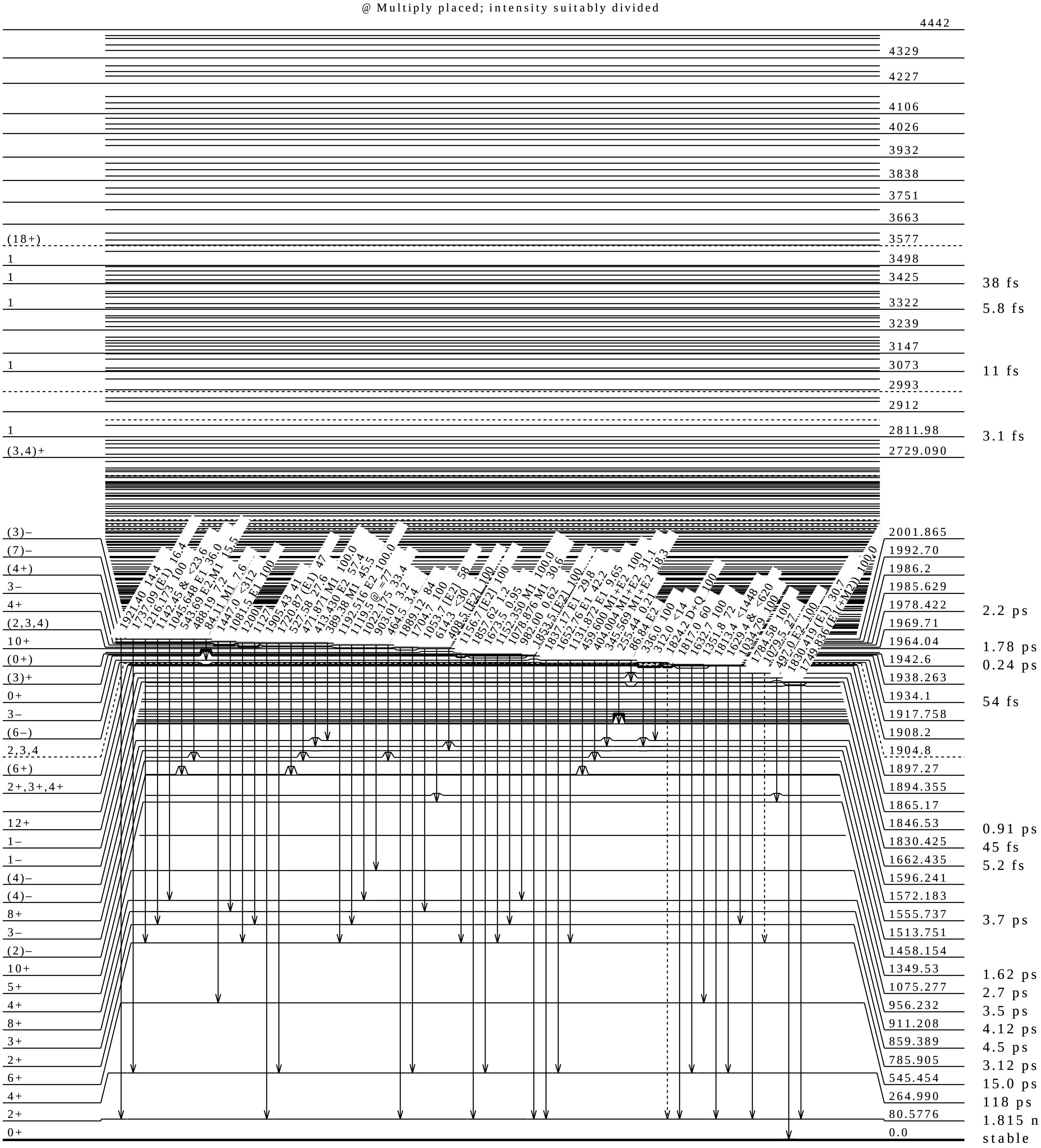


$^{166}_{68}Er_{98}$

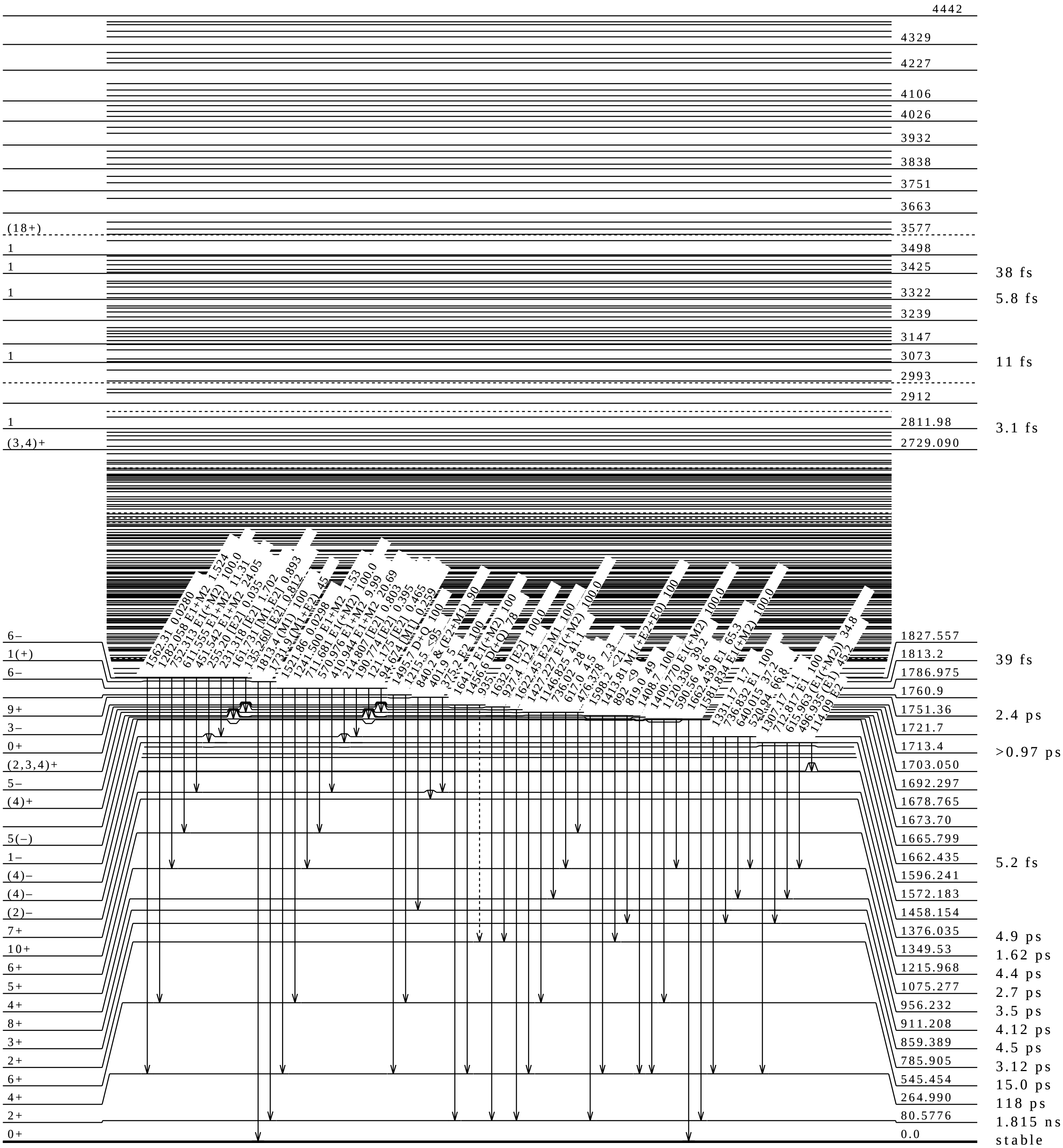
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

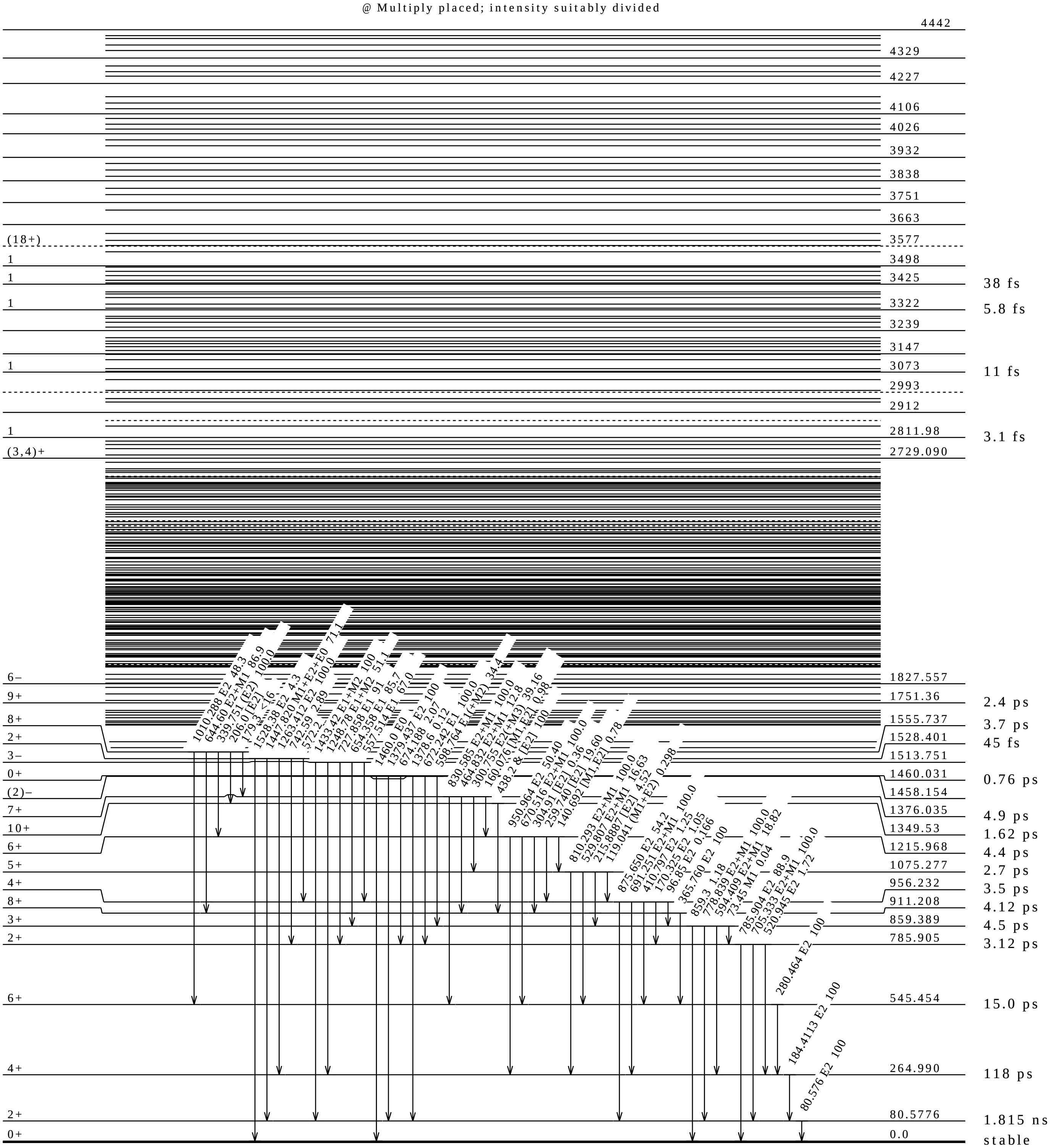
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{68}Er_{98}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Ho β⁻ Decay (26.824 h)

Parent ^{166}Ho: E=0.0; Jπ=0–; $T_{1/2}$=26.824 h *12*; Q(g.s.)=1854.7 *9*; %β⁻ decay=100.

^{166}Er Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0+	stable	
80.5775 *20*	2+	1.815 ns *23*	$T_{1/2}$: from Adopted Levels. Measured values from β–γ(t) are: 1.76 ns *5* (1963De21), 1.80 ns *5* (1963Fo02), 1.98 ns *21* (1961Bo05). Others: 1950Mc79, 1956Be54, 1959Bi10, 1960Be28, 1960Ma38.
265.02 *9*	4+		
785.865 *12*	2+		
1460.025 *7*	0+		Jπ: (1379.4γ)(80.574γ)(θ) is consistent only with J=0 for 0–2–0 cascade (1960Ma19,1960Ma38,1961Ku03).
1528.12 *7*	2+		
1662.436 *5*	1–		Jπ: (1581.89γ)(80.574γ)(θ) is consistent with 1(D+Q)2(Q)0 cascade and 3(D+Q)2(Q)0 cascade. J=3 ruled out because of log *ft*=6.94 for the β– branch to 1662.45 level (1968Fo11). 1969He02 measured the linear polarization and demonstrate that it is consistent with E1(+M2) for the 1581.89γ only if J=1 for 1662.45 level.
1830.425 *12*	1–		

† From least–squares fit to Eγ.
‡ From Adopted Levels.

β⁻ radiations

Eβ⁻(g.s.)	Iβ⁻	References
1854 *5*		1955Gr07
1859 *3*	49	1963Fu17
1857 *3*	52	1966Da04
1854.7 *15*	51 *2*	1974Gr41
1845 *2*	52	1976Ra32

Eβ⁻ (80.5 level)	Iβ⁻	References
1771 *7*	48 *4*	1955Gr07
1779 *5*	49	1963Fu17
1776 *4*	47 *3*	1966Da04
1776 *8*		1966Be12
1776 *5*	48 *2*	1974Gr41
1771 *2*	47.5	1976Ra32
1773.1 *14*		weighted ave.

For measurements of other low energy β– groups, see 1963Fu17, 1966Da04, 1966Be12, 1958Co76, 1976Ra32. Other measurements: 1949Gr01, 1950An12, 1950Si20, 1954Su12, 1958Co76.

β⁻ γ(θ): (1773.1β–)(80.574γ) cascade is consistent with 0–,2+,0+ (1955Gr07,1965Ma39,1968Me17). Other measurements: 1961De34, 1963Gr36, 1964Gr33.

Eβ⁻	E(level)	Iβ⁻†§	Log *ft*	Comments
(24.3 *9*)	1830.425	0.0342 *6*	5.11 *5*	av Eβ=6.12 *23*.
(192.3 *9*)	1662.436	0.302 *5*	6.916 *10*	av Eβ=52.18 *27*.
(326.6 *9*)	1528.12	0.00268 *12*	9.493[1u] *21*	av Eβ=105.41 *30*.
(394.7 *9*)	1460.025	0.943 *13*	7.424 *7*	av Eβ=115.14 *30*.
(1068.8 *9*)	785.865	0.0070 *12*	11.62[1u] *8*	av Eβ=369.33 *35*.
1773.1 *14*	80.5775	49.9 *12*	8.981[1u] *11*	av Eβ=651.33 *38*.
1854.7‡ *15*	0.0	48.8 *12*	8.104 *11*	av Eβ=693.96 *39*.

† From the intensity balance.
‡ from 1974Gr41.
§ Absolute intensity per 100 decays.

^{166}Ho β^- Decay (26.824 h) (continued)

$\gamma(^{166}Er)$

x–rays: (Iγ relative to Iγ(1379.3γ)=100 (1989Ch45)).

Intensity	Designation
13.3 *3*	L_1 x ray
359 *13*	L_α x ray
381 *13*	L_β x ray
59 *3*	L_γ x ray
346 *11*	$K\alpha_2$ x ray
613 *22*	$K\alpha_1$ x ray
194 *8*	$K\beta_1$' x ray
47 *2*	$K\beta_2$' x ray

Summary of γ intensity data relative to I(1379γ)=100:

Reference	80.6γ	184.4γ #	521.0γ	674.2γ #	705.4γ #	785.9γ
1962Cl03	730 *50*	–	–	3.0 *5*	2.0 *5*	1.0 *5*
1967Bu14	667 *43*	–	–	3.23 *22*	2.04 *32*	1.61 *32*
1970Re16	–	0.22 *5*	–	2.15 *22*	1.61 *22*	1.40 *22*
1976Ra32	704 *32*	–	–	3.44 *22*	2.26 *11*	1.2 *5*
1977Al27	672 *65*	0.129 *30*	0.032 *11*	1.76 *9*	1.37 *6*	1.25 *6*
1980VyZZ	–	–	–	1.95 *10*	1.40 *8*	1.37 *12*
1989Ch45	722 *8*	0.23 *1*	0.05 *2*	2.3 *1*	1.7 *1*	1.4 *1*
1992Ar06	656 *32*	0.097 *11*	0.0376 *43*	2.011 *32*	1.441 *22*	1.280 *22*
1995Gi10	–	–	–	2.4 *3*	–	–
Recommended e	712 *10*	0.17 *4*	0.037 *4*	2.07 *10*	1.49 *8*	1.286 *23*

Reference	1263.0γ	1379.4γ	1447.5γ	1528.2γ	1581.8γ	1662.4γ
1962Cl03	–	100	–	–	19 *3*	13 *3* @
1967Bu14	–	100	–	–	20.6 *10*	12.9 *7*
1970Re16	–	100 *5*	–	–	19.5 *10*	12.5 *6*
1976Ra32	–	100	–	–	21.5 *11*@	9.9 *4* @
1977Al27	0.151 *22*	100.0 *11*	0.105 *11*	0.022	19.7 *6*	13.0 *4*
1980VyZZ	–	100	–	–	20.3 *11*	13.2 *8*
1981Se09	–	100	–	–	–	–
1989Ch45	0.17 *1*	100 *1*	0.12 *1*	–	19.9 *4*	12.7 *3*
1992Ar06	0.161 *32*	100.0 *11*	0.14 *5*	0.0097 *11*	19.68 *22*	13.01 *11*
1995Gi10	–	100	–	–	–	–
Recommended e	0.166 *9*	100.0	0.114 *7*	0.0097 *11*	19.79 *22*	12.92 *14*

Reference	1732.0γ	1749.8γ	1812.8γ	1830.5γ
1962Cl03	–	3.0 *5*	–	1.0 *3* @
1967Bu14	–	3.33 *11* @	–	1.00 *8* @
1970Re16	–	2.69 *22*	–	0.86 *11*
1976Ra32	–	3.01 *18*	–	0.81 *54*
1977Al27	–	2.80 *22*	–	0.89 *5*
1980VyZZ	–	2.75 *15*	–	0.83 *5*
1989Ch45	–	2.8 *1*	–	0.85 *2*
1992Ar06	0.0054 *22*	2.85 *4*	0.0065 *22*	0.892 *22*
Recommended e	0.0054 *22*	2.84 *4*	0.0065 *22*	0.871 *15*

Data for this γ are discrepant (χ^2 exceeds critical value).
@ statistical outlier based on Chauvenet criterion; datum excluded from average.
e weighted average excluding statistical outliers and data from 1980VyZZ (for which evaluator lacks complete documentation).
γγ(θ): see 1955Fr06, 1960Ma19, 1961Bo05, 1961Ku03, 1963Ve11, 1969KaZV, 1971SkZX, 1973Di18.
β^- γ(θ,t), γγ(θ,t): see 1963Bo19, 1961Bo05, 1969Fo09, 1969KaZV, 1971HeYP, 1971HeYO.
γγ(θ,h), γγ(θ,H,t): 1960Ma38, 1961Bo05, 1961Ku03, 1971SkZX, 1973Di18.
γγ–coin: 1954Su12, 1955Fr06, 1958Co61, 1958Kl48, 1961Ha14, 1962Cl03.

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (26.824 h) (continued)

γ(^{166}Er) (continued)

ce(80.6γ): L1:L2=0.0859 *8*, L2:L3=0.962 *9*, M1:M3=0.0744 *22*, M2:M3=0.926 *9*, M45:M3=0.024 *4*, M:M3=2.027 *7*; L3:M3=3.99 *12*, N1:M3=0.024 *3*, N2:M3=0.210 *4*, N3:M3=0.224 *10*, N123:M3=0.458 *11*, O123:M3=0.065 *4*, N123:O123=7.0 *5* (1981Bu24); K:L1:L2:L3:M:M1:M2:M3:N:O= 350 *10*:35 *1*:380 *8*:430 *9*:210 *5*:8.0 *4*:94 *2*:100:42.5 *20*:8.5 *6* (1977Ka30); K:L=0.426 *11* (1968Ni06); L1:L2:L3:M3=87.1 *11*:959 *6*:1000:250 *3* (1966Ka13,1968Ni06); M1:M2:M3:M4:M5=79.0 *18*:934 *8*:1000:10.5 *4*:10.5 *5* (1968Ho19); M:(N+O+P)=3.78 *9* (1968Ni06); N1:N2:N3:N45=85 *28*:90 *7*:1000:10 *8* (1972Dr02); N/O=6.7 *4* (1972Dr02); (M+N)/L=0.320 *3* (1966Da04).

Iγ normalization: weighted average of 0.920 *13* based on %I(81γ)=6.55 *7* (1994Co02) and %I(1379γ)=0.93 *3* (1962Cl03). See comment on 81γ for additional absolute intensity data for that transition.

Eγ†	E(level)	Iγ‡#	Mult.§	δ	α	I(γ+ce)#	Comments
80.576 *2*	80.5775	712 *10*	E2		6.78		α(K)=1.671 *24*; α(L)=3.91 *6*; α(M)=0.954 *14*; α(N+..)=0.241 *4*. α(N)=0.216 *3*; α(O)=0.0251 *4*; α(P)=7.29×10^{-5} *11*. Eγ: from 1992Ar06. Other precise Eγ: 80.557 *4* (1963Ma08 cryst), 80.574 *8* (1962Ha46 cryst.), 80.574 *4* (1965Sc09 cryst.), 80.53 *5* (1960Ma19). Iγ: %Iγ(81)=6.55 *7* (1994Co02). Other %I(81γ): 6.7 *5* (1962Cl03); 6.6 *4* (1981Se09); 6.3 *4* (1966Ne06); 6.1 *4* and 7.2 *6*, respectively, from I(ce(L))/Iβ=0.240 *15* (1966Da04) and I(ce)/Iβ=0.49 *4* (1974Gr41) and E2 theory. Mult.: from α(K)exp=1.72 *6* (1969Ne02), 1.69 *6* (1971Ca08), 1.76 *15* (1960Ma19). M+N/L=0.320 *3* (1966Da04) cf. 0.306 from E2 theory.
184.4 *1*	265.02	0.17 *4*	E2		0.331		α(K)=0.205 *3*; α(L)=0.0965 *14*; α(M)=0.0231 *4*; α(N+..)=0.00590 *9*. α(N)=0.00525 *8*; α(O)=0.000642 *10*; α(P)=9.48×10^{-6} *14*. Eγ: from 1970Re16. Other Eγ: 184.5 *2* (1992Ar06), 184.5 *10* (1977Al27). Iγ: weighted average of 1970Re16, 1977Al27, 1989Ch45.

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^{166}Ho β^- Decay (26.824 h) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ[†]	E(level)	Iγ[‡#]	Mult.[§]	δ	α	I(γ+ce)[#]	Comments
520.8 *4*	785.865	0.037 *4*	E2		0.01482		α(K)=0.01185 *17*; α(L)=0.00231 *4*; α(M)=0.000525 *8*; α(N+..)=0.0001383 *20*. α(N)=0.0001211 *18*; α(O)=1.645×10^{-5} *24*; α(P)=6.58×10^{-7} *10*. Eγ: from 1977Al27. Other Eγ: 520.8 *5* (1992Ar06).
674.188 *15*	1460.025	2.07 *10*					Eγ: weighted average of 674.222 *16* (1992Ar06), 674.08 *10* (1977Al27), 673.99 *4* (1970Re16).
705.334 *22*	785.865	1.49 *8*	E2+M1	−5 *+3−14*	0.00716 *13*		α(K)=0.00588 *11*; α(L)=0.000999 *16*; α(M)=0.000225 *4*; α(N+..)=5.96×10^{-5} *10*. α(N)=5.20×10^{-5} *9*; α(O)=7.24×10^{-6} *12*; α(P)=3.32×10^{-7} *7*. δ: from Adopted Gammas. Eγ: weighted average of 705.352 *26* (1992Ar06), 705.22 *10* (1977Al27), 705.31 *4* (1970Re16).
785.89 *3*	785.865	1.286 *23*	E2		0.00561		α(K)=0.00464 *7*; α(L)=0.000759 *11*; α(M)=0.0001701 *24*; α(N+..)=4.52×10^{-5} *7*. α(N)=3.94×10^{-5} *6*; α(O)=5.52×10^{-6} *8*; α(P)=2.63×10^{-7} *4*. Eγ: weighted average of 785.88 *4* (1992Ar06), 785.9 *1* (1977Al27), 785.89 *4* (1970Re16).
1263.01 *14*	1528.12	0.166 *9*	E2		0.00212		α(K)=0.001774 *25*; α(L)=0.000259 *4*; α(M)=5.73×10^{-5} *8*; α(N+..)=2.84×10^{-5} *4*. α(N)=1.332×10^{-5} *19*; α(O)=1.91×10^{-6} *3*; α(P)=1.011×10^{-7} *15*; α(IPF)=1.309×10^{-5} *19*. Eγ: weighted average of 1262.94 *19* (1992Ar06), 1263.08 *20* (1977Al27).
1379.437 *6*	1460.025	100	E2		0.00181		α(K)=0.001498 *21*; α(L)=0.000216 *3*; α(M)=4.76×10^{-5} *7*; α(N+..)=4.91×10^{-5} *7*. α(N)=1.108×10^{-5} *16*; α(O)=1.591×10^{-6} *23*; α(P)=8.54×10^{-8} *12*; α(IPF)=3.64×10^{-5} *5*. Mult.: from α(K)exp= 1.4×10^{-3} *4* (1974Gr41). Eγ: weighted average of 1379.437 *6* (1992Ar06), 1379.36 *10* (1977Al27), 1379.43 *6* (1970Re16).

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (26.824 h) (continued)

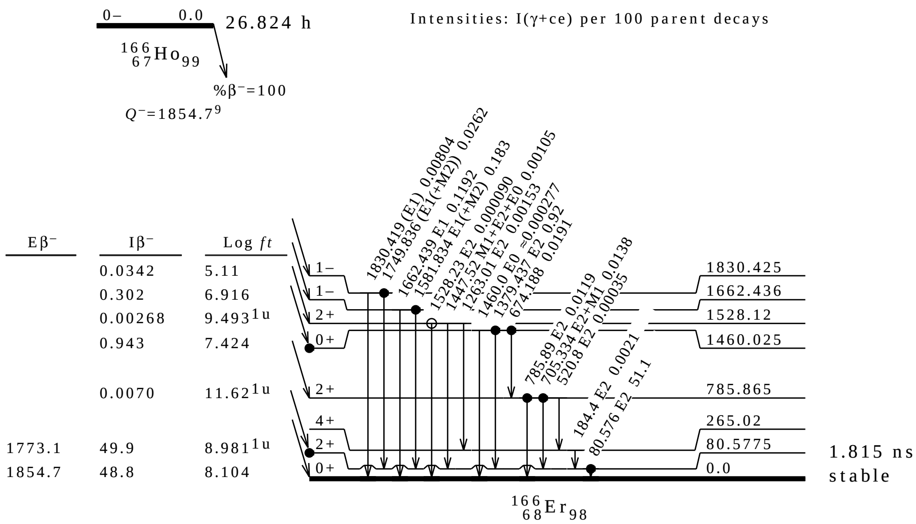
γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡#	Mult.§	δ	α	I(γ+ce)#	Comments
1447.52 *9*	1528.12	0.114 *7*	M1+E2+E0	+0.5 *3*	0.0021 *5*		α(K)=0.0018 *4*; α(L)=0.00025 *6*; α(M)=5.5×10^{-5} *12*; α(N+..)=7.6×10^{-5} *9*. α(N)=1.3×10^{-5} *3*; α(O)=1.8×10^{-6} *4*; α(P)=1.03×10^{-7} *25*; α(IPF)=6.1×10^{-5} *6*. Eγ: weighted average of 1447.5 *1* (1992Ar06), 1447.59 *20* (1977Al27).
1460.0	1460.025		E0			≈0.030	Mult.: no photon was observed; α(K)exp≥0.3 (1974Gr41). Eγ,I(γ+ce): from ce data (1974Gr41). I(ce(K) 1460)/I(ce(K) 1379)=0.2 *1*, so I(ce(K) 1460)=0.030 *15* if α(K)(1379)=0.00150.
1528.23 *15*	1528.12	0.0097 *11*	E2		1.54×10^{-3}		Eγ: from 1992Ar06. Other Eγ: 1528.2 (1977Al27).
1581.834 *7*	1662.436	19.79 *22*	E1(+M2)	−0.027 *27*	8.69×10^{-4} *15*		α(K)=0.000523 *11*; α(L)=6.94×10^{-5} *15*; α(M)=1.52×10^{-5} *4*; α(N+..)=0.000261 *4*. α(N)=3.53×10^{-6} *8*; α(O)=5.11×10^{-7} *11*; α(P)=2.89×10^{-8} *7*; α(IPF)=0.000257 *4*. Mult.: from linear polarization (1969He02). δ: from 1968Fo11. Eγ: weighted average of 1581.833 *7* (1992Ar06), 1581.88 *10* (1977Al27), 1581.89 *8* (1970Re16).
1662.439 *6*	1662.436	12.92 *14*	E1		8.77×10^{-4}		Eγ: 1662.439 *6* (1992Ar06), 1662.53 *10* (1977Al27), 1662.48 *8* (1970Re16).
1749.836 *14*	1830.425	2.84 *4*	(E1(+M2))		0.0023 *15*		Eγ: 1749.833 *14* (1962Cl03), 1749.88 *10* (1977Al27), 1749.94 *10* (1970Re16).
1830.419 *23*	1830.425	0.871 *15*	(E1)		9.20×10^{-4}		Eγ: 1830 *413* 24 (1992Ar06), 1830.46 *10* (1977Al27), 1830.57 *15* (1970Re16).

† Weighted average of data from 1977Al27 and 1970Re16, except as noted.
‡ Weighted average of photon data in table above after elimination of data (denoted there by '@') which are statistical outliers based on the Chauvenet criterion, and excluding data from 1980VyZZ. Uncertainties in I(1379γ) have been added in quadrature to the uncertainties in Iγ of other lines from the same data set before averages were calculated. Other measurements: 1950Si20, 1952Mc05, 1952Mi18, 1954Su12, 1955Fr06, 1955Gr07, 1957Mc34, 1958Co76, 1958Kl48, 1960He09, 1960Ma19, 1961Ha14, 1962El12, 1963Fu17, 1968Da24, 1971Be74.
§ From Adopted Gammas, unless otherwise noted.
\# For absolute intensity per 100 decays, multiply by 0.00922 *12*.

^{166}Ho β^- Decay (26.824 h) (continued)

Decay Scheme



^{166}Ho β^- Decay (1200 y)

Parent ^{166}Ho: E=5.969 *12*; Jπ=7–; $T_{1/2}$=1200 y *180*; Q(g.s.)=1854.7 *9*; %β^- decay=100.

^{166}Er Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0+	stable	
80.574 *4*	2+	1.83 ns *5*	$T_{1/2}$: from γγ(t) (1.83 ns *6* (1963Li04); 1.83 ns *5* (1968Ku03)).
264.987 *5*	4+	118 ps *4*	g=+0.315 *16* (1985Al22). $T_{1/2}$: from γγ(t) (1986Bo36). Other data: 120 ps *8* (1963Li04), 117 ps *7* (1968Ku03).
545.451 *5*	6+		g=+0.258 *11* (1985Al22).
785.933 *11*	2+		
859.384 *6*	3+		
911.204 *7*	8+		g=+0.262 *47* (1985Al22).
956.227 *6*	4+		
1075.271 *6*	5+	≤60 ps	$T_{1/2}$: from γγ(t) (1963Li04).
1215.963 *6*	6+		g=+0.254 *32* (1985Al22).
1376.029 *6*	7+		
1514.0 *3*	3–		
1527.12? *9*	2+		
1555.739 *11*	8+		
1572.177 *8*	(4)–		
1596.232 *8*	(4–)		
1665.795 *7*	5(–)		Jπ: (1120.3γ)(280.45γ)(θ) A_2=–0.103 *32*, A_4=–0.008 *42* is consistent only with 5(D)6(Q)4 spin sequence (1981La27).
1692.292 *7*	5(–)		Jπ: (1146.8γ)(280.45γ) A_2=–0.098 *45*, A_4=–0.06 *7*; and (1427.25γ)(184.41γ)(θ) A_2=–0.089 *45*, A_4=0.00 *3*. The two sets A_2, A_4 are consistent only with 5(D+Q)6(Q)4 spin sequence with δ(1146.8γ)=–0.02 *+7–6* or +9 *+9–6* and 5(D+Q)4(Q)2 spin sequence with δ(1427.25γ)=–0.025 *25* (1981La27).
1786.969 *6*	6–		Jπ: (711.68γ)(280.45γ)(θ) A_2=–0.05 *1*, A_4=–0.02 *2* and (1241.48γ)(280.45γ)(θ) A_2=+0.129 *13*, A_4=0.000 *23* are consistent only with J=6 (1981La27).
1827.552 *7*	6–		

† From least–squares fit to Eγ.
‡ From Adopted Levels, unless otherwise noted.

^{166}Ho β^- Decay (1200 y) (continued)

β^- radiations

Eβ⁻‡	E(level)	Iβ⁻†§	Log *ft*	Comments
(33.1 *9*)	1827.552	17.23 *16*	8.41 *8*	av Eβ=8.38 *24*.
(73.7 *9*)	1786.969	73.9 *10*	8.83 *7*	av Eβ=19.02 *24*.
(168.4 *9*)	1692.292	0.08 *3*	12.91 *18*	av Eβ=45.26 *26*.
(304.9 *9*)	1555.739	0.385 *6*	13.04 *7*	av Eβ=86.32 *29*.
(484.6 *9*)	1376.029	0.58 *24*	13.52 *20*	av Eβ=145.33 *31*.
(644.7 *9*)	1215.963	2.27 *18*	13.35 *8*	av Eβ=201.79 *33*.
(949.5 *9*)	911.204	1.16 *7*	14.23 *7*	av Eβ=316.97 *36*.
(1315.2 *9*)	545.451	3.3 *3*	14.30 *8*	av Eβ=464.67 *38*.

† From level scheme.
‡ For measured values, see 1963Cl02, 1962Ge02, 1959Bo57, 1952Bu18.
§ Absolute intensity per 100 decays.

γ(^{166}Er)

x-rays: (Iγ relative to Iγ(184.4γ)=100.0).

Energy	1988Ch44	1992Wa33	1996Mo11	2002Be04	x-ray
48.22	15.1 *3*	15.9 *4*	14.66 *11*	13.74 *21*	$K\alpha_2$ x ray
49.13	25.4 *4*	26.9 *7*	26.43 *19*	26.9 *4*	$K\alpha_1$ x ray
55.67	7.86 *12*	7.67 *18*	8.32 *7*	8.03 *12*	$K\beta_1$' x ray
56.08	1.94 *4*	1.75 *4*	2.20 *3*	2.08 *4*	$K\beta_2$' x ray

γγ(θ): 1965Re02, 1972Ca42, 1975Ba39, 1981La27, 1981Ka37, 1985Al22, .

Summary of relative intensity data for principal lines:

Reference	80.6γ #	94.7γ	119.0γ	121.2γ	135.3γ	140.7γ
1967Bu14	14.5 *29*	0.16 *3* @	0.7 *5* d		0.1 *1* @	–
1967Gu04	14.55 *45*	–	–	–	–	–
1970Re16	17.1 *5*	0.191 *14*	0.246 *27*	0.36 *4*	0.137 *14*	0.059 *14*
1973La32	14.5 *5*	–	–	0.78 *18*	–	–
1974Li11	16.8 *4*	0.21 *3*	0.23 *3*	0.54 *5* @	–	–
1977Ge12	16.7 *9*	–	–	–	–	–
1978Sa14	17.5 *5*	0.221 *11*	0.222 *11*	0.337 *13*	0.126 *14*	0.059 *9*
1981Ka37		0.217 *24*	–		0.136 *14*	0.045 *14*
1982Bl28	16.56 *8*	–	–	–	–	–
1982So12	17.8 *4*	0.22 *1*	0.27 *2* @	0.45 *2* @	0.14 *1*	0.06 *1*
1986Og03	16.97 *13*	0.20 *1*	0.24 *1*	0.35 *2*	0.14 *1*	0.07 *1*
1988Ad05	17.2 *7*	0.190 *25*	0.243 *12*	0.346 *12*	0.128 *5*	0.060 *3*
1988Ch44	17.2 *2*	–	–	–	–	–
1989Da18	16.59 *31*	–	–	–	–	–
1992Ar06	17.6 *4*	0.23 *3*	0.23 *3*	0.38 *3* @	0.15 *3*	0.07 *1*
1992Wa10	17.00 *22*	0.208 *10*	–	0.307 *11*@	–	–
1992Wa33	16.7 *4*	0.198 *4*	0.236 *5*	0.362 *7*	0.1358 *28*	0.0584 *16*
1994Mi22	16.05 *11*	–	–	–	–	–
1996Mo11	17.18 *11*	0.198 *5*	0.238 *7*	0.343 *11*	0.142 *9*	0.051 *7*
2000Hi01	16.35 *22*	–	–	–	–	–
2002Be04	16.09 *14*	0.187 *3*	0.576 *14* d		0.138 *3*	0.0579 *14*
Recommended	16.62 *12*	0.195 *3*	0.235 *6*	0.350 *5*	0.1364 *19*	0.0584 *10*

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Reference	160.1γ	161.7γ	184.4γ	190.7γ	214.8γ	215.9γ
1967Bu14	0.35 *10* d		100.0	–		3.8 *4* @
1967Gu04	–	–	100.0 *10*	–	4.15 *6* d	
1970Re16	0.134 *14*	0.150 *14*	100 *5*	0.301 *27*	0.75 *10*@	3.55 *27*
1973La32	0.36 *15* @	–	100.0	–	–	–
1974Li11	0.16 *3* @	0.16 *3*	100.0	0.31 *4*	–	–
1977Ge12	–	–	100.0 *31*	–	4.06 *16* d	
1978Sa14	0.109 *8* @	0.135 *8*	100.0 *20*	0.304 *14*	0.586 *20*@	3.54 *10*
1981Ka37	0.132 *13*	0.133 *13*	100.0 *10*	0.305 *16*	0.61 *4*	3.57 *6*
1982Bl28	–	–	100.0	–	–	4.04 *4*
1982So12	0.14 *1*	0.15 *8*	100.0	0.31 *1*	0.61 *2*	3.67 *9*
1986Og03	0.14 *2*	0.15 *2*	100.0	0.33 *2* @	0.61 *2*	3.60 *13*
1988Ad05	0.124 *8* @	0.140 *6*	100.0 *20*	0.291 *9*	4.14 *5* d	
1988Ch44	–	–	100.0 *10*	–	–	–
1989Da18	–	–	100.0 *14*	–	0.602 *48*	3.61 *12*
1992Ar06	0.14 *3*	0.15 *3*	100.0	0.31 *3*	0.61 *4*	3.49 *14*
1992Wa10	0.153 *7* @	–	100.0	–	–	3.59 *4*
1992Wa33	0.139 *3*	0.160 *4*	100.0 *16*	0.273 *6* @	0.671 *13*@	3.60 *6*
1994Mi22	–	–	100.0 *3*	–	–	3.447 *23* @
1996Mo11	0.140 *11*	0.158 *8*	100.0 *5*	0.301 *6*	0.600 *9*	3.566 *19*
2000Hi01	–	–	100.0 *10*	–	–	–
2002Be04	0.266 *6* d		100.0 *6*	0.292 *4*	4.145 *33* d	
Recommended	0.139 *3*	0.150 *4*	100.0	0.297 *3*	0.604 *8*	3.570 *11*

Reference	231.3γ	259.7γ	280.5γ	300.7γ #	304.9γ #	339.8γ
1967Bu14	0.3 *2*	1.8 *5* @	39.5 *28*	4.8 *4*	–	–
1967Gu04	0.32 *5*	1.42 *10*	43.6 *4* @	5.45 *5*	–	–
1970Re16	0.328 *27*	1.50 *8*	40.7 *20*	5.12 *26*	–	0.232 *27*
1973La32	0.36 *3* @	1.77 *12* @	38.6 *5* @	4.77 *9*	–	–
1974Li11	0.31 *4*	1.52 *5*	39.6 *13*	4.92 *12*	–	0.23 *4*
1977Ge12	–	–	40.2 *13*	4.97 *16*	–	–
1978Sa14	0.284 *14*	1.45 *4*	40.8 *12*	5.12 *15*	–	0.234 *15*
1981Ka37	0.289 *12*	1.482 *23*	41.34 *20*	5.165 *27*	–	0.232 *18*
1982Bl28	–	–	41.26 *28*	5.22 *4*	–	–
1982So12	0.30 *1*	1.53 *3*	41.0 *5*	5.17 *8*	–	0.21 *1*
1986Og03	0.33 *3*	1.52 *3*	40.6 *5*	5.11 *8*	0.023 *3*	0.21 *3*
1988Ad05	0.289 *9*	1.47 *4*	40.4 *13*	5.04 *16*	0.030 *3*	0.222 *7*
1989Da18	0.263 *19*	1.502 *40*	40.88 *48*	5.13 *7*	–	–
1992Ar06	0.30 *4*	1.45 *5*	39.8 *9*	4.98 *13*	0.023 *3*	0.22 *3*
1992Wa10	0.283 *6*	1.529 *34*	41.4 *5*	5.34 *6*	–	–
1992Wa33	0.260 *5*	1.507 *23*	41.8 *6*	5.29 *8*	0.020 *10*	0.221 *5*
1994Mi22	–	1.434 *25*	40.63 *11*	5.079 *36*	–	–
1996Mo11	0.293 *5*	1.480 *9*	40.66 *20*	5.118 *26*	0.026 *6*	0.2250 *34*
2000Hi01	–	–	41.02 *41*	–	–	–
2002Be04	0.291 *5*	1.445 *10*	40.36 *21*	5.004 *28*	0.0220 *14*	0.215 *6*
2006Ku03 s	–	1.428 *17*	–	–	0.0310 *12*	0.223 *4*
Recommended	0.286 *3*	1.468 *8*	40.78 *10*	5.13 *3*	0.027 *4* e	0.2221 *21*

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Reference	365.7γ #	410.9γ	451.5γ #	464.8γ #	476.4γ	496.9γ
1967Bu14	2.9 3 @	15.8 12	3.5 7 @	2.0 4	0.4 2 @	–
1967Gu04	3.72 7 @	16.8 2 @	4.30 8	1.66 8	–	–
1970Re16	3.44 18	15.8 8	4.18 20	1.68 11	–	–
1973La32	2.93 6 @	15.50 19	3.48 7 @	2.00 7	–	–
1974Li11	3.25 10	14.8 3	3.84 13	1.50 8	–	–
1977Ge12	3.30 3	15.27 16	3.99 4	–	–	–
1978Sa14	3.33 10	15.25 43	4.02 12	1.65 5	–	–
1981Ka37	3.445 24	15.95 15	4.160 25	1.699 21	–	–
1982Bl28	3.30 3	15.65 10	3.85 5	–	–	–
1982So12	3.49 6	15.9 2	4.17 5	1.67 3	–	0.18 3 @
1986Og03	3.46 6	15.5 4	4.04 11	1.73 7	0.052 6	0.17 1
1988Ad05	3.33 10	15.3 4	4.00 11	1.59 4	0.050 3	0.170 5
1989Da18	3.44 5	15.93 16	4.12 7	1.69 6	–	–
1992Ar06	3.34 9	15.0 4	3.89 13	1.66 7	0.052 7	0.17 3
1992Wa10	3.589 45	16.49 19 @	4.24 6	1.729 35	–	–
1992Wa33	3.51 6	16.02 25	4.11 7	1.73 3	0.0494 24	0.175 3
1994Mi22	3.439 45	15.42 6	4.023 28	2.027 30	–	–
1996Mo11	3.404 17	15.81 9	4.062 37	1.665 17	–	0.174 16
2000Hi01	–	15.73 18	–	–	–	–
2002Be04	3.351 21	15.39 8	4.001 22 d	1.587 11	–	0.168 6
2006Ku03 s	–	–	–	1.619 19	–	–
Recommended	3.400 20	15.56 6	4.04 4 e	1.67 8 e	0.0498 18	0.172 3

Reference	520.9γ	529.8γ #	570.9γ #	594.5γ	611.6γ	615.8γ #
1967Bu14	–	10.3 10 @	6.8 7	1.2 4 @	1.4 10 @	–
1967Gu04	–	13.0 4	7.08 14	0.74 10	1.59 32 @	–
1970Re16	–	13.9 7	7.86 40	0.96 5 @	1.90 11	–
1973La32	–	10.16 32 @	6.77 14	1.28 18 @	1.48 27 @	–
1974Li11	–	12.4 3	7.04 14	0.70 5 @	1.67 9 @	–
1977Ge12	–	12.78 13	7.45 8	–	–	–
1978Sa14	–	13.1 4	7.53 22	0.77 3	1.95 6	–
1981Ka37	–	13.46 7	7.70 8	0.813 27	2.001 27	–
1982Bl28	–	12.48 10	7.22 6	–	–	–
1982So12	0.22 3	13.3 2	7.65 9	0.77 2	1.86 4	–
1986Og03	0.21 1	13.18 34	7.64 20	0.80 9	1.86 12	0.044 13
1988Ad05	0.20 3	12.83 29	7.42 18	0.769 18	1.85 6	0.163 7
1989Da18	0.240 23	13.46 18	7.81 10	0.803 32	1.95 10	–
1992Ar06	0.21 3	12.6 4	7.27 23	0.78 7	1.86 11	0.044 13
1992Wa10	–	13.19 15	7.96 9	0.761 22	2.097 26 @	–
1992Wa33	0.276 13	–	–	–	–	0.138 10
1994Mi22	–	13.38 5	7.50 7	–	1.95 6	–
1996Mo11	0.212 13	13.33 7	7.705 43	0.880 20 @	1.911 34	0.160 10
2000Hi01	–	13.30 15	7.65 11	–	–	–
2002Be04	0.241 7	12.88 7	7.47 4	0.788 8	1.850 22	0.128 6
Recommended	0.227 6	13.14 24 e	7.51 20 e	0.783 7	1.900 18	0.128 17

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Reference	640.0γ	644.7γ #	670.6γ #	691.3γ	705.1γ #	711.7γ #
1967Bu14	–	0.27 15	7.0 7	1.9 4	–	72.5 60
1967Gu04	–	0.31 3 @	7.35 29	1.62 8 @	–	71.5 7
1970Re16	0.22 7 @	0.246 27	7.88 40	2.09 11 @	–	80.2 40 @
1973La32	–	–	7.01 25	1.85 9	–	71.65 68
1974Li11	–	–	6.98 16	1.60 10 @	–	71.1 14
1977Ge12	–	–	7.37 8	1.805 18	–	74.5 8
1978Sa14	0.122 16	0.213 19	7.37 21	1.87 6	–	74.5 22
1981Ka37	0.124 18	0.222 24	7.583 35	1.886 18	–	76.47 27
1982Bl28	–	–	7.28 6	–	–	72.4 4
1982So12	0.12 1	0.19 1	7.53 9	1.87 4	–	75.7 8
1986Og03	0.11 1	0.23 6	7.16 20	1.86 9	0.011 1	75.3 18
1988Ad05	0.124 5	0.186 5	7.32 17	1.79 4	0.025 15	73.8 20
1989Da18	–	–	7.60 9	1.839 40	–	76.4 8
1992Ar06	0.11 2	0.21 4	6.98 22	1.78 9	0.011 2	72.0 19
1992Wa10	–	–	7.72 8	1.87 4	–	77.5 6
1992Wa33	0.137 3	0.206 4	–	–	0.0272 6	–
1994Mi22	–	–	7.618 39	1.914 26	–	76.30 26
1996Mo11	0.138 9	0.189 11	7.563 43	1.862 19	–	76.34 43
2000Hi01	–	–	7.80 12	–	–	77.3 7
2002Be04	0.123 4	0.154 4	7.33 4	1.804 14	–	74.10 28
2006Ku03 s	–	0.2071 29	–	–	–	–
Recommended	0.128 3	0.193 6	7.49 13 e	1.851 11	0.019 8 e	75.2 12 e

Reference	736.7γ	752.3γ #	778.9γ #	785.8γ #	810.3γ #	830.6γ #
1967Bu14	0.45 15	16.1 12	3.8 3	–	76 8	12.5 10
1967Gu04	0.50 5	15.2 3 @	3.88 6	–	76.4 8	12.9 3
1970Re16	0.14 4 @	17.9 10 @	4.51 23	–	85.7 42 @	14.5 8 @
1973La32	0.46 4	16.06 40	3.72 7	–	76.4 8	12.07 25 @
1974Li11	0.45 5	15.98 32	4.16 12	–	75.7 15	12.83 3
1977Ge12	–	16.57 16	4.13 4	–	78.1 8	13.26 13
1978Sa14	0.506 24	16.6 5	4.17 12	–	78.7 22	13.3 4
1981Ka37	0.531 19	16.99 6	4.267 20	–	80.39 30	13.57 6
1982Bl28	–	16.26 12	4.00 3	–	76.9 4	12.99 10
1982So12	0.51 2	17.0 2	4.25 6	–	80.1 8	13.5 2
1986Og03	0.50 4	17.08 43	4.22 14	0.019 4	79.3 18	13.51 35
1988Ad05	0.530 14	16.5 4	4.13 10	0.023 3	78.2 20	13.3 3
1989Da18	0.547 22	16.98 22	4.27 7	–	80.3 11	13.62 18
1992Ar06	0.49 4	16.2 5	4.04 14	0.019 4	76.1 20	12.9 4
1992Wa10	0.510 12	17.16 14	4.28 6	–	80.8 6	13.87 18
1992Wa33	–	–	–	0.0312 10	–	–
1994Mi22	–	16.97 7	4.257 25	–	80.52 29	13.64 7
1996Mo11	0.550 17	16.98 9	4.242 26	–	80.3 4	13.64 7
2000Hi01	–	16.95 21	–	–	80.4 7	13.49 17
2002Be04	0.530 7	16.50 8	4.158 25	–	77.96 41	13.17 7
2006Ku03 s	–	–	–	–	[79.0]	–
Recommended	0.524 5	16.80 17 e	4.16 10 e	0.026 5 e	79.0 15 e	13.1 3 e

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Reference	875.6γ	951.0γ	1010.3γ	1120.4γ	1146.8γ	1241.5γ #
1967Bu14	1.15 *15* @	3.6 *6*	0.1 *1*	–	0.38 *6* @	1.25 *25*
1967Gu04	0.91 *4* @	3.16 *12* @	0.11 *3*	0.26 *2*	0.26 *2*	1.06 *4*
1970Re16	1.08 *8* @	4.15 *20* @	0.123 *14* @	0.314 *27* @	0.301 *27*	1.37 *7* @
1973La32	1.14 *7* @	3.50 *14* @	–	0.30	0.38 *5*	1.22 *5*
1974Li11	1.00 *9*	3.74 *16*	–	–	–	1.17 *12*
1977Ge12	0.979 *10*	3.68 *4*	–	–	0.274 *3*	1.098 *13*
1978Sa14	0.99 *3*	3.71 *11*	0.096 *7*	0.327 *13* @	0.271 *13*	1.14 *3*
1981Ka37	1.026 *12*	3.800 *18*	0.104 *6*	–	0.293 *20*	1.071 *31*
1982Bl28	–	3.65 *4*	–	–	–	–
1982So12	0.99 *4*	3.89 *6*	0.11 *1*	0.35 *1* @	0.30 *1*	1.21 *4*
1986Og03	1.00 *5*	3.87 *12*	0.13 *3* @	0.28 *5*	0.29 *4*	1.21 *6*
1988Ad05	0.987 *24*	3.74 *9*	0.107 *3*	0.268 *6*	0.279 *7*	1.118 *25*
1989Da18	1.002 *21*	3.85 *6*	–	–	0.281 *27*	1.116 *32*
1992Ar06	0.97 *6*	3.68 *12*	0.11 *2*	0.28 *3*	0.27 *3*	1.14 *5*
1992Wa10	1.003 *21*	3.90 *5*	–	–	0.290 *6*	1.211 *10*
1992Wa33	–	–	0.1113 *22*	0.281 *6*	0.289 *6*	–
1994Mi22	–	3.789 *22*	–	–	–	–
1996Mo11	1.016 *17*	3.793 *23*	0.107 *6*	0.278 *10*	0.279 *6*	1.121 *13*
2002Be04	0.994 *10*	3.709 *26*	0.100 *4*	0.260 *4*	0.278 *7*	1.099 *12*
2006Ku03 s	–	–	0.1082 *19*	–	–	–
Recommended	1.003 *7*	3.775 *18*	0.1073 *13*	0.273 *3* e	0.282 *3*	1.15 *6* e

Reference	1282.1γ	1306.6γ #	1331.0γ #	1400.8γ	1427.2γ
1967Bu14	–	–	–	–	0.69 *7*
1967Gu04	0.22 *2*	–	–	0.72 *2*	0.69 *2*
1970Re16	0.314 *27* @	–	–	0.75 *4*	0.81 *4* @
1973La32	0.38 *4* @	–	–	0.86 *5* @	0.65 *3*
1974Li11	0.24 *5*	–	–	–	–
1977Ge12	0.241 *4*	–	–	0.670 *7*	0.666 *10*
1978Sa14	0.246 *12*	–	–	0.686 *21*	0.667 *21*
1981Ka37	0.226 *18*	–	–	0.702 *27*	0.701 *27*
1982So12	0.29 *1*	–	–	0.74 *2*	0.72 *2*
1986Og03	0.28 *4*	0.010 *2*	0.010 *1*	0.76 *4*	0.77 *4* @
1988Ad05	0.240 *8*	0.0044 *4*	0.0051 *6*	0.672 *16*	0.673 *17*
1989Da18	0.271 *18*	–	–	0.720 *25*	0.708 *18*
1992Ar06	0.27 *3*	0.010 *2*	0.010 *2*	0.70 *3*	0.68 *3*
1992Wa10	0.268 *12*	–	–	0.707 *17*	0.705 *28*
1992Wa33	0.263 *5*	0.00615 *23*	0.0025 *10*	–	–
1996Mo11	0.2434 *27*	–	–	0.689 *6*	0.696 *6*
2002Be04	0.255 *6*	–	–	0.697 *10*	0.664 *10*
Recommended	0.256 *4*	0.0076 *15*e	0.0059 *16*	0.697 *5*	0.687 *5*

\# Data for this γ are discrepant (χ^2 exceeds critical value).
@ statistical outlier based on Chauvenet criterion; datum excluded from average.
s Iγ data were reported relative to I(810γ)=80.0; values have been scaled so I(810γ)=79.0, the value adopted here.
d for doublet.
e weighted average with uncertainty expanded to encompass most precise datum.

Iγ normalization: the absolute intensity per decay for the 184γ determined from activity measurements is 0.699 *14* (1989Da18), 0.7258 *22* (1994Mi22), 0.7021 *35* (1996Mo11), 0.724 *7* (2000Hi01), 0.726 *5* (2002Be04). No β^- feeding is expected from the (7)− ^{166}Ho parent to the 0+ g.s., 2+ 80.6 level or the 4+ 265 level. Σ(I(γ+ce) to 265 level) + Σ (I(γ+ce) for crossover transitions to g.s. and 81 level)=100 implies Iγ normalization=0.731 *9* and Σ(I(γ+ce) to 81 level)+I(γ+ce)(786γ)+I(γ+ce)(859γ)=100 implies Iγ normalization=0.723 *6*; the evaluator adopts the weighted average of these two values and the five absolute measurements, viz., 0.720 *4*. However, Σ(I(γ+ce) to g.s.)=100 implies Iγ normalization=0.773 *11* which gives an unphysical intensity imbalance at the 81 level, suggesting that the adopted I(81γ) is too low.

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
(73.45@ *2*)	859.384	0.002@	M1		6.92	α(K)=5.80 *9*; α(L)=0.876 *13*; α(M)=0.194 *3*; α(N+..)=0.0522 *8*. α(N)=0.0453 *7*; α(O)=0.00655 *10*; α(P)=0.000360 *5*.
80.574 *4*	80.574	16.62 *12*	E2		6.78	α(K)=1.671 *24*; α(L)=3.92 *6*; α(M)=0.954 *14*; α(N+..)=0.241 *4*. α(N)=0.216 *3*; α(O)=0.0251 *4*; α(P)=7.29×10^{-5} *11*. Eγ: unweighted average of 80.573 *15* (1970Re16), 80.589 *5* (1975Mo13), 80.572 *15* (1982So12), 80.56 *1* (1986Og03), 80.585 *15* (1988Ad05), 80.566 *3* (1992Wa33), 80.577 *7* (1992Ar06). Weighted average is 80.572 *4*. Iγ: this value appears to be too low; intensity balance at the 81 level requires I(γ+ce)(81γ)=Σ (I(γ+ce) to 81 level)=138.3 *5*, so Iγ(81)=17.78 *21* is expected assuming α(E2 theory)=6.78.
94.674 *3*	1786.969	0.195 *3*	[M1]		3.33	α(K)=2.79 *4*; α(L)=0.419 *6*; α(M)=0.0930 *13*; α(N+..)=0.0250 *4*. α(N)=0.0217 *3*; α(O)=0.00313 *5*; α(P)=0.0001723 *25*. Eγ: weighted average of 94.679 *9* (1992Ar06), 94.672 *2* (1992Wa33), 94.697 *23* (1988Ad05), 94.70 *1* (1986Og03), 94.68 *3* (1982So12), 94.653 *30* (1970Re16). Unweighted average: 94.680 *7*.
(96.85@ *5*)	956.227	0.00307@ *16*	E2		3.32	α(K)=1.9 *8*; α(L)=1.0 *7*; α(M)=0.25 *16*; α(N+..)=0.06 *4*. α(N)=0.06 *4*; α(O)=0.007 *4*; α(P)=0.00010 *6*.

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
119.041 *3*	1075.271	0.235 *6*	(M1+E2)	+1.94 *+23−21*	1.579 *24*	α(K)=0.86 *4*; α(L)=0.556 *19*; α(M)=0.134 *5*; α(N+..)=0.0341 *12*. α(N)=0.0304 *11*; α(O)=0.00366 *12*; α(P)=4.2×10^{-5} *3*. Eγ: weighted average of 119.035 *10* (1992Ar06), 119.040 *2* (1992Wa33); 119.09 *4* (1988Ad05); 119.07 *1* (1986Og03), 119.08 *4* (1982So12), 119.04 *3* (1970Re16). (unweighted average is 119.059 *10*.). Mult.,δ: D+Q from 119γ–876γ(θ) for intraband γ (1996Al31).
121.175 *3*	1786.969	0.350 *5*	[E2]		1.442	α(K)=0.665 *10*; α(L)=0.596 *9*; α(M)=0.1443 *21*; α(N+..)=0.0366 *6*. α(N)=0.0327 *5*; α(O)=0.00388 *6*; α(P)=2.81×10^{-5} *4*. Eγ: weighted average of 121.175 *10* (1992Ar06), 121.174 *2* (1992Wa33), 121.209 *26* (1988Ad05), 121.20 *1* (1986Og03), 121.161 *30* (1970Re16). Other Eγ: 121.30 *10* (1982So12); statistical outlier. Unweighted average: 121.184 *9*.
135.260 *4*	1827.552	0.1364 *19*	[E2]		0.970	α(K)=0.494 *7*; α(L)=0.365 *6*; α(M)=0.0882 *13*; α(N+..)=0.0224 *4*. α(N)=0.0200 *3*; α(O)=0.00239 *4*; α(P)=2.13×10^{-5} *3*. Eγ: weighted average of 135.257 *14* (1992Ar06), 135.259 *4* (1992Wa33), 135.275 *26* (1988Ad05), 135.30 *2* (1986Og03), 135.30 *10* (1982So12), 135.238 *35* (1970Re16). Unweighted average is 135.272 *10*.
140.692 *6*	1215.963	0.0584 *10*	[M1,E2]		0.96 *12*	α(K)=0.67 *23*; α(L)=0.22 *9*; α(M)=0.052 *22*; α(N+..)=0.013 *6*. α(N)=0.012 *5*; α(O)=0.0015 *5*; α(P)=3.7×10^{-5} *19*. Eγ: weighted average of 140.702 *20* (1992Ar06), 140.692 *5* (1992Wa33), 140.73 *4* (1988Ad05), 140.72 *2* (1986Og03), 140.81 *10* (1982So12), 140.62 *4* (1970Re16).

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
160.076 *5*	1376.029	0.129 *8*	[M1,E2]		0.64 *11*	α(K)=0.47 *16*; α(L)=0.13 *4*; α(M)=0.031 *11*; α(N+..)=0.008 *3*. α(N)=0.0072 *24*; α(O)=0.00093 *23*; α(P)=2.6×10^{-5} *13*. Eγ: weighted average of 160.077 *20* (1992Ar06), 160.074 *6* (1992Wa33), 160.09 *3* (1988Ad05), 160.09 *2* (1986Og03), 160.09 *10* (1982So12), 160.06 *5* (1970Re16). Unweighted average is 160.080 *5*.
161.731 *8*	1827.552	0.150 *4*	[M1,E2]		0.62 *11*	α(K)=0.45 *16*; α(L)=0.13 *4*; α(M)=0.030 *10*; α(N+..)=0.0078 *25*. α(N)=0.0069 *23*; α(O)=0.00089 *22*; α(P)=2.5×10^{-5} *12*. Eγ: weighted average of 161.707 *14* (1992Ar06), 161.728 *6* (1992Wa33), 161.78 *3* (1988Ad05), 161.78 *2* (1986Og03), 161.75 *8* (1982So12), 161.75 *5* (1970Re16). Unweighted average is 161.749 *12*.
170.288 *23*	956.227	0.0194 *5*	E2		0.434	α(K)=0.258 *4*; α(L)=0.1348 *19*; α(M)=0.0323 *5*; α(N+..)=0.00825 *12*. α(N)=0.00734 *11*; α(O)=0.000894 *13*; α(P)=1.170×10^{-5} *17*. Eγ: from 1992Wa33. Iγ: weighted average of 0.0192 *11* (1992Wa33) and 0.0195 *6* (2006Ku03, relative to adopted I(810γ)=79.0).

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
184.4113 *24*	264.987	100.0	E2		0.331	α(K)=0.205 *3*; α(L)=0.0964 *14*; α(M)=0.0230 *4*; α(N+..)=0.00590 *9*. α(N)=0.00524 *8*; α(O)=0.000642 *9*; α(P)=9.48×10^{-6} *14*. Iγ: Iγ(%)=69.9 *14* (1989Da18); 70.21 *35* (1996Mo11); 72.58 *22* (1994Mi22); 72.4 *7* (2000Hi01); 72.6 *5* (2002Be04). Eγ: weighted average of 184.407 *15* (1970Re16), 184.415 *6* (1975Mo13), 184.42 *2* (1982So12), 184.41 *1*(1986Og03), 184.405 *15* (1988Ad05), 184.404 *7* (1992Ar06), 184.412 *3* (1992Wa33).
190.762 *15*	1786.969	0.297 *3*	[E2]		0.295	α(K)=0.186 *3*; α(L)=0.0838 *12*; α(M)=0.0200 *3*; α(N+..)=0.00512 *8*. α(N)=0.00455 *7*; α(O)=0.000559 *8*; α(P)=8.66×10^{-6} *13*. Eγ: unweighted average of 190.747 *16* (1992Ar06), 190.746 *3* (1992Wa33), 190.759 *29* (1988Ad05), 190.80 *3* (1986Og03), 190.81 *2* (1982So12), 190.711 *25* (1970Re16). Weighted average is 190.748 *5*.
214.807 *8*	1786.969	0.604 *8*	[E2]		0.199	α(K)=0.1318 *19*; α(L)=0.0516 *8*; α(M)=0.01226 *18*; α(N+..)=0.00315 *5*. α(N)=0.00280 *4*; α(O)=0.000347 *5*; α(P)=6.31×10^{-6} *9*. Eγ: weighted average of 214.79 *3* (1992Ar06), 214.814 *9* (1992Wa33), 214.79 *2* (1986Og03), 214.79 *4* (1982So12), 214.76 *5* (1970Re16). The unweighted average is 214.789 *9*.

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
215.8887 *21*	1075.271	3.570 *11*	[E2]		0.195	α(K)=0.1298 *19*; α(L)=0.0506 *7*; α(M)=0.01201 *17*; α(N+..)=0.00308 *5*. α(N)=0.00274 *4*; α(O)=0.000340 *5*; α(P)=6.23×10^{-6} *9*. Other Iγ: Iγ(119γ)/Iγ(215.8γ)= 0.063 *5* (1969Su07). Eγ: weighted average of 215.871 *10* (1992Ar06), 215.889 *2* (1992Wa33), 215.90 *1* (1986Og03), 215.91 *4* (1982So12), 215.875 *30* (1970Re16).
231.318 *8*	1827.552	0.286 *3*	[E2]		0.1561	α(K)=0.1063 *15*; α(L)=0.0384 *6*; α(M)=0.00909 *13*; α(N+..)=0.00234 *4*. α(N)=0.00208 *3*; α(O)=0.000260 *4*; α(P)=5.18×10^{-6} *8*. Eγ: weighted average of 231.32 *4* (1992Ar06), 231.320 *10* (1992Wa33), 231.322 *26* (1988Ad05), 231.31 *2* (1986Og03). Other Eγ: 231.39 *3* (1982So12), 231.28 *4* (1970Re16) (statistical outliers). Unweighted average: 231.318 *3*.
255.20 *12*	1827.552	0.0059 *13*	[E2]		0.1140	α(K)=0.0801 *12*; α(L)=0.0262 *4*; α(M)=0.00618 *9*; α(N+..)=0.001593 *23*. α(N)=0.001411 *20*; α(O)=0.000178 *3*; α(P)=3.99×10^{-6} *6*. Eγ,Iγ: from 1988Ad05.
259.740 *3*	1215.963	1.468 *8*	[E2]		0.1079	α(K)=0.0761 *11*; α(L)=0.0245 *4*; α(M)=0.00577 *8*; α(N+..)=0.001489 *21*. α(N)=0.001318 *19*; α(O)=0.0001669 *24*; α(P)=3.81×10^{-6} *6*. Other Iγ: Iγ(140.7γ)/Iγ(259.7γ)= 0.037 *9* (1969Su07). Eγ: weighted average of 259.70 *3* (1992Ar06), 259.741 *3* (1992Wa33), 259.717 *18* (1988Ad05), 259.76 *2* (1986Og03), 259.76 *2* (1982So12), 259.716 *20* (1970Re16). Unweighted average is 259.732 *10*.

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
280.464 *2*	545.451	40.78 *10*	E2		0.0849	α(K)=0.0611 *9*; α(L)=0.0183 *3*; α(M)=0.00430 *6*; α(N+..)=0.001112 *16*. α(N)=0.000984 *14*; α(O)=0.0001255 *18*; α(P)=3.11×10^{-6} *5*. Eγ: weighted average of 280.456 *20* (1970Re16); 280.46 *2* (1982So12); 280.46 *1* (1986Og03); 280.450 *26* (1988Ad05); 280.450 *8* (1975Mo13); 280.468 *7* (1992Ar06); 280.465 *2* (1992Wa33). Unweighted average is 280.458 *3*.
300.755 *4*	1376.029	5.13 *3*	E2(+M3)	−0.018 *+15−16*	0.0691 *19*	α(K)=0.0507 *14*; α(L)=0.0143 *4*; α(M)=0.00334 *9*; α(N+..)=0.000866 *25*. α(N)=0.000765 *22*; α(O)=9.8×10^{-5} *3*; α(P)=2.63×10^{-6} *12*. Mult.,δ: from 1985Ma22. Other Iγ: Iγ(160.1γ)/Iγ(300.75γ) =0.032 *4* (1969Su07). Eγ: weighted average of 300.731 *9* (1992Ar06), 300.756 *3* (1992Wa33), 300.730 *24* (1988Ad05), 300.77 *1* (1986Og03), 300.77 *2* (1982So12), 300.744 *20* (1970Re16). Unweighted average is 300.750 *7*.
304.91 *5*	1215.963	0.027 *4*				Eγ: unweighted average of 304.8 *1* (1996Mo11), 305.03 *5* (1992Ar06), 304.86 *7* (1992Wa33), 304.82 *4* (1988Ad05), 305.03 *5* (1986Og03). Data are discrepant. Weighted average is 304.92 *5*.
339.751 *21*	1555.739	0.2221 *21*	(E2)		0.0477	α(K)=0.0358 *5*; α(L)=0.00915 *13*; α(M)=0.00213 *3*; α(N+..)=0.000553 *8*. α(N)=0.000488 *7*; α(O)=6.35×10^{-5} *9*; α(P)=1.89×10^{-6} *3*. Eγ: unweighted average of 339.75 *5* (1992Ar06), 339.807 *10* (1992Wa33, misprinted as 338.807 in table 1), 339.788 *25* (1988Ad05), 339.71 *3* (1986Og03), 339.67 *4* (1982So12), 339.78 *8* (1970Re16). Data are discrepant. Weighted average is 339.789 *17*.

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
365.760 *5*	911.204	3.400 *20*	E2		0.0385	α(K)=0.0293 *5*; α(L)=0.00709 *10*; α(M)=0.001643 *23*; α(N+..)=0.000428 *6*. α(N)=0.000377 *6*; α(O)=4.95×10^{-5} *7*; α(P)=1.562×10^{-6} *22*. Eγ: weighted average of 365.736 *9* (1992Ar06), 365.765 *4* (1992Wa33) 365.741 *22* (1988Ad05) 365.76 *2* (1986Og03), 365.74 *3* (1982So12), 365.739 *25* (1970Re16), 365.777 *16* (1975Mo13).
(410.797[@] *16*)	956.227	0.0231[@] *7*	E2			
410.949 *7*	1786.969	15.56 *6*	E1+M2	−0.010 *5*	0.00873	α(K)=0.00739 *11*; α(L)=0.001047 *15*; α(M)=0.000231 *4*; α(N+..)=6.14×10^{-5} *9*. α(N)=5.34×10^{-5} *8*; α(O)=7.57×10^{-6} *11*; α(P)=3.92×10^{-7} *6*. Unweighted average of Eγ for doublet: 410.950 *8* (1992Ar06), 410.974 *5* (1992Wa33), 410.96 *3* (1988Ad05), 410.95 *1* (1986Og03), 410.92 *2* (1982So12), 410.941 *25* (1970Re16). Weighted average of these data is 410.962 *6*. δ: from 1981Kr12. Other δ: −0.27 *18* (1965Re02); 0.23 *2* (1963Ge09).
[x]449.8 *1*		0.066 *10*				Eγ,Iγ: from 1996Mo11.
451.542 *7*	1827.552	4.04 *4*	E1+M2	−0.0023 *22*	0.00706 *14*	α(K)=0.00598 *11*; α(L)=0.000843 *18*; α(M)=0.000186 *4*; α(N+..)=4.95×10^{-5} *11*. α(N)=4.30×10^{-5} *9*; α(O)=6.12×10^{-6} *13*; α(P)=3.19×10^{-7} *7*. Eγ: weighted average of 451.528 *9* (1992Ar06), 451.554 *6* (1992Wa33), 451.531 *26* (1988Ad05), 451.53 *2* (1986Og03), 451.50 *2* (1982So12), 451.524 *25* (1970Re16). Unweighted average is 451.528 *7*. δ: from 1985Ma22. Other δ: −0.17 *13* (1981Kr12).

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
464.832 *6*	1376.029	1.67 *8*	E2+M1	−63 *+12−19*	0.0200 *4*	α(K)=0.0158 *3*; α(L)=0.00326 *5*; α(M)=0.000747 *12*; α(N+..)=0.000196 *3*. α(N)=0.000172 *3*; α(O)=2.31×10^{-5} *4*; α(P)=8.70×10^{-7} *18*. δ: from 1985Al22. δ data: −80<δ<+30 (1975Ba39); 11 −7+infinity or 0.20 *+14−12* (1981Ka37); (−13 −15+5, neodimium ethyl sulfate; −51 *+21*−Infinity, Ho metal) (1981Kr12); −32 −98+14 (1981La27); −63 *+12−19* (1985Al22); −238 *+152−303* (1985Ma22); −238 +153+320 (1990Ha34; solution includes ∞). Eγ: weighted average of 464.819 *12* (1992Ar06), 464.839 *7* (1992Wa33), 464.825 *20* (1988Ad05), 464.80 *3* (1982So12), 464.83 *4* (1970Re16). Other: 464.76 *2* (1986Og03), statistical outlier. Unweighted average is 464.823 *7*.
476.378 *19*	1692.292	0.050 *3*				Eγ: weighted average of 476.38 *6* (1992Ar06), 476.380 *26* (1992Wa33), 476.37 *4* (1988Ad05), 476.38 *6* (1986Og03). Unweighted average: 476.3775 *25*.
496.923 *8*	1572.177	0.172 *3*	E1		0.00566	α(K)=0.00480 *7*; α(L)=0.000672 *10*; α(M)=0.0001479 *21*; α(N+..)=3.94×10^{-5} *6*. α(N)=3.43×10^{-5} *5*; α(O)=4.88×10^{-6} *7*; α(P)=2.57×10^{-7} *4*. Eγ: weighted average of 497.0 *1* (1996Mo11), 496.86 *4* (1992Ar06), 496.929 *10* (1992Wa33), 496.935 *19* (1988Ad05), 496.86 *4* (1986Og03), 496.88 *5* (1982So12). Unweighted average: 496.911 *22*.

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
520.94 *3*	1596.232	0.227# *6*				Eγ: unweighted average of 520.86 *5* (1982So12), 520.85 *5* (1986Og03), 520.99 *4* (1988Ad05), 521.0 *1* (1989Da18), 520.85 *5* (1992Ar06), 521.041 *25* (1992Wa33), 521.0 *1* (1996Mo11). Data are discrepant. Weighted average is 520.97 *3*. Extremely weak component of 521γ from 786 level will have no significant effect on this Eγ.
520.945 *15*	785.933	0.00041# *8*	E2		0.01481	α(K)=0.01184 *17*; α(L)=0.00230 *4*; α(M)=0.000525 *8*; α(N+..)=0.0001381 *20*. α(N)=0.0001210 *17*; α(O)=1.644×10^{-5} *23*; α(P)=6.58×10^{-7} *10*.
529.807 *11*	1075.271	13.14 *21*	E2+M1	−25 *+4−5*	0.01421	α(K)=0.01139 *16*; α(L)=0.00219 *3*; α(M)=0.000499 *7*; α(N+..)=0.0001316 *19*. α(N)=0.0001152 *17*; α(O)=1.568×10^{-5} *22*; α(P)=6.34×10^{-7} *9*. δ: from 1981La27. Other δ: −85 *+45*–Infinity (1965Re02); −25 *3* (1975Ba39); 158 +infinity−130 (1981Ka37); (−60 −45+19, neodimium ethyl sulfate; −62 −40+17, Ho metal) (1981Kr12); −43 *+5−7* (1990Ha34); . Eγ: weighted average of 529.811 *10* (1992Ar06), 529.835 *18* (1988Ad05), 529.76 *2* (1986Og03), 529.79 *3* (1982So12), 529.81 *3* (1970Re16). Unweighted average is 529.801 *13*.

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
570.976 *18*	1786.969	7.51 *20*	E1+M2	+0.06 *3*	0.0044 *4*	α(K)=0.0038 *3*; α(L)=0.00053 *5*; α(M)=0.000116 *10*; α(N+..)=3.1×10^{-5} *3*. α(N)=2.70×10^{-5} *23*; α(O)=3.9×10^{-6} *4*; α(P)=2.05×10^{-7} *18*. Eγ: unweighted average of 570.940 *10* (1992Ar06), 571.034 *18* (1988Ad05), 570.94 *2* (1986Og03), 570.97 *3* (1982So12), 570.998 *30* (1970Re16); data are discrepant. Weighted average is 570.962 *18*. δ: from 1981Kr12. Other δ: −0.08 *+12−8* (1965Re02).
590.56 *3*	1665.795	0.032 *3*				Eγ: from 1992Wa33. Other: 590.67 *15* (1988Ad05).
594.46 *3*	859.384	0.783 *7*	E2+M1	−12 *2*	0.0109 *4*	α(K)=0.0088 *3*; α(L)=0.00160 *4*; α(M)=0.000361 *8*; α(N+..)=9.54×10^{-5} *21*. α(N)=8.35×10^{-5} *18*; α(O)=1.15×10^{-5} *3*; α(P)=4.95×10^{-7} *17*. δ: from Adopted Gammas. Others: −9 *+5−319* (1975Ba39), −9 *+5*−Infinity (1981La27); (−8 *+3−15*, neodimium ethyl sulfate; −12 −29+5, Ho metal) (1981Kr12); −36 *+32−11* (1990Ha34; sign from table 2, misprinted in table 1). Eγ: unweighted average of 594.536 *24* (1992Ar06), 594.423 *25* (1988Ad05), 594.52 *3* (1986Og03), 594.36 *3* (1982So12), 594.48 *8* (1970Re16). Data are discrepant. Weighted average is 594.47 *3*.
611.555 *26*	1827.552	1.900 *18*	E1+M2	−0.18 *7*	0.0054 *16*	α(K)=0.0046 *13*; α(L)=0.00067 *22*; α(M)=0.00015 *5*; α(N+..)=4.0×10^{-5} *13*. α(N)=3.5×10^{-5} *12*; α(O)=5.0×10^{-6} *17*; α(P)=2.7×10^{-7} *9*. Eγ: unweighted average of 611.620 *17* (1992Ar06), 611.615 *26* (1988Ad05), 611.49 *3* (1986Og03), 611.53 *3* (1982So12), 611.52 *7* (1970Re16). Data are discrepant. Weighted average is 611.583 *26*. δ: from 1981Kr12.

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
615.89 *4*	1572.177	0.128 *17*	(E1(+M2))			Eγ: weighted average of 616.0 *1* (1996Mo11); 615.84 *9* (1992Ar06), 615.85 *5* (1992Wa33), 616.08 *8* (1988Ad05), 615.84 *5* (1986Og03). Unweighted average is 615.92 *5*. Mult.: from Adopted Gammas.
617.0 *5*	1692.292	0.031 *9*				Eγ,Iγ: from deconvolution of doublet (1988Ad05). See also comments on 615.96γ.
640.015 *9*	1596.232	0.128 *3*				Eγ: weighted average of 639.97 *9* (1992Ar06), 640.019 *10* (1992Wa33), 640.003 *24* (1988Ad05), 639.97 *5* (1986Og03); 640.0 *1* (1982So12); unweighted average is 639.992 *10*. Other Eγ: 639.77 *6* (1970Re16); statistical outlier.
644.60 *5*	1555.739	0.193 *6*	E2+M1	+4.9 *+23−11*	0.0092 *3*	α(K)=0.00751 *23*; α(L)=0.00130 *3*; α(M)=0.000294 *7*; α(N+..)=7.78×10^{-5} *18*. α(N)=6.79×10^{-5} *16*; α(O)=9.42×10^{-6} *23*; α(P)=4.25×10^{-7} *15*. δ: from γ(θ), oriented nuclei (Ho metal) (1990Ha34). Other δ: >2 (1975Ba39); δ≤−1 or δ≥+4 (1981Kr12); δ>+1.4 or δ<−6 (1981La27). Eγ: unweighted average of 644.689 *15* (1992Ar06), 644.570 *8* (1992Wa33), 644.598 *26* (1988Ad05), 644.78 *5* (1986Og03), 644.51 *6* (1982So12), 644.45 *10* (1970Re16). Data are discrepant. Weighted average: 644.598 *24*.

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^{166}Ho β⁻ Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
670.516 *14*	1215.963	7.49 *13*	E2+M1	+10.0 *+16−12*	0.00805 *13*	α(K)=0.00659 *11*; α(L)=0.001140 *17*; α(M)=0.000257 *4*; α(N+..)=6.81×10^{-5} *10*. α(N)=5.95×10^{-5} *9*; α(O)=8.24×10^{-6} *13*; α(P)=3.72×10^{-7} *6*. δ: from 1981Kr12. δ data: (76 +infinity−71 or 1.6 *+11−3* (1981Ka37)); (+10.0 *+16−12*, Ho metal; +9.4 *+29−16*, crystal of neodymium ethyl sulfate) (1981Kr12); +25 *+17−7* (1985Ma22 and 1990Ha34); however, −20 *+9−90* (1975Ba39 and 1981La27). Eγ: unweighted average of 670.565 *12* (1992Ar06), 670.525 *21* (1988Ad05), 670.49 *2* (1986Og03), 670.49 *2* (1982So12), 670.51 *4* (1970Re16). Data are discrepant. Weighted average is 670.531 *17*.
691.251 *16*	956.227	1.851 *11*	E2+M1	−3.3 *+12−30*	0.0080 *6*	α(K)=0.0066 *5*; α(L)=0.00110 *6*; α(M)=0.000248 *12*; α(N+..)=6.6×10^{-5} *4*. α(N)=5.7×10^{-5} *3*; α(O)=8.0×10^{-6} *5*; α(P)=3.7×10^{-7} *3*. δ: from Adopted Gammas. δ from β⁻ decay: −10 *+4−27* (1975Ba39); 3.8 *+34−12* or 0.61 *+18−14* (1981Ka37); −16 −27+4 (1981La27); −16 *+9*−Infinity (1981Kr12); +566 −522−616 (1990Ha34; solution includes ∞). Eγ: unweighted average of 691.304 *12* (1992Ar06), 691.260 *18* (1988Ad05), 691.24 *3* (1986Og03), 691.24 *3* (1982So12), 691.21 *5* (1970Re16). Weighted average is 691.279 *15*.

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
705.24 *7*	785.933	0.019 *8*	E2+M1	−5 *+3−14*	0.00716 *13*	α(K)=0.00588 *11*; α(L)=0.000999 *16*; α(M)=0.000225 *4*; α(N+..)=5.96×10^{-5} *10*. α(N)=5.20×10^{-5} *9*; α(O)=7.24×10^{-6} *12*; α(P)=3.33×10^{-7} *7*. Mult.,δ: from Adopted Gammas. Eγ: weighted average of 705.09 *7* (1992Ar06), 705.34 *4* (1992Wa33); 706.2 *9* (1988Ad05); 705.09 *7* (1986Og03). Data are discrepant. Unweighted average is 705.4 *3*.
711.681 *6*	1786.969	75.2 *12*	E1(+M2)	+0.002 *3*	0.00264	α(K)=0.00225 *4*; α(L)=0.000309 *5*; α(M)=6.77×10^{-5} *10*; α(N+..)=1.81×10^{-5} *3*. α(N)=1.573×10^{-5} *22*; α(O)=2.26×10^{-6} *4*; α(P)=1.223×10^{-7} *18*. Eγ: weighted average of 711.680 *8* (1992Ar06), 711.701 *24* (1988Ad05), 711.68 *1* (1986Og03), 711.68 *2* (1982So12), 711.69 *4* (1970Re16). Unweighted average: 711.686 *4*. δ: from 1981Kr12. Other δ: −0.024 *29* (1965Re02); +0.01 *2* (1981La27); 0.06 *+11−6* (1963Ge09).
(712.89 *13*)	1572.177	0.380 *12*	E1		0.00264	α(K)=0.00224 *4*; α(L)=0.000308 *5*; α(M)=6.75×10^{-5} *10*; α(N+..)=1.80×10^{-5} *3*. α(N)=1.568×10^{-5} *22*; α(O)=2.25×10^{-6} *4*; α(P)=1.219×10^{-7} *17*. From ^{166}Tm ε decay. Iγ calculated from Iγ(712.89γ):Iγ(496.88γ)= (2.19 *4*):(0.99 *2*) (^{166}Tm ε decay) and I(496.88γ)=0.172 *3*.
736.02 *8*	1692.292	0.17 *3*				Eγ: from deconvolution of doublet (1988Ad05). Iγ: see comment on 737γ from 1596 level. Doublet intensity has been suitably divided.

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
736.83 *3*	1596.232	0.351 *18*	E1		0.00247	α(K)=0.00210 *4*; α(L)=0.000287 *5*; α(M)=6.31×10^{-5} *11*; α(N+..)=1.69×10^{-5} *3*. α(N)=1.465×10^{-5} *24*; α(O)=2.10×10^{-6} *4*; α(P)=1.142×10^{-7} *19*. Iγ: from I(640γ) here and I(737γ)/I(640γ)=2.74 *12* in ε decay (where the 737γ is not a doublet), I(737γ from 1596 level)=0.351 *18*. From table above, Iγ=0.524 *5* for doublet, so Iγ(737γ from 1692 level) is 0.17 *3*. δ: from Adopted Gammas. Eγ: from 1988Ad05. Others did not deconvolute observed doublet. Eγ for doublet: 736.70 *7* (1992Ar06), 736.653 *27* (1988Ad05), 736.65 *4* (1986Og03), 736.68 *5* (1982So12), 736.67 *8* (1970Re16); weighted average 736.661 *19*, unweighted average 736.671 *9*.
752.313 *12*	1827.552	16.80 *17*	E1(+M2)	+0.005 *4*	0.00237	α(K)=0.00201 *3*; α(L)=0.000276 *4*; α(M)=6.04×10^{-5} *9*; α(N+..)=1.617×10^{-5} *23*. α(N)=1.404×10^{-5} *20*; α(O)=2.02×10^{-6} *3*; α(P)=1.097×10^{-7} *16*. Eγ: weighted average of 752.332 *10* (1992Ar06), 752.281 *19* (1988Ad05), 752.30 *2* (1986Og03), 752.27 *3* (1982So12), 752.27 *4* (1970Re16). Unweighted average is 752.291 *12*. δ: from 1981Kr12. Other δ: 0.00 *2* (1981La27).

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
778.839 *11*	859.384	4.16 *10*	E2+M1	−20 *+2−4*	0.00574 *9*	α(K)=0.00474 *7*; α(L)=0.000778 *11*; α(M)=0.0001744 *25*; α(N+..)=4.63×10^{-5} *7*. α(N)=4.04×10^{-5} *6*; α(O)=5.66×10^{-6} *8*; α(P)=2.69×10^{-7} *4*. δ: from 1981Kr12. δ from β^- decay: −18 *+9−∞* (1975Ba39); (−20 *+2−4* Ho metal; −18 −8+5, neodimium ethyl sulfate) (1981Kr12); −19 *+10*−Infinity (1981La27); −45 *+8−13* (1985Ma22 and 1990Ha34). Note that data from 1981Kr12 and 1990Ha34 do not overlap, however. Eγ: weighted average of 778.862 *12* (1992Ar06), 778.818 *18* (1988Ad05), 778.82 *2* (1986Og03), 778.81 *3* (1982So12), 778.82 *4* (1970Re16). Unweighted average is 778.826 *9*.
785.94 *3*	785.933	0.026 *5*	E2		0.00561	α(K)=0.00464 *7*; α(L)=0.000759 *11*; α(M)=0.0001701 *24*; α(N+..)=4.52×10^{-5} *7*. α(N)=3.94×10^{-5} *6*; α(O)=5.52×10^{-6} *8*; α(P)=2.63×10^{-7} *4*. Eγ: weighted average of 785.81 *7* (1992Ar06); 785.955 *17* (1992Wa33); 785.90 *7* (1988Ad05); 785.81 *7* (1986Og03). Unweighted average is 785.87 *4*.

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
810.293 *10*	1075.271	79.0 *15*	E2+M1	−21.2 *+18−21*	0.00526	α(K)=0.00436 *7*; α(L)=0.000706 *10*; α(M)=0.0001580 *23*; α(N+..)=4.20×10^{-5} *6*. α(N)=3.66×10^{-5} *6*; α(O)=5.14×10^{-6} *8*; α(P)=2.47×10^{-7} *4*. Eγ: unweighted average of 810.325 *10* (1992Ar06), 810.282 *16* (1988Ad05), 810.27 *1* (1986Og03), 810.28 *2* (1982So12), 810.31 *4* (1970Re16). Data are discrepant; weighted average is 810.294 *12*. δ: from 1990Ha34. Other δ: −37 −10+7 (1965Re02); −20 *4* (1975Ba39); 24 *+54−10* (1981Ka37); −20 *+3−4* (1981La27); (−15 *1*,neodimium ethyl sulfate; −21 *2* Ho metal) (1981Kr12); −36 *+7−11* (1985Al22); 1963Ge09.
830.585 *9*	1376.029	13.1 *3*	E2+M1	−16.6 *+15−18*	0.00499	α(K)=0.00414 *6*; α(L)=0.000665 *10*; α(M)=0.0001487 *21*; α(N+..)=3.96×10^{-5} *6*. α(N)=3.45×10^{-5} *5*; α(O)=4.85×10^{-6} *7*; α(P)=2.35×10^{-7} *4*. δ: from 1981Kr12. Other δ: −70 −260+30 (1965Re02); −22 *+5−7* (1975Ba39); 63 −44+infinity (1981Ka37); −22 −7+5 (1981La27); (−16.6 −18+15, neodimium ethyl sulfate; −23 *4*, Ho metal) (1981Kr12); −18 *+2−3* (1985Al22); −17.3 *+13−15* (1990Ha34); 1963Ge09. Eγ: weighted average of 830.601 *15* (1992Ar06), 830.583 *18* (1988Ad05), 830.58 *2* (1986Og03), 830.57 *2* (1982So12), 830.56 *4* (1970Re16). Unweighted average is 830.579 *7*.
859.3 *1*	859.384	0.049 *10*				Eγ: from 1996Mo11. Iγ: weighted average of 0.044 *14* (1996Mo11) and 0.055 *14* (2002Be04). Placement from 1996Mo11.

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^{166}Ho β^- Decay (1200 y) (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡&	Mult.§	δ	α	Comments
875.650 *15*	956.227	1.003 *7*	E2		0.00444	α(K)=0.00369 *6*; α(L)=0.000584 *9*; α(M)=0.0001305 *19*; α(N+..)=3.47×10^{-5} *5*. α(N)=3.03×10^{-5} *5*; α(O)=4.27×10^{-6} *6*; α(P)=2.10×10^{-7} *3*. Eγ: weighted average of 875.63 *5* (1992Ar06), 875.658 *21* (1988Ad05), 875.69 *4* (1986Og03), 875.60 *4* (1982So12), 875.64 *5* (1970Re16). Unweighted average is 875.644 *15*.
950.964 *9*	1215.963	3.775 *18*	E2		0.00373	α(K)=0.00311 *5*; α(L)=0.000482 *7*; α(M)=0.0001074 *15*; α(N+..)=2.86×10^{-5} *4*. α(N)=2.49×10^{-5} *4*; α(O)=3.53×10^{-6} *5*; α(P)=1.771×10^{-7} *25*. Eγ: weighted average of 950.963 *10* (1992Ar06), 950.955 *28* (1988Ad05), 950.97 *3* (1986Og03), 951.00 *4* (1982So12), 950.94 *6* (1970Re16).
1010.288 *11*	1555.739	0.1073 *13*	E2		0.00329	α(K)=0.00275 *4*; α(L)=0.000420 *6*; α(M)=9.35×10^{-5} *13*; α(N+..)=2.49×10^{-5} *4*. α(N)=2.17×10^{-5} *3*; α(O)=3.08×10^{-6} *5*; α(P)=1.567×10^{-7} *22*. Eγ: weighted average of 1010.27 *6* (1992Ar06), 1010.290 *13* (1992Wa33), 1010.302 *26* (1988Ad05), 1010.27 *6* (1986Og03), 1010.25 *5* (1982So12), 1010.25 *10* (1970Re16). Unweighted average is 1010.272 *9*.
1120.330 *11*	1665.795	0.273 *3*				Eγ: weighted average of 1120.35 *5* (1992Ar06), 1120.329 *14* (1992Wa33), 1120.324 *28* (1988Ad05), 1120.35 *5* (1986Og03), 1120.33 *4* (1982So12), 1120.31 *7* (1970Re16). Unweighted average: 1120.332 *6*. δ(D,Q)=0.00 +*3*–*5* (1981La27).

Continued on next page (footnotes at end of table)

^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
1146.825 *12*	1692.292	0.282 *3*				δ(D,Q)=−0.02 *+7−6* or +9 *+9−6* (1981La27). Eγ: weighted average of 1146.81 *9* (1992Ar06), 1146.818 *15* (1992Wa33), 1146.84 *4* (1988Ad05), 1146.83 *5* (1986Og03), 1146.86 *4* (1982So12); 1146.82 *7* (1970Re16). Unweighted average: 1146.830 *7*.
1241.500 *14*	1786.969	1.15 *6*	E1+M2	+0.21 *5*	0.00129 *17*	α(K)=0.00107 *14*; α(L)=0.000147 *21*; α(M)=3.2×10^{-5} *5*; α(N+..)=4.70×10^{-5} *8*. α(N)=7.5×10^{-6} *11*; α(O)=1.09×10^{-6} *16*; α(P)=6.1×10^{-8} *9*; α(IPF)=3.83×10^{-5} *10*. Eγ: weighted average of 1241.52 *2* (1992Ar06), 1241.484 *28* (1988Ad05); 1241.47 *4* (1986Og03), 1241.51 *4* (1982So12), 1241.44 *6* (1970Re16). Unweighted average is 1241.485 *14*. δ: from 1981La27. Other δ: −0.09 *6* (1965Re02); +0.21 *12* (1981La27).
1261.98[a] *12*	1527.12?	0.010 *1*				Eγ,Iγ: from 1986Og03. Note that adopted Eγ=1263.412 *16* and that adopted Iγ is comparable to that of 1447γ.
1282.058 *15*	1827.552	0.256 *4*	E1+M2	0.20 *11*	0.0012 *4*	α(K)=0.0010 *3*; α(L)=0.00013 *5*. Eγ: weighted average of 1282.06 *6* (1992Ar06), 1282.050 *19* (1992Wa33), 1282.08 *4* (1988Ad05), 1282.06 *6* (1986Og03), 1282.07 *4* (1982So12). Unweighted average is 1282.064 *5*. Other Eγ: 1282.12 *7* (1970Re16); statistical outlier. δ: from 1981La27.
1306.74 *24*	1572.177	0.0076 *15*				Eγ: unweighted average of 1306.60 *15* (1992Ar06), 1306.90 *3* (1992Wa33), 1307.30 *8* (1988Ad05) and 1306.16 *15* (1986Og03). (weighted average is 1306.91 *11*.).
1331.17 *11*	1596.232	0.0059 *16*				Eγ: weighted average of 1331.04 *13* (1992Ar06), 1331.5 *5* (1992Wa33), 1331.45 *14* (1988Ad05), 1331.04 *13* (1986Og03). Unweighted average is 1331.26 *13*.

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^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}$Er) (continued)

Eγ[†]	E(level)	Iγ[‡&]	Mult.[§]	δ	α	Comments
1400.770 *15*	1665.795	0.697 *5*	E1(+M2)	+0.025 *+18−26*	8.81×10^{-4} *14*	δ: from Adopted Gammas. Other δ: +0.05 *+5−7* (1981La27). Eγ: weighted average of 1400.79 *2* (1992Ar06), 1400.75 *4* (1988Ad05); 1400.76 *5* (1986Og03); 1400.73 *4* (1982So12), 1400.72 *8* (1970Re16). Unweighted average is 1400.750 *12*.
1427.227 *21*	1692.292	0.687 *5*	E1(+M2)	−0.002 *+22−31*	8.72×10^{-4} *14*	α(K)=0.000620 *10*; α(L)=8.24×10^{-5} *14*; α(M)=1.80×10^{-5} *3*; α(N+..)=0.0001513 *22*. α(N)=4.19×10^{-6} *7*; α(O)=6.07×10^{-7} *11*; α(P)=3.41×10^{-8} *6*; α(IPF)=0.0001465 *21*. Mult.,δ: from Adopted Levels. Other δ: −0.025 *25* (1981La27). Eγ: weighted average of 1427.24 *2* (1992Ar06), 1427.24 *6* (1988Ad05), 1427.17 *5* (1986Og03), 1427.25 *4* (1982So12), 1427.05 *8* (1970Re16). Unweighted average: 1427.19 *4*.
1433.42 *25*	1514.0	0.00054 *25*	E1+M2	+0.054 *+19−27*	8.70×10^{-4}	α(K)=0.000615 *9*; α(L)=8.18×10^{-5} *12*; α(M)=1.79×10^{-5} *3*; α(N+..)=0.0001555 *22*. α(N)=4.16×10^{-6} *6*; α(O)=6.03×10^{-7} *9*; α(P)=3.39×10^{-8} *5*; α(IPF)=0.0001507 *22*. Eγ,Iγ: from 1992Wa33.
1446.72[a] *13*	1527.12?	≤0.01				Eγ: from 1986Og03; 1446.7 *2* from 1992Ar06. Iγ: from 1992Ar06 and 1986Og03.
1521.86 *5*	1786.969	0.0224 *8*				Eγ: from 1992Wa33; measured using 50 mm thick Pb filter. Iγ: from 1992Wa33. Other Iγ: 0.018 *5* (1988Ad12).
1562.31 *14*	1827.552	0.0047 *4*				Eγ: from 1992Wa33; measured with 50 mm thick Pb filter. Iγ: from 0.0047 *4* (1992Wa33). Other Iγ: 0.0040 *11* (1988Ad12).

† From indicated data of 1970Re16 (semi γ), 1982So12 (semi γ), 1986Og03 (HPGe γ), 1988Ad05 (Ge(Li) anti–compt), 1992Ar06 (HPGe, LEPS), 1992Wa33 (HPGe), unless otherwise noted. Others: 1996Mo11, 1975Mo13, 1973La32, 1967Bu14, 1967Gu04.

‡ Relative intensity normalized so I(184γ)=100. Adopted values are weighted averages of data tabulated above excluding all data identified as statistical outliers based on the Chauvenet criterion, unless noted to the contrary. Uncertainties in the 184γ reference line were combined in quadrature with with the uncertainties in other data from that measurement prior to averaging, where relevant. Data from 1967Bu14, 1967Gu04, 1970Re16, 1973La32, 1974Li11, 1977Ge12, 1978Sa14, 1981Ka37, 1982Bl28, 1982So12, 1986Og03, 1988Ad05, 1988Ch44, 1989Da18 (see also 1988DaZX), 1992Ar06, 1992Wa10, 1992Wa33, 1994Mi22, 2000Hi01, 2002Be04 and 2006Ku03 were considered. Other measurements: 1973Ko13, 1965Re02, 1963Ge09.

Footnotes continued on next page

^{166}Ho β^- Decay (1200 y) (continued)

$\gamma(^{166}Er)$ (continued)

§ From Adopted Gammas.

The recommended I(521γ)=0.227 *6* is for a doublet. Based on I(786γ+705γ)=0.045 *9* here and the adopted 786 level branching of I(521γ)/I(786γ+705γ)=0.00911 *25*, I(521γ from 786 level)=0.00041 *8* is expected in this decay. This represents a negligible fraction of the doublet intensity, so I(521γ from 1596 level)=0.227 *6* is adopted.

@ Eγ and branching assumed from Adopted Gammas.

& For absolute intensity per 100 decays, multiply by 0.720 *4*.

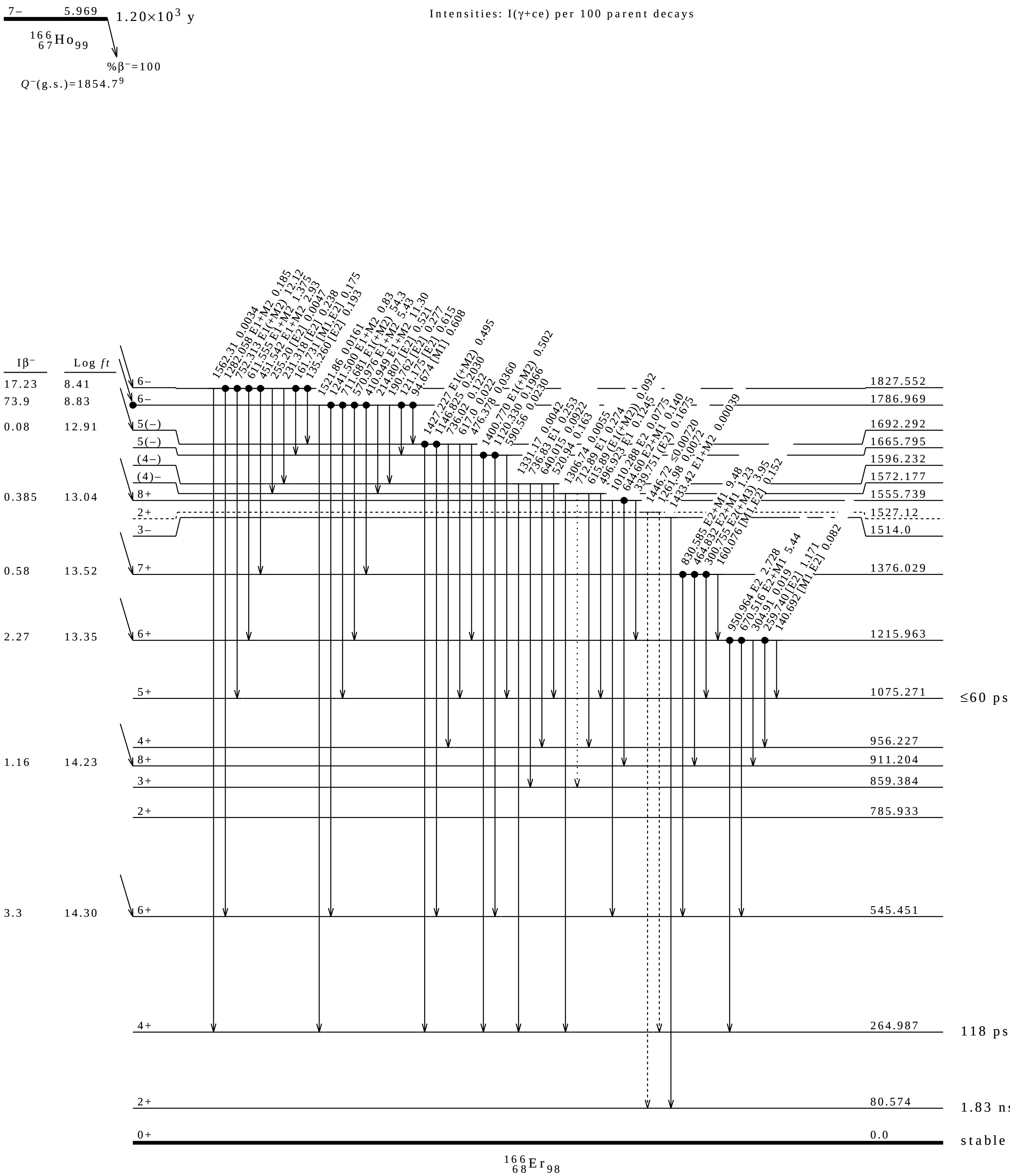
a Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

^{166}Ho β^- Decay (1200 y) (continued)

Decay Scheme

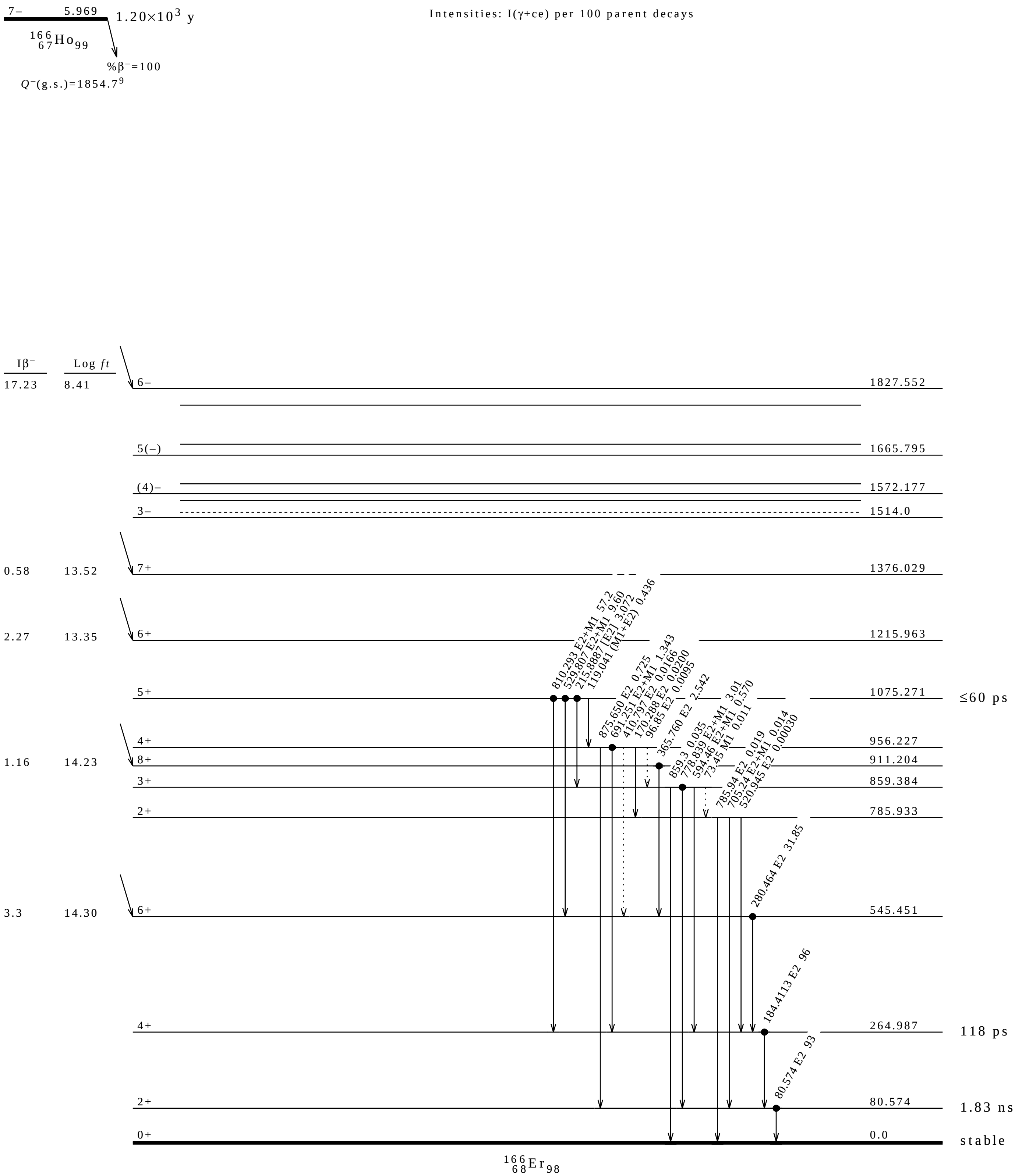
Intensities: I(γ+ce) per 100 parent decays



^{166}Ho β⁻ Decay (1200 y) (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Tm ε Decay 1989Ad11

Parent ^{166}Tm: E=0.0; Jπ=2+; $T_{1/2}$=7.70 h *3*; Q(g.s.)=3038 *12*; %ε+%β^+ decay=100.
Data are from 1989Ad11, unless otherwise noted. Other measurements: 1995KrZX (and 1996KrZW), 1993AdZY, 1993BaZS, 1980Pe15, 1979Ad06, 1974Ar28, 1961Ha23, 1961Gr33, 1966Zy01, 1973De22, 1970Re16, 1967Bu14, 1968Mi13, 1959Ba12, 1959Bo57, 1959Br17, 1960Ja08, 1960Wi12, 1961Bo15, 1962Gr29, 1964Pr02, 1969Ar23.

^{166}Er Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0	0+	1978.432 *16*	(4)+	2382.27 *4*	(3)+
80.581 *11*	2+	1985.644 *16*	3−	2393.14 *3*	2+,3+
264.985 *13*	4+	2001.874 *16*	(3)−	2413.68 *8*	(2,3,4)
545.444 *16*	6+	2021.359 *16*	(2,3)−	2435.11 *10*	(3,4)+
785.917 *11*	2+	2022.62 *12*	(4+)	2444.16 *24*	
859.399 *12*	3+	2046.88 *4*	2+,3+	2464.52 *10*	1+
956.240 *12*	4+	2076.305 *22*	(3−)	2475.40 *4*	(1,2+)
1075.281 *12*	5+	2101.6 *3*	(4+)	2542.88 *5*	
1458.164 *14*	(2)−	2117.8 *8*	(2+,3,4+)	2586.07 *12*	(3,4)+
1513.760 *14*	3−	2132.951 *12*	3+	2600.64 *4*	1+
1528.404 *14*	2+	2160.121 *14*	3+	2613.50 *17*	
1572.206 *14*	(4)−	2172.757 *20*	3+	2619.6 *6*	(2+)
1596.263 *17*	(4)−	2212.97 *12*		2624.8 *3*	(1,2)
1662.32 *6*	1−	2215.972 *16*	2−,3−	2628.5 *3*	(1,2)
1678.77 *3*	(4)+	2243.099 *23*	3−	2632.66 *17*	(3,4)+
1703.057 *20*	(2,3,4)+	2260.66 *3*	2(+),3	2671.98 *17*	
1813.2 *3*	1(+)	2264.31 *6*	(1,2+)	2679.05 *18*	1+
1830.42 *4*	1−	2273.01 *3*	3−	2729.094 *20*	(3,4)+
1865.17 *5*		2282.68 *5*	2(+),3	2783.69 *19*	1+
1894.364 *23*	2+,3+,4+	2290.997 *25*	(3)+	2797.5 *4*	(1,2)
1917.767 *13*	3−	2328.69 *9*	(1,2)	2811.99 *11*	1
1938.273 *15*	(3)+	2352.91 *8*	2(+),3	2858.17 *18*	(1,2)
1969.71 *17*	(2,3,4)	2377.77 *5*	1+		

† From least−squares fit to Eγ, omitting the 646.8γ from the 2160 level and all three placements for the 1216.173γ because these transitions have Eγ values that deviate from the expected value by at least 5σ.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)	$I\beta^+$‡	Iε†‡	Log *ft*	$I(\varepsilon+\beta^+)$‡	Comments
(180 *12*)	2858.17		0.0031 *4*	8.28 *10*	0.0031 *4*	εK=0.724 *13*; εL=0.209 *10*; εM+=0.067 *4*.
(226 *12*)	2811.99		<0.025	>7.6	<0.025	εK=0.756 *7*; εL=0.186 *5*; εM+=0.0588 *18*.
(241 *12*)	2797.5		0.0035 *5*	8.55 *9*	0.0035 *5*	εK=0.762 *6*; εL=0.181 *4*; εM+=0.0570 *15*.
(254 *12*)	2783.69		0.0121 *17*	8.07 *8*	0.0121 *17*	εK=0.768 *5*; εL=0.177 *4*; εM+=0.0555 *13*.
(309 *12*)	2729.094		0.358 *25*	6.81 *5*	0.358 *25*	εK=0.783 *3*; εL=0.1654 *21*; εM+=0.0514 *8*.
(359 *12*)	2679.05		0.070 *8*	7.67 *6*	0.070 *8*	εK=0.7924 *20*; εL=0.1586 *15*; εM+=0.0489 *6*.
(366 *12*)	2671.98		0.0075 *10*	8.66 *7*	0.0075 *10*	εK=0.7935 *19*; εL=0.1579 *14*; εM+=0.0487 *5*.
(405 *12*)	2632.66		0.019 *6*	8.35 *14*	0.019 *6*	εK=0.7986 *15*; εL=0.1541 *11*; εM+=0.0473 *4*.
(410 *12*)	2628.5		0.0056 *8*	8.90 *7*	0.0056 *8*	εK=0.7991 *14*; εL=0.1537 *11*; εM+=0.0472 *4*.
(413 *12*)	2624.8		0.0057 *7*	8.90 *6*	0.0057 *7*	εK=0.7995 *14*; εL=0.1534 *10*; εM+=0.0471 *4*.
(418 *12*)	2619.6		0.008 *3*	8.76 *17*	0.008 *3*	εK=0.8001 *14*; εL=0.1530 *10*; εM+=0.0469 *4*.
(425 *12*)	2613.50		0.0051 *6*	8.97 *6*	0.0051 *6*	εK=0.8007 *13*; εL=0.1526 *10*; εM+=0.0467 *4*.
(437 *12*)	2600.64		0.12 *6*	7.63 *22*	0.12 *6*	εK=0.8020 *12*; εL=0.1516 *9*; εM+=0.0464 *4*.
(452 *12*)	2586.07		0.023 *14*	8.4 *3*	0.023 *14*	εK=0.8033 *11*; εL=0.1506 *9*; εM+=0.0460 *3*.
(495 *12*)	2542.88		0.077 *9*	7.94 *6*	0.077 *9*	εK=0.8068 *9*; εL=0.1481 *7*; εM+=0.04513 *24*.
(563 *12*)	2475.40		0.082 *7*	8.04 *5*	0.082 *7*	εK=0.8110 *7*; εL=0.1449 *5*; εM+=0.04402 *18*.
(573 *12*)	2464.52		0.037 *3*	8.40 *4*	0.037 *3*	εK=0.8116 *7*; εL=0.1445 *5*; εM+=0.04387 *17*.
(594 *12*)	2444.16		0.024 *5*	8.62 *10*	0.024 *5*	εK=0.8126 *6*; εL=0.1438 *5*; εM+=0.04360 *16*.
(603 *12*)	2435.11		0.090 *14*	8.06 *7*	0.090 *14*	εK=0.8131 *6*; εL=0.1435 *5*; εM+=0.04349 *15*.
(624 *12*)	2413.68		0.058 *8*	8.29 *7*	0.058 *8*	εK=0.8140 *6*; εL=0.1428 *4*; εM+=0.04324 *14*.
(645 *12*)	2393.14		0.250 *19*	7.68 *4*	0.250 *19*	εK=0.8149 *5*; εL=0.1421 *4*; εM+=0.04301 *13*.
(656 *12*)	2382.27		0.138 *11*	7.96 *4*	0.138 *11*	εK=0.8153 *5*; εL=0.1418 *4*; εM+=0.04290 *13*.
(660 *12*)	2377.77		0.195 *12*	7.81 *4*	0.195 *12*	εK=0.8155 *5*; εL=0.1417 *4*; εM+=0.04286 *13*.
(685 *12*)	2352.91		0.025 *4*	8.74 *8*	0.025 *4*	εK=0.8164 *5*; εL=0.1410 *4*; εM+=0.04262 *12*.
(709 *12*)	2328.69		0.0066 *7*	9.35 *5*	0.0066 *7*	εK=0.8172 *4*; εL=0.1404 *3*; εM+=0.04240 *11*.

Continued on next page (footnotes at end of table)

^{166}Tm ε Decay 1989Ad11 (continued)

β^+,ε Data (continued)

Eε	E(level)	$I\beta^+$‡	Iε†‡	Log *ft*	$I(\varepsilon+\beta^+)$‡	Comments
(747 12)	2290.997		1.36 11	7.08 4	1.36 11	εK=0.8183 4; εL=0.1396 3; εM+=0.04210 10.
(755 12)	2282.68		0.086 7	8.29 4	0.086 7	εK=0.8186 4; εL=0.1394 3; εM+=0.04204 9.
(765 12)	2273.01		0.46 3	7.58 4	0.46 3	εK=0.8188 4; εL=0.13920 25; εM+=0.04197 9.
(774 12)	2264.31		0.0296 23	8.78 4	0.0296 23	εK=0.8191 4; εL=0.13902 24; εM+=0.04191 9.
(777 12)	2260.66		0.188 13	7.98 4	0.188 13	εK=0.8192 4; εL=0.13895 24; εM+=0.04188 9.
(795 12)	2243.099		0.324 24	7.76 4	0.324 24	εK=0.8196 3; εL=0.13862 23; εM+=0.04176 8.
(822 12)	2215.972		3.48 21	6.76 3	3.48 21	εK=0.8203 3; εL=0.13813 21; εM+=0.04159 8.
(825 12)	2212.97		0.054 12	8.58 10	0.054 12	εK=0.8203 3; εL=0.13808 21; εM+=0.04157 8.
(865 12)	2172.757		2.35 18	6.98 4	2.35 18	εK=0.8212 3; εL=0.13742 19; εM+=0.04134 7.
(878 12)	2160.121		16.2 11	6.16 4	16.2 11	εK=0.8215 3; εL=0.13723 19; εM+=0.04127 7.
(905 12)	2132.951		59 4	5.62 4	59 4	εK=0.8220 3; εL=0.13684 18; εM+=0.04113 6.
(920 12)	2117.8		0.067 13	8.58 9	0.067 13	εK=0.8223 3; εL=0.13663 17; εM+=0.04106 6.
(936 12)	2101.6		0.024 3	9.05 6	0.024 3	εK=0.8226 3; εL=0.13641 16; εM+=0.04098 6.
(962 12)	2076.305		0.222 15	8.10 4	0.222 15	εK=0.8230 2; εL=0.13609 15; εM+=0.04087 6.
(991 12)	2046.88		0.147 10	8.31 4	0.147 10	εK=0.8235 2; εL=0.13574 14; εM+=0.04074 5.
(1015 12)	2022.62		0.061 7	8.71 6	0.061 7	εK=0.8239 2; εL=0.1355 2; εM+=0.04064 5.
(1017 12)	2021.359		2.56 16	7.09 3	2.56 16	εK=0.8239 2; εL=0.1355 2; εM+=0.04064 5.
(1036 12)	2001.874		0.53 14	7.79 12	0.53 14	εK=0.8242 2; εL=0.1352 2; εM+=0.04056 5.
(1068 12)	1969.71		0.059 11	8.78 9	0.059 11	εK=0.8246 2; εL=0.1349 2; εM+=0.04045 5.
(1100 12)	1938.273		0.99 8	7.58 4	0.99 8	εK=0.8250 2; εL=0.1346 2; εM+=0.04034 4.
(1144 12)	1894.364		≤0.027	≥9.2	≤0.027	εK=0.8256 2; εL=0.1342 1; εM+=0.04020 4.
(1173 12)	1865.17		0.093 8	8.66 4	0.093 8	εK=0.8259 2; εL=0.1340 1; εM+=0.04012 4.
(1208 12)	1830.42		0.016 5	9.45 14	0.016 5	εK=0.8262 2; εL=0.1337 1; εM+=0.04002 4.
(1225 12)	1813.2		0.059 9	8.90 7	0.059 9	εK=0.8264 2; εL=0.13358 9; εM+=0.03997 4.
(1335 12)	1703.057		0.375 25	8.17 3	0.375 25	εK=0.8272; εL=0.13280 8; εM+=0.03970 3.
(1359 12)	1678.77		0.012 6	9.69 22	0.012 6	εK=0.8273; εL=0.13264 8; εM+=0.03965 3.
(1376 12)	1662.32		0.045 13	9.12 13	0.045 13	εK=0.8274; εL=0.13253 8; εM+=0.03961 3.
(1442 12)	1596.263		0.040 11	10.09^{1u} 12	0.040 11	εK=0.8164 2; εL=0.14089 16; εM+=0.04262 6.
(1466 12)	1572.206		0.052 19	10.00^{1u} 16	0.052 19	εK=0.8167 2; εL=0.14059 15; εM+=0.04251 6.
(1510 12)	1528.404	0.00191 24	1.03 7	7.85 3	1.03 7	av Eβ=234.8 54; εK=0.8272; εL=0.13165 9; εM+=0.03931 3.
(1524 12)	1513.760	0.00025 19	0.12 9	8.8 4	0.12 9	av Eβ=241.3 54; εK=0.8271 1; εL=0.13155 9; εM+=0.03927 3.
(1580 12)	1458.164	0.0014 6	0.45 18	8.25 18	0.45 18	av Eβ=265.7 53; εK=0.8265 2; εL=0.13116 9; εM+=0.03914 3.
(2179 12)	859.399	0.05 3	1.1 6	8.16 24	1.1 6	av Eβ=529.0 54; εK=0.7952 13; εL=0.12403 22; εM+=0.03692 7.
(2252 12)	785.917	0.075 22	1.3 4	8.09 13	1.4 4	av Eβ=561.5 53; εK=0.7874 14; εL=0.12263 25; εM+=0.03649 8.
(2957 12)	80.581	1.0 10	4 4	7.9 5	5 5	av Eβ=874.9 54; εK=0.669 3; εL=0.1030 4; εM+=0.03061 13. Eε: Eβ+=1940 20 (1961Gr33); =1928 20 (1961Zy02); =1936 20 (1963Pr13).

† From intensity balance, unless otherwise noted.
‡ Absolute intensity per 100 decays.

^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er)

x–rays: (1980VyZZ) (Iγ relative to Iγ(778.8γ)=100)

Energy	Iγ	Identification
48.221	142.5 *28*	$K\alpha_2$ x ray
49.128	252.0 *40*	$K\alpha_1$ x ray
55.6	80.2 *15*	$K\beta_1$' x ray
57.1	21.0 *4*	$K\beta_2$' x ray

1973De22 report, for equilibrium source (^{166}Yb+^{166}Tm+^{166}Er):
I(Tm Kx ray):I(82.3γ, ^{166}Tm):I(Er Kx ray):I(80.6γ, ^{166}Er):I(785.9γ, ^{166}Er)=
868 *21*:100:805 *32*:90.2 *9*:73 *4*.

γγ–coin: 1960Wi12, 1961Bo15, 1966Zy01, 1968Mi13, 1979Ad06.

Iγ normalization: The basis of the intensity normalization is that ε+β^+ feeding to the ground state of ^{166}Er is not expected (ΔJ=2, Δπ=no), so Σ(I(γ+ce) to g.s.)=100%.

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
73.45 *2*	859.399	≤0.5	M1		6.92	α(K)=5.80 *9*; α(L)=0.876 *13*; α(M)=0.194 *3*; α(N+..)=0.0522 *8*. α(N)=0.0453 *7*; α(O)=0.00655 *10*; α(P)=0.000360 *5*. Mult.: from L1:L2:L3=10 *3*:70 *7*: 50 *5*. Eγ,Iγ: from 1979Ad06.
80.585 *15*	80.581	60.4 *32*	E2		6.78	α(K)=1.671 *24*; α(L)=3.91 *6*; α(M)=0.953 *14*; α(N+..)=0.241 *4*. α(N)=0.215 *3*; α(O)=0.0251 *4*; α(P)=7.29×10^{-5} *11*. %I(80.6γ)=11.5 *3* assuming adopted normalization. Mult.: from L1:L2:L3=2270 *115*: 26700 *1400*:27500 *1400* and α(K)exp=2.2 *6*; (K:L:M=0.40 *4*:1:0.32 *3* (1966Zy01)).
84.11 *2*	2001.874	0.19 *5*	M1		4.68	α(K)=3.92 *6*; α(L)=0.591 *9*; α(M)=0.1311 *19*; α(N+..)=0.0352 *5*. α(N)=0.0306 *5*; α(O)=0.00442 *7*; α(P)=0.000243 *4*. Mult.: from L1:L2:L3=110 *11*: 10 *1*:2.5. α(K)exp=21 *9* is not consistent with M1; probably Iγ or Ice contained a typographical error. Eγ,Iγ: from 1979Ad06; not reported in 1989Ad11.
86.84	1917.767		E2		5.05	α(K)=1.458 *21*; α(L)=2.75 *4*; α(M)=0.671 *10*; α(N+..)=0.1694 *24*. α(N)=0.1516 *22*; α(O)=0.01770 *25*; α(P)=6.18×10^{-5} *9*. Eγ: from 1993BaZS. Mult.: from L2/L3≈1 (1993BaZS).

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
96.85 *5*	956.240	0.065 *3*	E2		3.32	α(K)=1.157 *17*; α(L)=1.658 *24*; α(M)=0.403 *6*; α(N+..)=0.1019 *15*. α(N)=0.0912 *13*; α(O)=0.01069 *16*; α(P)=4.82×10^{-5} *7*. Mult.: from L1:L2:L3=3.1 *4*:19 *2*:17 *2* and α(K)exp=2.3 *10*.
112.7 f	2273.01					Eγ: from 1993BaZS. Mult.: M1+E2 from L1/L2=0.25, L2/L3=1.3 (1993BaZS). However, level scheme requires E1. Consequently, placement is shown as uncertain here and transition is omitted from Adopted Gammas.
114.09	1572.206		E2		1.80	α(K)=0.778 *11*; α(L)=0.783 *11*; α(M)=0.190 *3*; α(N+..)=0.0481 *7*. α(N)=0.0430 *6*; α(O)=0.00508 *8*; α(P)=3.26×10^{-5} *5*. Eγ: from 1993BaZS. Mult.: from L1/L2≈1 (1993BaZS).
118.18 *3*	2290.997	0.16 *5*	[M1]		1.765	α(K)=1.481 *21*; α(L)=0.222 *4*; α(M)=0.0492 *7*; α(N+..)=0.01321 *19*. α(N)=0.01147 *16*; α(O)=0.001657 *24*; α(P)=9.13×10^{-5} *13*.
(119.041 *3*)	1075.281	0.0173 *5*	(M1+E2)	+1.94 *+23−21*	1.579 *24*	α(K)=0.86 *4*; α(L)=0.556 *19*; α(M)=0.134 *5*; α(N+..)=0.0341 *12*. α(N)=0.0304 *11*; α(O)=0.00366 *12*; α(P)=4.2×10^{-5} *3*. Eγ,Mult.,δ: from Adopted Gammas. Iγ: from I(810γ) and adopted branching.
130.90 *20*	2132.951	2.70 *25*	E1		0.1590	α(K)=0.1328 *20*; α(L)=0.0205 *3*; α(M)=0.00453 *7*; α(N+..)=0.001188 *18*. α(N)=0.001040 *16*; α(O)=0.0001414 *21*; α(P)=6.22×10^{-6} *9*. Mult.: from L1:L2:L3=14 *2*:2.8 *3*:3.0 *3* and α(K)exp=0.20 *4*.
139.64 *4*	2215.972	0.066 *4*				
143.2 *6*	2729.094	0.013 *5*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
147.301 *20*	2132.951	1.79 *7*	E1		0.1162	α(K)=0.0973 *14*; α(L)=0.01482 *21*; α(M)=0.00328 *5*; α(N+..)=0.000861 *12*. α(N)=0.000753 *11*; α(O)=0.0001029 *15*; α(P)=4.63×10^{-6} *7*. Mult.: from L1:L2:L3=2.5 *3*: 0.5 *1*:0.6 *1* and α(K)exp=0.083 *20*.
154.508 *25*	2132.951	1.08 *9*	M1+E2	0.75 *25*	0.75 *4*	α(K)=0.57 *6*; α(L)=0.140 *17*; α(M)=0.032 *5*; α(N+..)=0.0085 *11*. α(N)=0.0074 *10*; α(O)=0.00098 *10*; α(P)=3.3×10^{-5} *5*. Mult.: from L1:L2:L3=14 *2*: 2.7 *3*:1.4 *2* and α(K)exp=0.54 *11*. δ: from Adopted Gammas.
158.269 *25*	2160.121	0.186 *9*	E1		0.0961	α(K)=0.0805 *12*; α(L)=0.01218 *17*; α(M)=0.00269 *4*; α(N+..)=0.000708 *10*. α(N)=0.000619 *9*; α(O)=8.49×10^{-5} *12*; α(P)=3.87×10^{-6} *6*. Mult.: from α(K)exp=0.13 *6*.
x163.21 *10*		0.030 *4*				
166.26d *20*	2212.97	0.020d *8*				
	2382.27	0.020d *8*				
170.325 *16*	956.240	0.390 *20*	E2		0.433	α(K)=0.258 *4*; α(L)=0.1347 *19*; α(M)=0.0323 *5*; α(N+..)=0.00824 *12*. α(N)=0.00734 *11*; α(O)=0.000893 *13*; α(P)=1.169×10^{-5} *17*. Mult.: from L1:L2:L3=2.5 *3*: 6.7 *7*:5.9 *6* and α(K)exp=0.30 *11*.
184.405 *25*	264.985	85.0 *18*	E2		0.331	α(K)=0.205 *3*; α(L)=0.0964 *14*; α(M)=0.0230 *4*; α(N+..)=0.00590 *9*. α(N)=0.00524 *8*; α(O)=0.000642 *9*; α(P)=9.48×10^{-6} *14*. Mult.: from L1:L2:L3=330 *20*: 580 *30*:500 *25* and α(K)exp=0.19 *8*.; (K:L:M=2.1 *1*:1:0.36 *2* (1966Zy01)). δ: δ(E2/M3)=+0.09 *10* (1985DaZV).

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
194.678#e *15*	2132.951	≈4.0e	M1		0.433	α(K)=0.364 *5*; α(L)=0.0541 *8*; α(M)=0.01199 *17*; α(N+..)=0.00322 *5*. α(N)=0.00280 *4*; α(O)=0.000404 *6*; α(P)=2.24×10^{-5} *4*. Mult.: from L1:L2:L3=43 *5*: 3.7 *4*:0.55 *10* and α(K)exp=0.37 *8*.
194.678#e	2215.972	≈0.35e	M1		0.433	α(K)=0.364 *5*; α(L)=0.0541 *8*; α(M)=0.01199 *17*; α(N+..)=0.00322 *5*. α(N)=0.00280 *4*; α(O)=0.000404 *6*; α(P)=2.24×10^{-5} *4*.
215.185 *14*	2132.951	27.7 *9*	E1+M2	−0.09 *+7−6*	0.056 *23*	α(K)=0.047 *18*; α(L)=0.008 *4*; α(M)=0.0017 *9*; α(N+..)=0.00045 *24*. α(N)=0.00039 *21*; α(O)=5.×10^{-5} *3*; α(P)=2.7×10^{-6} *15*. Iγ: from 1989Ad11; Eγ=215.185 *185* 14, Iγ=28.0 *9* for doublet. Mult.: from L1:L2:L3=22 *3*: 3.7 *4*:4.2 *5* and α(K)exp=0.034 *7*. δ: from 1985DaZV. Other δ: −0.04 *8* from γ(θ,H,t) (1995KrZX).
215.88 *3*	1075.281	0.290 *13*	[E2]		0.196	α(K)=0.1298 *19*; α(L)=0.0506 *7*; α(M)=0.01201 *17*; α(N+..)=0.00308 *5*. α(N)=0.00274 *4*; α(O)=0.000340 *5*; α(P)=6.23×10^{-6} 9. Iγ: from 1989Ad11; Eγ=215.185 *185* 14, Iγ=28.0 *9* for doublet.
225.9 *5*	2273.01	0.007 *3*				
x228.21 *7*		0.121 *4*	M1+E2		0.22 *6*	α(K)=0.17 *7*; α(L)=0.038 *3*; α(M)=0.0087 *10*; α(N+..)=0.00227 *20*. α(N)=0.00199 *20*; α(O)=0.000267 *8*; α(P)=1.0×10^{-5} *5*. Mult.: from α(K)exp=0.39 *10*.
238.581 *20*	2132.951	0.187 *5*	M1		0.248	α(K)=0.208 *3*; α(L)=0.0308 *5*; α(M)=0.00683 *10*; α(N+..)=0.00184 *3*. α(N)=0.001592 *23*; α(O)=0.000230 *4*; α(P)=1.276×10^{-5} *18*. Mult.: from α(K)exp=0.31 *9*.
255.44 *6*	1917.767	0.028 *3*				
257.36 *10*	2243.099	0.017 *5*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
x277.73 *20*		0.030 *10*	(M1)		0.1641	α(K)=0.1380 *20*; α(L)=0.0203 *3*; α(M)=0.00450 *7*; α(N+..)=0.001210 *18*. α(N)=0.001050 *15*; α(O)=0.0001521 *22*; α(P)=8.44×10^{-6} *12*. Mult.: from α(K)exp=0.16 *15*.
280.461 *20*	545.444	1.47 *3*	E2		0.0849	α(K)=0.0611 *9*; α(L)=0.0183 *3*; α(M)=0.00430 *6*; α(N+..)=0.001112 *16*. α(N)=0.000984 *14*; α(O)=0.0001255 *18*; α(P)=3.11×10^{-6} *5*. Mult.: from L1:L2:L3=3.1 *4*: 3.3 *4*:2.3 *3* and α(K)exp=0.08 *3*.
287.1 *3*	2273.01	0.006 *2*				
x293.40 *8*		0.051 *8*	(E2)		0.0739	α(K)=0.0538 *8*; α(L)=0.01550 *22*; α(M)=0.00363 *5*; α(N+..)=0.000940 *14*. α(N)=0.000831 *12*; α(O)=0.0001065 *15*; α(P)=2.76×10^{-6} *4*. Mult.: from α(K)exp=0.16 *8*.
298.207 *20*	2215.972	0.95 *2*	M1		0.1355	α(K)=0.1140 *16*; α(L)=0.01676 *24*; α(M)=0.00371 *6*; α(N+..)=0.000998 *14*. α(N)=0.000866 *13*; α(O)=0.0001254 *18*; α(P)=6.96×10^{-6} *10*. Mult.: from α(K)exp=0.12 *3*.
312.58 *20*	2290.997	0.006 *3*				
x319.883 *18*		0.233 *7*	M1		0.1123	α(K)=0.0945 *14*; α(L)=0.01387 *20*; α(M)=0.00307 *5*; α(N+..)=0.000826 *12*. α(N)=0.000716 *10*; α(O)=0.0001038 *15*; α(P)=5.76×10^{-6} *8*. Mult.: from α(K)exp=0.19 *6*.
345.569 *15*	1917.767	2.43 *6*	M1+E2	−0.57 *+21−25*	0.080 *8*	α(K)=0.067 *7*; α(L)=0.0106 *5*; α(M)=0.00237 *9*; α(N+..)=0.00063 *3*. α(N)=0.000552 *21*; α(O)=7.8×10^{-5} *4*; α(P)=4.0×10^{-6} *5*. Mult.: from L1:L2=6.7 *7*:1.0 *1* and α(K)exp=0.10 *2*. δ: from A_2=+0.22 *6*, A_4=−0.07 *15* for 215γ–345γ(θ) (1993AdZY). Other δ: 0.75 *25* from ce data.
x372.40 *4*		0.062 *4*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
385.54 *4*	2215.972	0.076 *3*	E2		0.0331	α(K)=0.0255 *4*; α(L)=0.00594 *9*; α(M)=0.001372 *20*; α(N+..)=0.000358 *5*. α(N)=0.000315 *5*; α(O)=4.16×10^{-5} *6*; α(P)=1.367×10^{-6} *20*. Mult.: from α(K)exp=0.042 *5*.
389.38 *3*	1985.644	0.254 *7*	M1		0.0668	α(K)=0.0563 *8*; α(L)=0.00820 *12*; α(M)=0.00182 *3*; α(N+..)=0.000488 *7*. α(N)=0.000423 *6*; α(O)=6.14×10^{-5} *9*; α(P)=3.42×10^{-6} *5*. Mult.: from α(K)exp=0.059 *23*.
404.004 *13*	1917.767	4.12 *10*	M1+E2	−0.34 *+17−19*	0.057 *4*	α(K)=0.048 *4*; α(L)=0.0072 *3*; α(M)=0.00160 *6*; α(N+..)=0.000429 *17*. α(N)=0.000372 *15*; α(O)=5.36×10^{-5} *25*; α(P)=2.91×10^{-6} *23*. Mult.: from L1:L2=7 *1*:0.8 *3* and α(K)exp=0.053 *12*. δ: from A_2=+0.05 *8*, A_4=+0.08 *15* for 215γ−404γ(θ) (1993AdZY).
410.797 *16*	956.240	0.490 *10*	E2		0.0278	α(K)=0.0216 *3*; α(L)=0.00481 *7*; α(M)=0.001109 *16*; α(N+..)=0.000290 *4*. α(N)=0.000255 *4*; α(O)=3.39×10^{-5} *5*; α(P)=1.167×10^{-6} *17*. Iγ(411γ):Iγ(691γ)=0.0233 *5*: 1.85 (2006Ku03). Mult.: from α(K)exp=0.019 *10*.
413.430 *18*	1985.644	0.320 *10*	E2		0.0273	α(K)=0.0212 *3*; α(L)=0.00472 *7*; α(M)=0.001086 *16*; α(N+..)=0.000284 *4*. α(N)=0.000250 *4*; α(O)=3.32×10^{-5} *5*; α(P)=1.149×10^{-6} *16*. Mult.: from α(K)exp=0.047 *18*.
429.885 *20*	2132.951	0.410 *10*	M1		0.0516	α(K)=0.0435 *6*; α(L)=0.00632 *9*; α(M)=0.001397 *20*; α(N+..)=0.000376 *6*. α(N)=0.000326 *5*; α(O)=4.72×10^{-5} *7*; α(P)=2.64×10^{-6} *4*. Mult.: from α(K)exp=0.055 *21*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
454.20 *3*	2132.951	0.172 *20*	(E2)		0.0211	α(K)=0.01664 *24*; α(L)=0.00349 *5*; α(M)=0.000801 *12*; α(N+..)=0.000210 *3*. α(N)=0.000184 *3*; α(O)=2.47×10^{-5} *4*; α(P)=9.12×10^{-7} *13*. Mult.: E1,E2 from α(K)exp=0.009 *5*; Δπ=no from level scheme.
459.600 *15*	1917.767	13.26 *26*	M1+E2	−0.16 *4*	0.0428 *7*	α(K)=0.0361 *6*; α(L)=0.00525 *8*; α(M)=0.001162 *18*; α(N+..)=0.000312 *5*. α(N)=0.000271 *4*; α(O)=3.93×10^{-5} *6*; α(P)=2.18×10^{-6} *4*. Mult.: from Adopted Gammas. M1 from L1:L2:L3=14 *2*:1.0 *2*:0.3 and α(K)exp=0.043 *9*. δ: from Adopted Gammas. δ=−0.17 *3* from A_2=−0.28 *3*, A_4=+0.01 *7* for 215γ−460γ(θ) and δ=−0.21 *9* from A_2=−0.17 *5*, A_4=+0.06 *9* for 460γ−672γ(θ) (1993AdZY).
464.5 *3*	1978.432	0.030 *8*				
471.871 *23*	1985.644	0.558 *13*	M1		0.0405	α(K)=0.0342 *5*; α(L)=0.00495 *7*; α(M)=0.001094 *16*; α(N+..)=0.000294 *5*. α(N)=0.000255 *4*; α(O)=3.70×10^{-5} *6*; α(P)=2.07×10^{-6} *3*. Mult.: from α(K)exp=0.034 *10*.
475.36 *25*	2413.68	0.055 *10*				
^{x}477.24 *20*		0.028 *7*				
481.33 *10*	2160.121	0.089 *7*				
488.19 *8*	2001.874	0.18 *4*				
496.935 *16*	1572.206	0.990 *20*	E1		0.00566	α(K)=0.00480 *7*; α(L)=0.000672 *10*; α(M)=0.0001479 *21*; α(N+..)=3.94×10^{-5} *6*. α(N)=3.43×10^{-5} *5*; α(O)=4.88×10^{-6} *7*; α(P)=2.57×10^{-7} *4*. Mult.: from α(K)exp=0.0072 *35*.
520.92 *4*	1596.263	0.32 *4*				Eγ: from deconvolution of a doublet (1989Ad11). Iγ: see comment on 521γ from 786 level.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
520.99 *4*	785.917	0.998 *23*	E2		0.01481	α(K)=0.01184 *17*; α(L)=0.00230 *4*; α(M)=0.000525 *8*; α(N+..)=0.0001382 *20*. α(N)=0.0001211 *17*; α(O)=1.644×10^{-5} *23*; α(P)=6.58×10^{-7} *10*. L1:L2=0.4 *2*:0.15 and α(K)exp=0.012 *5* for the doublet. Iγ,Eγ: Iγ is from Iγ(521γ from 786 level)/Iγ(705γ)= 0.0172 *4* (2006Ku03) and I(705γ). Eγ=520.945 *15*, Iγ=1.32 *3* for doublet in 1989Ad11, so Iγ(521γ from 1596 level)=0.32 *4*. Note, however, that the resulting 521γ branch from the 1596 level is somewhat smaller than the value adopted from β^{-} decay (1200 y). 1989Ad11 estimated Eγ=520.99 *4*, Iγ=0.89 *9* and Eγ=520.92 *4*, Iγ=0.42 *7* for the respective components of the doublet they observed.
527.58 *10*	1985.644	0.154 *5*				
529.835 *20*	1075.281	0.947 *20*	E2		0.01419	α(K)=0.01136 *16*; α(L)=0.00219 *3*; α(M)=0.000499 *7*; α(N+..)=0.0001314 *19*. α(N)=0.0001151 *17*; α(O)=1.566×10^{-5} *22*; α(P)=6.32×10^{-7} *9*. Mult.: from α(K)exp=0.012 *6*.
536.67 *3*	2132.951	0.671 *18*	E1		0.00478	α(K)=0.00406 *6*; α(L)=0.000566 *8*; α(M)=0.0001244 *18*; α(N+..)=3.32×10^{-5} *5*. α(N)=2.88×10^{-5} *4*; α(O)=4.12×10^{-6} *6*; α(P)=2.18×10^{-7} *3*. Mult.: from α(K)exp=0.0038 *20*.
543.69 *3*	2001.874	0.387 *11*	E2,M1		0.021 *8*	α(K)=0.017 *7*; α(L)=0.0027 *7*; α(M)=0.00061 *15*; α(N+..)=0.00016 *4*. α(N)=0.00014 *4*; α(O)=2.0×10^{-5} *6*; α(P)=1.0×10^{-6} *5*. Mult.: from α(K)exp=0.025 *14*.
x547.04 *25*		0.028 *7*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
557.514 *18*	1513.760	1.54 *3*	E1		0.00440	α(K)=0.00374 *6*; α(L)=0.000520 *8*; α(M)=0.0001143 *16*; α(N+..)=3.05×10^{-5} *5*. α(N)=2.65×10^{-5} *4*; α(O)=3.79×10^{-6} *6*; α(P)=2.01×10^{-7} *3*. Mult.: from α(K)exp=0.004 *2*.
560.77 *3*	2132.951	0.363 *12*				
563.21 *3*	2021.359	0.318 *10*	E2,M1		0.019 *7*	α(K)=0.016 *6*; α(L)=0.0025 *7*; α(M)=0.00055 *14*; α(N+..)=0.00015 *4*. α(N)=0.00013 *4*; α(O)=1.8×10^{-5} *6*; α(P)=9.×10^{-7} *4*. Mult.: from α(K)exp=0.015 *8*.
572.2	1528.404					Eγ: from 1993BaZS.
587.90 *16*	2160.121	0.27 *5*				
594.409 *15*	859.399	18.3 *4*	E2+M1	−12 *2*	0.0111 *7*	α(K)=0.0090 *6*; α(L)=0.00161 *7*; α(M)=0.000365 *14*; α(N+..)=9.7×10^{-5} *4*. α(N)=8.4×10^{-5} *4*; α(O)=1.16×10^{-5} *5*; α(P)=5.1×10^{-7} *4*. Mult.: from L1:L2:L3=4.5 *5*: 1.3 *2*:0.8 *1* and α(K)exp=0.0076 *20*. δ: from γ(θ,H,t) (1995KrZX). Other δ: >+31 from γγ(θ) (1980Bu26); +5.5 *+74–22* (1985DaZV); −1.3 *+3–5* from 594γ–184γ(θ) (1993AdZY), however, evaluator cannot reproduce this value using the authors' stated A_2 and A_4 coefficients.
598.764 *19*	1458.164	11.13 *23*	E1(+M2)	−0.02 *6*	0.0038 *4*	α(K)=0.0032 *3*; α(L)=0.00045 *5*; α(M)=9.8×10^{-5} *12*; α(N+..)=2.6×10^{-5} *3*. α(N)=2.3×10^{-5} *3*; α(O)=3.3×10^{-6} *4*; α(P)=1.75×10^{-7} *21*. Mult.,δ: from Adopted Gammas. E1 from L1:L2:L3=1.2 *2*:0.2 and α(K)exp=0.0042 *13*.
604.553 *15*	2132.951	1.047 *23*	E2		0.01025	α(K)=0.00832 *12*; α(L)=0.001506 *21*; α(M)=0.000341 *5*; α(N+..)=9.01×10^{-5} *13*. α(N)=7.88×10^{-5} *11*; α(O)=1.083×10^{-5} *16*; α(P)=4.67×10^{-7} *7*. Mult.: from α(K)exp=0.0086 *18*.
610.8[d] *3*	2273.01	0.015[d] *6*				
	2783.69	0.015[d] *6*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
615.963 *15*	1572.206	0.763 *17*	(E1(+M2))			Mult.: from Adopted Gammas.
619.49[d] *25*	2132.951	0.015[d] *6*				
	2215.972	0.015[d] *6*				
631.62 *10*	2160.121	0.380 *10*	(E2)		0.00924	α(K)=0.00752 *11*; α(L)=0.001336 *19*; α(M)=0.000302 *5*; α(N+..)=7.98×10^{-5} *12*. α(N)=6.98×10^{-5} *10*; α(O)=9.63×10^{-6} *14*; α(P)=4.23×10^{-7} *6*. Mult.: from α(K)exp=0.009 *5*.
640.04 *3*	1596.263	0.263 *8*				
643.90 *10*	2215.972	0.120 *6*				
646.75[@&e] *4*	2160.121	≈0.04[e]				
	2243.099	≈0.08[e]				
654.358 *16*	1513.760	1.97 *4*	E1		0.00314	α(K)=0.00267 *4*; α(L)=0.000368 *6*; α(M)=8.08×10^{-5} *12*; α(N+..)=2.16×10^{-5} *3*. α(N)=1.87×10^{-5} *3*; α(O)=2.69×10^{-6} *4*; α(P)=1.446×10^{-7} *21*. Mult.: from α(K)exp=0.0046 *25*.
659.04 *20*	2172.757	0.029 *6*				
672.242 *20*	1458.164	32.4 *7*	E1		0.00297	α(K)=0.00253 *4*; α(L)=0.000348 *5*; α(M)=7.63×10^{-5} *11*; α(N+..)=2.04×10^{-5} *3*. α(N)=1.771×10^{-5} *25*; α(O)=2.54×10^{-6} *4*; α(P)=1.370×10^{-7} *20*. δ: <−0.01 from γγ(θ) (1980Bu26); +0.16 *4* from 672γ–785γ(θ) (1993AdZY). Mult.: from L1:L2:L3=1.9 *2*: 0.2 *1*:0.2 *1* and α(K)exp=0.0026 *9*.
674.788 *22*	2132.951	13.6 *3*	E1		0.00295	α(K)=0.00251 *4*; α(L)=0.000345 *5*; α(M)=7.57×10^{-5} *11*; α(N+..)=2.02×10^{-5} *3*. α(N)=1.757×10^{-5} *25*; α(O)=2.52×10^{-6} *4*; α(P)=1.359×10^{-7} *19*. Mult.: from α(K)exp=0.002 *1*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
691.250 *17*	956.240	39.1 *8*	E2+M1	−3.3 *+12−30*	0.00802 *20*	α(K)=0.00660 *17*; α(L)=0.001106 *23*; α(M)=0.000248 *5*; α(N+..)=6.59×10^{-5} *14*. α(N)=5.75×10^{-5} *12*; α(O)=8.03×10^{-6} *18*; α(P)=3.76×10^{-7} *11*. δ: from Adopted Gammas. δ from ε decay: −3.7 *5* from γγ(θ) (1980Bu26); −8.5<δ<+7.0 (1985DaZV), −13 *9* from 691γ−184γ(θ) (1993AdZY), +5.5 *+28−14* from γ(θ,H,t) (1995KrZX). Mult.: from L1:L2:L3=5.6 *6*: 0.5 *2*:0.5 *2* and α(K)exp=0.0068 *16*.
702.28 *10*	2215.972	2.71 *7*	M1		0.01475	α(K)=0.01247 *18*; α(L)=0.001782 *25*; α(M)=0.000393 *6*; α(N+..)=0.0001058 *15*. α(N)=9.17×10^{-5} *13*; α(O)=1.332×10^{-5} *19*; α(P)=7.49×10^{-7} *11*. Mult.: from α(K)exp=0.014 *4*.
705.333 *20*	785.917	58.0 *12*	M1+E2	−5 *+3−14*	0.00716 *13*	α(K)=0.00588 *11*; α(L)=0.000999 *16*; α(M)=0.000225 *4*; α(N+..)=5.96×10^{-5} *10*. α(N)=5.20×10^{-5} *9*; α(O)=7.24×10^{-6} *12*; α(P)=3.32×10^{-7} *7*. δ: from γγ(θ) (1987Kr12). Other: −22 *+13−7* (1980Bu26), −7 *+23−3* from γ(θ,H,t) (1995KrZX). Mult.: from L1:L2:L3=7.0 *7*: 0.7 *1*:0.7 *1* and α(K)exp=0.0067 *14*.
712.817 *22*	1572.206	2.19 *4*	E1		0.00264	α(K)=0.00224 *4*; α(L)=0.000308 *5*; α(M)=6.75×10^{-5} *10*; α(N+..)=1.80×10^{-5} *3*. α(N)=1.568×10^{-5} *22*; α(O)=2.25×10^{-6} *4*; α(P)=1.219×10^{-7} *17*. Mult.: from α(K)exp=0.0032 *17*.
727.858 *20*	1513.760	2.09 *10*	E1		0.00253	α(K)=0.00215 *3*; α(L)=0.000295 *5*; α(M)=6.47×10^{-5} *9*; α(N+..)=1.729×10^{-5} *25*. α(N)=1.502×10^{-5} *21*; α(O)=2.16×10^{-6} *3*; α(P)=1.170×10^{-7} *17*. Mult.: from α(K)exp=0.0013 *5*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
729.38 *3*	2243.099	0.45 *4*	M1		0.01342	α(K)=0.01135 *16*; α(L)=0.001619 *23*; α(M)=0.000357 *5*; α(N+..)=9.61×10^{-5} *14*. α(N)=8.33×10^{-5} *12*; α(O)=1.210×10^{-5} *17*; α(P)=6.81×10^{-7} *10*. Mult.: from α(K)exp=0.023 *13*.
736.832 *22*	1596.263	0.721 *24*				
742.59 *10*	1528.404	0.138 *12*				
743.8 *5*	2729.094	0.037 *13*				
757.798 *17*	2215.972	12.33 *25*	M1		0.01220	α(K)=0.01032 *15*; α(L)=0.001471 *21*; α(M)=0.000324 *5*; α(N+..)=8.73×10^{-5} *13*. α(N)=7.57×10^{-5} *11*; α(O)=1.099×10^{-5} *16*; α(P)=6.19×10^{-7} *9*. Mult.: from α(K)exp=0.011 *3*. δ: 0.03 *+18–14* if Jπ=2– or +0.31 *9* if Jπ=3– (1985DaZV).
778.814 *15*	859.399	100.0 *20*	E2+M1	−20 *+2−4*	0.00580	α(K)=0.00479 *7*; α(L)=0.000784 *11*; α(M)=0.0001758 *25*; α(N+..)=4.67×10^{-5} *7*. α(N)=4.07×10^{-5} *6*; α(O)=5.71×10^{-6} *8*; α(P)=2.72×10^{-7} *4*. δ: from Adopted Gammas. Data from ε decay: +8.4 *7* from γγ(θ) (1980Bu26); +15 *+26–6* (1985DaZV), +10 *+130–5* from 598γ–778γ(θ) (1993AdZY), −6.2 *+10–8* from γ(θ,H,t) (1995KrZX); reason for discrepant results is not known. Mult.: from L1:L2:L3=11 *1*: 2.2 *3*:1.0 *2* (α(K)=4.79×10^{-3} (E2 theory)).
785.904 *15*	785.917	52.5 *6*	E2		0.00561	α(K)=0.00463 *7*; α(L)=0.000759 *11*; α(M)=0.0001701 *24*; α(N+..)=4.52×10^{-5} *7*. α(N)=3.94×10^{-5} *6*; α(O)=5.52×10^{-6} *8*; α(P)=2.63×10^{-7} *4*. Iγ: from Iγ(786γ)/Iγ(705γ)= 0.906 *10* (2006Ku03) and I(705γ); in excellent agreement with Iγ=52.4 *11* from 1989Ad11. Mult.: from L1:L2:L3=3.3 *10*: 1.3 *4*:0.5 *2* and α(K)exp=0.0046 *3*.
797.02 *20*	2393.14	0.023 *5*				
ˣ799.74 *20*		0.023 *5*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
810.290 *16*	1075.281	5.78 *13*	E2+M1	−21.2 *+18−21*	0.00526	α(K)=0.00436 *7*; α(L)=0.000706 *10*; α(M)=0.0001580 *23*; α(N+..)=4.20×10^{-5} *6*. α(N)=3.66×10^{-5} *6*; α(O)=5.14×10^{-6} *8*; α(P)=2.47×10^{-7} *4*. Mult.: from Adopted Gammas; E2 from L1:L2=1.0 *2*:0.2 *1* and α(K)exp=0.006 *2*. δ: from Adopted Gammas; <−17 from γγ(θ) (1980Bu26). +0.39 *+19−17* from 810γ−184γ(θ) (1993AdZY); however, evaluator obtains −0.35 *+9−11* and −3.8 *+11−21* (first solution preferred) using authors' stated A_2 and A_4.
814.82 *20*	2273.01	0.062 *12*				
824.52[d] *11*	2282.68	0.026[d] *7*				
	2352.91	0.026[d] *7*				
832.88 *7*	2290.997	0.051 *4*				
[x]858.62 *9*		0.042 *7*				
868.47 *12*	2382.27	0.052 *9*				
875.650 *15*	956.240	21.5 *4*	E2		0.00444	α(K)=0.00369 *6*; α(L)=0.000584 *9*; α(M)=0.0001305 *19*; α(N+..)=3.47×10^{-5} *5*. α(N)=3.03×10^{-5} *5*; α(O)=4.27×10^{-6} *6*; α(P)=2.10×10^{-7} *3*. Iγ(875γ):Iγ(691γ)=1.026 *16*: 1.85 (2006Ku03). Mult.: from L1:L2:L3=2.0 *2*: 0.4 *1*:0.2 and α(K)exp=0.0035 *4*. δ: δ(E2/M3)=−0.07 *9* (1985DaZV).
899.80 *18*	2413.68	0.020 *4*				
903.01 *13*	1978.432	0.029 *5*				
924.21 *11*	2382.27	0.063 *9*				
946.57 *8*	2542.88	0.038 *5*				
982.00 *15*	1938.273	0.051 *9*				
[x]985.53 *15*		0.052 *9*				
[x]1004.99 *20*		0.028 *8*				
1017.29 *6*	2475.40	0.077 *5*				
1022.175 *23*	1978.432	0.294 *11*				
1034.79 *13*	1894.364	0.029 *5*				
1045.648 *20*	2001.874	0.901 *20*	E1		1.26×10^{-3}	α(K)=0.001075 *15*; α(L)=0.0001447 *21*; α(M)=3.17×10^{-5} *5*; α(N+..)=8.49×10^{-6} *12*. α(N)=7.36×10^{-6} *11*; α(O)=1.063×10^{-6} *15*; α(P)=5.90×10^{-8} *9*. Mult.: from α(K)exp=0.0018 *9*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1057.67 *4*	2132.951	3.66 *12*	E2		0.00300	α(K)=0.00251 *4*; α(L)=0.000379 *6*; α(M)=8.43×10^{-5} *12*; α(N+..)=2.25×10^{-5} *4*. α(N)=1.96×10^{-5} *3*; α(O)=2.78×10^{-6} *4*; α(P)=1.430×10^{-7} *20*. Mult.: from α(K)exp=0.0024 *3*.
1078.876 *22*	1938.273	2.51 *5*	M1		0.00513	α(K)=0.00435 *6*; α(L)=0.000612 *9*; α(M)=0.0001349 *19*; α(N+..)=3.63×10^{-5} *5*. α(N)=3.15×10^{-5} *5*; α(O)=4.57×10^{-6} *7*; α(P)=2.59×10^{-7} *4*. Mult.: from α(K)exp=0.0059 *20*.
1084.826 *17*	2160.121	1.92 *4*	E2		0.00285	α(K)=0.00239 *4*; α(L)=0.000359 *5*; α(M)=7.96×10^{-5} *12*; α(N+..)=2.13×10^{-5} *3*. α(N)=1.85×10^{-5} *3*; α(O)=2.63×10^{-6} *4*; α(P)=1.360×10^{-7} *19*. Mult.: from α(K)exp=0.0024 *2*.
1090.70 *6*	2046.88	0.113 *6*				
1097.46 *5*	2172.757	0.302 *9*	E2		0.00278	α(K)=0.00233 *4*; α(L)=0.000350 *5*; α(M)=7.76×10^{-5} *11*; α(N+..)=2.07×10^{-5} *3*. α(N)=1.80×10^{-5} *3*; α(O)=2.57×10^{-6} *4*; α(P)=1.329×10^{-7} *19*. Mult.: from α(K)exp=0.0035 *19*.
1119.50[§e]	1978.432	≈0.68[e]				
1119.5[§e]	2076.305	≈0.67[e]				
[x]1126.807 *25*		0.380 *11*	M1+E2		0.0036 *10*	α(K)=0.0031 *9*; α(L)=0.00044 *11*; α(M)=9.7×10^{-5} *24*; α(N+..)=2.7×10^{-5} *7*. α(N)=2.3×10^{-5} *6*; α(O)=3.3×10^{-6} *9*; α(P)=1.8×10^{-7} *6*; α(IPF)=7.8×10^{-7} *8*. Mult.: α(K)exp=0.0032 *8* (1993BaZS).
1131.872 *25*	1917.767	1.28 *3*	E1		1.09×10^{-3}	α(K)=0.000931 *13*; α(L)=0.0001249 *18*; α(M)=2.73×10^{-5} *4*; α(N+..)=1.183×10^{-5} *17*. α(N)=6.35×10^{-6} *9*; α(O)=9.18×10^{-7} *13*; α(P)=5.11×10^{-8} *8*; α(IPF)=4.50×10^{-6} *7*. Mult.: from α(K)exp=0.0013 *7*.
1142.45[d] *3*	2001.874	0.578[d] *13*				Mult.: α(K)exp≈0.0010, mult=E1 for doublet (1993BaZS).
	2600.64	0.578[d] *13*				Mult.: α(K)exp≈0.0010, mult=E1 for doublet (1993BaZS).

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1152.350 *16*	1938.273	8.20 *21*	M1		0.00438	α(K)=0.00371 *6*; α(L)=0.000521 *8*; α(M)=0.0001148 *16*; α(N+..)=3.28×10^{-5} *5*. α(N)=2.68×10^{-5} *4*; α(O)=3.89×10^{-6} *6*; α(P)=2.21×10^{-7} *3*; α(IPF)=1.94×10^{-6} *3*. Mult.: from α(K)exp=0.0040 *14* (1979Ad06,1989Ad11) and 0.0033 *5* (1993BaZS).
1161.955 *16*	2021.359	3.78 *9*	E1		1.05×10^{-3}	α(K)=0.000888 *13*; α(L)=0.0001190 *17*; α(M)=2.60×10^{-5} *4*; α(N+..)=1.721×10^{-5} *25*. α(N)=6.05×10^{-6} *9*; α(O)=8.75×10^{-7} *13*; α(P)=4.88×10^{-8} *7*; α(IPF)=1.024×10^{-5} *15*. Mult.: from α(K)exp=0.0012 *6*.
1176.704 *16*	2132.951	50.5 *10*	M1+E2	+0.20 *4*	0.00410 *7*	α(K)=0.00347 *6*; α(L)=0.000488 *8*; α(M)=0.0001074 *17*; α(N+..)=3.26×10^{-5} *5*. α(N)=2.51×10^{-5} *4*; α(O)=3.64×10^{-6} *6*; α(P)=2.06×10^{-7} *4*; α(IPF)=3.70×10^{-6} *6*. Mult.: from α(K)exp=0.0032 *2*. δ: weighted average of +0.24 *4* from 1177γ–876γ(θ) (1993AdZY), +0.11 *7* from 1177γ–876γ(θ) (1993AdZY) and +0.16 *11* (1985DaZV).
1187.49 *4*	2046.88	0.560 *14*	M1(+E2)		0.0032 *9*	α(K)=0.0027 *8*; α(L)=0.00039 *10*; α(M)=8.6×10^{-5} *21*; α(N+..)=2.7×10^{-5} *6*. α(N)=2.0×10^{-5} *5*; α(O)=2.9×10^{-6} *8*; α(P)=1.6×10^{-7} *5*; α(IPF)=4.4×10^{-6} *5*. Mult.: from α(K)exp=0.0030 *7* (1993BaZS).
1192.516 *16*	1978.432	0.880 *20*	E2		0.00236	α(K)=0.00198 *3*; α(L)=0.000292 *4*; α(M)=6.48×10^{-5} *9*; α(N+..)=2.17×10^{-5} *3*. α(N)=1.505×10^{-5} *21*; α(O)=2.15×10^{-6} *3*; α(P)=1.130×10^{-7} *16*; α(IPF)=4.41×10^{-6} *7*. Mult.: from α(K)exp=0.0015 *8* (1979Ad06) and 0.0020 *6* (1993BaZS).

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1200.66 3	2729.094	1.66 5	E2,M1		0.0032 9	α(K)=0.0027 7; α(L)=0.00038 10; α(M)=8.4×10^{-5} 20; α(N+..)=2.8×10^{-5} 6. α(N)=2.0×10^{-5} 5; α(O)=2.8×10^{-6} 7; α(P)=1.6×10^{-7} 5; α(IPF)=5.7×10^{-6} 6. Mult.: from α(K)exp= 4.3×10^{-3} 22.
1203.873 20	2160.121	5.49 11	M1+E2		0.0031 9	α(K)=0.0026 7; α(L)=0.00038 10; α(M)=8.3×10^{-5} 20; α(N+..)=2.8×10^{-5} 6. α(N)=1.9×10^{-5} 5; α(O)=2.8×10^{-6} 7; α(P)=1.5×10^{-7} 5; α(IPF)=6.1×10^{-6} 6. Mult.: from α(K)exp=0.0026 4.
1216.173[&e] 17	2001.874	2.5[e] 5				Iγ: from ce–γ coin data (1989Ad11); Iγ=3.72 8 for doublet.
	2076.305					Iγ: Iγ must be small. Placement is uncertain.
	2172.757	1.2[e] 5				Iγ: from ce–γ coin data (1989Ad11); Iγ=3.72 8 for doublet.
1235.433 16	2021.359	9.8 2	E1(+M2)	+0.04 +9−6	0.00098 12	α(K)=0.00081 10; α(L)=0.000108 16; α(M)=2.4×10^{-5} 4; α(N+..)=4.35×10^{-5} 8. α(N)=5.5×10^{-6} 8; α(O)=8.0×10^{-7} 12; α(P)=4.4×10^{-8} 7; α(IPF)=3.71×10^{-5} 8. Mult.: from Adopted Gammas. E1 from α(K)exp=0.8×10^{-3} 4 (1979Ad06), 0.00092 20 (1993BaZS). δ: from Adopted Gammas. Other δ: +0.1 2 (1985DaZV), +0.05 10 from γ(θ,H,t) (1995KrZX).
1242.2 3	2101.6	0.035 7				
1248.78 3	1513.760	1.175 25	E1+M2	+0.13 3	0.008	α(K)=0.004 4; α(L)=0.0006 5; α(M)=0.00013 11; α(N+..)=5.8×10^{-5} 10. α(N)=3.×10^{-5} 3; α(O)=4.×10^{-6} 4; α(P)=2.5×10^{-7} 21; α(IPF)=2.3×10^{-5} 20. Mult.,δ: from Adopted Gammas; E1(+M2) from α(K)exp=0.0011 4 (1993BaZS).
1256.7 3	2212.97	0.047 20				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1263.412 *16*	1528.404	4.77 *10*	E2		0.00212	α(K)=0.001772 *25*; α(L)=0.000259 *4*; α(M)=5.72×10^{-5} *8*; α(N+..)=2.85×10^{-5} *4*. α(N)=1.331×10^{-5} *19*; α(O)=1.91×10^{-6} *3*; α(P)=1.010×10^{-7} *15*; α(IPF)=1.315×10^{-5} *19*. Mult.: from Adopted Gammas; consistent with α(K)exp=0.0030 *12* (1979Ad06) and 0.0021 *4* (1993BaZS).
1273.540 *16*	2132.951	78.6 *16*	M1+E2	−0.11 *8*	0.00344 *6*	α(K)=0.00290 *5*; α(L)=0.000407 *7*; α(M)=8.96×10^{-5} *15*; α(N+..)=4.18×10^{-5} *7*. α(N)=2.09×10^{-5} *4*; α(O)=3.04×10^{-6} *5*; α(P)=1.73×10^{-7} *3*; α(IPF)=1.77×10^{-5} *3*. Mult.: from α(K)exp=0.0029 *2*. δ: −0.11 *8* (1985DaZV); however, δ=+0.30 *6* from 1273γ–778γ(θ) (1993AdZY).
1287.1 *3*	2243.099	0.023 *6*				
1290.368 *22*	2076.305	0.416 *11*				
1300.725 *16*	2160.121	7.05 *14*	M1		0.00330	α(K)=0.00278 *4*; α(L)=0.000388 *6*; α(M)=8.55×10^{-5} *12*; α(N+..)=4.61×10^{-5} *7*. α(N)=1.99×10^{-5} *3*; α(O)=2.90×10^{-6} *4*; α(P)=1.648×10^{-7} *23*; α(IPF)=2.31×10^{-5} *4*. Mult.: from α(K)exp=0.0028 *3*.
1307.17 *15*	1572.206	0.023 *6*				
1313.37 *3*	2172.757	1.13 *3*	M1,E2		0.0026 *7*	α(K)=0.0022 *6*; α(L)=0.00031 *7*; α(M)=6.8×10^{-5} *16*; α(N+..)=4.2×10^{-5} *7*. α(N)=1.6×10^{-5} *4*; α(O)=2.3×10^{-6} *6*; α(P)=1.3×10^{-7} *4*; α(IPF)=2.37×10^{-5} *23*. Mult.: from α(K)exp=0.0014 *7*.
1315.6 *8*	2101.6	0.090 *9*				
1334.74 *21*	2290.997	0.042 *7*	M1(+E2)		0.0025 *6*	α(K)=0.0021 *5*; α(L)=0.00030 *7*; α(M)=6.6×10^{-5} *15*; α(N+..)=4.6×10^{-5} *7*. α(N)=1.5×10^{-5} *4*; α(O)=2.2×10^{-6} *6*; α(P)=1.2×10^{-7} *4*; α(IPF)=2.8×10^{-5} *3*. Mult.: from α(K)exp≈0.0048 *8* (1993BaZS).

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1347.035 *18*	2132.951	5.79 *12*	M1		0.00304	α(K)=0.00255 *4*; α(L)=0.000357 *5*; α(M)=7.86×10^{-5} *11*; α(N+..)=5.56×10^{-5} *8*. α(N)=1.83×10^{-5} *3*; α(O)=2.67×10^{-6} *4*; α(P)=1.516×10^{-7} *22*; α(IPF)=3.45×10^{-5} *5*. Mult.: from α(K)exp=0.0024 *3*.
1353.27 *25*	2212.97	0.050 *15*				
1356.62 *4*	2215.972	0.09 *6*				Mult.: α(K)exp=0.008 *6* (1993BaZS).
1374.194 *25*	2160.121	29.6 *7*	M1+E2	−0.11 *4*	0.00290 *5*	α(K)=0.00242 *4*; α(L)=0.000339 *5*; α(M)=7.46×10^{-5} *11*; α(N+..)=6.24×10^{-5} *9*. α(N)=1.74×10^{-5} *3*; α(O)=2.53×10^{-6} *4*; α(P)=1.438×10^{-7} *21*; α(IPF)=4.23×10^{-5} *6*. Mult.: from α(K)exp=0.0023 *2*. δ: weighted average of −0.18 *7* (1985DaZV) and −0.09 *4* from 1374γ–785γ(θ) (1993AdZY). Others: +0.01 *14* from 1374γ–705γ(θ) (1993AdZY), −0.34 *+17–12* from γ(θ,H,t) (1995KrZX).
1378.6 *10*	1458.164	0.040 *20*				
1383.5 *3*	2243.099	0.06 *3*				
ˣ1388.47 *5*		0.22 *3*				
1396.8 *4*	2352.91	0.015 *8*				
1401.16 *4*	2260.66	0.39 *3*				
ˣ1406.6 *3*		0.023 *8*				
1413.81 *4*	1678.77	0.310 *15*	M1(+E2+E0)	+0.35 *30*	0.062 *21*	α(K)=0.00218 *17*; α(L)=0.000306 *22*; α(M)=6.7×10^{-5} *5*; α(N+..)=7.2×10^{-5} *4*. α(N)=1.57×10^{-5} *11*; α(O)=2.28×10^{-6} *17*; α(P)=1.29×10^{-7} *11*; α(IPF)=5.43×10^{-5} *20*. Mult.: from α(K)exp=0.0048 *16* (1993BaZS). α: approximate value from α(K)exp x 1.3.
1427.06 *20*	2212.97	0.14 *4*				
1430.2 *3*	2215.972	0.86 *20*				
1431.6 *3*	2290.997	1.8 *3*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1433.1 *3*	1513.760	2.3 *4*	E1+M2	+0.054 *+19−27*	8.70×10^{-4}	α(K)=0.000615 *9*; α(L)=8.18×10^{-5} *12*; α(M)=1.79×10^{-5} *3*; α(N+..)=0.0001553 *22*. α(N)=4.16×10^{-6} *6*; α(O)=6.03×10^{-7} *9*; α(P)=3.39×10^{-8} *5*; α(IPF)=0.0001505 *22*. Mult.,δ: from Adopted Gammas; E1 from α(K)exp=0.0009 *3* (1993BaZS).
1437.3 *3*	2393.14	0.30 *4*				
1447.820 *25*	1528.404	3.39 *8*	M1+E2+E0	+0.5 *3*	0.0021 *5*	α(K)=0.0018 *4*; α(L)=0.00025 *6*; α(M)=5.5×10^{-5} *12*; α(N+..)=7.6×10^{-5} *9*. α(N)=1.3×10^{-5} *3*; α(O)=1.8×10^{-6} *4*; α(P)=1.03×10^{-7} *25*; α(IPF)=6.1×10^{-5} *6*. Mult.: from α(K)exp=0.0038 *9* (1993BaZS). δ: from Adopted Gammas.
1457.17[a] *5*	2243.099	0.35 *5*				
1474.84 *4*	2260.66	0.593 *16*	M1,E2		0.0021 *5*	α(K)=0.0017 *4*; α(L)=0.00024 *5*; α(M)=5.2×10^{-5} *11*; α(N+..)=8.5×10^{-5} *10*. α(N)=1.2×10^{-5} *3*; α(O)=1.8×10^{-6} *4*; α(P)=9.9×10^{-8} *24*; α(IPF)=7.1×10^{-5} *7*. Mult.: from α(K)exp= 1.8×10^{-3} *10*.
1487.01 *15*	2273.01	0.046 *8*				
1493.43 *16*	2352.91	0.081 *12*				
x1495.57 *18*		0.074 *12*				
1505.00 *4*	2290.997	4.37 *10*	M1(+E2)	−0.2 *+2−3*	0.00237 *14*	α(K)=0.00194 *12*; α(L)=0.000270 *16*; α(M)=5.9×10^{-5} *4*; α(N+..)=0.000105 *4*. α(N)=1.39×10^{-5} *8*; α(O)=2.02×10^{-6} *12*; α(P)=1.15×10^{-7} *8*; α(IPF)=8.9×10^{-5} *3*. Mult.: from α(K)exp=0.0024 *10*. δ: from 1985DaZV.
1518.8 *9*	2377.77	0.026 *6*				
1522.85 *4*	2382.27	0.552 *21*	M1(+E2)		0.0019 *4*	α(K)=0.0016 *4*; α(L)=0.00022 *5*; α(M)=4.9×10^{-5} *10*; α(N+..)=0.000101 *12*. α(N)=1.14×10^{-5} *23*; α(O)=1.6×10^{-6} *4*; α(P)=9.2×10^{-8} *22*; α(IPF)=8.8×10^{-5} *9*. Mult.: from α(K)exp= 2.4×10^{-3} *9*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1528.38 *4*	1528.404	0.207 *17*	E2		1.54×10^{-3}	α(K)=0.001235 *18*; α(L)=0.0001753 *25*; α(M)=3.86×10^{-5} *6*; α(N+..)=9.19×10^{-5} *13*. α(N)=8.99×10^{-6} *13*; α(O)=1.295×10^{-6} *19*; α(P)=7.03×10^{-8} *10*; α(IPF)=8.15×10^{-5} *12*. Mult.: from α(K)exp>0.0013.
1533.80 *19*	2393.14	0.024 *6*				
1554.33 *20*	2413.68	0.030 *15*				
x1562.05 *9*		0.068 *12*				
1575.65 *26*	2435.11	0.14 *3*				
x1577.5 *3*		0.051 *20*				
1581.8 *8*	1662.32	0.15 *6*	E1(+M2)	−0.027 *27*	8.69×10^{-4} *15*	α(K)=0.000523 *11*; α(L)=6.94×10^{-5} *15*; α(M)=1.52×10^{-5} *4*; α(N+..)=0.000261 *4*. α(N)=3.53×10^{-6} *8*; α(O)=5.11×10^{-7} *11*; α(P)=2.89×10^{-8} *7*; α(IPF)=0.000257 *4*. Mult.,δ: from Adopted Gammas.
1586.68 *8*	2542.88	0.143 *24*				
1591.77 *6*	2377.77	0.812 *18*	E2,M1		0.0018 *4*	α(K)=0.0014 *3*; α(L)=0.00020 *4*; α(M)=4.4×10^{-5} *9*; α(N+..)=0.000128 *14*. α(N)=1.03×10^{-5} *20*; α(O)=1.5×10^{-6} *3*; α(P)=8.4×10^{-8} *19*; α(IPF)=0.000116 *12*. Mult.: from α(K)exp=0.0026 *14*.
1596.7 *5*	2382.27	0.045 *20*				
1607.18 *3*	2393.14	0.79 *4*	E2,M1		0.0018 *4*	α(K)=0.0014 *3*; α(L)=0.00020 *4*; α(M)=4.3×10^{-5} *9*; α(N+..)=0.000134 *15*. α(N)=1.01×10^{-5} *20*; α(O)=1.5×10^{-6} *3*; α(P)=8.2×10^{-8} *18*; α(IPF)=0.000122 *13*. Mult.: from α(K)exp= 2.0×10^{-3} *11*.
1615.88 *7*	2475.40	0.153 *11*				
1622.45 *3*	1703.057	2.39 *6*	E2,M1		0.0018 *4*	α(K)=0.0014 *3*; α(L)=0.00019 *4*; α(M)=4.2×10^{-5} *8*; α(N+..)=0.000140 *16*. α(N)=9.9×10^{-6} *19*; α(O)=1.4×10^{-6} *3*; α(P)=8.0×10^{-8} *18*; α(IPF)=0.000129 *13*. Mult.: from α(K)exp=0.0021 *11*.
1627.8 *3*	2413.68	0.16 *3*				If this is the same transition as the 1630γ in (n,n'γ), mult=D+Q, δ=+15 *+31−5*.
1629.4[d] *3*	1894.364	0.15[d] *3*				
	2586.07	0.15[d] *3*				
x1641.10[a] *20*		0.127 *15*				
1649.19 *10*	2435.11	0.33 *6*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1652.76 *3*	1917.767	5.60 *15*	E1		8.75×10^{-4}	α(K)=0.000484 *7*; α(L)=6.40×10^{-5} *9*; α(M)=1.399×10^{-5} *20*; α(N+..)=0.000313 *5*. α(N)=3.26×10^{-6} *5*; α(O)=4.72×10^{-7} *7*; α(P)=2.67×10^{-8} *4*; α(IPF)=0.000310 *5*. δ: <−0.03 from γγ(θ) (1980Bu26); −0.05 *8* from A_2=−0.10 *7*, A_4=−0.06 *16* for 1653γ–184γ(θ) (1993AdZY). Mult.: from α(K)exp=0.0005 *2*.
1658.4 *3*	2444.16	0.097 *20*				
1662.33 *20*	1662.32	0.120 *15*	E1		8.77×10^{-4}	Mult.: from Adopted Gammas.
1673.5 *4*	1938.273	0.078 *20*				
1683.3 *3*	2542.88	0.08 *3*				
x1688.6 *4*		0.041 *15*				
1690.2 *4*	2475.40	0.043 *15*				
x1703.0 *5*		0.055 *22*				
1704.7 *3*	1969.71	0.17 *4*				
x1707.7 *5*		0.032 *12*				
x1714.2 *5*		0.025 *10*				
1720.87 *20*	1985.644	0.26 *3*	(E1)		8.89×10^{-4}	α(K)=0.000453 *7*; α(L)=5.98×10^{-5} *9*; α(M)=1.307×10^{-5} *19*; α(N+..)=0.000363 *5*. α(N)=3.04×10^{-6} *5*; α(O)=4.41×10^{-7} *7*; α(P)=2.50×10^{-8} *4*; α(IPF)=0.000360 *5*. Mult.: E1,E2 from α(K)exp=0.6×10^{-3} *4*.
1726.3 *5*	2586.07	0.021 *8*				
x1730.5 *5*		0.12 *4*				
1731.9 *5*	1813.2	0.12 *4*	(M1+E2)			Mult.: from Adopted Gammas.
1737.09 *20*	2001.874	0.41 *2*	(E1)		8.93×10^{-4}	α(K)=0.000446 *7*; α(L)=5.89×10^{-5} *9*; α(M)=1.287×10^{-5} *18*; α(N+..)=0.000375 *6*. α(N)=2.99×10^{-6} *5*; α(O)=4.34×10^{-7} *6*; α(P)=2.46×10^{-8} *4*; α(IPF)=0.000372 *6*. Mult.: E1,E2 from α(K)exp=0.7×10^{-3} *4*.
1749.78 *7*	1830.42	0.113 *8*	(E1(+M2))		0.0023 *15*	Mult.: from Adopted Gammas.
x1755.5 *5*		0.033 *6*				
1758.06 *20*	2022.62	0.101 *9*				
1781.40 *15*	2046.88	0.110 *12*				
1784.58 *4*	1865.17	0.489 *25*				
1810.6 *5*	2076.305	0.10 *3*				
1813.4d *3*	1813.2	0.37d *5*	(M1)			Mult.: from Adopted Gammas.
	1894.364	0.37d *5*				
x1824.10 *20*		0.51 *10*				
1830.9 *5*	1830.42	0.050 *20*	(E1)		9.20×10^{-4}	Mult.: from Adopted Gammas.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1837.17 *3*	1917.767	3.95 *9*	E1		9.22×10^{-4}	α(K)=0.000407 *6*; α(L)=5.37×10^{-5} *8*; α(M)=1.172×10^{-5} *17*; α(N+..)=0.000449 *7*. α(N)=2.73×10^{-6} *4*; α(O)=3.96×10^{-7} *6*; α(P)=2.25×10^{-8} *4*; α(IPF)=0.000446 *7*. Mult.: from α(K)exp= 5.3×10^{-4} *25*.
1846.6 *3*	2632.66	0.08 *3*				
1853.1 *10*	2117.8	0.25 *6*				
1857.62 *17*	1938.273	0.10 *3*				
1867.94 *3*	2132.951	21.4 *5*	M1+E2	+3.49 *+10−3*	1.26×10^{-3}	α(K)=0.000878 *13*; α(L)=0.0001218 *18*; α(M)=2.68×10^{-5} *4*; α(N+..)=0.000232 *4*. α(N)=6.24×10^{-6} *9*; α(O)=9.02×10^{-7} *13*; α(P)=5.01×10^{-8} *7*; α(IPF)=0.000225 *4*. δ: from γγ(θ) (1980Bu26). Others: 3.7 *+57−18* (1987Kr12). +4.3 *+10−7* from 1868γ−184γ(θ) (1993AdZY), +3.6 *+24−12* from γ(θ,H,t) (1995KrZX). Mult.: from α(K)exp= 0.81×10^{-3} *9*.
ˣ1883.18 *11*		0.127 *22*				
1889.12 *20*	1969.71	0.14 *3*				
1895.12 *3*	2160.121	6.4 *20*	M1+E2	+2.63 *4*	1.27×10^{-3}	α(K)=0.000870 *13*; α(L)=0.0001206 *17*; α(M)=2.65×10^{-5} *4*; α(N+..)=0.000248 *4*. α(N)=6.17×10^{-6} *9*; α(O)=8.94×10^{-7} *13*; α(P)=4.98×10^{-8} *7*; α(IPF)=0.000240 *4*. δ: from γγ(θ) (1980Bu26) based on %E2=87.4 and %M1=12.6 *3*. Other: +2.3 *+6−4* from 1895γ−184γ(θ) (1993AdZY). Mult.: from α(K)exp= 0.76×10^{-3} *10*.
1905.43 *23*	1985.644	0.23 *6*				
1907.71 *6*	2172.757	1.82 *8*	E2,M1		0.00141 *21*	α(K)=0.00098 *16*; α(L)=0.000135 *22*; α(M)=3.0×10^{-5} *5*; α(N+..)=0.00027 *3*. α(N)=6.9×10^{-6} *11*; α(O)=1.00×10^{-6} *17*; α(P)=5.7×10^{-8} *10*; α(IPF)=0.00027 *3*. Mult.: from α(K)exp=0.0015 *6*.
1921.40 *15*	2001.874	0.36 *3*				
ˣ1922.4 *4*		0.06 *3*				
ˣ1929.1 *3*		0.024 *6*				
1941.78 *15*	2022.62	0.22 *3*				
1943.6 *15*	2729.094	0.06 *4*				

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
1948.2[f] *3*	2212.97	0.071 *8*				
x1966.52 *4*		0.234 *23*	M1,M2			Eγ: close to, but inconsistent with, Eγ expected for a 2047 to 81 transition. Mult.: from α(K)exp=0.0023 *15*.
x1976.38 *20*		0.29 *3*				
1978.12 *20*	2243.099	0.43 *3*	E1		9.71×10^{-4}	α(K)=0.000361 *5*; α(L)=4.75×10^{-5} *7*; α(M)=1.038×10^{-5} *15*; α(N+..)=0.000552 *8*. α(N)=2.41×10^{-6} *4*; α(O)=3.51×10^{-7} *5*; α(P)=1.99×10^{-8} *3*; α(IPF)=0.000549 *8*. Mult.: E1,E2 from α(K)exp=1.0×10^{-3} *6*.
x1986.53 *5*		0.194 *10*	M1,E2		0.00136 *19*	α(K)=0.00090 *14*; α(L)=0.000124 *19*; α(M)=2.7×10^{-5} *4*; α(N+..)=0.00031 *4*. α(N)=6.3×10^{-6} *10*; α(O)=9.2×10^{-7} *15*; α(P)=5.2×10^{-8} *9*; α(IPF)=0.00031 *4*. Mult.: from α(K)exp=0.0011 *6*.
1996.10 *15*	2076.305	0.041 *5*				
x2003.4 *3*		0.071 *14*				
2008.00 *4*	2273.01	1.21 *3*	E1		9.82×10^{-4}	α(K)=0.000353 *5*; α(L)=4.64×10^{-5} *7*; α(M)=1.012×10^{-5} *15*; α(N+..)=0.000573 *8*. α(N)=2.36×10^{-6} *4*; α(O)=3.42×10^{-7} *5*; α(P)=1.95×10^{-8} *3*; α(IPF)=0.000571 *8*. Mult.: from α(K)exp= 0.44×10^{-3} *25*.
2017.67 *7*	2282.68	0.200 *20*				
x2022.03 *20*		0.09 *3*				
2026.06[d] *11*	2290.997	0.120[d] *20*				
	2811.99	0.120[d] *20*				
2036.8 *12*	2117.8	0.100 *20*				
2052.36 *3*	2132.951	91.0 *18*	M1+E2	+7.0 *5*	1.16×10^{-3}	α(K)=0.000723 *11*; α(L)=9.96×10^{-5} *14*; α(M)=2.19×10^{-5} *3*; α(N+..)=0.000314 *5*. α(N)=5.09×10^{-6} *8*; α(O)=7.37×10^{-7} *11*; α(P)=4.12×10^{-8} *6*; α(IPF)=0.000308 *5*. δ: from γγ(θ) (1980Bu26). Others: +9 *+19−4* (1985DaZV), +6.0 *+76−24* from γ(θ,H,t) (1995KrZX). Mult.: from α(K)exp= 0.77×10^{-3} *8*.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	δ	α	Comments
2079.53 *3*	2160.121	33.3 *7*	M1+E2	+5.2 *+15−5*	1.16×10^{-3}	α(K)=0.000709 *11*; α(L)=9.76×10^{-5} *15*; α(M)=2.14×10^{-5} *4*; α(N+..)=0.000328 *5*. α(N)=4.99×10^{-6} *8*; α(O)=7.23×10^{-7} *11*; α(P)=4.04×10^{-8} *6*; α(IPF)=0.000322 *5*. Mult.: from α(K)exp= 0.72×10^{-3} *7*. δ: from γγ(θ) (1980Bu26). Others: +10+∞−6 (1985DaZV), +10 +∞−6 from γ(θ,H,t) (1995KrZX).
2092.13 *3*	2172.757	8.26 *18*	M1+E2	+3.7 *+19−7*	1.16×10^{-3} *2*	α(K)=0.000709 *13*; α(L)=9.74×10^{-5} *18*; α(M)=2.14×10^{-5} *4*; α(N+..)=0.000336 *6*. α(N)=4.98×10^{-6} *10*; α(O)=7.22×10^{-7} *14*; α(P)=4.04×10^{-8} *8*; α(IPF)=0.000331 *6*. Mult.: from α(K)exp= 0.99×10^{-3} *44*. δ: from γγ(θ) (1980Bu26).
ˣ2100.2 *6*		0.032 *9*				
2128.19 *5*	2393.14	0.088 *6*				
2135.36 *4*	2215.972	0.192 *8*				
2148.6 *3*	2413.68	0.012 *3*				Iγ: there is a discrepancy. Iγ=0.12 *3* in table 1 but 0.01 in table 2 of 1989Ad11.
2162.54 *5*	2243.099	0.278 *11*	E1		1.04×10^{-3}	α(K)=0.000313 *5*; α(L)=4.11×10^{-5} *6*; α(M)=8.98×10^{-6} *13*; α(N+..)=0.000680 *10*. α(N)=2.09×10^{-6} *3*; α(O)=3.04×10^{-7} *5*; α(P)=1.730×10^{-8} *25*; α(IPF)=0.000678 *10*. Mult.: from α(K)exp= 0.29×10^{-3} *17*.
ˣ2176.61 *6*		0.184 *8*	M1,E2		0.00128 *16*	α(K)=0.00074 *10*; α(L)=0.000102 *14*; α(M)=2.2×10^{-5} *3*; α(N+..)=0.00041 *5*. α(N)=5.2×10^{-6} *7*; α(O)=7.6×10^{-7} *11*; α(P)=4.3×10^{-8} *7*; α(IPF)=0.00041 *5*. Mult.: from α(K)exp=0.0015 *9*.
2183.68 *7*	2264.31	0.117 *7*	Q(+D)			Mult.: from Adopted Gammas.

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	α	Comments
2192.43 *4*	2273.01	1.09 *3*	E1	1.06×10^{-3}	α(K)=0.000307 *5*; α(L)=4.02×10^{-5} *6*; α(M)=8.78×10^{-6} *13*; α(N+..)=0.000700 *10*. α(N)=2.04×10^{-6} *3*; α(O)=2.97×10^{-7} *5*; α(P)=1.693×10^{-8} *24*; α(IPF)=0.000698 *10*. Mult.: from α(K)exp=0.40×10^{-3} *23*.
2202.09 *6*	2282.68	0.238 *10*	E1,E2		Mult.: from α(K)exp=0.68×10^{-3} *37*.
2210.49 *6*	2290.997	0.323 *12*			
2247.90 *20*	2328.69	0.0118 *19*			
x2254.5 *3*		0.007 *3*			
x2257.0 *3*		0.0096 *25*			
2264.34 *8*	2264.31	0.038 *3*			
2272.33 *15*	2352.91	0.0228 *23*			
2277.88 *8*	2542.88	0.056 *2*			
x2284.6 *3*		0.0087 *19*			
2297.26 *10*	2377.77	0.079 *4*	E2,M1	0.00125 *14*	α(K)=0.00066 *8*; α(L)=9.1×10^{-5} *11*; α(M)=1.99×10^{-5} *24*; α(N+..)=0.00048 *5*. α(N)=4.6×10^{-6} *6*; α(O)=6.8×10^{-7} *9*; α(P)=3.8×10^{-8} *5*; α(IPF)=0.00047 *5*. Mult.: from α(K)exp=0.0014 *8*.
x2302.85 *8*		0.112 *10*	E2,M1	0.00125 *14*	α(K)=0.00066 *8*; α(L)=9.0×10^{-5} *11*; α(M)=1.98×10^{-5} *24*; α(N+..)=0.00048 *5*. α(N)=4.6×10^{-6} *6*; α(O)=6.7×10^{-7} *9*; α(P)=3.8×10^{-8} *5*; α(IPF)=0.00047 *5*. Mult.: from α(K)exp=0.9×10^{-3} *6*.
x2309.3 *3*		0.0145 *17*			
2312.57 *9*	2393.14	0.082 *4*	M1	1.38×10^{-3}	α(K)=0.000726 *11*; α(L)=9.98×10^{-5} *14*; α(M)=2.19×10^{-5} *3*; α(N+..)=0.000532 *8*. α(N)=5.12×10^{-6} *8*; α(O)=7.46×10^{-7} *11*; α(P)=4.27×10^{-8} *6*; α(IPF)=0.000526 *8*. Mult.: from α(K)exp=1.5×10^{-3} *9*.
2321.18 *18*	2586.07	0.0122 *18*			
2328.72 *10*	2328.69	0.0225 *21*			
2333.11 *10*	2413.68	0.0247 *25*			
x2352.7 *10*		0.006 *3*			
2354.6 *10*	2619.6	0.009 *4*			
2363.3 *4*	2444.16	0.0186 *22*			
x2366.6 *4*		0.0163 *24*			
2377.84 *8*	2377.77	0.100 *10*	M1	1.37×10^{-3}	α(K)=0.000682 *10*; α(L)=9.36×10^{-5} *14*; α(M)=2.06×10^{-5} *3*; α(N+..)=0.000570 *8*. α(N)=4.80×10^{-6} *7*; α(O)=6.99×10^{-7} *10*; α(P)=4.00×10^{-8} *6*; α(IPF)=0.000564 *8*. Mult.: from α(K)exp=0.0010 *6*.
2383.91 *10*	2464.52	0.066 *6*	E2,M1	0.00124 *13*	α(K)=0.00061 *7*; α(L)=8.4×10^{-5} *10*; α(M)=1.84×10^{-5} *21*; α(N+..)=0.00052 *6*. α(N)=4.3×10^{-6} *5*; α(O)=6.2×10^{-7} *8*; α(P)=3.5×10^{-8} *5*; α(IPF)=0.00052 *6*. Mult.: from α(K)exp=6.5×10^{-4} *40*.
2394.81 *8*	2475.40	0.155 *7*	E2,M1	0.00124 *13*	α(K)=0.00061 *7*; α(L)=8.3×10^{-5} *9*; α(M)=1.82×10^{-5} *21*; α(N+..)=0.00053 *6*. α(N)=4.3×10^{-6} *5*; α(O)=6.2×10^{-7} *7*; α(P)=3.5×10^{-8} *5*; α(IPF)=0.00052 *6*. Mult.: from α(K)exp=0.8×10^{-3} *4*.
x2398.7 *4*		0.014 *4*			
x2403.05 *25*		0.0096 *22*			
x2413.0 *5*		0.007 *3*			
x2423.95 *10*		0.128 *4*	E2,M1	0.00123 *13*	α(K)=0.00059 *6*; α(L)=8.1×10^{-5} *9*; α(M)=1.78×10^{-5} *20*; α(N+..)=0.00054 *6*. α(N)=4.1×10^{-6} *5*; α(O)=6.0×10^{-7} *7*; α(P)=3.4×10^{-8} *4*; α(IPF)=0.00054 *6*. Mult.: from α(K)exp=0.8×10^{-3} *4*.
x2435.8 *5*		0.019 *3*			
x2438.6 *10*		0.0110 *25*			
x2441.3 *8*		0.016 *3*			

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^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	α	Comments
2444.0 *10*	2444.16	0.0086 *25*			
x2458.51 *20*		0.023 *5*			
2462.5 *5*	2542.88	0.085 *8*			
2464.7 *5*	2464.52	0.126 *10*	M1	1.35×10^{-3}	α(K)=0.000628 *9*; α(L)=8.62×10^{-5} *12*; α(M)=1.89×10^{-5} *3*; α(N+..)=0.000619 *9*. α(N)=4.42×10^{-6} *7*; α(O)=6.44×10^{-7} *9*; α(P)=3.69×10^{-8} *6*; α(IPF)=0.000614 *9*. Mult.: E2,M1 from α(K)exp=9×10^{-4} *5*; ΔJ=1 from Adopted Gammas.
x2490.4 *7*		0.0040 *9*			
x2494.42 *20*		0.0247 *15*			
2505.58 *20*	2586.07	0.0224 *18*			
2520.20 *10*	2600.64	0.110 *7*			
x2524.6 *5*		0.0086 *20*			
2532.3 *3*	2613.50	0.0077 *13*			
x2536.7 *10*		0.014 *3*			
2538.8 *10*	2619.6	0.0145 *26*			
2544.3 *3*	2624.8	0.0146 *25*			
2547.1 *10*	2628.5	0.008 *3*			
2552.12 *20*	2632.66	0.0210 *16*			
x2560.1 *5*		0.029 *4*			
x2562.8 *3*		0.084 *4*	E2,M1	0.00123 *12*	α(K)=0.00053 *5*; α(L)=7.2×10^{-5} *7*; α(M)=1.58×10^{-5} *16*; α(N+..)=0.00061 *7*. α(N)=3.7×10^{-6} *4*; α(O)=5.4×10^{-7} *6*; α(P)=3.1×10^{-8} *4*; α(IPF)=0.00061 *7*. Mult.: from α(K)exp=1.2×10^{-3} *6*.
2591.4 *3*	2671.98	0.013 *4*			
2598.2 *4*	2679.05	0.125 *25*			
2600.76 *20*	2600.64	0.225 *25*	M1	1.34×10^{-3}	α(K)=0.000557 *8*; α(L)=7.63×10^{-5} *11*; α(M)=1.675×10^{-5} *24*; α(N+..)=0.000694 *10*. α(N)=3.91×10^{-6} *6*; α(O)=5.69×10^{-7} *8*; α(P)=3.26×10^{-8} *5*; α(IPF)=0.000690 *10*. Mult.: E2,M1 from α(K)exp=0.7×10^{-3} *4*; D from Adopted Gammas.
2613.75 *20*	2613.50	0.0188 *18*			
2619.7 *8*	2619.6	0.021 *14*			
x2620.8 *6*		0.042 *4*			
2624.4 *7*	2624.8	0.0150 *15*			
2628.5 *3*	2628.5	0.0215 *21*			
2648.50 *2*	2729.094	0.092 *6*	E2,M1	0.00123 *12*	α(K)=0.00049 *4*; α(L)=6.7×10^{-5} *6*; α(M)=1.48×10^{-5} *13*; α(N+..)=0.00066 *7*. α(N)=3.4×10^{-6} *3*; α(O)=5.0×10^{-7} *5*; α(P)=2.9×10^{-8} *3*; α(IPF)=0.00065 *7*. Mult.: from α(K)exp=0.9×10^{-3} *5*.
2671.95 *20*	2671.98	0.0262 *19*			
2679.09 *20*	2679.05	0.241 *18*	M1	1.34×10^{-3}	α(K)=0.000521 *8*; α(L)=7.13×10^{-5} *10*; α(M)=1.566×10^{-5} *22*; α(N+..)=0.000737 *11*. α(N)=3.65×10^{-6} *6*; α(O)=5.32×10^{-7} *8*; α(P)=3.05×10^{-8} *5*; α(IPF)=0.000733 *11*. Mult.: E2,M1 from α(K)exp=0.7×10^{-3} *4*; D from Adopted Gammas.
x2682.5 *7*		0.030 *3*			
2703.1 *4*	2783.69	0.0202 *25*			
2716.8 *4*	2797.5	0.0139 *16*			
x2720.2 *4*		0.0102 *20*			
2728.9 *10*	2729.094	0.0065 *20*			
2732.0 *10*	2811.99	0.0060 *20*			
x2740.26 *20*		0.0440 *25*			
x2753.05 *20*		0.0140 *25*			
2777.56 *18*	2858.17	0.0126 *11*			
2783.8 *3*	2783.69	0.0351 *19*	M1		Mult.: E2,M1 from α(K)exp=0.7×10^{-3} *4*; D from Adopted Gammas.
x2795.7 *7*		0.0057 *20*			

Continued on next page (footnotes at end of table)

^{166}Tm ε Decay 1989Ad11 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†b	Mult.‡	Comments
2798.2 *10*	2797.5	0.0043 *18*		
ˣ2801.3 *7*		0.0042 *15*		
ˣ2808.5 *10*		0.0034 *12*		
2811.7 *10*	2811.99	0.0041 *12*	D	Mult.: from Adopted Gammas.
2858.1 *10*	2858.17	0.0035 *15*		
ˣ2861.4 *10*		0.0043 *15*		

† From 1989Ad11, except as noted.

‡ Deduced from α(K)exp=ce(K)/Iγ normalized to α(K)(778.90γ)=4.79×10^{-3} (E2 theory), ce(K) from 1979Ad06, Iγ from 1989Ad11, except as noted.

§ Measured Eγ=1119.50 *4* (Iγ=1.35 *5*) is doublet, Iγ divided by 1989Ad11. α(K)exp=0.00089 *22* for doublet (1993BaZS).

Measured Eγ=194.678 *15* (Iγ=4.34 *13*) is doublet, Iγ divided by 1989Ad11.

@ Measured Eγ=646.75 *4* (Iγ=0.117 *6*) is doublet, Iγ divided by 1989Ad11.

& Eγ deviates by at least 5σ from value expected for this placement. Datum excluded from least–squares fit.

a if the unplaced 1641γ in ε decay corresponds to the 1641γ deexciting a 1722 level in (n,n'γ), then one should also see a 1456.6γ in ε decay. From Iγ(1456.6γ)/Iγ(1641.2γ)=0.78 *16* in (n,n'γ) and I(1641γ)=0.127 *15* in ε decay, one expects Iγ(1456γ)=0.099 *24* for a possible 1456.6 *10* transition in ε decay. This could have been masked by the 1457.17γ, with Iγ=0.35 *5*. However, if present, Iγ(1457γ) from the 2243.1 level in ε decay should then be decreased to 0.25 *6*.

b For absolute intensity per 100 decays, multiply by 0.191 *11*.

d Multiply placed; undivided intensity given.

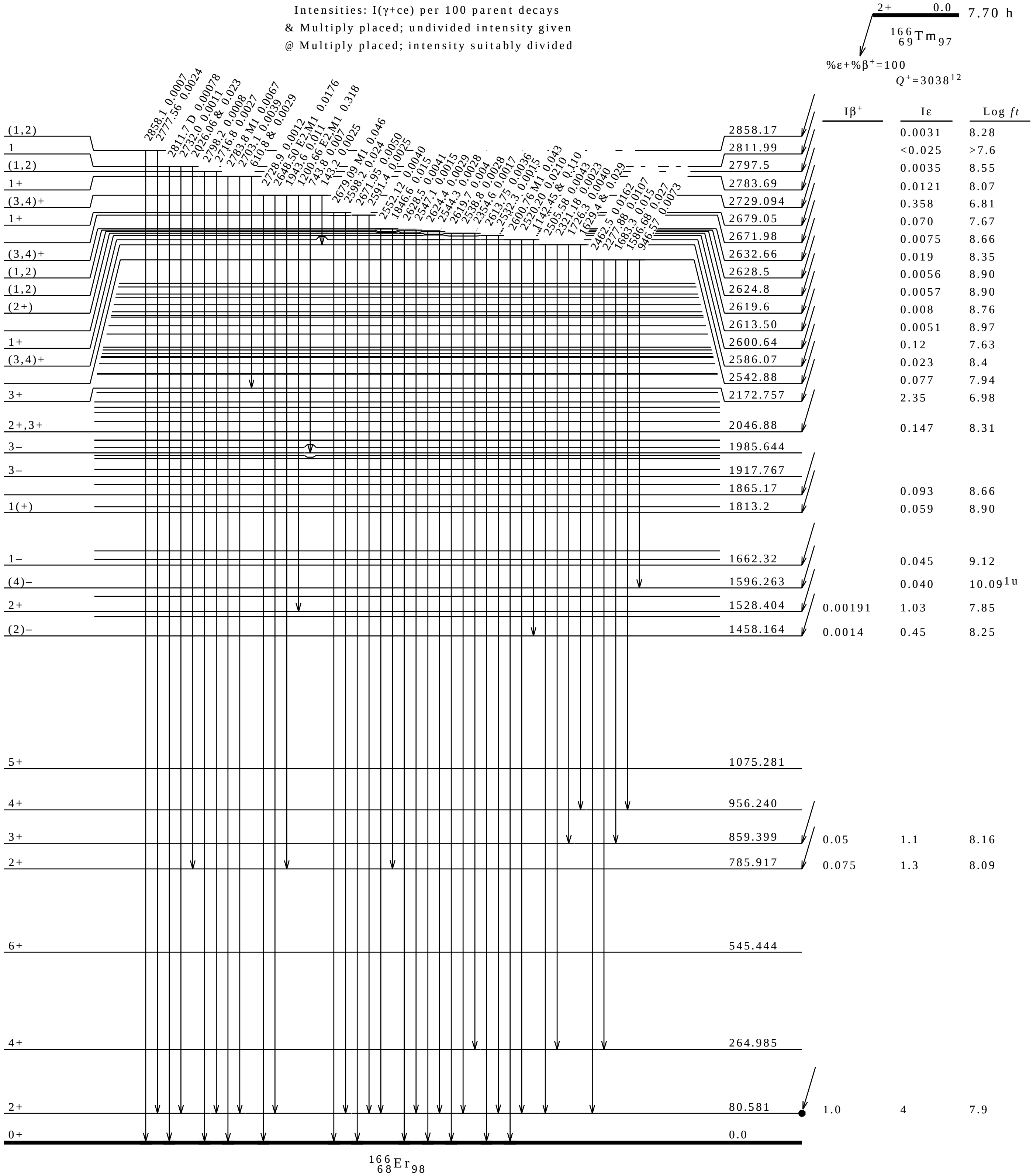
e Multiply placed; intensity suitably divided.

f Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
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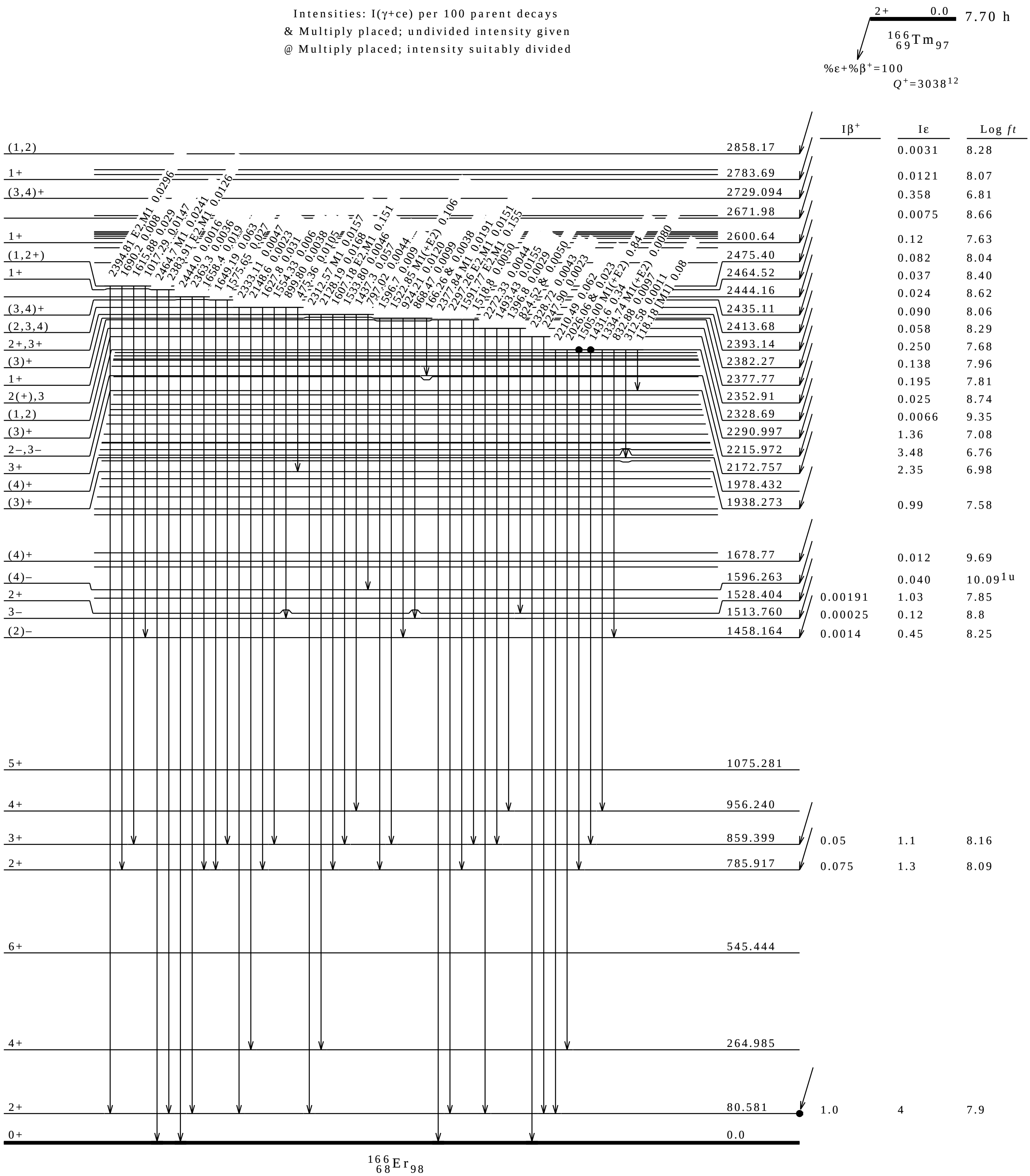
^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



CITATION:
Nuclear Data Sheets (1992)

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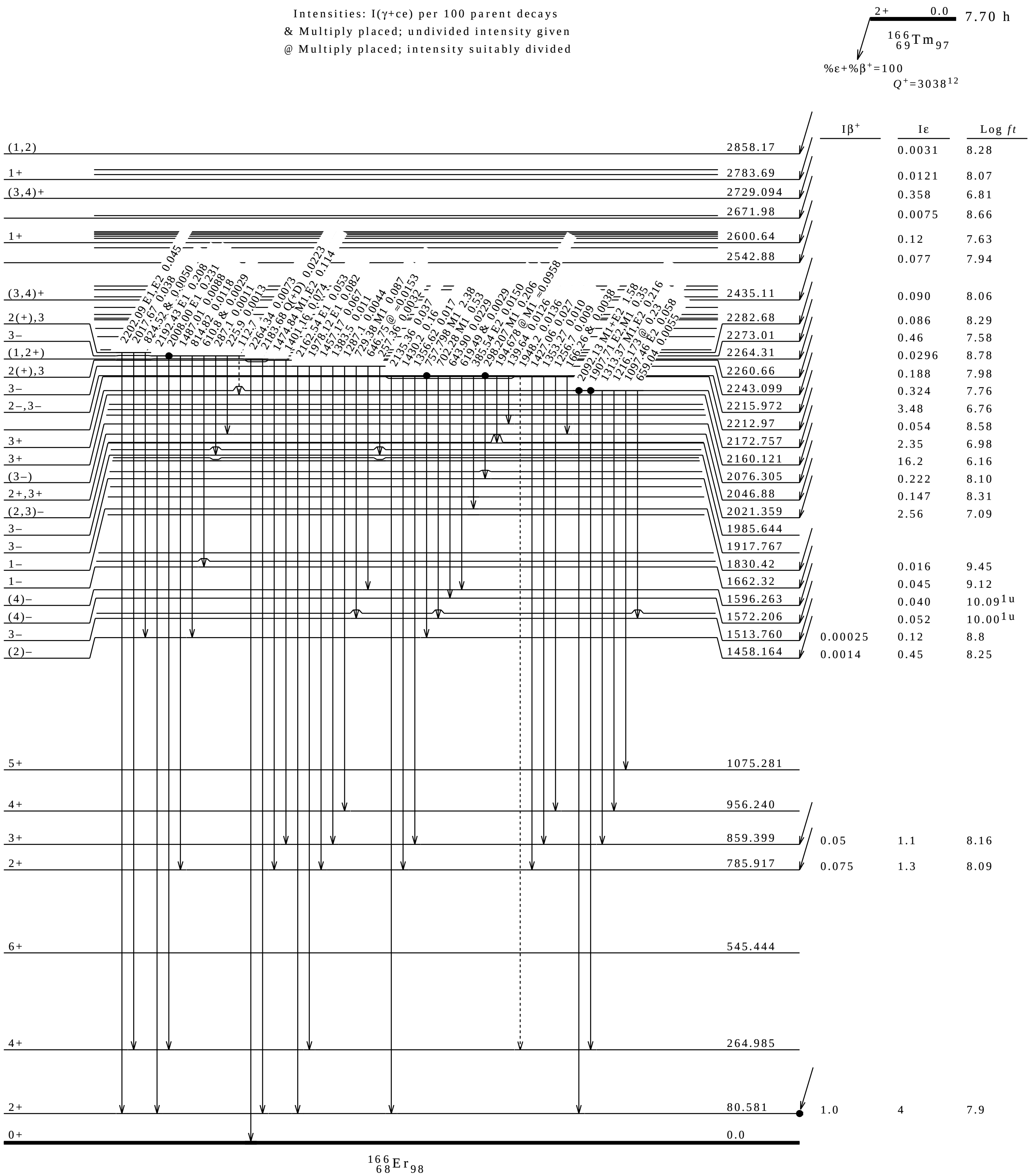
^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme (continued)



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From NNDC(BNL)
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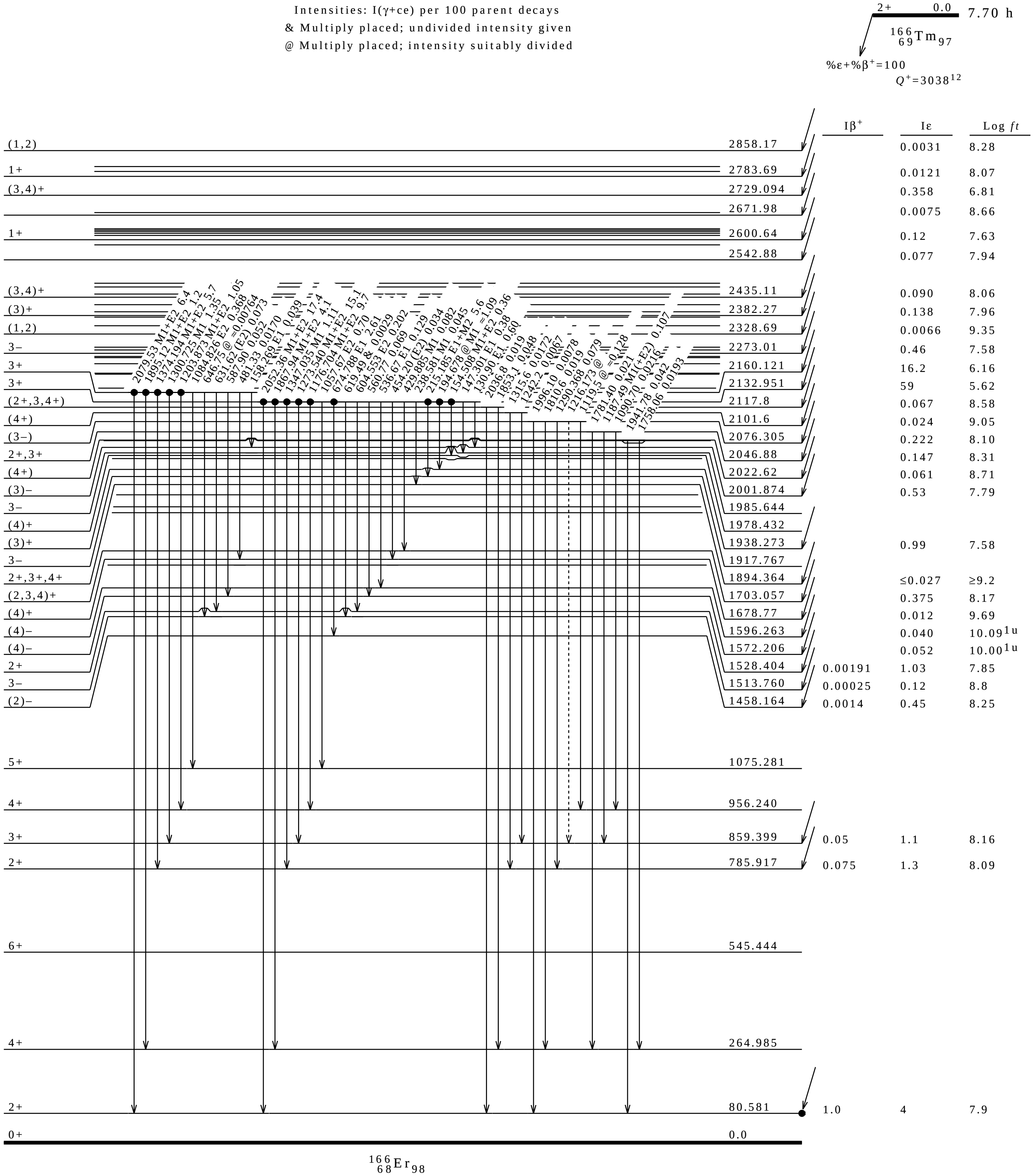
^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



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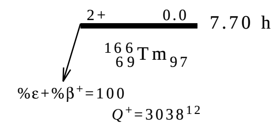
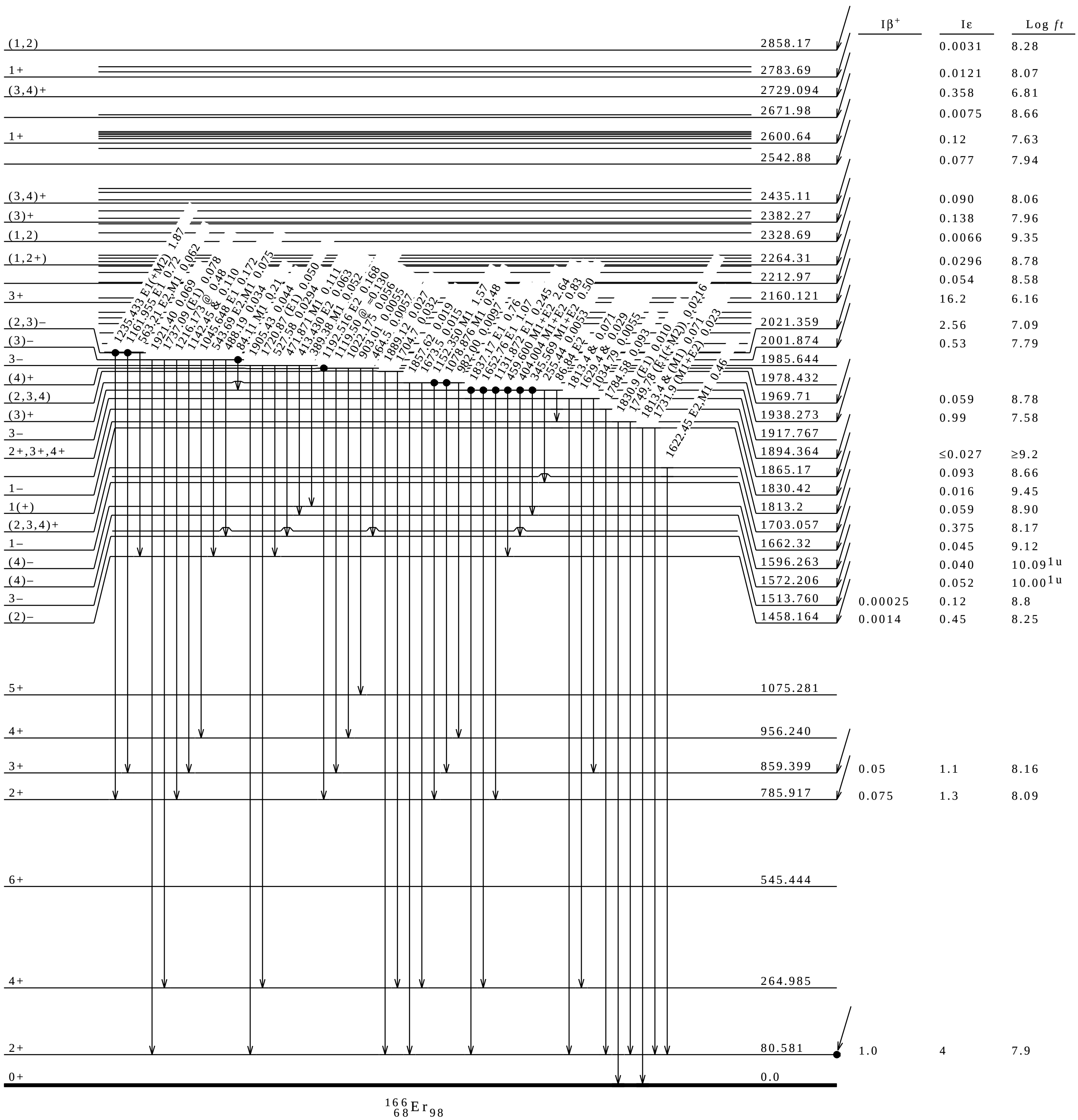
^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided





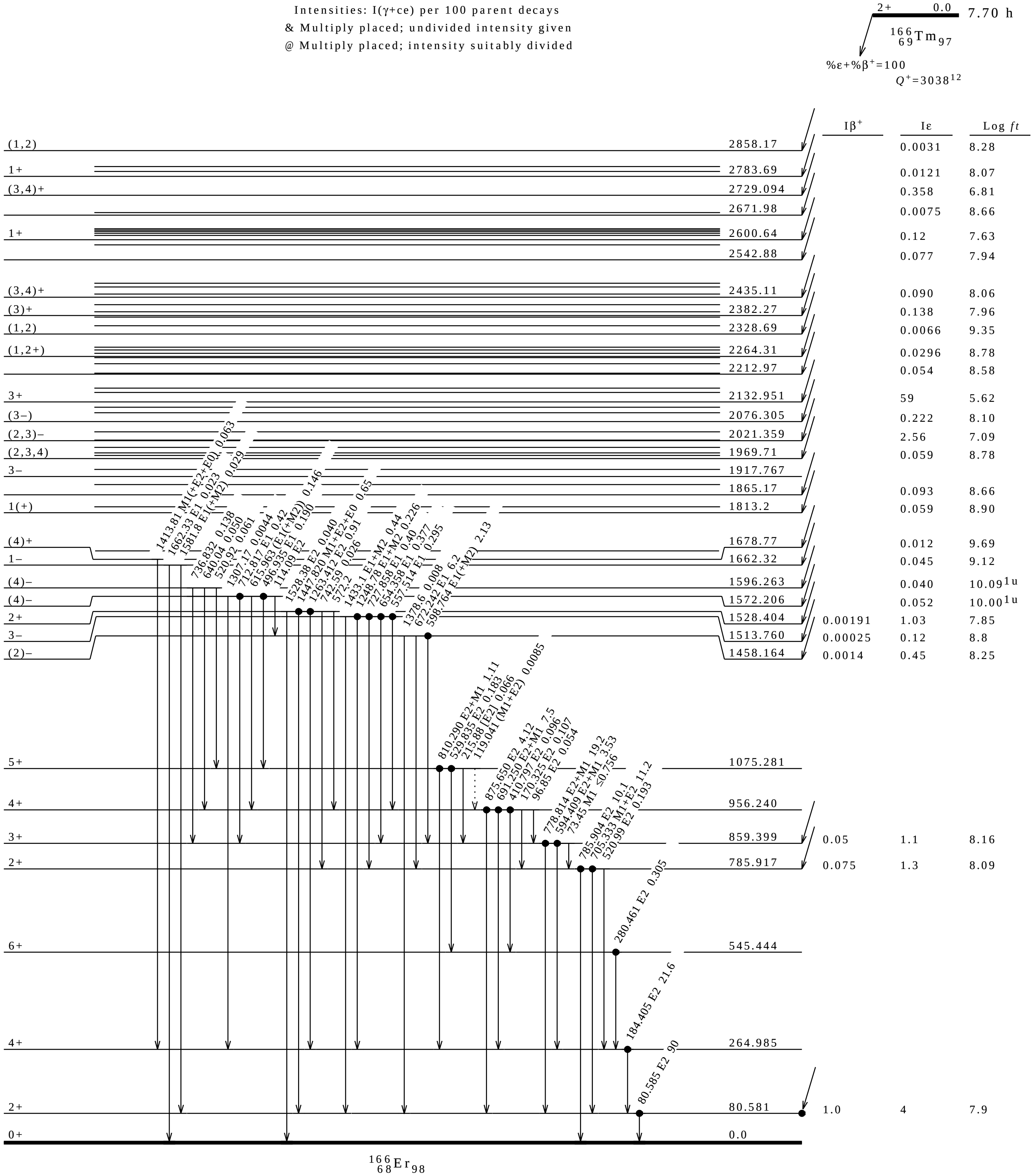
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Tm ε Decay 1989Ad11 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{164}Dy(\alpha,2n\gamma)$ 1985Fi04

Others: 1966Mo01, 1976Da10, 1976We24.
1976We24: E(α)=24 MeV; measured Eγ, Iγ, γγ–coin, γ(θ), Ge(Li). 1976Da10: E(α)=27.5 MeV; measured Eγ, Iγ(θ), γ–coin, Ge(Li). 1985Fi04: E(α)=24 MeV; measured Eγ, Iγ, γγ–coin, I(ce), Ge(Li) and HPGE detectors, mini–orange spectrometer.

^{166}Er Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0§	0+	1528&	(2+)	2144.46b 15	(8−)
80.37§ 8	2+	1555.38# 12	8+	2189.33?# 15	(11+)
264.79§ 10	4+	1596.2@	(4−)	2194.26& 16	(8+)
545.22§ 11	6+	1665.11a 13	5(−)	2245.96a 16	(9−)
785.83# 8	2+	1673.50& 14	(4+)	2328.17a 16	(9−)
859.23# 11	3+	1692.21a 15	5(−)	2388.98§ 20	14+
910.86§ 13	8+	1751.07# 14	9+	2426.5@ 4	(10−)
956.22# 10	4+	1786.66@ 13	6−	2428.38?# 17	(12+)
1074.92# 11	5+	1827.22b 15	6−	2479.39?& 17	(10+)
1215.86# 11	6+	1846.18§ 17	12+	2654.03?# 18	(13+)
1349.18§ 14	10+	1897.03& 15	(6+)	2656.49?& 20	(12+)
1375.86# 12	7+	1963.68# 14	10+	2879.68?# 20	(14+)
1458@	(2)−	1992.36a 16	(7)−	2967.0§ 6	16+
1460&	0+	2072.99@ 14	(8)−		
1514a	3−	2091.96a 16	(7)−		

† From least–squares fit to Eγ.
‡ From Adopted Levels.
§ (A): Kπ=0+ g.s. band.
# (B): Kπ=2+ γ–vibrational band.
@ (C): Kπ=(2−) band. In Adopted Levels, the 1787 level is assigned, instead, to a Kπ=4− band which is strongly mixed with this Kπ=2− band.
& (D): Kπ=(0+) band.
a (E): Kπ=(2−,5−) band. In Adopted Levels, the 1514, 1692 and 2246 levels are assigned, instead, to the Kπ=(2−) band based on the 1458 level, and the 1665 and 2328 levels are assigned to a Kπ=(4)− band (based on a 1572 level that 1985Fi04 do not observe) which mixes strongly with the 2− band. Different or no band assignments are adopted for the 1992 and2091 levels.
b (F): Kπ=(5−) band (1985Fi04). Band not adopted. In Adopted Levels, the 1827 and 2144 levels are assigned, respectively, to Kπ=2− and 4− bands, which are strongly Coriolis mixed. (The latter band is based on a 1572 level which 1985Fi04 do not observe.).

$\gamma(^{166}Er)$

Eγ†	E(level)	Iγ†	Mult.‡	δ§	α	Comments
80.3 1	80.37	3 1	E2#		6.87	A_2=+0.20 3, A_4=−0.01 3 (1976We24).
141.4 1	1215.86	<1				
160.0 1	1375.86	<1				
170.4 1	956.22	<1				
179.3 1	1555.38	<1				
184.6 1	264.79	120 12	E2#		0.329	A_2=+0.27 1, A_4=−0.028 11 (1976We24).
215.6 1	1074.92	1.70 17				
259.5 1	1215.86	2.2 2				A_2=+0.09 18, A_4=−0.22 23 (1976We24).
280.4 1	545.22	100 10	E2#		0.0849	A_2=+0.32 4, A_4=−0.05 5 (1976We24).
286.2 1	2072.99	<1				
300.7 1	1375.86	4.7 5				A_2=+0.40 8, A_4=−0.13 9 (1976We24).
339.7 1	1555.38	5.1 6				A_2=+0.14 7, A_4=+0.24 18 (1976We24).
352.0& 5	2426.5	<1				
365.6 1	910.86	50 5	E2		0.0385	A_2=+0.43 4, A_4=+0.05 4 (1976We24). α(K)exp=0.033 3.
375.2 1	1751.07	6.1 6	E2		0.0358	α(K)exp=0.0276 13. A_2=+0.39 8, A_4=+0.09 9 (1976We24).
401.9 1	1751.07	<1				
408.5 1	1963.68	3.3 3				A_2=+0.48 12, A_4=+0.12 13 (1976We24).
410.7 1	1786.66	<1				
438.2@ 1	1349.18	22.5@ 23				A_2=+0.36 4, A_4=−0.07 5 (1976We24) for multiply–placed γ.
	2189.33?	22.5@ 3				
451.3& 1	2879.68?	<1				

Continued on next page (footnotes at end of table)

^{164}Dy(α,2nγ) 1985Fi04 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†	Mult.‡	δ§	α	Comments
464.7@ *1*	1375.86	1.80@ *18*				A_2=+0.22 *14*, A_4=+0.14 *17* (1976We24) imply D+Q, δ=−3.1 *+9−15* but transition is multiply−placed.
	2428.38?	1.80@ *18*				
	2654.03?	1.80@ *18*				
497.0 *1*	1846.18	7.0 *7*	E2		0.01670	A_2=+0.23 *6*, A_4=−0.064 *8* (1976We24). α(K)exp=0.0130 *10*.
529.8 *1*	1074.92	2.60 *26*	E2+M1	−5.0 *25*	0.0148 *16*	A_2=+0.10 *14*, A_4=+0.37 *18* (1976We24). α(K)exp=0.0124 *10*.
542.8 *1*	2388.98	1.50 *15*	E2		0.01335	α(K)exp=0.0145 *10*.
578.0 *5*	2967.0	<1	E2		0.01143	α(K)exp=0.011 *3*.
594.4 *1*	859.23	<1	E2+M1		0.017 *6*	α(K)exp=0.0138 *16*.
614.3 *1*	1963.68	<1	E2			α(K)exp=0.0073 *8*.
644.6 *1*	1555.38	3.9 *4*	E2+M1		0.014 *5*	δ: A_2=+0.06 *11*, A_4=−0.06 *14* (1976We24); δ=−0.75 *20* or +1.6 *+10−6*. α(K)exp=0.0061 *6*.
670.6 *1*	1215.86	8.5 *9*	E2+M1		0.012 *5*	A_2=−0.15 *7*, A_4=−0.14 *9* (1976We24). δ: −1.2 *+4−8* or −6 + infinity −3 from γ(θ); α(K)exp<α(K)(E2) and <α(K)(M1). α(K)exp=0.0056 *5*.
677.0& *5*	2426.5	<1				
691.4 *1*	956.22	5.4 *5*	E2+M1		0.011 *4*	α(K)exp=0.00900 *19*.
697.2 *1*	2072.99	1.60 *16*	E1			α(K)exp=0.0029 *10*.
705.4 *1*	785.83	3.0 *3*	E2(+M1)		0.011 *4*	α(K)exp=0.0064 *6*.
711.7 *1*	1786.66	2.30 *23*	E1			α(K)exp=0.0039 *4*.
752.3 *1*	1827.22	2.10 *21*	E1			α(K)exp=0.0048 *8*.
768.6 *1*	2144.46	1.40 *14*				
778.8 *1*	859.23	10.0 *10*	E2+M1	<−7	0.009 *3*	A_2=+0.02 *8*; A_4=+0.06 *11* (1976We24). α(K)exp=0.0051 *3*.
785.9 *1*	785.83	3.2 *3*	E2			A_2=−0.31 *22*, A_4=+0.03 *4* (1976We24); inconsistent with stretched Q required by level scheme. α(K)exp=0.0053 *3*.
810.3@ *1*	1074.92	15.6@ *16*	(E2+M1)		0.008 *3*	α(K)exp=0.0054 *4*; A_2=−0.017 *38*, A_4=+0.18 *5*, δ=−84 *+57*− infinity (1976We24) implies mult=(E2+M1), δ<−27 for multiply−placed γ. Based on adopted branching from 1075 level, most or all of I(810.3γ) is attributable to this placement.
	2656.49?	15.6@ *16*				See comment on 810γ from 1075 level.
830.6 *1*	1375.86	11.5 *12*	E2+M1	<−20		A_2=−0.09 *5*, A_4=+0.30 *6*, δ=−37 *+17*− infinity (1976We24). α(K)exp=0.0054 *4*.
840.2@ *1*	1751.07	5.5@ *6*	(E2+M1)		0.0072 *23*	δ: A_2=+0.03 *8*, A_4=+0.25 *10* imply δ(D,Q)=−11 *+3*− infinity (1976We24); however transition may be doubly−placed. α(K)exp=0.0043 *4*.
	2189.33?	5.5@ *6*				
875.7 *1*	956.22	3.8 *4*	E2			A_2=+0.44 *12*, A_4=+0.22 *14* (1976We24). α(K)exp=0.0039 *3*.
951.0 *1*	1215.86	4.2 *4*	E2			A_2=+0.17 *16*, A_4=−0.33 *19* (1976We24). α(K)exp=0.0032 *4*.
1010.3 *1*	1555.38	2.10 *20*	E2			α(K)exp=0.0024 *3*.
1053.7& *1*	1963.68	1.90 *19*				α(K)exp=0.0010 *4*.
1081.5 *1*	1992.36	1.60 *16*	E1			α(K)exp=0.0013 *5*.
1119.7 *1*	1665.11	1.10 *11*				
1130.2& *1*	2479.39?	<1				
1147.0 *1*	1692.21	<1				
1181.1 *1*	2091.96	6 *1*	E1			α(K)exp=0.00038 *10*.
1283.4 *1*	2194.26	2.1 *4*				
1335.1 *1*	2245.96	<1				
1351.8 *1*	1897.03	1.50 *15*				
1400.5 *1*	1665.11	2.30 *23*				

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^{164}Dy(α,2nγ) 1985Fi04 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ†
1408.7 *1*	1673.50	<1
1417.3 *1*	2328.17	1.40 *14*
1427.0 *5*	1692.21	<5
1447.0 *5*	1992.36	<5

† From 1985Fi04.
‡ From α(K)exp. 1985Fi04 used α(K)(280.4γ)=0.064 to normalize their intensity scales; α(K)exp values shown here have been recalculated using α(K)(280.4γ)=0.0612 (E2 theory).
§ From γ(θ) in 1976We24.
# Q from γ(θ) (1976We24); not M2 from RUL and adopted level half–life.
@ Multiply placed; undivided intensity given.
& Placement of transition in the level scheme is uncertain.

CITATION:
Nuclear Data Sheets (1992)

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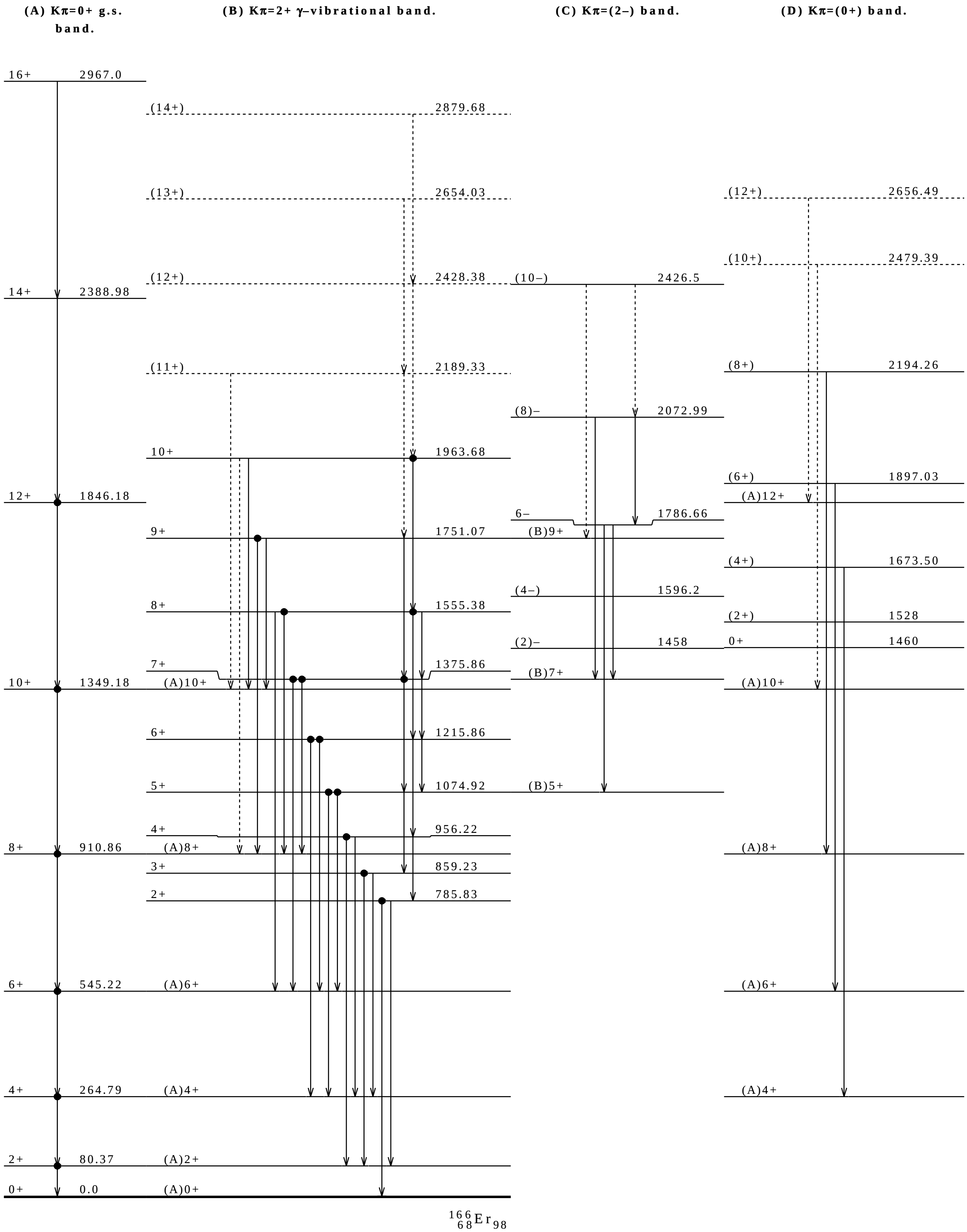
$^{164}Dy(\alpha,2n\gamma)$ 1985Fi04 (continued)



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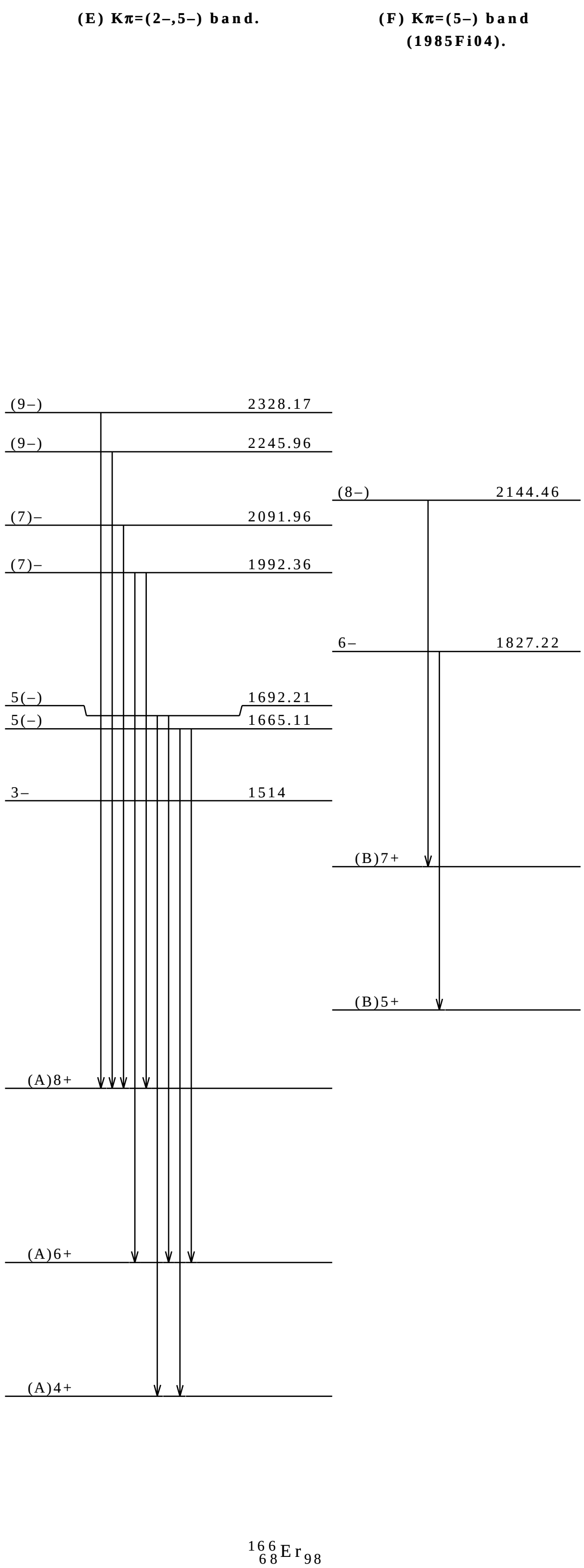
^{164}Dy(α,2nγ) 1985Fi04 (continued)



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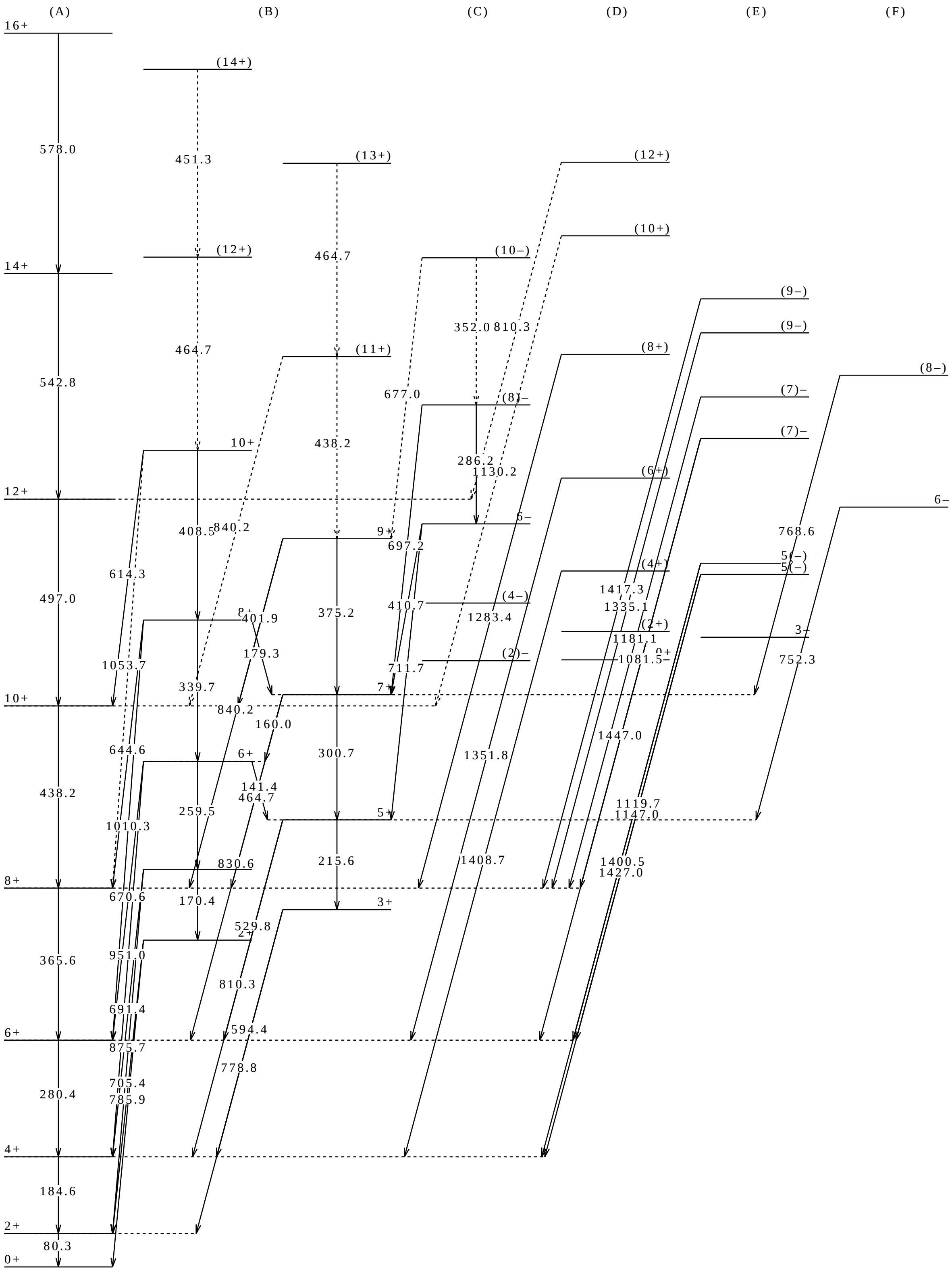
$^{166}_{68}Er_{98}$–110

^{164}Dy(α,2nγ) 1985Fi04 (continued)

Bands for ^{166}Er



$^{166}_{68}Er_{98}$

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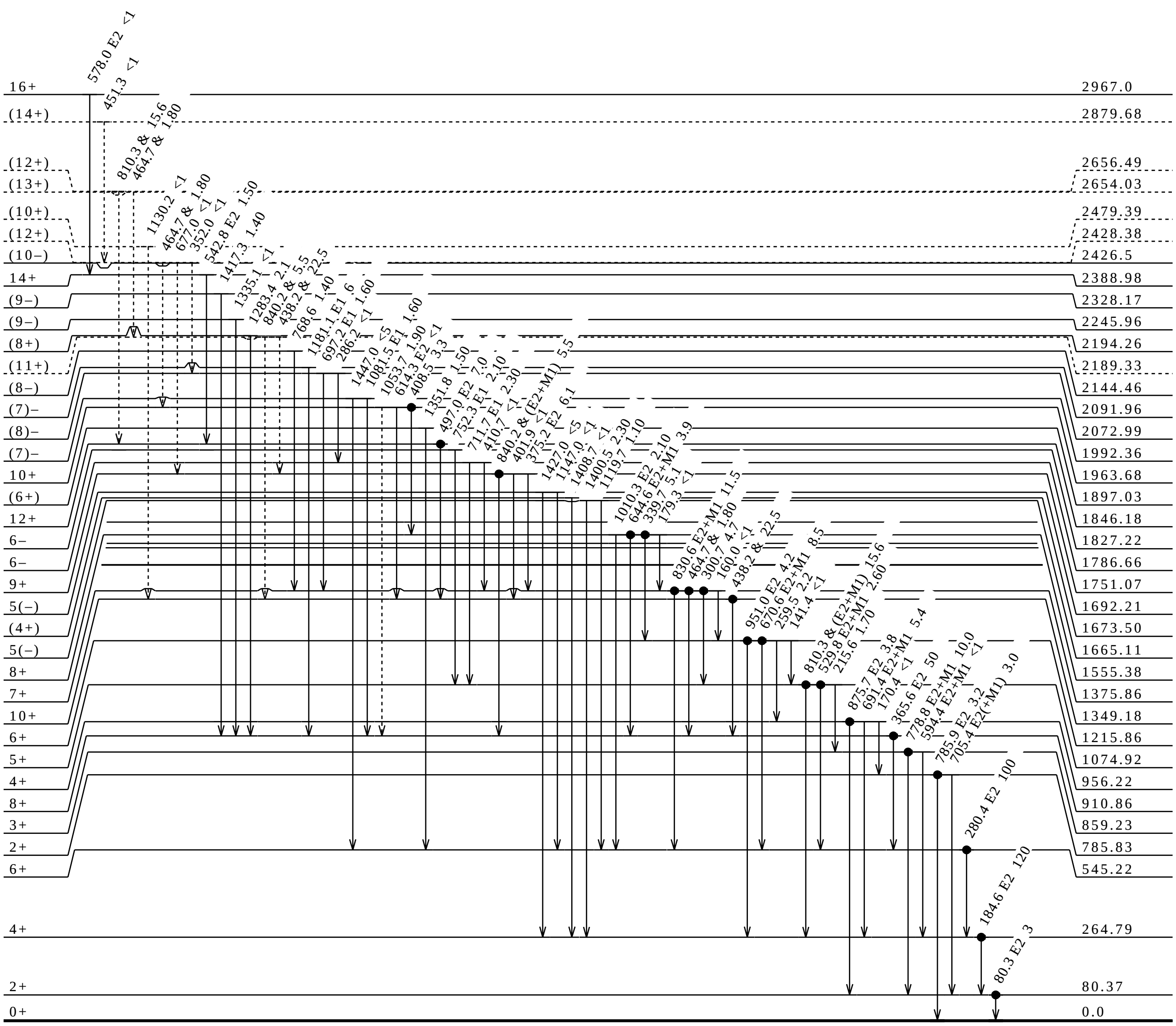
^{164}Dy(α,2nγ) 1985Fi04 (continued)

Level Scheme

Intensities: relative Iγ

& Multiply placed; undivided intensity given



$^{166}_{68}Er_{98}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{164}Er(t,p) 1992Bu16

1992Bu16: E(t)=17 MeV; 67.2% ^{164}Er enriched target; magnetic spectrometer with photographic plates, FWHM≈14 keV; θ(lab)=7.5°– 67.5° (in 7.5° steps); measured E(p), angular distributions, L transfer; DWBA calculations.

^{166}Er Levels

E(level)†	L‡	dσ/dΩ(30°) μb/sr§	Comments
0.0#	0	271	
81# *1*		21	
265# *1*		8	
545		1	E(level): rounded value from Adopted Levels.
786@ *1*		2	
861@ *2*		1	
956@ *1*		10	
1460& *1*	0	≤45	
1513& *1*		6	
1528 *3*		5	
1669 *2*		5	
1692 *2*		1	
1714 *2*	0	54	
1760 *3*			
1869 *3*		4	
1900 *3*			
1967 *3*			
2060 *3*			
2089 *3*		≤6	
2197 *3*	(0)	12	

† From 1992Bu16, except as noted.
‡ From comparison of measured and calculated σ(θ) (1992Bu16).
§ Differential cross section at 30° in μb/sr from 1992Bu16.
# (A): Kπ=0+ g.s. band.
@ (B): Kπ=2+ γ–vibrational band.
& (C): Kπ=2– octupole band.

^{165}Ho(^{3}He,d),(α,t) 1993Li12,1979Pa15

Target Jπ=7/2–.
Other measurements: 1974Ka02, 1969Bu01.
1993Li12:
E(^{3}He)=25 MeV, Eα=40 MeV; Q3D magnetic spectrometer with position sensitive detector in focal plane, FWHM≈20 keV; θ(lab)=40° and 65° for (^{3}He,d), 20° and 30° for (α,t); measured E(level) and dσ/dΩ; DWBA calculations.
1979Pa15:
E(^{3}He)=24 MeV and E(^{4}He)=27 MeV; Enge split–pole magnetic spectrograph, photographic emulsions (FWHM=13–15 keV); measured E(level), dσ/dΩ.

^{166}Er Levels

E(level)†	Jπ‡	L	dσ/dΩ(60°) (α,t) μb/sr§	Comments
0.0&	0+		<1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45°.
80&	2+		6.1	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 2.2 at 45°, 1.6 at 60°.
264&	4+		24	Other E: 258 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 6.4 at 45°, 5.2 at 60°.
545&	6+		10.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 2.8 at 45°, 2.6 at 60°.
786a	2+		<1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45° and 60°.
859a	3+		1.0	E(level): absent in (^{3}He,d) (1979Pa15).
910&	8+		1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45°.
955a	4+		1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45° and 60°.
1076a	5+		1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45° and 60°.
1215a	6+			E(level): absent in (α,t) (1979Pa15) and in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45° and 60°.
1452			<1.0	E(level): absent in (^{3}He,d) (1979Pa15).
1529			1.6	E(level): absent in (^{3}He,d) (1979Pa15).

Continued on next page (footnotes at end of table)

^{165}Ho(^{3}He,d),(α,t) 1993Li12,1979Pa15 (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ[‡]	L	dσ/dΩ(60°) (α,t) μb/sr[§]	Comments
1557[@a]	8+			
1572[b]	(4−)		29	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 27 at 45°, 17.7 at 60°.
1595[b]	4−		3.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 1.9 at 45°, 1.7 at 60°.
1651[@]				
1665[b]	(5−)		13.5	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 9.8 at 45°, 7.2 at 60°.
1680[b]			≈1.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3.0 at 45°, 2.6 at 60°.
1692	(5−)		≈12.8	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 8.2 at 45°, 5.0 at 60°.
1720			2.6	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 1.2 at 45°, 1.4 at 60°.
1757			2.2	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45° and 60°.
1785[b]	(6−)		2.5	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 1.9 at 45°, 1.7 at 60°.
1813				E(level): absent in (α,t) (1979Pa15) and in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <1.0 at 45°.
1828[b]	(6−)		5.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 6.4 at 45°, 4.9 at 60°.
1864			4.5	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4.4 at 45°, 3.5 at 60°.
1916[c]	(3−)		13.8	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 18.0 at 45°, 11.9 at 60°.
1938			4.5	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 1.4 at 45°, 2.0 at 60°.
1976[d]	4+[#]		11.2	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 13.2 at 45°, 9.2 at 60°.
1989[e]	(7−)		35	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 19.4 at 45°, 16.9 at 60°.
2002[c]	(4−)		12.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 14.9 at 45°, 10.3 at 60°.
2022			10.4	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.7 at 45°, 7.3 at 60°.
2045[d]	5+[#]		19.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 14.9 at 45°, 15.8 at 60°.
2057[j]	(1−)		17.2	E(level): doublet; J=1, Kπ=1− and J=2, Kπ=2−. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 33 at 45°, 19.1 at 60° for presumed doublet.
2057[f]	(2−)			
2074	(2−)		3.5	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 2.0 at 45°, 2.9 at 60°.
2116	(6+)		2.2	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 2.2 at 45°, 1.9 at 60°.
2132[d]	(6+)		38	E(level): triplet; J=3, Kπ=3+ and J=6, Kπ=4+ and J=3, Kπ=2−. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 36 at 45°, 26 at 60° for presumed triplet.
2132[f]	3−[#]			
2132[g]	3+[#]			
2152[j]	(2−)		≈8	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 13.0 at 45°, 11.3 at 60°.
2167	(2−)		2.0	E(level): absent in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3.5 at 45°, 1.8 at 60°.
2204			11.6	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 5.0 at 45°, 6 at 60°.
2217			8.0	E(level): absent in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 8.7 at 45°, 6.2 at 60°.
2226[j]	(3−)		≈5	E(level): doublet. J=3, Kπ=1− and J=4, Kπ=2−. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.7 at 45°, 9.8 at 60°.
2226[f]	(4−)			
2239[g]	4+[#]		12.9	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.2 at 45°, 8.5 at 60°.
2266[d]	7+[#]		3.6	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4.3 at 45°, 3.2 at 60°.
2279			1.6	E(level): absent in (^{3}He,d) (1979Pa15). Other E: 2283 in 1993Li12.
2289				E(level): absent in (α,t) (1979Pa15). dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3.1 at 45°, 1.0 at 60°.
2313			2.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4.2 at 45°, 2.6 at 60°.
2333			5.1	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 8.4 at 45°, 6.6 at 60°.
2347			3.4	E(level): absent in (^{3}He,d) (1979Pa15) and in 1993Li12.
2359[g]	5+[#]		3.4	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4.1 at 45°, 3.2 at 60°.
2368				E(level): absent in (^{3}He,d) (1979Pa15) and in 1993Li12.
2388			≈2	Absent in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4 at 45°, 4.5 at 60°.
2402			≈6	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 6 at 45°, 6.3 at 60°.
2418			1.8	E(level): 1993Li12 report E=2430; possibly this a doublet consisting of the 2418 and 2438 levels reported by 1975Pa15. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3 at 45°.

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^{165}Ho(^{3}He,d),(α,t) 1993Li12,1979Pa15 (continued)

^{166}Er Levels (continued)

E(level)†	Jπ‡	L	dσ/dΩ(60°) (α,t) μb/sr§	Comments
2438			2.5	E(level): see comment on 2418 level. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3.4 at 45°, 2.3 at 60°.
2453			6.1	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 9.3 at 45°, 7.6 at 60°.
2476			6.2	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 7.0 at 45°, 7.1 at 60°.
2505			5.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 5.9 at 45°, 7.2 at 60°.
2537			3.4	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 3.0 at 45°, 5.7 at 60°.
2568[g]	6+[#]		3.0	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): <2 at 45°.
2583				E(level): absent in (α,t) (1979Pa15). dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 7.7 at 45°, 7.0 at 60°.
2608	(6−)		34	Possible configuration: π^{2}(7/2[523]+5/2[402]) (1993Li12). dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 74 at 45°, 56 at 60°.
2632			9.8	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.9 at 45°, 9.5 at 60°.
2655			8.3	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 14.2 at 45°, 10.3 at 60°.
2671			2.1	Absent in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 5.2 at 45°, 3.6 at 60°.
2684[@]				
2713[@g]	7+[#]			
2742[@]				
2766[@]				
2786[@]				
2808[@]				
2880[@]				
2912			1.3	Other E: 2920 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 4.5 at 45°, 3.8 at 60°.
2954			2.1	Other E: 2959 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 10.9 at 45°, 10.0 at 60°.
2993			1.9	Absent in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 10.8 at 45°, 8.7 at 60°.
3000[@]				
3043[@]				
3077[h]	(8+)		6.9	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 6.7 at 45°, 4 at 60°.
3087			2.8	Other E: 3096 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 5.0 at 45°, 7.5 at 60°.
3147			1.9	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 12.4 at 45°.
3160			1.2	Other E: 3168 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 10.5 at 45°.
3211[@]				
3239			4.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.7 at 45°.
3253[@]				
3273[h]	(9+)		13.7	dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 11.2 at 45°, 6.1 at 60°.
3296[@]				
3322[@]				
3345[@]				
3371[@]				
3394[@]				
3429[@]				
3459[@]				
3476				E(level): absent in (α,t) (1979Pa15). Other E: 3482 in 1993Li12. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 15.1 at 45°.
3501		0	<2	E(level): absent in (α,t) (1979Pa15). L: based on dσ/dΩ(^{3}He,d)/dσ/dΩ(α,t) at 60°. dσ/dΩ(μb/sr) in (^{3}He,d) at E(^{3}He)=24 MeV (1979Pa15): 25.0 at 45°, 22 at 60°.
3554[@]				
3579[@]				
3600[@]				
3627[@]				
3663[@]				
3721[@]				
3751[@]				
3783[@]				
3808[@]				

Continued on next page (footnotes at end of table)

 $^{166}_{68}Er_{98}$–115

^{165}Ho(^{3}He,d),(α,t) 1993Li12,1979Pa15 (continued)

^{166}Er Levels (continued)

E(level)†	E(level)†	E(level)†
3838@	4064@	4297@
3856@	4087@i	4329@
3881@	4106@	4359@
3907@	4126@	4381@
3932@	4149@	4407@
3978@	4174@	4418@
4002@i	4227@	4442@
4026@	4256@	
4045@	4274@	

† From 1979Pa15, except as noted. If level is observed in both (^{3}He,d) and (α,t), the mean of the two energies is given.
‡ Assignments based on (^{3}He,d) or (α,t) cross section and (^{3}He,d) to (α,t) cross section ratios.
§ dσ/dΩ at 60° and Eα=27 MeV for the (α,t) reaction (μb/sr) (1979Pa15).
\# Definite Jπ assigned based on cross section fingerprint.
@ From 1993Li12. Uncertainty not stated by authors.
& (A): Kπ=0+ g.s. band. Configuration: 7/2[523]−7/2[523].
a (B): Kπ=2+ γ−vibrational band.
b (C): Mixed Kπ=2− and 4− bands. K=2 octupole−vibrational states are strongly Coriolis mixed with Kπ=4− two−quasiproton 7/2[523]+1/2[411] states for J≥4. K=2 dominates in 1458, 1514, 1596, and 1692 levels, K=4 dominates in 1572 and 1666 levels and K=2 and K=4 amplitudes are comparable for the E>1692 levels (see mixing calculations in 1989Ad12).
c (D): Kπ=3− band. Configuration: 7/2[523]−1/2[411].
d (E): Kπ=4+ band. Configuration: 7/2[523]+1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.
e (F): Kπ=7− band. Configuration: 7/2[523]+7/2[404].
f (G): Kπ=2− band. Configuration: 7/2[523]−3/2[411].
g (H): Kπ=3+ band. Configuration: 7/2[523]−1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.
h (I): Kπ=8+ band. Configuration: 7/2[523]+9/2[514].
i (J): Kπ=1+? band. Possible configuration: 7/2[523]−9/2[514].
j (K): Kπ=1− band. Configuration: 7/2[523]−5/2[402].

^{166}Er(γ,γ') 1996Ma18,1976Me04,1973Me17

Other studies: 1991Zi01.
1973Me17: bremsstrahlung E=1.6–4.2 MeV; measured σ(98°) and σ(127°) (1976Me04).
1996Ma18: bremsstrahlung endpoint energy=3.55 MeV; 95.5% ^{166}Er metal target; HPGe detector, 3 Ge detectors, true−coaxial HPGe Compton polarimeter with 8−crystal BGO Compton shield; θ=95°, 127°; measured Eγ, integrated cross section, γ anisotropy, γ polarization; deduced Γ_0, $\Gamma_{\gamma 0}^2/\Gamma$, $\Gamma_{\gamma 1}/\Gamma_{\gamma 0}$, Jπ, K.

^{166}Er Levels

Values of K, deduced by 1996Ma18 from measured $\Gamma_{\gamma 1}/\Gamma_{\gamma 0}$, are given in comments on the relevant levels.

E(level)†	Jπ#	$T_{1/2}$‡	$\Gamma_{\gamma 0}^2/\Gamma$ (meV)§	Comments
0.0	0+			
80.6	2+			E(level): rounded value from Adopted Levels. Jπ: from Adopted Levels.
1663 *1*	1−	5.2 fs *5*	13.9 *16*	E(level): from 1991Zi01. K=(0) (1996Ma18). $\Gamma_{\gamma 0}^2/\Gamma$: weighted average of 15.2 *17* (1996Ma18) and 17.1 *11* (1991Zi01, from reported $\Gamma_{\gamma 1}/\Gamma_{\gamma 0}$=1.50 *4* and $\Gamma_{\gamma 0}$=42.8 meV 28) and 12.0 *8* (1976Me04).
1812 *1*	1(+)	34 fs *7*	5.5 *10*	E(level): from 1973Me17. $T_{1/2}$: value becomes 39 fs *7* based on adopted branching. $\Gamma_{\gamma 0}^2/\Gamma$: weighted average of 7.0 *9* (1996Ma18) and 4.8 *6* (1976Me04). K=1 (1996Ma18).
1830		45 fs *8*		E(level): from 1973Me17; not reported in 1996Ma18. $T_{1/2}$: $\Gamma_{\gamma 0}\Gamma_{\gamma 1}/\Gamma$=1.8 *3* meV (1973Me17); deduced by evaluator from authors' calculated $\Gamma_{\gamma 0}$ and assumed $\Gamma_{\gamma 1}/\Gamma$. Assuming adopted I(1749γ):I(1830γ)=100.0 *21*:29.9 *5* and J=1, this gives Γ=10.1 *17* meV.
2055?				From 1976Me04. $\Gamma_{\gamma 0}^2/\Gamma$=0.8 *5* meV if the only branch is to the g.s.

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^{166}Er(γ,γ') 1996Ma18,1976Me04,1973Me17 (continued)

^{166}Er Levels (continued)

E(level)†	Jπ#	$T_{1/2}$‡	$\Gamma_{\gamma0}^2/\Gamma$ (meV)§	Comments
2202	1(+)	9.7 fs *12*	5.8 *6*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 6.1 *9* (1996Ma16) and 5.4 *9* (1976Me04). K=0 (1996Ma18).
2465	1	43 fs *6*	5.1 *5*	K=1 (1996Ma18). $T_{1/2}$: from $\Gamma_{\gamma0}^2/\Gamma$=5.1 *5* and adopted $\Gamma_{\gamma0}/\Gamma_{\gamma1}$=0.44 *7*. $\Gamma_{\gamma0}^2/\Gamma$: weighted average of 5.3 *3* (1996Ma16) and 3.9 *8* (1976Me04).
2525	1	23 fs *3*	8.7 *10*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 9.0 *13* (1996Ma16) and 8.3 *17* (1976Me04). K=1 (1996Ma18).
2601	1	12 fs *3*	16 *3*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 23 *4* (1996Ma16) and 15.4 *16* (1976Me04). K=1 (1996Ma18).
2679	1	20 fs *3*	9.8 *9*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 10.0 *10* (1996Ma16) and 9.1 *19* (1976Me04). K=1 (1996Ma18).
2768	1	22 fs *4*	5.2 *5*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 5.1 *5* (1996Ma16) and 5.8 *11* (1976Me04). K=0 (1996Ma18).
2783	1	49 fs *14*	2.6 *5*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 3.2 *6* (1996Ma16) and 2.2 *5* (1976Me04). $T_{1/2}$: from $\Gamma_{\gamma0}^2/\Gamma$=2.6 *5* and adopted $\Gamma_{\gamma0}/\Gamma$=0.53 *6*.
2812	1	3.1 fs *3*	18.9 *13*	K=0 (1996Ma18). $\Gamma_{\gamma0}^2/\Gamma$: weighted average of 19.1 *16* (1996Ma16) and 18.6 *23* (1976Me04).
3073	1	11 fs *4*	2.4 *4*	K=0 (1996Ma18).
3123	1	17 fs *6*	6.3 *6*	K=(0) (1996Ma18).
3144	1	5.4 fs *5*	39 *3*	E(level): 3141 in 1973Me17. $\Gamma_{\gamma0}^2/\Gamma$: weighted average of 42 *3* (1996Ma16) and 35 *4* (1976Me04). K=1 (1996Ma18).
3175	1	11.8 fs *15*	14.9 *16*	K=(1) (1996Ma18).
3187	1	11.4 fs *10*	18.0 *13*	K=1 (1996Ma18).
3197	1	7.4 fs *7*	27.0 *25*	$\Gamma_{\gamma0}^2/\Gamma$: weighted average of 29.0 *21* (1996Ma16) and 23.8 *27* (1976Me04). K=1 (1996Ma18). E(level): 3193 in 1973Me17.
3288	1	6.0 fs *9*	11.9 *13*	K=(0) (1996Ma18).
3322	1	5.8 fs *14*	7.5 *11*	K=0 (1996Ma18).
3329	1	15.0 fs *25*	15.5 *21*	K=1 (1996Ma18).
3386	1	5.3 fs *12*	14.3 *25*	K=(0) (1996Ma18).
3425	1	38 fs *19*	12 *6*	
3430	1	13 fs *3*	22 *5*	K=1 (1996Ma18).
3440	1	3.4 fs *13*	9.3 *27*	K=0 (1996Ma18).
3493	1		20 *18*	
3498	1		10 *10*	

† From 1996Ma18, except as noted.

‡ Deduced from measured $\Gamma_{\gamma0}^2/\Gamma$ and $\Gamma_{\gamma1}/\Gamma_{\gamma0}$, assuming $\Gamma=\Gamma_{\gamma1}+\Gamma_{\gamma0}$, except as noted. Thus, deduced $T_{1/2}$ will be an upper limit if branches exist to levels other than the g.s. and the 81–keV level.

§ From 1996Ma18, except as noted. Calculated by evaluator from integrated cross section data of 1996Ma18 assuming J indicated, unless noted otherwise.

\# From γ multipolarity (based on γ anisotropy) in 1996Ma18 and γ polarization (1973Me17). J=1,2 are the only possible spin choices for the levels excited by bremsstrahlung in a ^{168}Er target.

γ(^{166}Er)

E(level)	Eγ†	Iγ‡	Mult.§	Comments
1663	1582	152 *4*	E1	Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.50 *6* (1996Ma18), 1.50 *4* (1991Zi01) and 1.63 *7* (1973Me17). Mult.: from 1973Me17.
	1663	100	E1	Mult.: from 1973Me17.
1812	1732	56 *9*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.48 *5* (1996Ma18) and 0.67 *6* (1973Me17).
	1813	100	(M1)	Mult.: D, Δπ=(no) from 1973Me17.
1830	1749	100		
	1830			Iγ: weak branch; consistent with $\Gamma_{\gamma1}/\Gamma_{\gamma0}\approx3$ expected by authors from earlier decay studies (1973Me17).
2202	2121	186 *9*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.88 *10* (1996Ma18) and 1.78 *23* (1976Me04).
	2202	100	D	Mult.: Δπ=(no) (1976Me04).
2465	2384	38 *6*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.36 *6* (1996Ma18) and 0.59 *20* (1976Me04).
	2465	100	D	

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From NNDC(BNL)
program ENSDAT

^{166}Er(γ,γ') 1996Ma18,1976Me04,1973Me17 (continued)

γ(^{166}Er) (continued)

E(level)	Eγ†	Iγ‡	Mult.§	Comments
2525	2444	51 *5*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.52 *5* (1996Ma18) and 0.41 *20* (1976Me04).
	2525	100	D	
2601	2520	53 *9*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.52 *10* (1996Ma18) and 0.61 *26* (1976Me04).
	2601	100	D	
2679	2598	53 *11*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.52 *11* (1996Ma18) and 0.7 *4* (1976Me04).
	2679	100	D	
2768	2687	150 *18*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.57 *20* (1996Ma18) and 1.2 *4* (1976Me04).
	2768	100	D	
2783	2702	53 *6*		Iγ: from Adopted Gammas; $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.43 *41* in 1976Me04.
	2783	100	D	Mult.: from 1996Ma18.
2812	2731	181 *9*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.80 *9* (1996Ma18) and 2.1 *4* (1976Me04).
	2812	100	D	
3073	2992	320 *60*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=3.2 *6* (1996Ma18).
	3073	100	D	
3123	3042	105 *35*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.05 *35* (1996Ma18).
	3123	100	D	
3144	3063	47 *3*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.48 *3* (1996Ma18) and 0.39 *10* (1976Me04).
	3144	100	D	
3175	3094	61 *6*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.61 *6* (1996Ma18).
	3175	100	D	
3187	3106	49 *4*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.49 *4* (1996Ma18).
	3187	100	D	
3197	3116	51 *3*		Iγ: from weighted average of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.52 *3* (1996Ma18) and 0.41 *10* (1976Me04).
	3197	100	D	
3288	3207	152 *13*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.52 *13* (1996Ma18).
	3288	100	D	
3322	3241	223 *31*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=2.23 *31* (1996Ma18).
	3322	100	D	
3329	3248	40 *7*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.40 *7* (1996Ma18).
	3329	100	D	
3386	3305	146 *16*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=1.46 *16* (1996Ma18).
	3386	100	D	
3425	3425	100	D	
3430	3349	24 *6*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=0.24 *6* (1996Ma18).
	3430	100	D	
3440	3359	280 *50*		Iγ: from $\Gamma_{\gamma1}/\Gamma_{\gamma0}$=2.8 *5* (1996Ma18).
	3440	100	D	
3493	3493	100	D	
3498	3498	100	D	

† From level energy difference, except as noted.

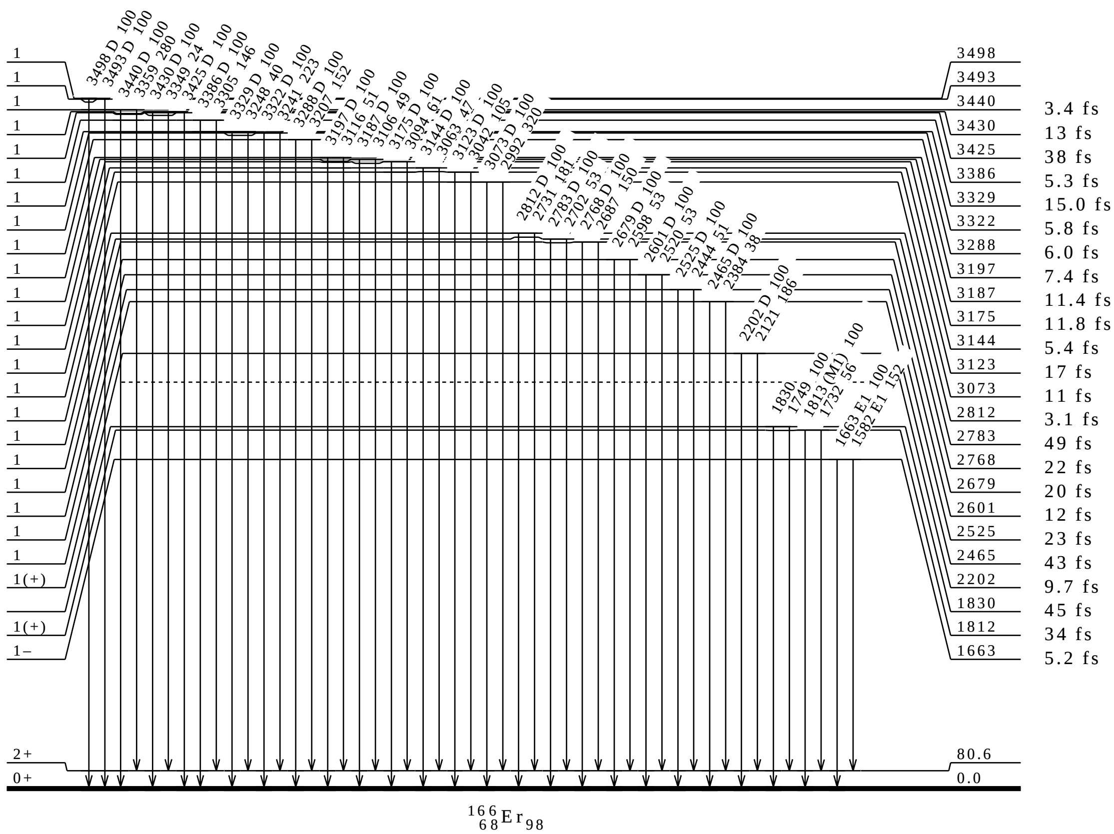
‡ Relative branching based on ($\Gamma_{\gamma1}/\Gamma_{\gamma0}$) calculated by evaluator from experimental R=($\Gamma_{\gamma1}/\Gamma_{\gamma0}$)($E_{\gamma0}/E_{\gamma1}$)^3 in 1996Ma18, except as noted. Values of $\Gamma_{\gamma1}/\Gamma_{\gamma0}$ are given in comments.

§ ΔJ from γ anisotropy (1996Ma18), Δπ from γ linear polarization (1976Me04, except as noted).

^{166}Er(γ,γ') 1996Ma18,1976Me04,1973Me17 (continued)

Level Scheme

Intensities: relative photon branching from each level



^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40

Others: 2000De59, 1997Ga11, 1997Ga13.

1997Ga11, 1997Ga13: E(n)=1.4 to 3.2 MeV, using nearly monoenergetic neutrons from the ^{3}H(p,n) reaction; 98% enriched ^{166}Er target; HPGe detector (FWHM=2.1 keV at 1332 keV); measured excit (E(n)=1.4–3.1 MeV), γ(θ) (E(n)=2.1 MeV, 10 angles; 2.5 MeV, 11 angles), γγ coin (E(n)=3.2 MeV), $T_{1/2}$ using DSAM; searched for two–phonon γ–vibrational states. See also 2000Ga22.

1992Be29: reactor neutrons; 96.1% ^{166}Er enriched oxide target; Ge detector (FWHM=2.4 keV at 1300 keV); two–crystal Compton polarimeter; measured Eγ, Iγ, γ(θ) (θ=90°, 105°, 115°, 125°, 135°, 142° and 150°), γ linear polarization. See also 1991Be38 and 2000De59. 2000De59 (which supersedes 1999DeZX) reanalyses γ(θ) for six transitions.

1981Bo40: E=reactor spectrum; 96.3% ^{166}Er target; Ge(Li) detector (FWHM=3 keV at Eγ=700); measured Eγ, Iγ. See also 1982Bo39.

For further discussion of band structure, see 2000Gr33.

^{166}Er Levels

The band structure shown here is taken from 1992Be29.

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0§	0+	stable	
80.62§ *15*	2+		
265.06§ *19*	4+		
545.46§ *24*	6+		

Continued on next page (footnotes at end of table)

^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
785.90[#] 18	2+		
859.35[#] 21	3+		
911.2[§] 4	8+		
956.45[#] 21	4+		
1075.55[#] 25	5+		
1216.0[#] 4	6+		
1375.9[#] 4	7+		
1458.1[@] 3	2−		
1459.9[&] 4	0+	0.76 ps 28	$T_{1/2}$: from DSAM (1997Ga13). Band assignment from Adopted Levels.
1513.46[@] 22	3−		
1528.5[&] 3	2+		
1555.6[#] 3	8+		Jπ and band assignment from Adopted Levels.
1572.31 3	4−		K=4 suggested in 1992Be29.
1596.38[@] 25	4−		
1662.5[a] 3	1−		
1665.6 4	5−		
1674.1? 11			
1678.4[&] 6	4+		
1692.1 5	(5−)		K=5 suggested in 1992Be29.
1703.0[b] 6			
1713.4 8	(0+)	>0.97 ps	$T_{1/2}$: from DSAM (1997Ga13).
1721.8[a] 6	3−		
1760.9 5	5−		
1784.8[be] 4			
1787.2 11			
1812.5[c] 4	1+		
1827.9 5			
1830.6[d] 3	1−		
1865.2? 5			
1897.9[&] 6	(6+)		
1904.8? 6	(2+)		
1908.3 5			
1917.7[d] 4	3−		
1934.1 5	(0+)	54 fs 6	$T_{1/2}$: from DSAM (1997Ga13).
1938.3 4	(3)+		
1942.7 11	(0+)	0.24 ps 7	Jπ: from 1997Ga11. $T_{1/2}$: from DSAM (1997Ga11).
1969.5[b] 4			
1978.1 4	4+		K=4 suggested in 1992Be29.
2001.4 6			
2021.1 7	(2)−		
2022.5 4	(4+)		Jπ: from Adopted Levels.
2028.4 6	(4+)	0.22 ps 8	$T_{1/2}$: from DSAM (1997Ga11).
2031.5? 11			
2045.5? 11			Level shown as tentative and omitted from Adopted Levels because its existence relies entirely on placement of one multiply−placed transition.
2046.3 5	(3+)		
2082.6 5			
2118.1 9			
2124.9 8			
2132.6 6	3+		
2133.8? 8	3+		Level shown as tentative and omitted from Adopted Levels because its existence relies entirely on placement of one multiply−placed transition.
2148.7 5			
2160.0? 8			
2172.1 11			
2201.8 8	1		
2265.6? 11	(2−)		
2282.6? 11	(3)		
2291.9 11	3+		
2415.9 11	(3)		
2442.1? 11	(3,4)+		

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^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

^{166}Er Levels (continued)

E(level)†	Jπ‡	Comments
2459.0? *10*		Jπ: 1992Be29 suggest J=(2), but this is inconsistent with negative A_2 for 2459γ(θ).
2504.6 *11*	(3,4)+	

† From least–squares fit to Eγ, assigning ΔE=1 keV to Eγ data for which the authors gave no uncertainty.
‡ From 1992Be29, based on deduced band structure and γ(θ) data for interconnecting transitions, except as noted.
§ (A): Kπ=0+ ground–state band.
\# (B): Kπ=2+ band.
@ (C): Kπ=2– band. Note that, in Adopted Levels, the J=5, 1666 level is assigned to a Kπ=4– band which is strongly mixed with the 2– band.
& (D): Kπ=0+ band.
a (E): Kπ=0– band.
b (F): Kπ=0+ band. Not adopted. One of the three levels associated with this band in (n,n'γ) (at 1785 keV) is not adopted and the available information concerning the 1703 and 1969 levels is quite limited.
c (G): Kπ=1+ band.
d (H): Kπ=1–? band. Not adopted. The 1918 level is adopted, instead, as the bandhead of a 3– band, and no band assignment is adopted for the 1– 1831 level.
e The evaluators have not included the 1784.8 level from (n,n'γ). A comparison of branching of 1704γ and 1889γ, placed from 1969 level in ε decay, suggests that this level is being seen in both reactions and that entire Iγ(1704γ) in (n,n'γ) can be assigned to the 1969 level. The 1784γ is placed only from the 1865 level in ε decay with assignment of the 1704γ entirely to the 1969 level; the alternative placement of the 1784γ from a possible 1785 level is less convincing.

γ(^{166}Er)

A_2 and A_4 from γ(θ), and γ linear polarization data (P(γ)), are given in comments on the relevant γ rays.
See 2000De59 and 1999De37 for discussion of relative signs of mixing ratios for low–lying transitions connecting the g.s. band and/or the γ and β bands.

Eγ†	E(level)	Iγ‡	Mult.§	δ	α	Comments
80.6 *2*	80.62	200 *80*				
184.4 *2*	265.06	310 *70*	E2		0.331	Mult.: A_2=+0.17 *9*, A_4=–0.013 *12*, P(γ)=1.48 *+12–6* (1992Be29).
215	1075.55	<1				
260	1216.0	0.9 *3*				
280.5 *2*	545.46	42 *5*	E2		0.0848	Mult.: A_2=+0.278 *15*, A_4=–0.071 *19*, P(γ)=2.1 *+6–2* (1992Be29).
300.5 *4*	1375.9	1.3 *4*				
312.0	1908.3	<0.2				
x321.4 *4*		1.3 *3*				
336.0 *4*	1908.3	1.4 *3*				
339.8	1555.6	<0.4				
365.7 *3*	911.2	3.7 *3*	E2		0.0385	Mult.: A_2=+0.33 *3*, A_4=–0.05 *4*, P(γ)=3.2 *+999–7* (1992Be29).
x385.0 *5*		0.8 *1*				
404.0 *5*	1917.7	0.6 *1*				
411.5 *5*	956.45	0.6 *1*				
452.0 *5*	1827.9	0.4 *2*				
455.7	2028.4					Eγ: from 1997Ga11. Iγ: see comment on 1243.2γ.
459.7 *3*	1917.7	2.8 *3*	D+Q			Mult.: A_2=–0.31 *4*, A_4=0.00 *6* (1992Be29). δ: –0.11 *+5–8* or –2.7 *5* (1992Be29).
488.2[c] *5*	2001.4	1.1 *4*				
x494.0 *5*		1.4 *7*				
496.5 *5*	1572.31	3.3 *7*				
520.9[a] *2*	785.90	1.5[&a] *2*				
	1596.38	2.4[&a] *5*				
530.5 *3*	1075.55	10.5 *5*	M1+E2	–20 *+10–110*	0.01418	Mult.: A_2=–0.143 *18*, A_4=+0.04 *3*, P(γ)=0.52 *+15–17* (1992Be29). δ: –21 *+5–111* from γ(θ) (1992Be29).
556.5 *3*	1513.46	4.8 *8*				
569.2 *4*	2082.6	2.5 *6*				
x573.2 *3*		4.1 *6*				

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^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	δ	α	Comments
594.4 *3*	859.35	21 *7*	D+Q	−50 *+20−140*		Mult.: A_2=−0.139 *21*, A_4=+0.05 *3* (1992Be29). A_2=−0.136 *20*, A_4=+0.04 *3* (2000De59). δ: −45 *+19−137* from 2000De59; −23 *+7−120* from 1992Be29.
598.7 *4*	1458.1	9.9 *18*	D(+Q)			Mult.: A_2=−0.04 *3*, A_4=0.00 *4* (1992Be29). δ: −0.02 *6* or −5.4 *+13−30* (1992Be29).
616.0 *3*	1572.31	2.8 *5*	D(+Q)			Mult.: A_2=+0.288 *21*, A_4=−0.02 *3*, P(γ)=0.7 *+4−3* (1992Be29). δ: −0.03 *+10−6* or +1.02 *+14−18* (1992Be29).
ˣ633.5 *4*		0.9 *5*				
640.0 *3*	1596.38	3.2 *5*				
644.4 *5*	1555.6	0.4 *2*				
646.0#c *5*	2160.0?	1.2# *4*				
654.4 *3*	1513.46	3.6 *4*	D(+Q)			Mult.: A_2=+0.204 *18*, A_4=−0.052 *24* (1992Be29). δ: −0.08 *+9−6* or +1.55 *+21−23* (1992Be29).
ˣ668.0 *8*		1.0 *4*				
670.5	1216.0	<6	M1+E2	≥+11	0.00807	Mult.: A_2=−0.209 *18*, A_4=−0.16 *3*, P(γ)=0.31 *+9−12* (1992Be29). δ: +16 +∞−5 (1992Be29).
672.3 *3*	1458.1	19.6 *15*	D(+Q)			Mult.: A_2=+0.171 *12*, A_4=−0.029 *16* (1992Be29). δ: +0.01 *+7−5* or +2.2 *+3−4* (1992Be29).
674.0 *6*	1459.9	1.6 *8*				Iγ: too large by an order of magnitude cf. adopted branching.
691.2 *2*	956.45	41 *4*	D+Q	≥50		Mult.: A_2=−0.180 *10*, A_4=−0.119 *14* (1992Be29, 2000De59), P(γ)=0.39 *+7−11* (1992Be29). 1/δ(D,Q)=0.00 *2* (1992Be29).
705.3 *3*	785.90	84 *5*	D+Q	≥50		Mult.: A_2=−0.051 *9*, A_4=−0.035 *13* (1992Be29, 2000De59), P(γ)=0.73 *+8−10* (1992Be29). 1/δ(D,Q)=0.00 *2* (1992Be29).
711.7	1787.2	<4				
712.9 *3*	1572.31	12.8 *7*				
727.8 *3*	1513.46	5.4 *5*	E1(+M2)	+0.01 *+3−4*	0.00807	Mult.: A_2=−0.181 *16*, A_4=−0.013 *22*, P(γ)=1.5 *+8−5* (1992Be29).
ˣ730.4 *7*		1.1 *4*				
736.8 *3*	1596.38	6.7 *5*	E1(+M2)	+0.002 *+19−25*	0.00247	Mult.: A_2=−0.215 *17*, A_4=−0.055 *24*, P(γ)=1.5 *+8−5* (1992Be29).
742.6b	1528.5	<0.7b				
	2201.8	<0.7b				
ˣ749.5 *8*		0.7 *4*				
752.3 *7*	1827.9	1.4 *5*				
ˣ764.0 *8*		0.8 *5*				
ˣ771.0 *8*		1.2 *7*				
778.8 *3*	859.35	106 *5*	M1+E2	−80 *+30−130*	0.00572	Mult.: A_2=+0.054 *8*, A_4=+0.064 *12*, P(γ)=1.32 *+22−15* (1992Be29). A_2=+0.052 *8*, A_4=+0.061 *12* (2000De59). δ: −75 *+26−134* from 2000De59; −67 *+30−44* from 1992Be29.
785.9 *3*	785.90	68 *3*	E2		0.00561	Mult.: A_2=+0.236 *10*, A_4=−0.068 *12* (1992Be29, 2000De59), P(γ)=2.1 *+6−2* (1992Be29).
ˣ794.0 *6*		1.0 *5*				

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^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	δ	α	Comments
810.3 3	1075.55	35 2	M1+E2	−27 +4−6	0.00525	Mult.: A_2=−0.051 9, A_4=+0.151 12, P(γ)=1.07 +16−14 (1992Be29).
819.0	1678.4	1.6 5				
830.3 5	1375.9	2.7 5	D+Q	−34 +14−51		Mult.: A_2=−0.084 21, A_4=+0.24 3, P(γ)=0.9 +4−3 (1992Be29).
875.6 3	956.45	18 1	E2		0.00444	Mult.: A_2=+0.305 10, A_4=−0.068 13 (1992Be29, 2000De59), P(γ)=3.6 +22−6 (1992Be29).
x879.0 8		1.2 6				
892	1678.4	<0.3				
927.4	1713.4					Eγ: from 1997Ga13. Iγ: see comment on 1632.9γ.
950.9 3	1216.0	2.0 3	Q			Mult.: A_2=+0.32 3, A_4=−0.10 3 (1992Be29).
x1020.5 8		1.1 7				
1021.0 8	1978.1	0.7 3				
x1070.8 8		1.2 3				Mult.: A_2=0.00 6, A_4=+0.03 9 (1992Be29).
1079.5[bc] 8	1865.2?	1.6[b] 7				Mult.: A_2=+0.31 7, A_4=−0.02 10, P(γ)=2.0 +12−6 (1992Be29). −0.007<δ(D,Q)<+1.3 (1992Be29), mult=D+Q for doubly−placed γ.
	1938.3	1.6[b] 7				Mult.: A_2=+0.31 7, A_4=−0.02 10, P(γ)=2.0 +12−6 (1992Be29). −0.007<δ(D,Q)<+1.3 (1992Be29), mult=D+Q for doubly−placed γ.
1089[bc]	2045.5?	<0.4[b]				See comment on 1089γ from 2046.3 level.
	2046.3	<0.4[b]				1981Bo40 show two placements for this γ but, based on adopted branching from the 2046 level, all its intensity can be exhausted by this placement alone.
1119.7[b] 5	1665.6	3.9[b] 4				
	1978.1	3.9[b] 4				
1126.0 8	2082.6	0.8 4				
1146.0 10	1692.1	1.3 4				
x1149 1		0.9 4				
1152.3 3	1938.3	4.5 5	M1(+E2)	+0.01 +3−4	0.00438	Mult.: A_2=−0.189 22, A_4=−0.01 3, P(γ)=0.57 +28−23 (1992Be29).
x1156.3 5		1.6 5				Mult.: A_2=−0.02 3, A_4=+0.01 5 (1992Be29).
1156.8	1942.7					Eγ: from 1997Ga11.
1161.6[b] 8	2021.1	1.3[b] 4				
	2118.1	1.3[b] 4				
1168.5 7	2124.9	1.3 4				
1168.8	2028.4		D+Q	4.5 10		Eγ: from 1997Ga11. Iγ: see comment on 1243.2γ. Mult.,δ: from 1997Ga11.
1176	2132.6	<0.9				
1187.0	2046.3	1.7 5				Mult.: A_2=+0.23 4, A_4=+0.04 6, P(γ)=2.0 +12−6 (1992Be29). δ: −0.03 +12−6 or +1.40 +23−27 (1992Be29).
1191.0 7	1978.1	1.4 5	(Q)			Mult.: A_2=+0.27 4, A_4=−0.19 6 (1992Be29).
1192.5 7	2148.7	1.4 5				
1215.5[b] 5	1760.9	4.1[b] 5				
	2001.4	4.1[b] 5				
x1217.0 10		1.4 5				
x1233.0 15		1.4 5				

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^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	δ	α	Comments
1235.5 *10*	2021.1	2.3 *5*	E1(+M2)	+0.04 *+9−6*	0.00098 *12*	Mult.: A_2=+0.188 *23*, A_4=+0.01 *3*, P(γ)=0.64 *+30−24* (1992Be29).
1243.2	2028.4					Eγ: from 1997Ga11. Iγ: I(1243γ):I(1169γ):I(456γ)=0.47 *1*: 0.46 *1*:0.07 *1* (1997Ga11).
1248.7 *7*	1513.46	2.8 *5*	E1+M2	+0.13 *3*	0.00109 *7*	Mult.: A_2=−0.05 *3*, A_4=0.00 *4*, P(γ)=2.1 *+22−10* (1992Be29).
1261.0@c *10*	2046.3	2.0@ *10*				
1263.3 *3*	1528.5	9.9 *6*	E2		0.00212	Mult.: A_2=+0.092 *11*, A_4=−0.024 *15*, P(γ)=1.2 *+4−3* (1992Be29).
1273	2132.6	<1.0				
1353.0 *10*	1897.9	1.8 *5*				
1374.5#c *10*	2160.0?	3.3# *5*				
1379.4 *5*	1459.9	9.7 *6*				Mult.: P(γ)=0.96 *+21−18* (1992Be29).
x1388.8 *10*		1.7 *6*	D+Q			Mult.: A_2=+0.14 *9*, A_4=−0.04 *13* (1992Be29).
x1396 *1*		1.2 *6*				
1400.7 *3*	1665.6	4.1 *6*	E1(+M2)	+0.025 *+18−26*	8.81×10^{-4} *14*	Mult.: A_2=−0.183 *23*, A_4=−0.02 *3*, P(γ)=1.7 *+11−7* (1992Be29).
1409.0c *10*	1674.1?	1.1 *6*				
1413.5 *10*	1678.4	3.4 *6*	D+Q	+0.35 *30*		Mult.: A_2=+0.388 *17*, A_4=−0.008 *23*, P(γ)=3.7 *+150−18* (1992Be29). +0.08<δ(D,Q)<+0.65 (1992Be29).
1427.2 *5*	1692.1	3.4 *6*	E1(+M2)	−0.002 *+22−31*	8.72×10^{-4} *14*	Mult.: A_2=−0.22 *3*, A_4=−0.02 *4*, P(γ)=2.0 *+12−6* (1992Be29).
1432.7 *3*	1513.46	6.9 *6*	E1+M2	+0.054 *+19−27*	8.86×10^{-4} *18*	Mult.: A_2=−0.137 *18*, A_4=−0.02 *3*, P(γ)=1.9 *+8−5* (1992Be29).
1448.2 *5*	1528.5	6.3 *6*	D+Q	+0.5 *3*		Mult.: A_2=+0.339 *15*, A_4=−0.051 *20*, P(γ)=1.8 *+10−7* (1992Be29). +0.2<δ(D,Q)<+0.8 (1992Be29).
1456.6 *10*	1721.8	4.7 *7*	D(+Q)			Mult.: A_2=−0.07 *8*, A_4=−0.12 *11* (1992Be29). δ: −0.01 *10* or −8 *+13−12* (1992Be29).
1475.5 *10*	2022.5	0.8 *3*				
1486.0c *10*	2031.5?	1.2 *3*				
1495.7 *7*	1760.9	4.3 *7*	D+Q			Mult.: A_2=+0.300 *20*, A_4=−0.06 *3*, P(γ)=2.0 *+12−6* (1992Be29). δ: +0.41 *+7−4* or +4.2 *8* (1992Be29).
x1506.0 *10*		2.4 *7*	D+Q			Mult.: A_2=−0.35 *6*, A_4=−0.11 *9* (1992Be29). δ: −0.15 *+5−10* or −2.4 *+4−5* (1992Be29).
1506.0 *10*	2291.9	2.4 *7*	D+Q			Mult.: A_2=−0.35 *6*, A_4=−0.11 *9* (1992Be29). δ: −0.15 *+5−10* or −2.4 *+4−5* (1992Be29). Eγ: presumed to be the 1505γ mentioned in 1992Be29; unplaced in 1981Bo40.
x1515 *1*		0.8 *3*				
1528c *1*	1528.5	1.8 *7*	Q			Mult.: A_2=+0.16 *3*, A_4=−0.08 *4* (1992Be29).
1581.9 *3*	1662.5	10.6 *7*	E1(+M2)		0.0028 *20*	Mult.: A_2=−0.005 *10*, A_4=0.0, P(γ)=1.02 *+28−23* (1992Be29). δ: −0.04 *+8−9* or −3.0 *+7−11* (1992Be29).
1598.2	1678.4	<0.7				
x1604 *1*		2.3 *7*				
x1607 *1*		1.0 *4*				
1622.4 *5*	1703.0	9.6 *7*				

Continued on next page (footnotes at end of table)

^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

γ(^{166}Er) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	δ	α	Comments
1630 *1*	2415.9	2.0 *7*	D+Q	+15 *+31–5*		Mult.: A_2=+0.14 *4*, A_4=–0.04 *5*, P(γ)=1.1 *+11–6* (1992Be29). Eγ: presumed to be the 1629γ mentioned in 1992Be29; unplaced in 1981Bo40.
1632.7 *7*	1897.9	2.5 *8*				Mult.: A_2=0.00 *3*, A_4=–0.04 *4*, P(γ)=0.8 *+7–5* (1992Be29).
1632.9	1713.4					Eγ: from 1997Ga13. Iγ: I(1633γ):I(927γ)=0.890 *5*:0.110 *5* (1997Ga13).
1641.2 *7*	1721.8	6.0 *8*	E1(+M2)	+0.01 *+3–4*	8.74×10^{-4} *14*	Mult.: A_2=–0.188 *18*, A_4=0.00 *3*, P(γ)=1.2 *+6–4* (1992Be29).
1653 *1*	1917.7	1.3 *7*				
1662.4 *5*	1662.5	7.7 *8*	E1		8.77×10^{-4}	Mult.: A_2=–0.095 *16*, A_4=0.0, P(γ)=2.2 *+18–8* (1992Be29).
1704.5[b] *5*	1784.8	3.2[b] *6*				
	1969.5	3.2[b] *6*				
1731.5 *5*	1812.5	2.8 *7*	D+Q			Mult.: A_2=+0.05 *3*, A_4=0.0 (1992Be29). δ: –1.6<δ(D,Q)<–0.28 (1992Be29).
1750.0 *3*	1830.6	5.2 *8*	D(+Q)			Mult.: A_2=–0.018 *16*, A_4=0.0 (1992Be29). δ(D,Q)=+0.09 *+25–15* or 1/δ=–0.20 *+25–16* (1992Be29).
[x]1756						Eγ: from 1992Be29. Mult.: A_2=+0.26 *4*, A_4=–0.06 *6* (1992Be29).
1757.2 *5*	2022.5	3.0 *8*				
[x]1758						Mult.: A_2=+0.11 *4*, A_4=+0.04 *5* (1992Be29).
1781	2046.3	<2				
1784.5[b] *5*	1784.8	6.0[b] *8*				
	1865.2?	6.0[b] *8*				
1812.8 *5*	1812.5	8.5 *8*	D			Mult.: A_2=–0.066 *18*, A_4=0.0 (1992Be29).
1817 *1*	1897.9	1.5 *8*				
1824.2[c] *5*	1904.8?	5.2 *8*	D+Q			Mult.: A_2=+0.053 *16*, A_4=–0.015 *23* (1992Be29). δ: –0.22 *+4–3* or +4.9 *+7–8* (1992Be29). Placement from 1992Be29; no other evidence exists for this level or for a 2089 level from which the 1824γ was placed previously.
1830.6 *5*	1830.6	1.5 *8*	D			Mult.: A_2=–0.09 *4*, A_4=0.0 (1992Be29).
[x]1833 *1*		1.1 *5*				
1837	1917.7	<1				
1853.5 *5*	1934.1	4.0 *8*				Other Eγ: 1853.9 (1997Ga13).
1883.5 *6*	2148.7	1.5 *5*				
1888.8 *5*	1969.5	2.7 *5*				
1942.5 *5*	2022.5	4.4 *8*				
1966.3[@c]	2046.3	0.9[@] *5*				
2052.5[b] *10*	2132.6	2.7[b] *8*				Mult.: A_2=+0.02 *3*, A_4=–0.08 *4* (1992Be29) for doubly–placed γ. δ: +0.20 *3* or –22 *+8–57* (1992Be29) for doublet.
	2133.8?	2.7[b] *8*				See comment on 2052γ from 2132.6 level.
2079	2160.0?	<1				
2091.5 *10*	2172.1	3.2 *8*				

Continued on next page (footnotes at end of table)

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

γ(^{166}Er) (continued)

Eγ[†]	E(level)	Iγ[‡]	Mult.[§]	Comments
2120.5 *10*	2201.8	1.9 *9*	D+Q	Mult.: A_2=−0.05 *4*, A_4=−0.07 *5* (1992Be29). Shown as unplaced in 1992Be29.
[x]2134.5 *10*		1.9 *9*	D+Q	Mult.: A_2=−0.15 *3*, A_4=+0.01 *5* (1992Be29). Eγ is consistent with placement from the 2134 level, but multipolarity is inconsistent with that placement if J(2134)=3+ as proposed in 1992Be29.
2177[c]	2442.1?		D+Q	Eγ: from 1992Be29. Mult.: A_2=+0.06 *5*, A_4=−0.12 *7* (1992Be29). δ: −3.2 *+11−7* or −0.19 *+8−9* (1992Be29) if J(2441)=3; +2.3 *+6−5* or −0.41 *10* (1992Be29) if J(2441)=4.
2185[c]	2265.6?		Q(+D)	Eγ: from 1992Be29. Mult.: A_2=−0.06 *6*, A_4=−0.25 *8* (1992Be29). δ: −0.47 *+14−19* or 1/δ=−0.02 *+12−13* (1992Be29).
2202[bc]	2201.8	1.0[b] *5*		Mult.: A_2=−0.31 *6*, A_4=−0.04 *8* (1992Be29) for doubly−placed γ. δ: −0.11 *+5−8* or −2.7 *+5−6* (1992Be29) for doublet.
	2282.6?	1.0[b] *5*		Mult.: A_2=−0.31 *6*, A_4=−0.04 *8* (1992Be29) for doubly−placed γ. δ: −0.11 *+5−8* or −2.7 *+5−6* (1992Be29) for doublet..
2424	2504.6			Eγ: from 1992Be29. Mult.: A_2=+0.18 *4*, A_4=−0.05 *6* (1992Be29). δ: δ(D,Q)=+0.36 *+6−4* or +9 *+7−3* (1992Be29) if J(2506 level)=3, but γ(θ) does not rule out stretched Q.
2459[c]	2459.0?			Eγ: from 1992Be29. Mult.: A_2=−0.014 *7*, A_4=+0.17 *10* (1992Be29); not consistent with stretched Q.

[†] From 1981Bo40, except as noted.

[‡] Photon intensity normalized to Iγ(847γ,^{56}Fe)=1000 for the equal weight of ^{56}Fe and ^{166}Er. Data are from 1981Bo40, except as noted; they are not corrected for the angular distributions of the transitions, but the authors do not expect those corrections to exceed 10−15%.

[§] Based on γ(θ) and linear polarization data from 1992Be29.

[#] γ probably misplaced because, based on adopted branching from the 2160 level, Iγ here is far too large relative to I(2079γ).

[@] Placement shown as tentative and γ omitted from Adopted Gammas because γ is absent in ε decay even though its branching here is too large for transition to have been missed in the ε decay studies.

[&] I(521γ doublet)=3.9 *5*. From adopted I(521γ)/I(705γ)=0.0172 *4* and I(705γ)=84 *5* in (n,n'γ), I(521γ from 786 level)=1.5 *2* leaving Iγ=2.4 *5* to be placed elsewhere. From adopted I(521γ)/I(736γ)=0.668 *18* and I(736γ)=6.7 *5* in (n,n'γ), one expects I(521γ from 1596 level)=4.5 *8*, leaving no intensity for the proposed placement from the 1978 level. Consequently, the evaluator does not include a 521γ from the 1978 level.

[a] Multiply placed; intensity suitably divided.

[b] Multiply placed; undivided intensity given.

[c] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

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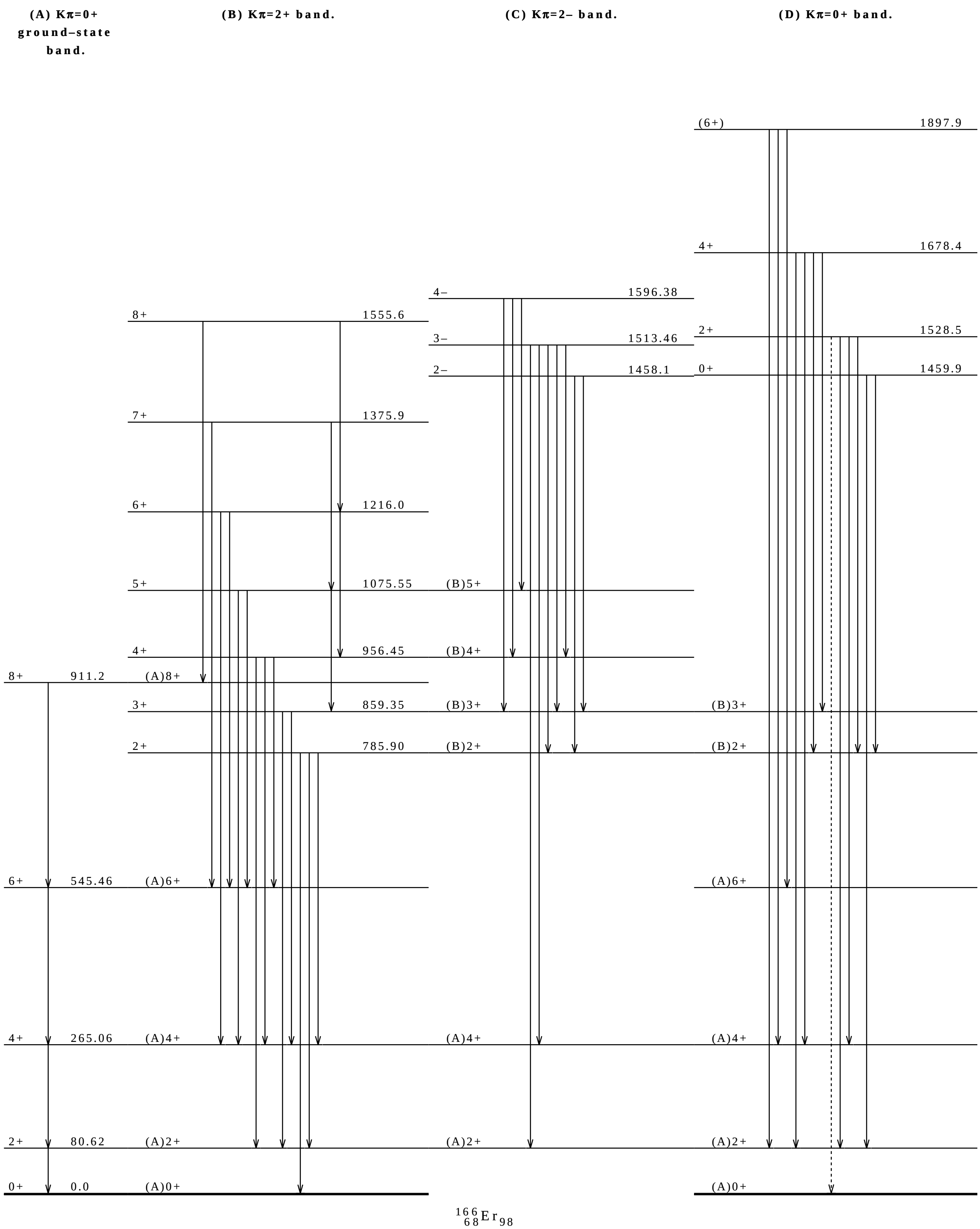
^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)



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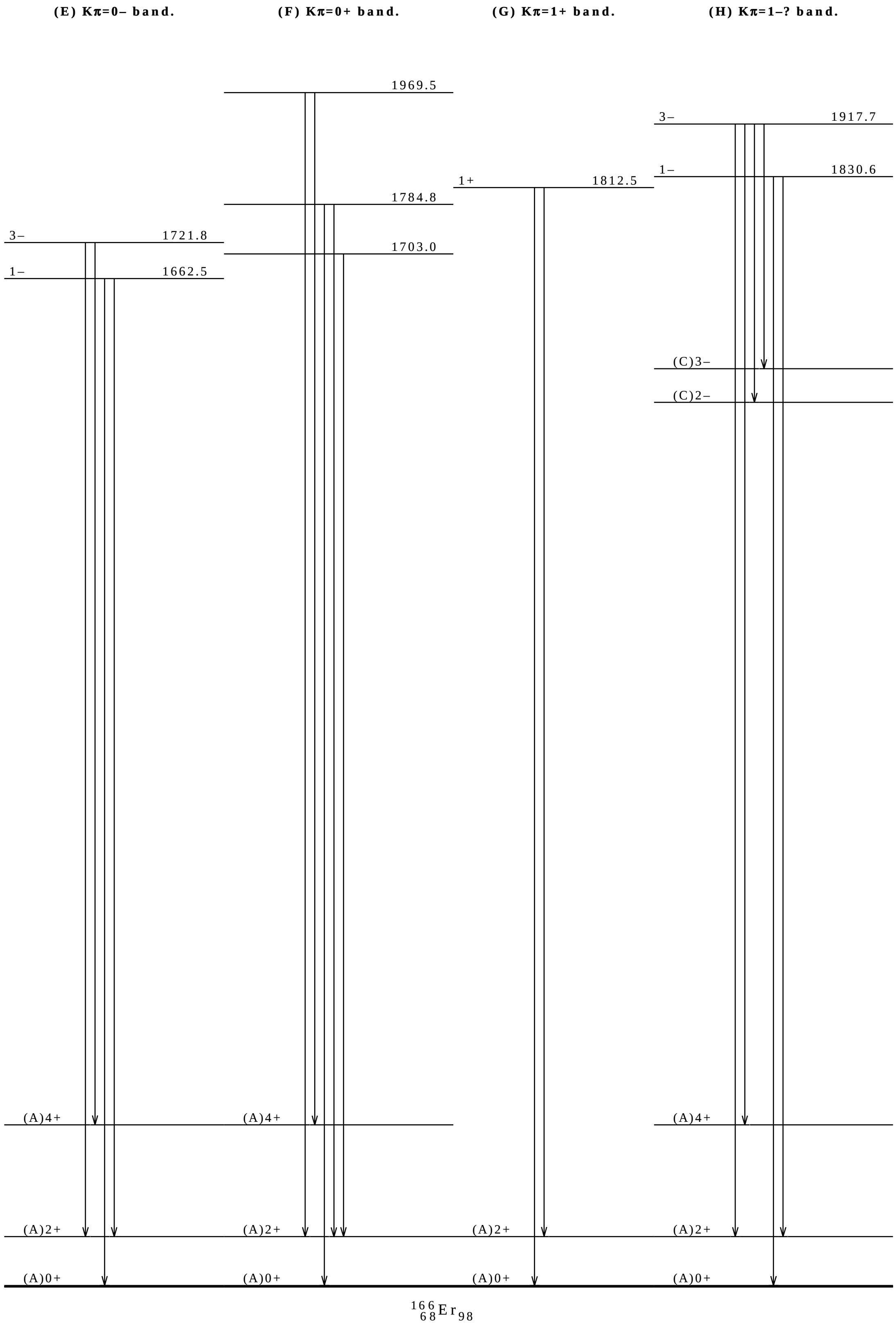
From NNDC(BNL)
program ENSDAT

^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)



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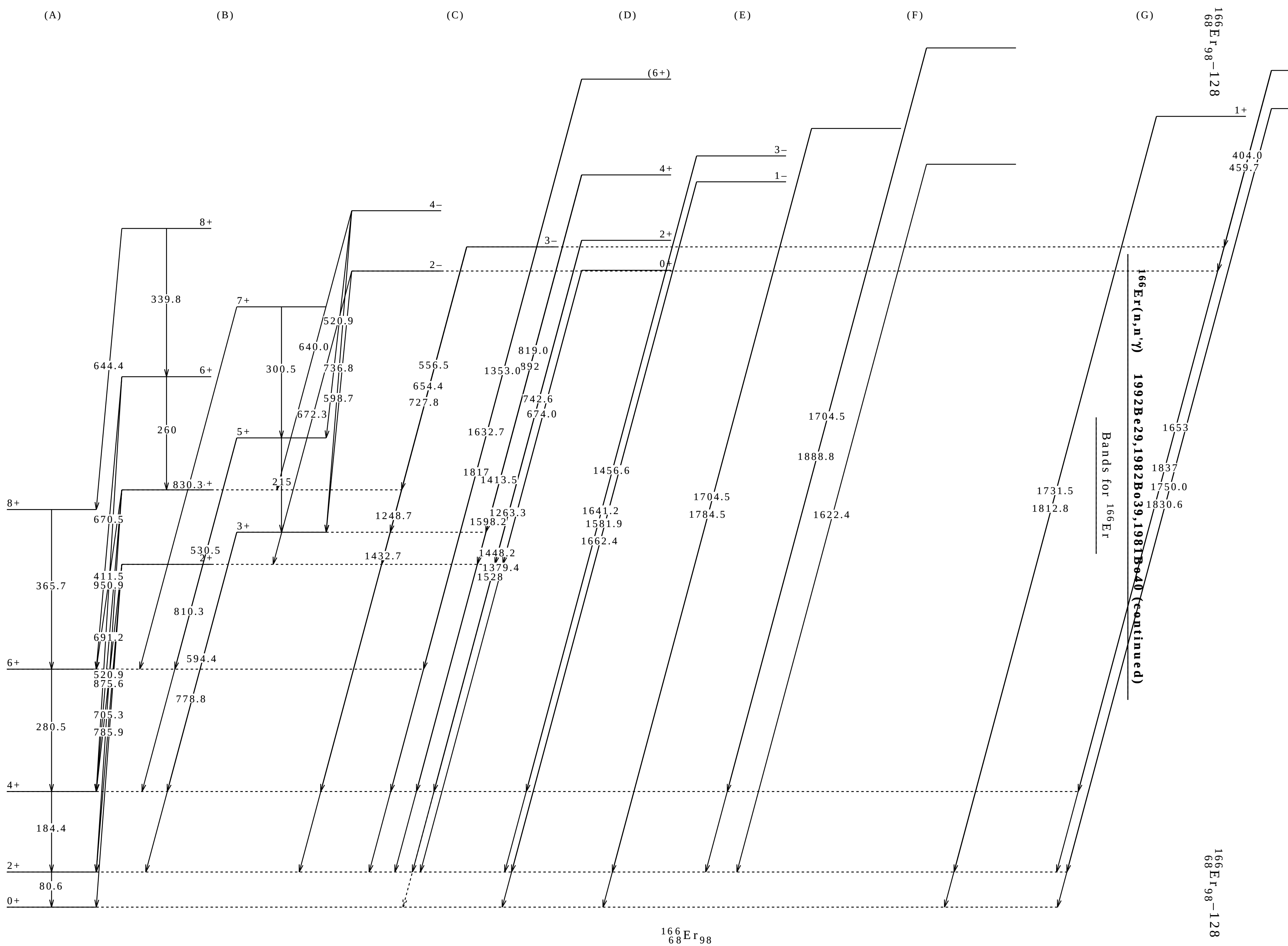


From NNDC(BNL) program ENSDAT

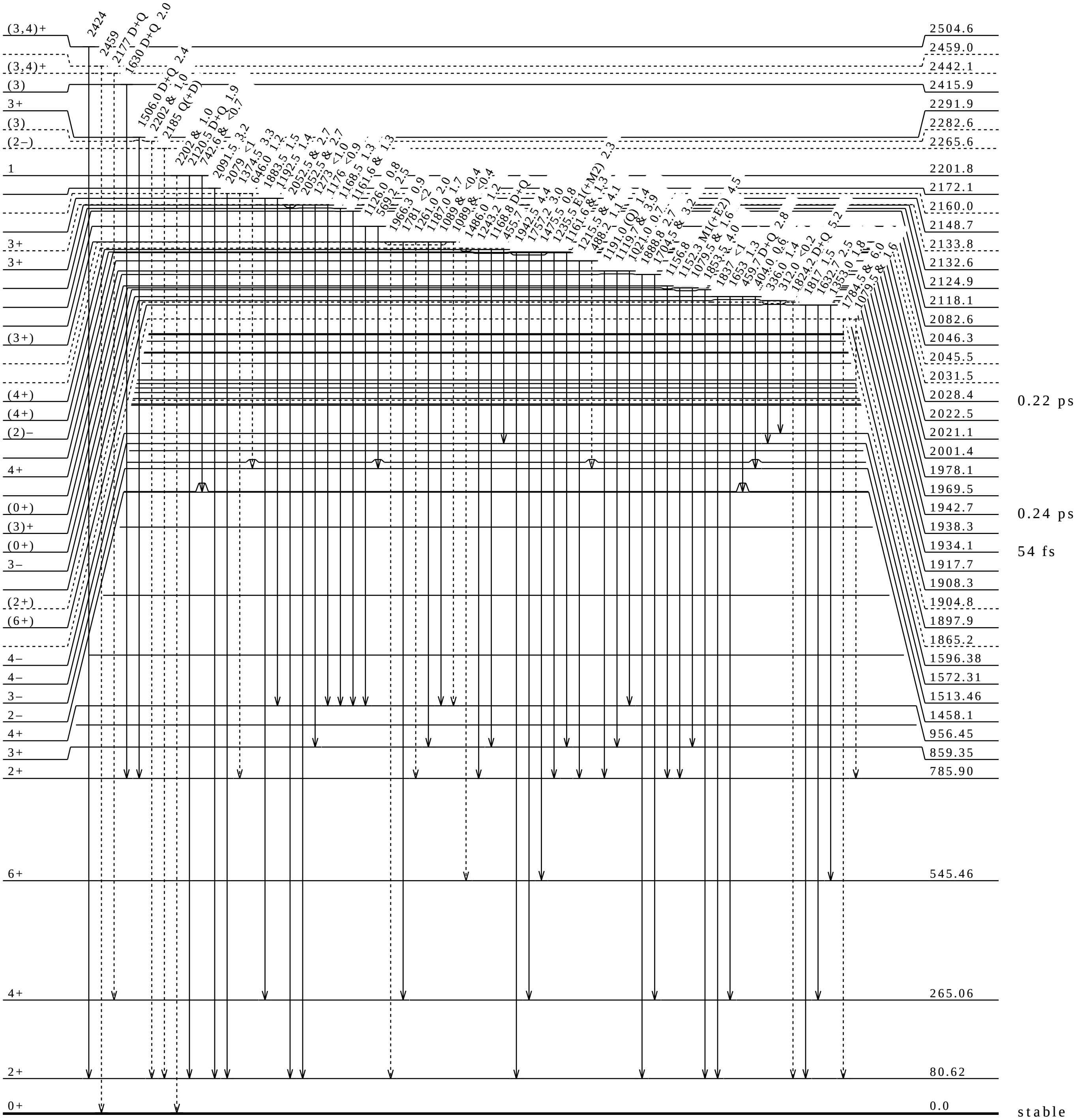
^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

Level Scheme

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided

& Multiply placed; undivided intensity given



$^{166}_{68}Er_{98}$

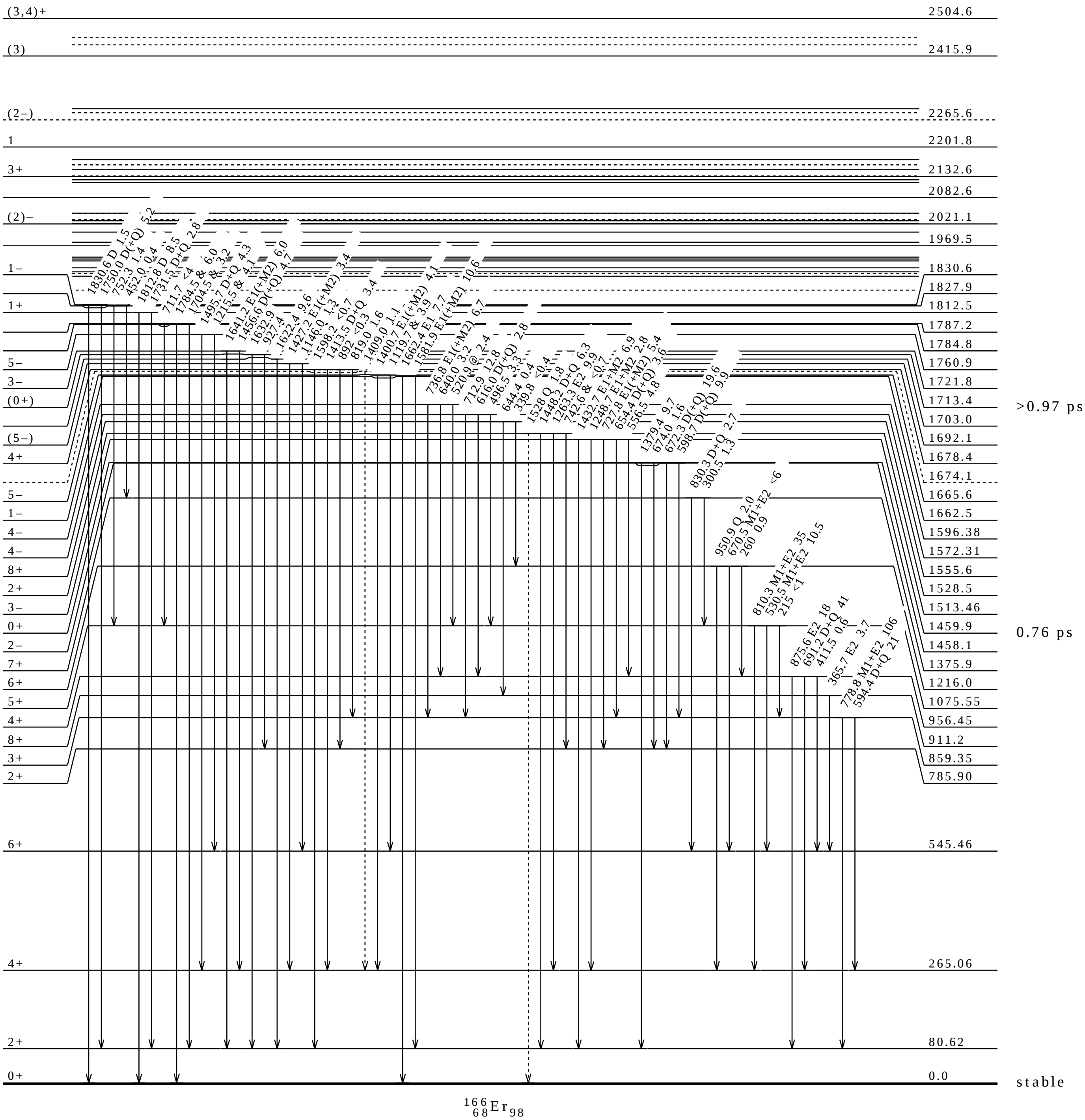
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Er(n,n'γ) 1992Be29,1982Bo39,1981Bo40 (continued)

Level Scheme (continued)

Intensities: relative Iγ
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

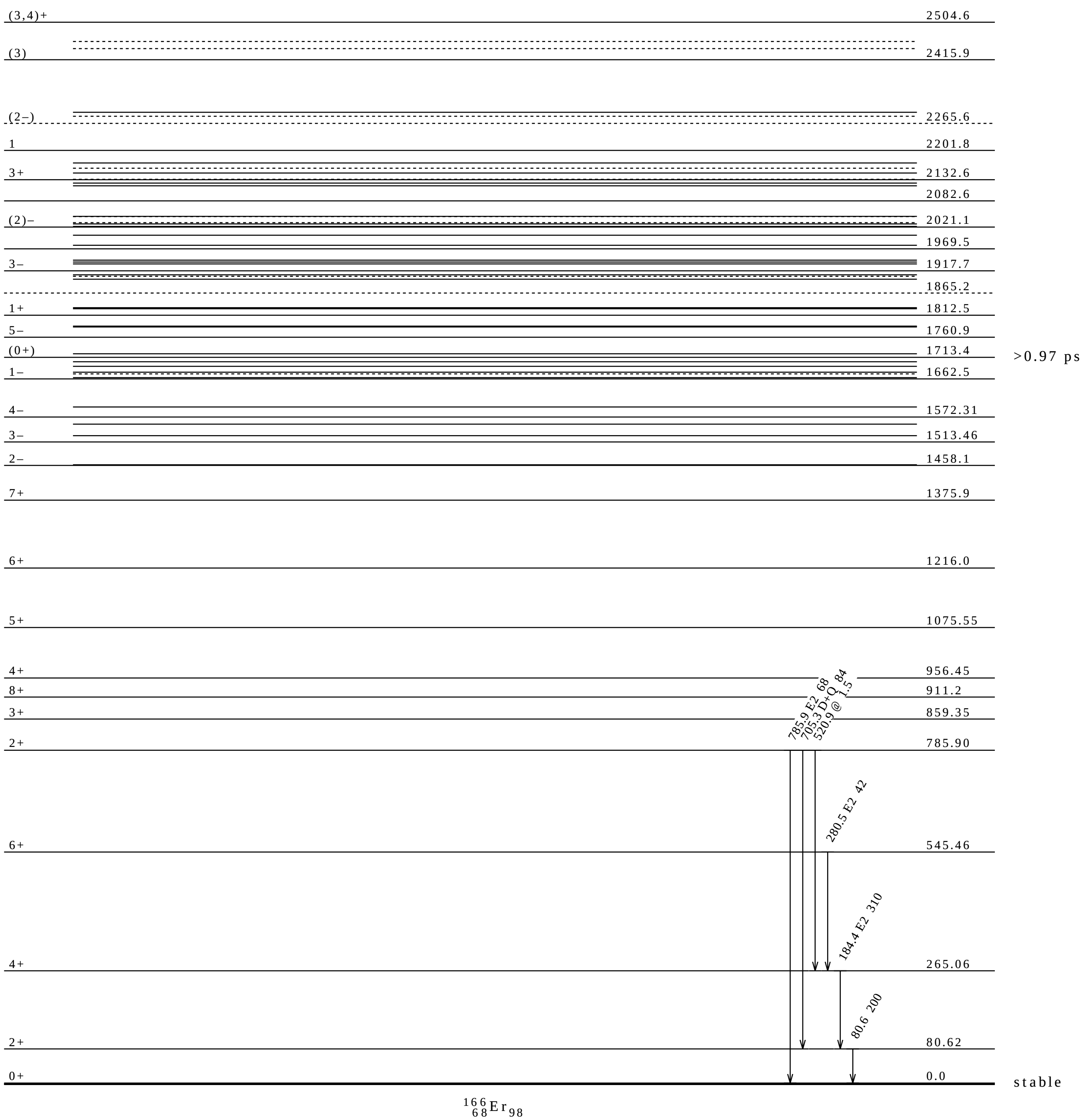


$^{166}_{68}Er_{98}$

$^{166}Er(n,n'\gamma)$ 1992Be29,1982Bo39,1981Bo40 (continued)

Level Scheme (continued)

Intensities: relative Iγ
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



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From NNDC(BNL)
program ENSDAT

^{166}Er(pol p,p'),(^{3}He,^{3}He'), (α,α') 1992Ka07,1984Ic01,1983Ro11

Others: 1968He24 ((α,α'), E=50 MeV).

1992Ka07: E=30 MeV/nucleon; 97.69% ^{166}Er target; RAIDEN magnetic spectrograph with two–dimensional position sensitive proportional counter, dual single–wire proportional counter and plastic scintillator; θ(lab)=10°– 95° for (p,p'), 10°– 62° for (^{3}He,^{3}He') and (α,α'); measured σ(θ) for all three reactions, analyzing power for (p,p'); coupled channels analysis, folding–model calculations; deduced quadrupole moments of deformed optical potentials.

1984Ic01: (pol p,p'), E=65 MeV; 97.69% ^{166}Er target; RAIDEN magnetic spectrograph (FWHM=20–26 keV) with two–dimensional position sensitive proportional counter, dual single–wire proportional counter and plastic scintillator; measured E(p'), σ(θ), analyzing power (θ=11° –35° in 1° steps, θ=36° –70° in 2° steps); coupled channels analysis; deduced deformation parameters, multipole moments; observed J=0,2,4,6 members of g.s. band and J=2,4 members of γ band. 1986Ic02 and 1987Ic04 extended and further refined analysis.

1983Ro11: (pol p,p'), E(p)=133.9 MeV; 96% enriched ^{166}Er target; magnetic spectrometer with with helical wire counter backed by two plastic scintillators (FWHM=45 keV); measured E(p'), σ(θ) and asymmetry (θ(lab)=22.5° – 70° in 2.5° steps).

^{166}Er Levels

For deduced moments of deformed optical potential and/or imaginary and spin–orbit potential deformation parameters, see 1983Ro11, 1984Ic01, 1984Ic02, 1992Ka07.

E(level)†	Jπ‡	Comments
0.0§	0+	
81§	2+	Potential deformation: β_2=+0.230 from (α,α') (1968He24); β_2(real)=+0.276 *6* (1983Ro11), +0.294 (1992Ka07) from (p,p').
265§	4+	Potential deformation: β_4=0 from (α,α') (1968He24). β_4(real)=+0.009 *5* (1983Ro11), +0.019 (1992Ka07) from (p,p').
545§	6+	Potential deformation: β_6=–0.015 from (α,α') (1968He24). β_6(real)=–0.007 *2* (1983Ro11), –0.020 (1992Ka07) from (p,p').
786#	2+	
911§	8+	E(level): rounded value from Adopted Levels. Excited in (p,p') (1983Ro11) but not resolved from 956 level.
956#	4+	
1514	3–	

† From 1992Ka07, except as noted.
‡ From Adopted Levels.
§ (A): Kπ=0+ g.s. band.
# (B): Kπ=2+ γ band.

^{166}Er(d,d') 1968Tj02

^{166}Er Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0	0+	956	4+	1759	
81	2+	1512	(3–)	1901	(5–)
265	4+	1662		1973	
544	6+	1698		2238	(3–)
786	2+	1719	(3–)	2463	

† From 1968Tj02; uncertainties unstated by authors.
‡ Assignments based on the empirical rules, see 1968Tj02.

From NNDC(BNL)
program ENSDAT

 $^{166}_{68}Er_{98}$–133

Coulomb Excitation 1992Fa01,1992Th04,1996Br09

Other measurements: 1963Yo09, 1970Ka45, 1972Er04, 1973Be40, 1974Wo01, 1974Sh12, 1972Do01, 1974Ke04, 1977Ke06, 1977Wo03, 1978Mc02, 1983Hu01, 1986Do13, 1992Br07, 1994OsZZ (and 1994KuZY), 1996Fa21, 1998Fa15.

Model–dependent deformation parameters deduced from Coulomb excitation: see 1970Ap03, 1972Er04, 1972Yu03, 1973Be40, 1973He28, 1975Le22, 1977Fi01.

1998Fa15: (^{58}Ni,^{58}Ni'γ), E=240 MeV; GASP spectrometer, two position–sensitive parallel–plate avalanche detectors; measured Eγ, γ(θ) and γγ coin gated by scattered projectiles.

1996Br09: (^{58}Ni,^{58}Ni'γ), E=165, 210, 225 MeV; measured γ(θ,H,T) in polarized Gd (IMPAC technique); deduced g–factors.

1996Fa21: (^{58}Ni,^{58}Ni'γ), E=225 MeV; one high resolution Ge detector and circular segmented Si detector, all surrounded by the Heidelberg Darmstadt Crystal Ball spectrometer array of 160 NaI detectors, operated in coincidence with Ge and Si detectors. Measured Eγ, γγ coin.

1994OsZZ: (^{74}Ge,^{74}Ge'γ), E=295 MeV; (^{58}Ni,^{58}Ni'γ), E=235 MeV; four Ge–BGO γ spectrometers; measured Eγ, Iγ; observed g.s. band to 16+ state, γ band to 10+ state, and candidate for γγ vibrational state; data analysis performed using GOSIA code. See also 1994KuZY.

1992Br07: (^{58}Ni,^{58}Ni'γ), E=210 MeV; parallel–plate avalanche counter (for backscattered projectiles), four Ge detectors; Gd ferromagnetic host; measured Eγ, Iγ(θ,H,t); deduced g–factors.

1992Fa01: (^{16}O,^{16}O'γ), E=57 MeV; (^{32}S,^{32}S'γ), E=115, 120 MeV; (^{58}Ni,^{58}Ni'γ), E=221 MeV; E(beam) at center of 96% ^{166}Er target was 56, 112, 117, 214 MeV, respectively. Two parallel–plate avalanche detectors, annular surface–barrier detector, four Ge detectors. Measured Eγ, Iγ and γ(θ), gated with scattered projectiles.

1992Th04: (^{58}Ni,^{58}Ni'γ), E=227 MeV; 96.24% ^{166}Er target, Ni backing; Measured lifetimes using the Recoil Distance Method (RDM).

1986Do13: ^{166}Er(^{58}Ni,^{58}Ni'γ), E=160, 200 MeV; HPGe detector; measured g–factors using transient field technique.

1983Hu01: ^{166}Er(α,α'γ), E=12.5 MeV; ^{166}Er(^{16}O,^{16}O'γ), E(^{16}O)=48 MeV; measured particle–γ coincidence σ, inelastic σ, Ge(Li) and silicon surface–barrier detectors.

1978Mc02: ^{166}Er(α,α'γ), E=14 MeV; measured Iγ, Eγ, γ(θ); Ge(Li).

1977Wo03: ^{166}Er(α,α'γ), E=11.5–12 MeV.

1977Ke06: ^{166}Er(^{56}Fe,^{56}Fe), (^{84}Kr,^{84}Kr'); E(^{56}Fe)=232 MeV, E(^{84}Kr)=348 MeV; measured Eγ (Ge(Li)).

1978Mc02 proposed a 2+ level at 1159 keV and deexcited by 1159γ, 1078γ, 373γ. These γ's probably arise from an impurity, based on their absence in the (n,n'γ) reaction study in 1981Bo40.

^{166}Er Levels

Values for Q have been estimated by the evaluator from the static (diagonal) matrix elements in table 3 of 1992Fa01 using the relation Q= <J M(E2) J>x $[16\pi\ J(2J-1)/(5(2J+1)(2J+3)(J+1))]^{1/2}$, unless noted to the contrary. They are not included in Adopted Levels.

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0§	0+		
80.574§	2+	1.86 ns *5*	B(E2)↑=5.77 *5*. Q=−1.77 *+14−9* based on diagonal matrix element. $T_{1/2}$: from B(E2)↑ and adopted transition properties. B(E2)↑: From an unweighted average of 5.69 *16* (1970Ka45); 5.76 *10* (1972Er04); 5.65 *5* (1973Be40); 5.85 *4* (1974Wo01); 5.91 *3* (1977Fi01). Other: 5.2 *5* (1992Fa01). Static matrix element: <2+ M(E2) 2+> =−2.33 *+19−12* (1992Fa01).
264.98§	4+	120 ps *7*	g=0.297 *13* (1986Do13). Q=−1.60 *+26−12* based on diagonal matrix element. g–factor from transient field IPAC: +0.297 *13* (1986Do13), 0.285 *20* (1996Br09). Static matrix element: <4+ M(E2) 4+> =−2.12 *+34−16* (1992Fa01). E4 matrix element=0.06 *+12−18* (1972Er04); 0.32 *16* (1973Be40); 0.22 *+11−16*(1974Wo01); 0.31 *+9−10* (1974Sh12); 0.24 *7* (1977Fi01). $T_{1/2}$: from B(E2) and adopted transition properties.
545.44§	6+	15.0 ps *8*	g=+0.287 *15* (1996Br09). Q=−2.81 *+17−14* based on diagonal matrix element. g–factor: method, transient field. Other: 0.259 *30* (1986Do13) from g–factor/g–factor(265)=0.85 *9*, g–factor(265)=+0.305 *15*. Static matrix element: <6+ M(E2) 6+> =−4.03 *+25−20* (1992Fa01). $T_{1/2}$: from RDM (1992Th04); 17.7 ps *+10−14* from B(E2) and adopted transition properties.

Continued on next page (footnotes at end of table)

Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

^{166}Er Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	Comments
785.89#	2+	3.12 ps *10*	g=+0.371 *24* (1996Br09). Q=2.18 *30* (1983Hu01). B(E2)↑=0.140 *4*. Other Q: +2.25 *+13–11* based on diagonal matrix element. g–factor: method, transient field. Other: 0.271 *44* (1986Do13) from g–factor/g–factor(265)=0.89 *14*, g–factor(265)=+0.305 *15*. Static matrix element: <2+ M(E2) 2+> =+2.97 *+17–15* (1992Fa01). $T_{1/2}$: from B(E2)↑=0.140 *4* and adopted transition properties. Other value: 4.0 ps *4* from RDM (1992Th04). B(E2)(785.9γ)/B(E2)(705.3γ)=0.544 *15* (1983Hu01). B(E2)↑: Weighted average of 0.140 *8* (1978Mc02), 0.134 *9* (1972Do01), 0.142 *5* (1973Be40), and 0.140 *15* (1992Fa01) from <$2+_{\gamma}$ M(E2) $0+_{g}$> =+0.372 *19*. Others: 0.176 *8* (1977Wo03), 0.19 *4* (1963Yo09).
859.4#	3+	4.5 ps *8*	$T_{1/2}$: from B(E2)(594γ) and adopted transition properties.
911.18§	8+	4.12 ps *15*	g=+0.278 *22* (1996Br09). Q=−3.05 *+15–30* based on diagonal matrix element. g–factor: method, transient field. Other: 0.229 *41* (1986Do13) from g–factor/g–factor(265)=0.75 *13*, g–factor(265)=+0.305 *15*. Static matrix element: <8+ M(E2) 8+> =−4.74 *+24–47* (1992Fa01). $T_{1/2}$: weighted average of 4.2 ps *3* (Doppler–broadened lineshape) and 4.7 ps *4* (RDM) (1977Ke06), 3.88 ps *21* RDM (1992Th04); 4.2 ps *3* from B(E2) and adopted transition properties.
956.20#	4+	3.5 ps *2*	Q=−1.08 *+13–6* based on diagonal matrix element. Static matrix element: <4+ M(E2) 4+> =−1.43 *+17–8* (1992Fa01). $T_{1/2}$: weighted average of 3.6 ps *3* from RDM (1992Th04) and 3.4 ps *2* from B(E2) and adopted γ properties.
1075.3# *3*	5+	2.7 ps *3*	$T_{1/2}$: from measured B(E2) for 530γ and 810γ and adopted transition properties.
1216.0# *3*	6+	4.4 ps *3*	$T_{1/2}$: from RDM (1992Th04). The unweighted average of 3.5 ps *4*, 4.4 ps *4*, 4.6 ps *5* from B(E2)(260γ), B(E2)(671γ), B(E2)(951γ), respectively, and adopted transition properties is 4.2 ps *3*. Q=−2.57 *+13–15* based on diagonal matrix element. Static matrix element: <6+ M(E2) 6+> =−3.69 *+18–22* (1992Fa01).
1350§	10+	1.62 ps *7*	g=+0.28 *4* (1996Br09). Q=−4.1 *+3–6* based on diagonal matrix element. g–factor: method, transient field. Other: 0.20 *7* (1986Do13) from g–factor/g–factor(265)=0.64 *24*, g–factor(265)=+0.305 *14*. Static matrix element: <10+ M(E2) 10+> =−6.8 *+5–10* (1992Fa01). $T_{1/2}$: weighted average of 1.59 ps *8* from RDM (1992Th04) and 1.72 ps *14* from B(E2) and adopted transition properties. Others: 1.7 ps *2* (Doppler–broadened lineshape) and 1.6 ps *3* (recoil distance method) (1977Ke06).
1376.4#	7+	4.9 ps *9*	$T_{1/2}$: from B(E2)(301γ) and adopted transition properties. Other values: 5.0 ps *12* from B(E2)(831γ), 8.5 ps *23* from B(E2)(465γ).
1514	3−		B(E3)↑=0.061 *10* (1978Mc02).
1528	2+	45 fs *6*	B(E2)↑=0.018 *2* (1978Mc02). $T_{1/2}$: from measured B(E2) and adopted transition properties.
1555.8# *4*	8+	3.7 ps *3*	$T_{1/2}$: from RDM (1992Th04). 3.2 ps *3* from B(E2)(340γ), 3.2 ps *4* from B(E2)(645γ) and 4.0 ps *+9–5* from B(E2)(1010γ) and adopted transition properties if 206.0 branch is not significant. Q=−3.17 *+28–22* based on diagonal matrix element. Static matrix element: <8+ M(E2) 8+> =−4.92 *+44–34* (1992Fa01).
1721	(3−)		B(E3)↑=0.032 *5* (1978Mc02).
1751.1# *5*	9+	2.4 ps *5*	$T_{1/2}$: from B(E2)(375γ) and adopted γ properties.
1847§	12+	0.91 ps *5*	$T_{1/2}$: weighted average of 0.90 ps *8* (1977Ke06) and 0.92 ps *6* from RDM (1992Th04). 0.94 ps *8* from B(E2) and adopted transition properties.
1942.9 *11*	(0+)		Jπ: Possible Kπ=0+, γγ bandhead.
1964.6# *4*	10+	1.78 ps *17*	$T_{1/2}$: weighted average of 1.73 ps *21* from RDM (1992Th04) and 1.86 ps *26* from B(E2)(409γ) and adopted transition properties. Other value: 1.7 ps *+4–3* from B(E2)(1054γ).
1977.8 *7*	(4+)	2.2 ps *+11–9*	Jπ: Possible Kπ=4+, γγ bandhead. $T_{1/2}$: from B(E2)(1192γ) and adopted transition properties assuming 903γ branch is negligible. B(E2)↑(786 to 1978)=B(E2)↑(g.s. to 786)x 0.16 *12* (1994OsZZ)= 0.022 *17* if B(E2)↑(g.s. to 786)=0.140 *4*.
1986.1 *8*	(4+)		

Continued on next page (footnotes at end of table)

Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

^{166}Er Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	Comments
2028.2@ *7*	(4+)	0.33 ps *12*	$T_{1/2}$: from B(E2)(1243γ) and adopted transition properties, assuming 1070 branch is negligible.
2101.6	(4+)	0.27 ps *19*	E(level): level reported by 1994OsZZ only. 1996Fa21 report no evidence for the deexciting transitions reported by 1994OsZZ in a study using the same beam species and similar beam energy. However, level is known from an ε decay study. Jπ: candidate for two–phonon (γγ vibration) state (1994OsZZ). B(E2)↑(786 to 2102)=0.47 *35* x B(E2)↑(g.s. to 786)(1994OsZZ)= 0.07 *5* if B(E2)↑(786 level)=0.140 *4*. $T_{1/2}$: from B(E2)(1316γ) and adopted transition properties assuming negligible 1145γ branch.
2155.8 *8*	(6+)		
2260.3@ *8*	(6+)		
2389.6§ *6*	14+	0.55 ps *7*	$T_{1/2}$: from RDM (1992Th04). Other value: 0.52 *+11–5* ps from B(E2) and adopted transition properties.
2429.6# *5*	12+	1.18 ps *21*	$T_{1/2}$: from RDM (1992Th04). Other datum: 1.8 *+7–4* ps from B(E2)(465γ) if 1081γ is negligible.
2574.0@ *11*	(8+)		
2968.8§ *7*	16+	0.49 ps *27*	$T_{1/2}$: from B(E2) an adopted transition properties.
3577?§	18+		E(level): from fig. 1 of 1998Fa15; justification for value is unknown.

† From least–squares adjustment of Eγ, except as noted, assuming Δ(Eγ)=0.3 keV for Eγ data quoted to one decimal place and 1 keV for for all other data.
‡ From Adopted Levels.
§ (A): g.s. band.
\# (B): γ band.
@ (C): Possible Kπ=4+, γγ vibration band.

γ(^{166}Er)

E(level)	Eγ†	Iγ‡	Mult.§	δ	α	Comments
80.574	80.6	100	E2		6.77	<4+$_g$ M(E2) 2+$_g$> =+3.86 *12* (1992Fa01).
264.98	184.4	100	E2		0.331	B(E2)↓=1.66 *10*. B(E2)↓: from <4+$_g$ M(E2) 2+$_g$> =+3.86 *12* (1992Fa01).
545.44	280.5	100	E2		0.0848	B(E2)↓=1.70 *+14–10*. B(E2)↓: from <6+$_g$ M(E2) 4+$_g$> =+4.70 *+19–14* (1992Fa01).
785.89	521.0	2.1	E2		0.01480	B(E2)↓=0.0052 *+17–14*. B(E2)↓: from <2+$_γ$ M(E2) 4+$_g$> =+0.161 *+26–22* (1992Fa01).
	705.3	100	E2+M1	−19 *+9−38*	0.011 *4*	B(E2)↓=0.054 *5*. B(E2)↓: from <2+$_γ$ M(E2) 2+$_g$> =+0.518 *26* (1992Fa01). A_2=−0.24 *4*, A_4=−0.46 *7* and A_2=−0.24 *9*, A_4=−0.40 *12* (1972Do01). δ: from 1972Do01. Others: −38 *+24*– infinity (1972Do01); ≥25 (1978Mc02).
	785.9	88	E2		0.00561	B(E2)↓=0.028 *3*. B(E2)↓: from <2+$_γ$ M(E2) 0+$_g$> =+0.372 *19* (1992Fa01). Iγ(786γ)/Iγ(705γ)=0.85 *4* and 80 *5* (1972Do01).
859.4	73.4a	0.04				
	594.4	16.5				B(E2)↓=0.026 *5*. B(E2)↓: from <3+$_γ$ M(E2) 4+$_g$> =−0.43 *4* (1992Fa01).
	778.8	100				B(E2)↓=0.018 *+5–4*. B(E2)↓: from <3+$_γ$ M(E2) 2+$_g$> =−0.35 *+5–4* (1992Fa01).
911.18	366.1# *5*	100	E2		0.0384	B(E2)↓=1.99 *14*. B(E2)↓: from <8+$_g$ M(E2) 6+$_g$> =+5.81 *20* (1992Fa01).
956.20	97.0a	1.99				Iγ: this value appears to be an order of magnitude too large; evaluator suspects a typographical error in 1992Fa01.
	170.3	1.08				B(E2)↓=0.75 *8*. B(E2)↓: from <4+$_γ$ M(E2) 2+$_γ$> =+2.60 *13* (1992Fa01).

Continued on next page (footnotes at end of table)

Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	δ	Comments
956.20	410.7	1.38			B(E2)↓=0.0118 *+12–30*. B(E2)↓: from <4+$_\gamma$ M(E2) 6+$_g$> =+0.326 *+16–41* (1992Fa01).
	691.2	100	D+Q	−3.3 *+12–30*	B(E2)↓=0.059 *6*. B(E2)↓: from <4+$_\gamma$ M(E2) 4+$_g$> =+0.727 *36* (1992Fa01). A_2=−0.47 *6*, A_4=−0.55 *9* (1972Do01). δ: from 1972Do01.
	875.64	57			B(E2)↓=0.0110 *11*. B(E2)↓: from <4+$_\gamma$ M(E2) 2+$_g$> =+0.315 *16* (1992Fa01). Iγ(876γ)/Iγ(691γ)=0.53 *5* (1972Do01). A_2=+0.51 *11*, A_4=−0.43 *19* (1972Do01).
1075.3	119.1[a]	0.39			
	216.0	4.32			B(E2)↓=1.6 *+9–4*. B(E2)↓: from <5+$_\gamma$ M(E2) 3+$_\gamma$> =+4.20 *+12–5* (1992Fa01).
	529.8	15.6			B(E2)↓=0.066 *+9–12*. B(E2)↓: from <5+$_\gamma$ M(E2) 6+$_g$> =−0.85 *+6–8* (1992Fa01).
	810.3	100			B(E2)↓=0.050 *8*. B(E2)↓: from <5+$_\gamma$ M(E2) 4+$_g$> =−0.74 *6* (1992Fa01).
1216.0	140.7[a]	0.73			
	259.7	24.8			B(E2)↓=1.52 *15*. B(E2)↓: from <6+$_\gamma$ M(E2) 4+$_\gamma$> =+4.44 *20* (1992Fa01).
	304.7				B(E2)↓≈0.008. B(E2)↓: from <6+$_\gamma$ M(E2) 8+$_g$> =+0.33 *+31–30* (1992Fa01).
	670.5	100			B(E2)↓=0.054 *5*. B(E2)↓: from <6+$_\gamma$ M(E2) 6+$_g$> =+0.834 *42* (1992Fa01).
	951.0	49.1			B(E2)↓=0.0046 *4*. B(E2)↓: from <6+$_\gamma$ M(E2) 4+$_g$> =+0.244 *12* (1992Fa01).
1350	438.5[#] *5*	100			B(E2)↓=1.99 *16*. B(E2)↓: from <10+$_g$ M(E2) 8+$_g$> =+6.47 *25* (1992Fa01).
1376.4	301.0				B(E2)↓=1.18 *22*. B(E2)↓: from <7+$_\gamma$ M(E2) 5+$_\gamma$> =+4.2 *4* (1992Fa01).
	464.8				B(E2)↓=0.025 *7*. B(E2)↓: from <7+$_\gamma$ M(E2) 8+$_g$> =−0.61 *+9–8* (1992Fa01).
	830.6				B(E2)↓=0.018 *4*. B(E2)↓: from <7+$_\gamma$ M(E2) 6+$_g$> =−0.52 *6* (1992Fa01).
1514	558[b]				
	655[b]				
	728[b]				
1528	1528[b]				
1555.8	206.0				B(E2)↓≈0.008. B(E2)↓: from <8+$_\gamma$ M(E2) 10+$_g$> =+0.37 *+18–30* (1992Fa01).
	339.7	86			B(E2)↓=1.64 *16*. B(E2)↓: from <8+$_\gamma$ M(E2) 6+$_\gamma$> =+5.28 *26* (1992Fa01).
	644.5	100			B(E2)↓=0.055 *5*. B(E2)↓: from <8+$_\gamma$ M(E2) 8+$_g$> =+0.97 *5* (1992Fa01).
	1010.3	38			B(E2)↓=0.0027 *+3–6*. B(E2)↓: from <8+$_\gamma$ M(E2) 6+$_g$> =+0.214 *+11–22* (1992Fa01).
1721	935[bc]				
1751.1	375.0	100			B(E2)↓=1.57 *+28–21*. B(E2)↓: from <9+$_\gamma$ M(E2) 7+$_\gamma$> =+5.5 *+5–4* (1992Fa01).
	401.9[a]	5			
	840.2[a]	88			
1847	497.3[#] *5*	100			B(E2)↓=1.96 *17*. B(E2)↓: from <12+$_g$ M(E2) 10+$_g$> =+7.0 *3* (1992Fa01).
1942.9	1156.7[@] *4*	100			Iγ:Iγ(1243.4γ)=121 *29*:359 *50* (1996Fa21). γ(θ) is isotropic (1998Fa15).
1964.6	408.5	100			B(E2)↓=1.52 *15*. B(E2)↓: from <10+$_\gamma$ M(E2) 8+$_\gamma$> =+5.65 *28* (1992Fa01).
	614.3[a]	28			
	1053.7	62			B(E2)↓=0.0082 *+11–17*. B(E2)↓: from <10+$_\gamma$ M(E2) 8+$_g$> =+0.416 *+27–44* (1992Fa01).
1977.8	903.1				Eγ: from level energy difference in fig. 3 of 1994OsZZ.
	1021[&]				
	1119[@] *1*	29 *10*			Iγ(1119γ):Iγ(1191.6γ)=41 *15*:143 *36* (1996Fa21).

Continued on next page (footnotes at end of table)

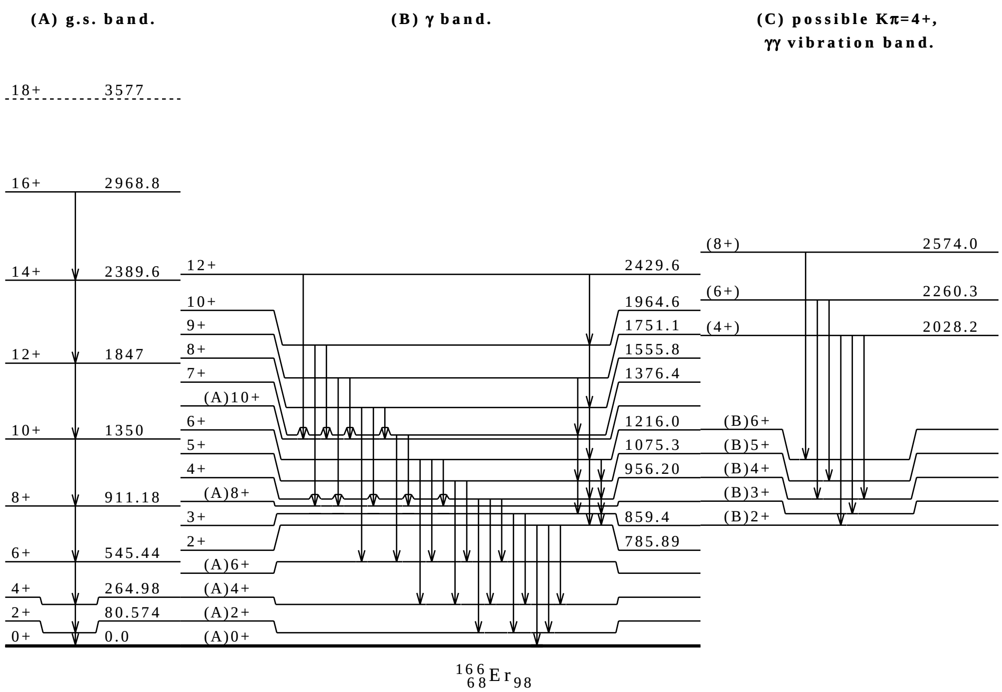
Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

γ(^{166}Er) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	Comments
1977.8	1191.6[@] *4*	100 *25*		B(E2)↓=0.0049 *+20–25* (1996Fa21).
				Iγ: see comment on 1119γ.
1986.1	1127[&]			
	1200[&]			
2028.2	1070[&]			
	1169.7[@] *3*	68 *14*		Iγ(1169.7γ):Iγ(1243.4γ)=243 *50*:359 *50* (1996Fa21).
	1243.4[@] *3*	100 *14*	Q	B(E2)↓=0.027 *10* (1996Fa21).
				Iγ: see comment on 1169.7γ.
				Mult.: Q from preliminary γ(θ) data (1998Fa15).
2101.6	1145.4[c]			Eγ: from level energy difference in fig. 3 of 1994OsZZ.
	1242.2			Eγ: from level energy difference in fig. 3 of 1994OsZZ.
	1315.7			Eγ: from level energy difference in fig. 3 of 1994OsZZ.
2155.8	1080[&]			
	1200[&]			
2260.3	1185[&]			
	1304[&]			
2389.6	542.8	100		B(E2)↓=2.29 *+23–49*.
				B(E2)↓: from <$14+_g$ M(E2) $12+_g$> =+8.15 *+41–86* (1992Fa01).
2429.6	465.0			B(E2)↓=1.4 *+4–6*.
				B(E2)↓: from <$12+_γ$ M(E2) $10+_γ$> =+6.0 *+8–12* (1992Fa01).
	1081.2			Eγ: from level energy difference in fig. 3 of 1994OsZZ.
2574.0	1358[&]			
2968.8	579.2			B(E2)↓=1.8 *10*.
				B(E2)↓: from <$16+_g$ M(E2) $14+_g$> =+7.7 *+20–22* (1992Fa01).

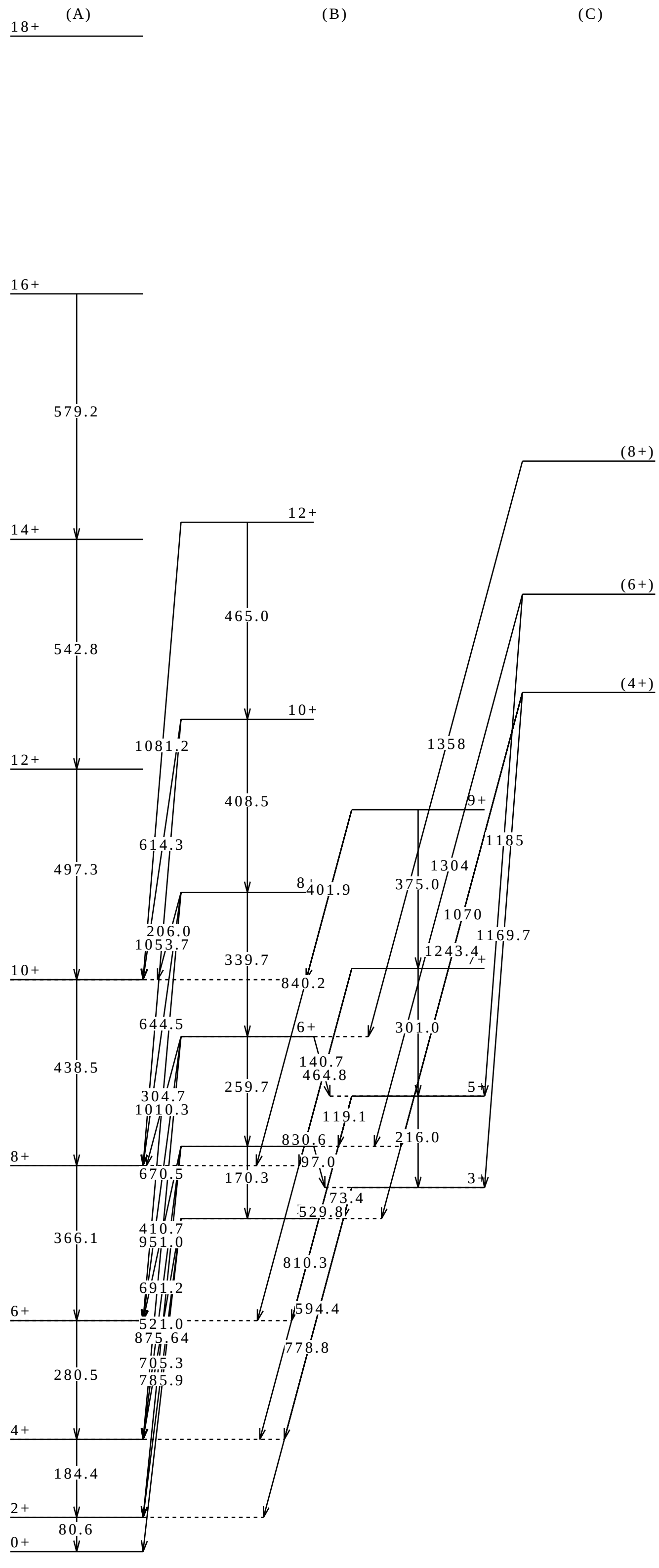
† From 1992Fa01, unless otherwise stated. Uncertainty unstated by authors.
‡ Relative photon branching from level; from 1992Fa01, except as noted. Values result from analysis of data using the code GOSIA.
§ From Adopted Gammas, unless otherwise noted.
\# From 1977Ke06.
@ From 1996Fa21.
& From 1998Fa15. Uncertainty unstated by authors.
a Rounded–off value from Adopted Gammas. Transition shown in figure 5 of 1992Fa01.
b From 1978Mc02. Uncertainty unstated by authors.
c Placement of transition in the level scheme is uncertain.

Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)



Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

Bands for ^{166}Er



$^{166}_{68}Er_{98}$

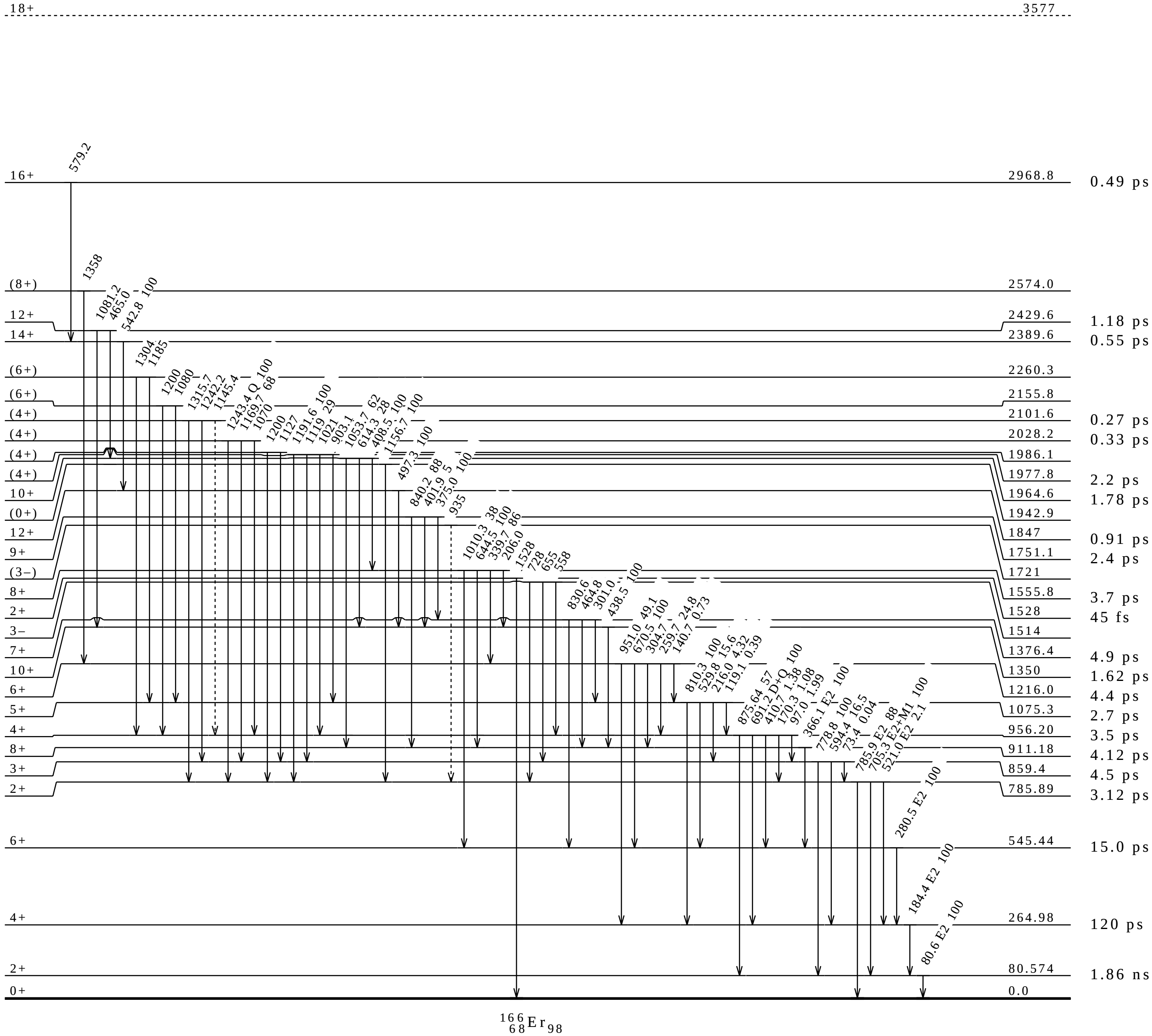
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Coulomb Excitation 1992Fa01,1992Th04,1996Br09 (continued)

Level Scheme

Intensities: relative photon branching from each level



CITATION: Nuclear Data Sheets (1992)

From NNDC(BNL) program ENSDAT

$^{166}_{68}Er_{98}$–140

^{167}Er(d,t),(^{3}He,α) 1979Pa15

Target Jπ=7/2+.
1979Pa15: E(d)=15 MeV (FWHM=7–8 keV) and E(^{3}He)=24 MeV (FWHM≈21 keV); magnetic spectrograph, photographic emulsions; measured dσ/dΩ.
Other measurement: 1969Bu01.

^{166}Er Levels

E(level)	Jπ[†]	L	dσ/dΩ(d,t)[‡]	Comments
79[#]	2+		17.3	dσ/dΩ(50°)<1.0 μb/sr for (^{3}He,α) (1979Pa15).
265[#]	4+		≈39	dσ/dΩ(50°)=6.5 μb/sr for (^{3}He,α) (1979Pa15).
545[#]	6+		24	dσ/dΩ(50°)=17.2 μb/sr for (^{3}He,α) (1979Pa15).
786[@]	2+		5.6	
859[@]	3+		5.6	
911[#]	8+		8.2	dσ/dΩ(50°)=6.0 μb/sr for (^{3}He,α) (1979Pa15).
957[@]	4+		5.8	
1075[@]	5+		4.1	
1215[@]	6+		2.3	
1375[@]	7+		<1.0	
1458[&]	(2−)		103	dσ/dΩ(50°)<1.0 μb/sr for (^{3}He,α) (1979Pa15).
1515[&]	(3−)		72	dσ/dΩ(50°)=2.1 μb/sr for (^{3}He,α) (1979Pa15).
1572[&]	4−		5.0	
1597	(4−)		46	dσ/dΩ(50°)=1.9 μb/sr for (^{3}He,α) (1979Pa15).
1666	5−		14.8	
1679			4.7	dσ/dΩ(50°)=1.9 μb/sr for (^{3}He,α) (1979Pa15).
1692	(5−)		12.4	
1700			4.2	dσ/dΩ(50°)=2.0 μb/sr for (^{3}He,α) (1979Pa15).
1722			7.0	
1762			10.9	dσ/dΩ(50°)=2.1 μb/sr for (^{3}He,α) (1979Pa15).
1787	6−		3.5	
1813			3.4	
1829	(6−)		9.9	
1865			33	dσ/dΩ(50°)=15.5 μb/sr for (^{3}He,α) (1979Pa15).
1896			11.3	
1910[a]	(6−)		47	dσ/dΩ(50°)=5.3 μb/sr for (^{3}He,α) (1979Pa15).
1940	(3,4)+[§]	0[§]	38	dσ/dΩ(50°)<1.0 μb/sr for (^{3}He,α) (1979Pa15).
1970			11.8	dσ/dΩ(50°)=2.2 μb/sr for (^{3}He,α) (1979Pa15).
1979	(3,4)+[§]	0[§]	26	
1987			15.9	
2003			2.2	
2022[b]	(4−)		96	dσ/dΩ(50°)=8.0 μb/sr for (^{3}He,α) (1979Pa15).
2032	(5+)		29	dσ/dΩ(50°)=12.7 μb/sr for (^{3}He,α) (1979Pa15).
2050[a]	(7−)		22	dσ/dΩ(50°)=8.8 μb/sr for (^{3}He,α) (1979Pa15).
2061			28	dσ/dΩ(50°)=4.7 μb/sr for (^{3}He,α) (1979Pa15).
2080[c]	(3−)		88	Peak obscured in (^{3}He,α) (1979Pa15).
2090	(6+)		10.3	dσ/dΩ(50°)=11.2 μb/sr for (^{3}He,α) (1979Pa15).
2122[b]	(5−)		28	dσ/dΩ(50°)=18.1 μb/sr for (^{3}He,α) (1979Pa15).
2128			190	
2147[c]	(4−)		33	dσ/dΩ(50°)=11.2 μb/sr for (^{3}He,α) (1979Pa15).
2161	(3,4)+[§]	0[§]	38	
2174			14.3	dσ/dΩ(50°)=13.2 μb/sr for (^{3}He,α) (1979Pa15).
2182			3.4	dσ/dΩ(50°)=5.4 μb/sr for (^{3}He,α) (1979Pa15).
2215	(3−)		86	dσ/dΩ(50°)=12.5 μb/sr for (^{3}He,α) (1979Pa15).
2242[d]	(5−)		143	dσ/dΩ(50°)=30 μb/sr for (^{3}He,α) (1979Pa15).
2266			12.4	dσ/dΩ(50°)=16.7 μb/sr for (^{3}He,α) (1979Pa15).
2274			13.8	
2295	(3,4)+[§]	0[§]	289	dσ/dΩ(50°)=7.1 μb/sr for (^{3}He,α) (1979Pa15).
2316	(3,4)+[§]	0[§]	277	dσ/dΩ(50°)=9.8 μb/sr for (^{3}He,α) (1979Pa15).
2336			243	dσ/dΩ(50°)=11.1 μb/sr for (^{3}He,α) (1979Pa15).
2353			75	
2367[d]	(6−)		115	dσ/dΩ(50°)=10.2 μb/sr for (^{3}He,α) (1979Pa15).
2377			81	dσ/dΩ(50°)=23 μb/sr for (^{3}He,α) (1979Pa15).
2386	(3,4)+[§]	0[§]	73	
2402			49	dσ/dΩ(50°)=7.6 μb/sr for (^{3}He,α) (1979Pa15).
2417			37	dσ/dΩ(50°)=4.9 μb/sr for (^{3}He,α) (1979Pa15).
2427			98	
2438	(3,4)+[§]	0[§]	≈28	

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^{167}Er(d,t),(^{3}He,α) 1979Pa15 (continued)

^{166}Er Levels (continued)

E(level)	Jπ[†]	L	dσ/dΩ(d,t)[‡]	Comments
2449			83	dσ/dΩ(50°)=6.8 μb/sr for (^{3}He,α) (1979Pa15).
2478			58	dσ/dΩ(50°)=2.9 μb/sr for (^{3}He,α) (1979Pa15).
2495	(9−)		57	dσ/dΩ(50°)=34 μb/sr for (^{3}He,α) (1979Pa15).
2499	(3,4)+[§]	0[§]	94	
2512	(3,4)+[§]	0[§]	237	dσ/dΩ(50°)=18.7 μb/sr for (^{3}He,α) (1979Pa15).
2522			≈28	
2534				dσ/dΩ(50°)=7.8 μb/sr for (^{3}He,α) (1979Pa15).
2545			41	
2563			26	dσ/dΩ(50°)=5.2 μb/sr for (^{3}He,α) (1979Pa15).
2578			8.8	
2586	(3,4)+[§]	0[§]	76	dσ/dΩ(50°)=7.3 μb/sr for (^{3}He,α) (1979Pa15).
2603			30	
2622			21	
2631	(3,4)+[§]	0[§]	388	dσ/dΩ(50°)=5.3 μb/sr for (^{3}He,α) (1979Pa15).
2649			11.4	dσ/dΩ(50°)=2.7 μb/sr for (^{3}He,α) (1979Pa15).
2670			2.7	
2677			19.1	
2687			≈20	
2734	(3,4)+[§]	0[§]	48	

[†] Assignments based on (d,t) and (^{3}He,α) cross section.
[‡] dσ/dΩ(45°) in μb/sr for (d,t) reaction (1979Pa15).
[§] Angular distributions in the (d,t) reaction have large cross sections at forward angles indicative of L=0 neutron transfers.
[#] (A): Kπ=0+ g.s. band. Configuration: 7/2[633]−7/2[633].
[@] (B): Kπ=2+ γ−vibrational band.
[&] (C): Kπ=2− band. Configuration: 7/2[633]−3/2[521] mixed with 7/2[523]+1/2[411] for J≥4.
[a] (D): Kπ=(6−) band. Configuration: 7/2[633]+5/2[523].
[b] (E): Kπ=(4−) band. Configuration: 7/2[633]+1/2[521].
[c] (F): Kπ=(3−) band. Configuration: 7/2[633]−1/2[521].
[d] (G): Kπ=(5−) band. Configuration: 7/2[633]+3/2[521].

^{168}Er(p,t) 1992Bu16,1972Ma37

Other: 1973Oo01 (E=19 MeV).
1992Bu16: E(p)=18 MeV; 97.69% ^{168}Er enriched target; magnetic spectrometer with photographic plates, FWHM≈7 keV; θ(lab)=6° and θ=10°– 65° (in 5° steps); measured E(t), angular distributions, L transfer; DWBA calculations.

^{166}Er Levels

E(level)[†]	L[‡]	dσ/dΩ(25°) μb/sr[§]	Comments
0.0[#]	0	630	
81[#] *1*		92	
265[#] *1*		36	
546[#] *1*		3	
786[@] *1*		8	
859[@] *2*		1	
956[@] *1*		4	
1160			E(level): reported by 1972Ma37 only; not adopted.
1458[&] *2*	(0)	≤1	E(level): possible doublet; 0+ and (2)− levels are known to exist at approximately this energy.
1514[&] *2*		6	Other E: 1505 in 1972Ma37.
1528 *2*		≤1	
1665 *1*		4	
1703 *1*		22	
1713 *1*	0	38	
1762 *2*		1	
1831 *1*		2	
1869 *2*		1	
1905 *2*		3	

Continued on next page (footnotes at end of table)

^{168}Er(p,t) 1992Bu16,1972Ma37 (continued)

^{166}Er Levels (continued)

E(level)†	L‡	dσ/dΩ(25°) μb/sr§	Comments
1935 *2*	0	21	Other E: 1928 in 1972Ma37.
1948			E(level): reported by 1972Ma37 only; not adopted.
1979 *3*		2	
2004 *2*		4	
2025 *2*		4	
2063 *2*		1	
2093 *2*		3	
2159 *2*		2	
2196 *2*	0	17	Other E: 2187 in 1972Ma37.
2207 *3*		1	
2245 *3*		2	
2260 *2*		5	
2287 *3*		2	
2302 *3*		2	

† From 1992Bu16, except as noted.
‡ From comparison of measured and calculated σ(θ) (1992Bu16).
§ Differential cross section at 25° in μb/sr from 1992Bu16.
# (A): Kπ=0+ g.s. band.
@ (B): Kπ=2+ γ–vibrational band.
& (C): Kπ=2– octupole band.

Adopted Levels, Gammas

Q(β⁻)=–305 *14*; S(n)=7029 *12*; S(p)=4655 *12*; Q(α)=1728 *12* 2003Au03.
Assignment: ^{169}Tm(p,4n), E=230 MeV; ion chem. Parent ^{166}Tm (1960Bu27). ^{169}Tm(p,4n) chem. ms (1963Pa08).

^{166}Tm Levels

Cross Reference (XREF) Flags

A ^{166}Yb ε Decay
B ^{165}Ho(α,3nγ)
C ^{160}Gd(^{11}B,5nγ)...
D Er(p,xnγ)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0	2+	ABCD	7.70 h *3*	%ε+%β⁺=100. μ=+0.0926 *7* (1992Sh31); Q=+2.14 *3* (1988Al04). μ: 0.0926 *7* from radiation detected optical pumping (1992Sh31). Other: +0.092 *1* from LASER resonance ion mass spectroscopy (1988Al04); relative to ^{169}Tm. Q: LASER resonance ion mass spectroscopy (1988Al04); relative to ^{170}Tm, Sternheimer correction applied. $<r^2>^{1/2}$(charge)=5.205 *4* (2004An14). Jπ: J=2 from atomic beam (1972Ad14); M1 82.29γ from 1+. $T_{1/2}$: weighted average of 7.7 h *1* (1949Wi03); 7.74 h *8* (1960Gr15); 7.69 h *5* (1960Wi12); 8.0 h *2* (1961Bj02); 7.5 h *2* (1963Pa08); 7.7 h *1* (1963Ra15); 7.70 h *8* (1970Ka23). Other measurements: 1954Mi16, 1960Bo29, 1960Bu27.
0+x [g]	(3+)	BC		E(level): x<16 keV from estimated Eγ<50 keV for (4+) to 2+ transition.
0+u [s]		B		
33.637+x [f] *6*	(4+)	C		
74.920+x [g] *3*	(5+)	BC		
82.298 *8*	1+	ABCD	385 ps *40*	Jπ: allowed ε decay from 0+ ^{166}Yb (log *ft*=4.9). $T_{1/2}$: from ce(L)(t) in Er(p,xnγ) (1976Sv01).
109.338+x [#] *4*	(6–)	BC	340 ms *25*	%IT=100. E(level): 1996Dr07 assumed that the isomer depopulated via an unseen transition of energy x<25 keV. However, based on energy differences, 2002Ca46 find x=0.2 *5* and conclude that the isomer decays directly via a 34.42γ to the 75+x level. $T_{1/2}$: from 34.4γ(t) in (^{11}B,5nγ). Other: 370 ms *40* from K x ray(t) in (^{11}B,5nγ).
131.753+x [k] *6*	(5+)	C		
152.117+x [f] *4*	(6+)	BC		
171.566+x [d] *4*	(6+)	BC		
194.032+u [s]		B		
207.553+x [j] *5*	(6+)	BC		
211.437+x [e] *4*	(7+)	BC		
212.91+x [n] *24*	(5+)	C		
226.586+x [g] *4*	(7+)	BC		
231.053+x [b] *4*	(6–)	BC	36 ns *2*	$T_{1/2}$: from fits to time spectra for 59γ, 62γ and 122γ in (^{11}B,5nγ), (^{6}Li,4nγ) (2002Ca46). Other $T_{1/2}$: 2 μs 1 from 59.5γ(t) and 62.2γ(t) measured with pulsed beam (90 μs on, 90 μs off) and <2 μs from 121.7γ(t) (1996Dr07). 80 ns<$T_{1/2}$<1 μs (1992Dr03) from two–parameter Eγ–t in (α,3nγ).
256.995+x [@] *8*	(7–)	BC		
266.26+x [&] *14*	(6+)	C		
281.53+x [o] *11*	(6+)	C		
287.586+x [c] *5*	(7–)	BC		
288.141+x [k] *4*	(7+)	BC		
293.81+x [m] *14*	(6+)	C		
298.122+x [d] *6*	(8+)	BC		
341.853+x [f] *4*	(8+)	BC		
359.14+x *11*		B		
367.485+x [b] *7*	(8–)	BC		
377.0+x? [r] *4*	(5–)	C		
383.21+x [n] *13*	(7+)	C		
389.07+x [a] *14*	(7+)	C		
401.81+x [p] *11*	(7+)	C		
409.088+u [s] *23*		B		
415.45+x *20*	(–)	B		Jπ: E2 184γ to (6–) 230+x.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Tm Levels (continued)

E(level)[†]	Jπ[‡]	XREF
417.445+x[e] *6*	(9+)	BC
423.656+x[i] *20*	(7−)	BC
423.693+x[j] *5*	(8+)	BC
424.176+x[#] *9*	(8−)	BC
453.93+x?[q] *18*	(6−)	C
460.262+x[g] *6*	(9+)	BC
469.141+x[c] *7*	(9−)	BC
488.73+x[o] *11*	(8+)	BC
504.87+x[m] *12*	(8+)	C
507.811+x[h] *9*	(8−)	C
524.631+x[k] *5*	(9+)	C
529.71+x[&] *14*	(8+)	C
539.90+x[r] *18*	(7−)	C
563.383+x[d] *7*	(10+)	C
592.557+x[b] *9*	(10−)	BC
605.315+x[f] *5*	(10+)	BC
609.616+x[@] *13*	(9−)	BC
634.390+x[i] *9*	(9−)	BC
634.54+x[n] *11*	(9+)	BC
637.89+x[q] *15*	(8−)	C
642.59+u[s] *6*		B
649.73+x[p] *11*	(9+)	BC
688.03+x[a] *14*	(9+)	BC
733.224+x[e] *8*	(11+)	BC
733.695+x[j] *11*	(10+)	BC
736.322+x[h] *9*	(10−)	BC
737.615+x[c] *12*	(11−)	BC
756.17+x[r] *15*	(9−)	BC
772.742+x[g] *12*	(11+)	BC
778.37+x[o] *11*	(10+)	BC
799.37+x[m] *12*	(10+)	C
812.26+x[#] *9*	(10−)	C
850.036+x[k] *8*	(11+)[§]	BC
863.54+x[&] *14*	(10+)	BC
887.39+x[q] *15*	(10−)	BC
904.431+x[b] *13*	(12−)	BC
915.984+x[i] *10*	(11−)	BC
922.167+x[d] *9*	(12+)	BC
946.244+x[f] *10*	(12+)	BC
965.86+x[n] *11*	(11+)	BC
982.27+x[p] *11*	(11+)	BC
1030.91+x[@] *9*	(11−)	C
1043.013+x[h] *10*	(12−)	BC
1045.54+x[r] *15*	(11−)	BC
1055.56+x[a] *14*	(11+)	BC
1092.229+x[c] *14*	(13−)	BC
1130.482+x[j] *11*	(12+)	BC
1132.345+x[e] *10*	(13+)	BC
1156.59+x[o] *11*	(12+)	BC
1157.140+x[g] *18*	(13+)	BC
1173.09+x[m] *12*	(12+)	C
1214.15+x[q] *15*	(12−)	BC
1263.35+x[&] *23*	(12+)	BC
1264.02+x[#] *12*	(12−)	C
1268.634+x[k] *22*	(13+)	BC
1279.702+x[i] *17*	(13−)	BC
1299.528+x[b] *14*	(14−)	BC
1350.370+x[d] *25*	(14+)	BC
1368.12+x[f] *4*	(14+)	BC
1379.24+x[n] *13*	(13+)	BC
1397.15+x[p] *12*	(13+)	C
1416.80+x[r] *15*	(13−)	BC
1433.82+x[h] *3*	(14−)	BC
1486.8+x[a] *3*	(13+)	C
1510.57+x[@] *13*	(13−)	C
1528.158+x[c] *17*	(15−)	BC
1599.63+x[e] *5*	(15+)	BC
1604.02+x[j] *9*	(14+)	C
1610.04+x[g] *3*	(15+)	BC
1612.15+x[o] *10*	(14+)	BC
1625.45+x[q] *16*	(14−)	BC
1634.82+x[m] *17*	(14+)	C
1722.71+x[i] *7*	(15−)	BC
1723.9+x[&] *3*	(14+)	C
1768.85+x[#] *14*	(14−)	C
1770.17+x[b] *4*	(16−)	BC
1774.71+x[k] *11*	(15+)	BC
1836.51+x[d] *8*	(16+)	BC
1858.44+x[n] *15*	(15+)	C
1865.94+x[f] *9*	(16+)	BC
1873.54+x[r] *16*	(15−)	BC
1900.78+x[p] *23*	(15+)	C
1908.47+x[h] *4*	(16−)	BC
1976.5+x[a] *4*	(15+)	C
2037.54+x[@] *22*	(15−)	C
2038.35+x[c] *7*	(17−)	BC
2120.43+x[g] *7*	(17+)	BC
2122.43+x[j] *14*	(16+)	C
2123.26+x[q] *17*	(16−)	BC
2131.92+x[e] *7*	(17+)	C
2153.22+x[o] *12*	(16+)	C
2181.72+x[m] *19*	(16+)	C
2237.39+x[i] *10*	(17−)	C
2245.5+x[&] *4*	(16+)	C
2307.58+x[b] *8*	(18−)	BC
2315.79+x[#] *25*	(16−)	C
2357.11+x[k] *14*	(17+)	C
2381.19+x[d] *7*	(18+)	BC
2399.14+x[n] *17*	(17+)	C
2412.13+x[r] *18*	(17−)	C
2423.39+x[f] *11*	(18+)	C
2463.70+x[h] *10*	(18−)	BC
2479.1+x[p] *4*	(17+)	C
2521.0+x[a] *5*	(17+)	C
2602.1+x[@] *3*	(17−)	C
2614.28+x[c] *10*	(19−)	BC
2690.13+x[g] *10*	(19+)	C
2696.33+x[j] *17*	(18+)	C
2702.85+x[q] *19*	(18−)	C
2713.80+x[e] *10*	(19+)	C
2751.22+x[o] *15*	(18+)	C
2785.4+x[m] *4*	(18+)	C
2814.91+x[i] *12*	(19−)	C
2839.3+x[&] *5*	(18+)	C
2893.6+x[#] *4*	(18−)	C
2902.79+x[b] *11*	(20−)	BC
2978.39+x[d] *11*	(20+)	C
2987.24+x[k] *23*	(19+)	C
3016.41+x[n] *23*	(19+)	C
3024.5+x[r] *3*	(19−)	C
3031.65+x[f] *13*	(20+)	C
3092.79+x[h] *14*	(20−)	C
3100.6+x *5*		C
3109.0+x *5*		C
3133.9+x[p] *5*	(19+)	C
3200.6+x[@] *5*	(19−)	C
3246.17+x[c] *12*	(21−)	C
3308.63+x[g] *12*	(21+)	C
3328.23+x[j] *20*	(20+)	C
3345.18+x[e] *12*	(21+)	C
3354.7+x[q] *3*	(20−)	C
3374.8+x[o] *4*	(20+)	C
3449.20+x[i] *24*	(21−)	C
3457.7+x[m] *5*	(20+)	C
3546.74+x[b] *13*	(22−)	C
3623.42+x[d] *13*	(22+)	C
3640.6+x[k] *4*	(21+)	C
3686.78+x[f] *15*	(22+)	C
3699.0+x[l] *4*	(21+)	C
3699.9+x[r] *4*	(21−)	C
3732.3+x[n] *3*	(21+)	C
3788.4+x[h] *4*	(22−)	C
3804.3+x[p] *6*	(21+)	C
3923.95+x[c] *14*	(23−)	C
3975.90+x[g] *15*	(23+)	C
4018.5+x[j] *4*	(22+)	C
4024.69+x[e] *15*	(23+)	C
4058.9+x[q] *4*	(22−)	C
4136.2+x[i] *4*	(23−)	C
4232.54+x[b] *16*	(24−)	C
4316.92+x[d] *17*	(24+)	C
4328.3+x[l] *4*	(23+)	C
4359.0+x[k] *4*	(23+)	C
4391.08+x[f] *18*	(24+)	C
4421.0+x[r] *5*	(23−)	C
4481.8+x[n] *5*	(23+)	C
4542.3+x[h] *5*	(24−)	C
4642.89+x[c] *17*	(25−)	C
4697.4+x[g] *4*	(25+)	C
4755.8+x[e] *4*	(25+)	C
4762.7+x[j] *5*	(24+)	C
4874.2+x[i] *5*	(25−)	C
4957.64+x[b] *19*	(26−)	C
5021.3+x[l] *5*	(25+)	C
5064.6+x[d] *4*	(26+)	C
5111.0+x[k] *4*	(25+)	C
5150.9+x[f] *4*	(26+)	C
5346.5+x[h] *6*	(26−)	C
5407.2+x[c] *4*	(27−)	C
5480.3+x[g] *5*	(27+)	C
5544.9+x[e] *5*	(27+)	C
5559.3+x[j] *6*	(26+)	C
5662.6+x[i] *6*	(27−)	C
5725.5+x[b] *4*	(28−)	C
5766.4+x[l] *6*	(27+)	C
5873.6+x[d] *5*	(28+)	C
5923.5+x[k] *5*	(27+)	C
5972.8+x[f] *5*	(28+)	C
6192.9+x[h] *7*	(28−)	C
6227.2+x[c] *5*	(29−)	C
6329.6+x[g] *6*	(29+)	C
6396.4+x[e] *6*	(29+)	C
6407.3+x[j] *7*	(28+)	C
6503.2+x[i] *7*	(29−)	C
6542.5+x[b] *6*	(30−)	C
6571.1+x[l] *7*	(29+)	C
6748.9+x[d] *6*	(30+)	C
6788.7+x[k] *6*	(29+)	C
6861.1+x[f] *6*	(30+)	C

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Tm Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
7063.2+x[h] *7*	(30−)	C	7692.5+x[d] *7*	(32+)	C	8352.7+x[i] *8*	(33−)	C
7111.2+x[c] *6*	(31−)	C	7816.1+x[f] *7*	(32+)	C	8692.2+x[d] *7*	(34+)	C
7247.9+x[g] *7*	(31+)	C	7969.9+x[h] *8*	(32−)	C	8845.2+x?[f] *7*	(34+)	C
7304.6+x[j] *8*	(30+)	C	8065.8+x[c] *7*	(33−)	C	9338.8+x[b] *7*	(36−)	C
7313.9+x[e] *7*	(31+)	C	8234.4+x[g] *7*	(33+)	C			
7398.8+x[i] *8*	(31−)	C	8297.4+x[e] *7*	(33+)	C			
7414.4+x[b] *6*	(32−)	C	8345.2+x[b] *7*	(34−)	C			

† From least−squares fit to Eγ.
‡ Values given without comment are based on deduced band structure in (^{11}B,5nγ) and transition multipolarities.
§ D+Q 245γ to (10+) 605+x.
\# (A): Kπ=6−, α=0 (π 7/2[404])+(ν 5/2[523]) band.
@ (B): Kπ=6−, α=1 (π 7/2[404])+(ν 5/2[523]) band.
& (C): Kπ=6+, α=0 (π 7/2[523])+(ν 5/2[523]) band. Note that adopted J values are two units higher than shown in (α,3nγ) and π is opposite. The configuration proposed in (α,3nγ) differs also.
a (D): Kπ=6+, α=1 (π 7/2[523])+(ν 5/2[523]) band. See comment on signature partner of this band.
b (E): Kπ=6−, α=0 (π 7/2[523])+(ν5/2[642]) band.
c (F): Kπ=6−, α=1 (π 7/2[523])+(ν5/2[642]) band.
d (G): Kπ=6+, α=0 (π 7/2[404])+(ν5/2[642]) band. Note that adopted J values are one unit higher than shown in (α,3nγ).
e (H): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner of this band.
f (I): Kπ=2+,3+, α=0 (π 1/2[411])⊗(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown in (α,3nγ).
g (J): Kπ=2+,3+, α=1 (π 1/2[411])⊗(ν 5/2[642]) band. See comment on signature partner of this band.
h (K): Kπ=2−,3−, α=0 (p1/2[541])⊗(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown in (α,3nγ) and π is opposite. The configuration proposed in (α,3nγ) differs also. From the adopted Kπ=3− configuration=(π 1/2[541])+(ν 5/2[642]).
i (L): Kπ=2−,3−, α=1 (p1/2[541])⊗(ν 5/2[642]) band. See comment on signature partner of this band.
j (M): Kπ=2+,3+, α=0 (π 1/2[541])⊗(ν 5/2[523]) band. Note that adopted J values are one unit higher than shown in (α,3nγ) and π is opposite. The configuration proposed in (α,3nγ) differs also.
k (N): Kπ=2+,3+, α=1 (π 1/2[541])⊗(ν 5/2[523]) band. See comment on signature partner of this band.
l (O): α=1 band including (21+) 3699+x level.
m (P): Kπ=1+,2+, α=0 (π 1/2[541])⊗(ν 3/2[521]) band.
n (Q): Kπ=1+,2+, α=1 (π 1/2[541])⊗(ν 3/2[521]) band.
o (R): Kπ=1+, α=0 (π 7/2[404])−(ν 5/2[642]) band.
p (S): Kπ=1+, α=1 (π 7/2[404])−(ν 5/2[642]) band.
q (T): Kπ=1−, α=0 (π 7/2[523])−(ν 5/2[642]) band. Note that adopted J values are three units higher than shown in (α,3nγ). The configuration proposed in (α,3nγ) differs also.
r (U): Kπ=1−, α=1 (π 7/2[523])−(ν 5/2[642]) band. See comment on signature partner of this band.
s (V): Possible band fragment (1995Ma07). Observed only in (α,3nγ).

γ(^{166}Tm)

E(level)	Eγ†	Iγ†	Mult.†	δ‡	α	Comments
74.920+x	41.29 *7*	38 *5*	M1+E2	0.33	19.8 *4*	Mult.,δ: from intensity balance at the 74.9+x level in (^{11}B,5nγ).
	74.920# *3*	100 *5*	E2		9.57	Mult.: from α(K)exp in (^{11}B,5nγ); Q from DCO in (^{11}B,5nγ).
82.298	82.298# *8*	100	M1		5.43	B(M1)(W.u.)=0.0160 *17*. Mult.: from ce data in ^{166}Yb ε decay.
109.338+x	34.418# *1*	100	E1		1.116	B(E1)(W.u.)=7.6×10^{-12} *6*. Mult.: from intensity balance at the 109+x level in (^{11}B,5nγ).
131.753+x	57#&					
	98.2 *3*	100 *14*	D(+Q)			
152.117+x	77.195# *2*	55.1 *12*	(M1+E2)§		7.5 *10*	Iγ: from (α,3nγ). Other Iγ: 79 from (^{11}B,5nγ).
	118.480# *4*	100# *9*	E2@		1.627	Mult.: from ce data in (α,3nγ) and DCO in (^{11}B,5nγ).
171.566+x	62.225# *2*	100	E1		1.137	Mult.: from α(K)exp in (^{11}B,5nγ).
194.032+u	194.032# *7*	100	(M1+E2)§		0.38 *10*	
207.553+x	75.793# *4*	100# *3*				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	δ‡	α	Comments
207.553+x	98.10#& *5*	<96				Eγ,Iγ: from (α,3nγ) for triplet; intensity not divided. This placement of 98.1γ triplet is from (α,3nγ); it does not fit this placement well, so is shown as tentative here.
	132.636# *4*	88.5# *25*				Other Eγ: 132.0 *3* in (^{11}B,5nγ).
211.437+x	39.867# *2*	100# *23*	M1(+E2)		90 *80*	Mult.: from α(exp)=9 *3* from intensity balance in (^{11}B,5nγ) (2002Ca46). Placement from (^{11}B,5nγ); placement feeding 109+x level in (α,3nγ) not confirmed in (^{11}B,5nγ).
	102.102# *2*	63.1 *12*	E1		0.316	Mult.: from α(exp)≤1.5 (2002Ca46) in (^{11}B,5nγ) and γ(θ) in (α,3nγ). Iγ: from (α,3nγ). Other: 72 from (^{11}B,5nγ).
226.586+x	74.45# *3*	3.94# *25*				
	151.666# *1*	100.0# *8*	E2§		0.670	
231.053+x	59.488# *2*	100# *6*	E1		0.246	B(E1)(W.u.)=1.35×10^{-5} *12*. Mult.: from α(K)exp in (^{11}B,5nγ) (1996Dr07).
	121.710# *5*	33.8 *6*	M1		1.768	B(M1)(W.u.)=5.3×10^{-5} *4*. Iγ: from (α,3nγ). Other I(122γ):I(59γ)=45 *15*:100 *16* in (11b5ng). Mult.: from ce data in (α,3nγ).
256.995+x	147.656# *7*	100	(M1+E2)§		0.88 *15*	
266.26+x	35.1 *3*		E1		1.06 *3*	α(exp)≤3 (2002Ca46).
	94.4 *3*					
	156.9 *3*					
287.586+x	56.532# *2*	100				
288.141+x	80.584# *4*	62 *12*	M1,E2		6.5 *7*	Iγ: from (α,3nγ). Other: 56 from (^{11}B,5nγ).
	136.022# *3*	100.0# *21*	D+Q§			
	156.409# *7*	27.8				Iγ: other Iγ: 41.5 *3* from (α,3nγ).
293.81+x	81.1 *3*					
	141.7 *3*					
298.122+x	86.696# *9*	100	M1+E2	+0.32 *2*	4.74	Mult.: from ce data and γ(θ) in (α,3nγ). δ: from γ(θ) in (α,3nγ).
	126.5 *3*	6.7	(E2)@		1.281 *21*	
341.853+x	53.8 *3*	7.6				
	115.269# *2*	30.5 *13*	(M1)		2.06	Iγ: from (α,3nγ). Other: 36 from (^{11}B,5nγ).
	189.733# *3*	100.0# *11*	E2§		0.310	
367.485+x	79.888# *9*	100# *3*	(M1+E2)		6.7 *8*	
	136.445# *9*	9.1 *20*				Iγ: from (α,3nγ). Other: 3.9 from (^{11}B,5nγ).
383.21+x	89.6 *3*					
	170.1 *3*					
389.07+x	122.809 *4*	100				
401.81+x	107.7 *3*	74				
	120.2 *3*	100				
409.088+u	215.056# *21*	100				
415.45+x	184.4# *2*	100	E2		0.341	Mult.: from α(K)exp=0.21 *8* in (α,3nγ).
417.445+x	119.324# *3*	100.0# *16*	M1+E2§	+0.44 *1*	1.82	
	206.004 *5*	70.6# *16*	E2§		0.236	
423.656+x	271.543# *19*	100				Other Eγ: 271.1 *3* in (^{11}B,5nγ).
423.693+x	135.554# *3*	95.9 *24*	(M1+E2)§		1.15 *16*	Iγ: from (α,3nγ). Other: 49 from (^{11}B,5nγ).
	196.8 *3*	29.0				
	216.139# *12*	100.0# *24*	E2§		0.201	
	271.543# *19*	33# *4*				
424.176+x	167.180# *5*	100 *4*	(M1+E2)§		0.60 *13*	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	δ‡	α	Comments
424.176+x	314.87# *4*	72 *5*				
453.93+x?	76.9 *3*	100				
460.262+x	118.4#&					
	233.675# *5*	100	E2§		0.1561	
469.141+x	101.657# *3*	100.0# *18*	M1+E2§	+0.20 *1*	2.95	
	181.552# *9*	16.4 *18*	E2§		0.360	Iγ: from (α,3nγ). Other: 12.2 from (^{11}B,5nγ).
488.73+x	86.918# *4*	100# *5*				
	129.588# *6*	31.2# *9*				
	207.20# *4*	80 *14*	(E2)@		0.231	Iγ: from (α,3nγ). Other: 63 from (^{11}B,5nγ).
504.87+x	103.0 *3*	28				
	121.4 *3*	43				
	162.9 *3*	35				
	211.1 *1*	100				
507.811+x	219.9 *3*	17.4	D			
	281.228# *16*	100	D+Q§			
524.631+x	100.939# *3*	18.8	(M1(+E2))		2.99	
	182.775# *8*	100	D+Q§			
	236.484# *10*	65	(E2)@		0.1502	
529.71+x	140.641# *12*	100	(M1+E2)		1.02 *15*	
	242.5 *3*	12.9				
	263.5 *3*	18.6				
539.90+x	85.973 *20*	100				
563.383+x	145.939# *3*	50	(M1+E2)	+0.47 *2*	1.004 *15*	δ: +0.40 to +0.67 from (^{11}B,5nγ), +0.47 *2* from (α,3nγ).
	265.263# *11*	100	E2§		0.1043	
592.557+x	123.416# *6*	100.0# *14*	M1+E2§	+0.22 *1*	1.685	
	225.056# *17*	29.3 *12*	E2§		0.1763	Iγ: from (α,3nγ). Other: 36.7 from (^{11}B,5nγ).
605.315+x	80.682# *3*	8.0# *16*	D			
	144.9 *1*	14.5	(M1+E2)		0.93 *15*	Eγ=145.061 *3* for doublet in (α,3nγ). Other Iγ: 17 *5* in (α,3nγ).
	263.466 *6*	100.0# *10*	E2§		0.1066	
609.616+x	185.441#a *9*	83a *9*				
	352.6 *1*	100 *7*				Iγ: I(353γ):I(185γ)=4.8 *5*:5.8 *4* from γγ coin (1996Dr07) in (^{11}B,5nγ).
634.390+x	126.577# *4*	15.6 *13*	(M1)		1.581	Iγ: from (α,3nγ). Other: 14.4 from (^{11}B,5nγ).
	211.4 *3*	17.0				Other Eγ: 210.7 in (α,3nγ).
	292.534# *14*	100.0# *22*	(E1(+M2))	0.0 *1*	0.020 *7*	δ: −0.1 to +0.1 from DCO ratio in (^{11}B,5nγ).
634.54+x	129.5 *3*	45				
	145.805# *4*	69				
	251.4 *1*	100	(E2)@		0.1235	
637.89+x	98.0 *1*	100	(M1(+E2))		3.30	
	214.7 *3*	20.9				
642.59+u	448.56# *6*	100				
649.73+x	160.998# *15*	100	(M1(+E2))		0.67 *13*	
	247.9 *3*	62	(E2)@		0.1292	
	266.1 *3*	28.2				
688.03+x	158.329# *15*	100# *15*	(M1+E2)§		0.71 *14*	
	298.89# *9*	65 *19*	E2§		0.0723	Iγ: from (α,3nγ). Other: 39 from (^{11}B,5nγ).
	320.6 *3*	33				
733.224+x	169.841# *5*	20.9 *12*	M1+E2§	+0.66 *19*	0.62 *3*	Iγ: from (α,3nγ). Other: 27.1 from (^{11}B,5nγ).
	315.735# *17*	100# *4*	E2§		0.0613	
733.695+x	209.081# *13*	50 *4*	(M1+E2)		0.31 *9*	Iγ: from (α,3nγ). Other: 58 from (^{11}B,5nγ).
	273.5 *3*	4.9				
	309.977# *16*	100# *3*	E2§		0.0647	
	391.0 *3*	2.1				

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Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	δ‡	α	Comments
736.322+x	101.929# *5*	10.54 *18*				Iγ: from (α,3nγ). Other: 13.9 from (^{11}B,5nγ).
	211.67# *3*	31.9 *15*	D			Iγ: from (α,3nγ). Other: 26.7 from (^{11}B,5nγ).
	228.533# *15*	71 *6*	(E2)@		0.1677	Iγ: from (α,3nγ). Other: 35 from (^{11}B,5nγ).
	276.058# *13*	100.0# *18*	D§			
737.615+x	145.1 *1*	100# *20*	(M1+E2)		0.93 *15*	Eγ=145.061 *3* for doublet in (α,3nγ).
	268.479# *10*	51 *3*	E2§		0.1005	Iγ: from (α,3nγ). Other: 42 from (^{11}B,5nγ).
756.17+x	118.284# *4*	100	(M1+E2)		1.78 *15*	
	216.1 *3*	12.8				
	248.1 *3*	30				
772.742+x	167.4 *3*	4.2	(M1)		0.718	
	248.2 *3*					
	312.484# *12*	100	E2§		0.0632	
778.37+x	128.645# *7*	55 *3*	(M1(+E2))		1.36 *16*	Iγ: from (α,3nγ). Other: 44 from (^{11}B,5nγ).
	143.7 *3*	45				
	289.61# *5*	100# *11*	E2@		0.0795	
799.37+x	164.8 *3*	25				
	193.9 *3*	9.6				
	294.5 *1*	100				Eγ: possibly the same transition as the unplaced 294.379 *22* in (α,3nγ).
812.26+x	202.5 *3*	44				
	388.0 *1*	100				
850.036+x	116.3#&					γ absent in (^{11}B,5nγ).
	244.718# *7*	59 *4*	D+Q			Iγ: from (α,3nγ). Other: 64 from (^{11}B,5nγ). Mult.: Δπ=yes from α(K)exp in (α,3nγ); D+Q from γ(θ) in (α,3nγ) and DCO ratio in (^{11}B,5nγ). However, level scheme requires Δπ=no.
	325.423# *12*	100.0# *13*	E2§		0.0560	
	389.4 *1*	42				
863.54+x	175.514# *9*	100				
	333.78# *3*	32				I(334γ):I(176γ)=100 *1*:75 *5* in (α,3nγ).
887.39+x	131.215# *4*	100# *6*	(M1(+E2))		1.27 *16*	
	249.7 *1*	46 *15*				Iγ: from (α,3nγ). Other: 35 from (^{11}B,5nγ).
	252.9 *3*					
904.431+x	166.819# *7*	100# *3*	M1+E2§	+0.25 *1*	0.711	δ: from γ(θ) in (α,3nγ).
	311.855# *19*	86.4 *25*	E2§		0.0636	Iγ: from (α,3nγ). Other: 78 from (^{11}B,5nγ).
915.984+x	179.664# *7*	28.2 *22*	(M1+E2)	−0.15 *10*	0.585 *12*	Iγ: from (α,3nγ). Other: 39 from (^{11}B,5nγ).
	281.597# *13*	71 *8*	E2§		0.0867	Iγ: from (α,3nγ). Other: 52 from (^{11}B,5nγ).
	310.662# *19*	100# *6*	D			
922.167+x	188.925# *8*	18.3 *12*	M1+E2§	+0.63 *14*	0.456 *19*	δ: from γ(θ) in (α,3nγ). Iγ: from (α,3nγ). Other: 17.0 from (^{11}B,5nγ).
	358.80# *1*	100.0# *23*	E2§		0.0422	
946.244+x	96.23# *4*	3.0 *4*	D			Iγ: from (α,3nγ). Other: 5.9 from (^{11}B,5nγ).
	173.46# *8*	5.4 *7*	(M1(+E2))	−0.11 *14*	0.647 *14*	δ: −0.25 to +0.03. Iγ: from (α,3nγ). Other: 3.9 from (^{11}B,5nγ).
	340.928# *10*	100.0# *9*	E2§		0.0489	
965.86+x	166.5 *3*	7.4				
	187.482# *6*	38 *7*	D			Iγ: from (α,3nγ). Other: 44 from (^{11}B,5nγ).
	331.323# *21*	100# *4*	E2§		0.0531	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{166}Tm)$ (continued)

E(level)	Eγ†	Iγ†	Mult.†	δ‡	α	Comments
982.27+x	203.894# *12*	21.1 *26*				Iγ: from (α,3nγ). Other: 33 from (^{11}B,5nγ).
	332.58# *3*	100# *4*	E2§		0.0525	
1030.91+x	218.2 *3*	34.5				
	421.4 *1*	100	(E2)@		0.0269	
1043.013+x	127.030# *4*	12.1 *15*	(M1+E2)		1.41 *16*	Iγ: from (α,3nγ). Other: 17.8 from (^{11}B,5nγ).
	192.8# *2*	9.7 *24*	D			Iγ: from (α,3nγ). Other: 17.4 from (^{11}B,5nγ).
	270.30# *4*	30.6 *24*	D			Iγ: from (α,3nγ). Other: 42.1 from (^{11}B,5nγ).
	306.685# *9*	100.0# *19*	E2§		0.0668	
1045.54+x	158.148# *14*	100	(M1+E2)§		0.71 *14*	
	289.36# *7*	22.0				I(158γ):I(289γ)=100 *10*:68 *7* in (α,3nγ).
	309.1 *3*	4.8				
1055.56+x	192.023# *11*	100				
	367.52# *5*	63	E2§		0.0394	Other Iγ: I(192γ):I(368γ)=63 *8*:100 *5* in (α,3nγ).
1092.229+x	187.796# *5*	85 *3*	M1+E2	+0.40 *8*	0.494 *12*	Iγ: from (α,3nγ). Other: 98 from (^{11}B,5nγ). δ: weighted average of +0.23 *8* from DCO in (^{11}B,5nγ), +0.44 *4* from γ(θ) in (α,3nγ).
	354.61# *6*	100# *7*	E2§		0.0436	
1130.482+x	280.446# *8*	52 *8*	(M1(+E2))		0.13 *5*	Iγ: from (α,3nγ). Other: 24.5 from (^{11}B,5nγ).
	396.79# *4*	100# *8*	E2§		0.0317	
1132.345+x	210.177# *3*	17.1 *16*				Iγ: from (α,3nγ). Other: 12.9 from (^{11}B,5nγ).
	399.16# *2*	100	E2§		0.0312	
1156.59+x	174.4 *3*	13.6				
	190.4 *3*	14.8				
	378.22# *5*	100	E2§		0.0363	
1157.140+x	210.893# *25*	32.9 *11*	(M1)		0.378	Iγ: from (α,3nγ). Other: 8.7 from (^{11}B,5nγ).
	384.406# *21*	100.0# *14*	E2§		0.0347	
1173.09+x	206.9 *3*	17.4				
	373.7 *1*	100				
1214.15+x	168.609# *5*	100	(M1+E2)§		0.58 *12*	
	326.89## *8*	32.7	E2		0.0553	Other Iγ: 73 *12* in (α,3nγ).
1263.35+x	207.7 *3*	100				Other Eγ: 208.0 in (α,3nγ).
	399.9 *3*	74				
1264.02+x	233.2 *3*	30.3				
	451.7 *1*	100				
1268.634+x	322.27# *7*	21.9 *26*	(M1+E2)	−2.6 *24*	0.07 *6*	δ: −5.0 to −0.18. Iγ: from (α,3nγ). Other: 29.4 from (^{11}B,5nγ).
	418.603# *22*	100.0# *26*	E2@		0.0274	
	496.1 *3*	7.9				
1279.702+x	236.688# *15*	48.2 *22*	(M1)		0.275	Iγ: from (α,3nγ). Other: 50 from (^{11}B,5nγ).
	333.6 *1*	48	D			
	363.76# *5*	100# *4*	E2§		0.0405	
1299.528+x	207.295# *5*	69 *5*	(M1+E2)	+0.17 *1*	0.392	δ: from γ(θ) in (α,3nγ). Iγ: from (α,3nγ). Other: 67 from (^{11}B,5nγ).
	395.12# *2*	100# *3*	E2§		0.0321	
1350.370+x	217.8 *3*	8.5 *19*				Iγ: from (α,3nγ). Other: 7.9 from (^{11}B,5nγ).
	404.14# *3*	20.4 *19*	Q			Iγ: from (α,3nγ). Other: 32 from (^{11}B,5nγ).
	428.19# *4*	100# *4*	(E2)@		0.0258	
1368.12+x	211.2a *3*	2.3a				

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Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	α	Comments
1368.12+x	235.6 *3*	6.1			
	421.88# *4*	100	(E2)@	0.0268	
	445.9 *1*	25.0	Q		
1379.24+x	206.0 *3*	5.7			
	222.7 *3*	4.9	D		
	396.9 *3*	27			
	413.4# *1*	100	E2§	0.0283	
1397.15+x	223.6 *3*	15.4			
	240.4 *3*	43			
	267.0 *3*	12.3			
	414.9 *1*	100			
1416.80+x	202.649# *8*	100	(M1(+E2))	0.34 *9*	
	371.3 *1*	52	(E2)@	0.0382	
1433.82+x	154.18# *4*	14.5 *14*	(M1(+E2))	0.77 *14*	Iγ: from (α,3nγ). Other: 8.4 from (^{11}B,5nγ).
	165.1 *3*	4.3			
	276.7 *3*	9.2	D		
	390.77# *3*	100# *3*	E2§	0.0331	
1486.8+x	223.5 *3*	96			
	431.2 *3*	100			
1510.57+x	246.4 *3*	19.2			
	479.7 *1*	100			
1528.158+x	228.622# *10*	62# *5*	(M1+E2)	0.24 *7*	
	435.97# *2*	100# *5*	(E2)@	0.0245	
1599.63+x	231.8 *3*	6.5			
	249.3 *3*	3.5			Other Iγ: 8 *4* in (α,3nγ).
	442.3 *3*	8.6			
	467.28# *6*	100	(E2)@	0.0204	
1604.02+x	335.1 *3*	7.9			
	430.9 *3*	9.2			
	447.0 *3*	34			
	473.6 *1*	100			
1610.04+x	241.9 *3*	3.8			
	259.7 *3*	7.8	D		
	452.904# *22*	100	(E2)@	0.0222	
	477.6 *3*	7.2			
1612.15+x	343.6 *3*	13.3			
	439.0 *3*	80			
	455.6 *1*	100	(E2)@	0.0218	
	481.60# *16*	63			Placement from (^{11}B,5nγ); placed in different band in (α,3nγ).
1625.45+x	208.659# *15*	100# *5*			
	411.21# *11*	45 *5*	(E2)§	0.0288	Iγ: from (α,3nγ). Other: 39 from (^{11}B,5nγ).
1634.82+x	461.9 *3*	92			
	478.3 *3*	100			Placement from (^{11}B,5nγ); see comment on the 478.99 *11* transition in (α,3nγ) source data set.
	504.4 *3*	16			
1722.71+x	289.0 *3*	27	(M1+E2)	0.12 *4*	
	354.3 *3*	23.1	D		
	372.6 *3*	10.0			
	442.95# *7*	100	(E2)@	0.0235	
1723.9+x	237.1 *3*	87			
	460.5 *3*	100			
1768.85+x	258.5 *3*	13.0			
	504.8 *1*	100	(E2)@	0.01671	
1770.17+x	242.05# *4*	70 *3*	(M1+E2)	0.20 *6*	Iγ: from (α,3nγ). Other: 46 in (^{11}B,5nγ).
	470.60# *4*	100# *7*	(E2)@	0.0200	
1774.71+x	406.9 *3*	10.7			
	505.97# *13*	100	(E2)@	0.01662	
1836.51+x	236.8 *3*	3.7			
	468.3 *3*	10.9	Q		
	486.14# *4*	100	(E2)@	0.0184	
1858.44+x	461.3 *3*	14.3			

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Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[†]	α	Comments
1858.44+x	479.2 1	100	(E2)[@]	0.0191	Placement from (^{11}B,5nγ); see comment on the 478.99 11 transition in (α,3nγ) source data set.
1865.94+x	266.2 3	5.8			
	497.8[#] 1	100	(E2)[@]	0.01732	
	515.4 3	4.8			
1873.54+x	248.08[#] 3	100	(M1+E2)[§]	0.19 6	
	456.91[#] 16				Iγ: data from (^{11}B,5nγ) (86) and from (α,3nγ) (25 7) are discrepant.
1900.78+x	296.8 3	24			
	503.6 3	100			
1908.47+x	185.4[a] 3	4.7[a]			
	299.1 3	2.4	D		
	474.66[#] 3	100	(E2)[@]	0.0196	
1976.5+x	252.6 3	55			
	489.9 3	100			
2037.54+x	268.6 3	12.5			
	527.0 3	100	(E2)[@]	0.01499	
2038.35+x	268.2 1	22 6	(M1+E2)	0.15 5	Iγ: from (α,3nγ). Other: 37 in (^{11}B,5nγ).
	510.2 1	100[#] 22	E2[@]	0.01627	
2120.43+x	254.5 3	13			
	283.9 3	7.0			
	510.4 1	100	(E2)[@]	0.01625	
	520.8 1	16.0	Q		
2122.43+x	510.3 1	100			
	518.2 3	35			
2123.26+x	249.8 1	100	(M1(+E2))	0.18 6	
	497.8 1	100			
2131.92+x	295.6 3	14.7	(M1+E2)	0.11 4	
	521.9 1	100	Q		
	532.3 1	82	(E2)[@]	0.01462	
2153.22+x	378.3 3	3.2			
	518.7 3				
	541.0 3	48			
	549.2 1	100			
2181.72+x	546.9 1	100			
2237.39+x	329.1 3	22			
	401.1 3	8.6			
	514.6 1	100	(E2)[@]	0.01592	
2245.5+x	269.2 3	39			
	521.4 3	100			
2307.58+x	269.32[#] 9	47[#] 11	(M1+E2)	0.15 5	
	537.38[#] 11	100[#] 16	(E2)[@]	0.01428	
2315.79+x	278.4 3				
	547.0 3	100			
2357.11+x	582.4 1	100	(E2)[@]	0.01171	
2381.19+x	249.3 3	1.5			
	544.67[#] 6	100	(E2)[@]	0.01381	
2399.14+x	540.7 1	100	(E2)[@]	0.01406	
2412.13+x	289.6 3	4.5			
	538.5 1	100			
2423.39+x	291.7 3	5.8			
	557.4 1	100	(E2)[@]	0.01304	
2463.70+x	555.26[#] 9	100	(E2)[@]	0.01316	Other Eγ: 554.9 1 in (^{11}B,5nγ).
2479.1+x	578.3 3	100			
2521.0+x	544.5 3	100			
2602.1+x	286.5 3				
	564.4 3				
2614.28+x	306.8 1	<17	(M1+E2)	0.10 4	Iγ: from (α,3nγ). Other: 30 in (^{11}B,5nγ).
	575.76[#] 14	100[#] 10	(E2)[@]	0.01205	
2690.13+x	266.6 3	4.6			
	308.9 3	4.6			
	558.3 3	8.2			
	569.7 1	100	(E2)[@]	0.01236	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	α	Comments
2696.33+x	573.9 *1*	100			
2702.85+x	290.8 *3*	56			
	579.6 *1*	100			
2713.80+x	290.8 *3*	3.7			
	332.6 *3*	8.1			
	581.9 *1*	100	(E2)@	0.01174	
2751.22+x	598.0 *1*	100	(E2)@	0.01099	
2785.4+x	603.7 *3*	100			
2814.91+x	351.5 *3*	19			
	433.6 *3*	3.7			
	577.5 *1*	100	(E2)@	0.01196	
2839.3+x	593.8 *3*	100			
2893.6+x	291.4 *3*				
	577.9 *3*				
2902.79+x	288.6 *1*	34	(M1+E2)	0.12 *4*	
	595.2 *1*	100	(E2)@	0.01112	Other Eγ: 598.8 *8* in (α,3nγ).
2978.39+x	597.2 *1*	100	(E2)@	0.01103	
2987.24+x	588.2 *3*	100			
	630.1 *3*	88	(E2)@	0.00971	
3016.41+x	617.2 *3*	66			
	659.3 *3*	100			
3024.5+x	321.7 *3*	47			
	612.3 *3*	100			
3031.65+x	318.3 *3*	6.7			
	608.2 *1*	100	(E2)@	0.01056	
3092.79+x	629.1 *1*	100	(E2)@	0.00974	
3100.6+x	621.5 *3*	100			
3109.0+x	629.9 *3*	100			
3133.9+x	654.8 *3*	100			
3200.6+x	598.4 *3*	100			
3246.17+x	343.6 *1*	34	(M1+E2)	0.07 *3*	
	631.8 *1*	100	(E2)@	0.00965	
3308.63+x	277.1 *3*	1.4			
	330.4 *3*	4.2			
	618.5 *1*	100	(E2)@	0.01014	
3328.23+x	631.9 *1*	100			
3345.18+x	366.8 *3*	7.9			
	631.4 *1*	100	(E2)@	0.00966	
3354.7+x	330.1 *3*	35			
	651.9 *3*	100			
3374.8+x	623.6 *3*	100	(E2)@	0.00995	
3449.20+x	356.5 *3*	11.8			
	634.2 *3*	100	(E2)@	0.00956	
3457.7+x	672.3 *3*	100			
3546.74+x	300.7 *1*	28	(M1+E2)	0.11 *4*	
	643.8 *1*	100	(E2)@	0.00923	
3623.42+x	645.0 *1*	100	(E2)@	0.00919	
3640.6+x	653.4 *3*	100	(E2)@	0.00892	
3686.78+x	341.8 *3*				
	655.1 *1*	100	(E2)@	0.00886	
3699.0+x	682.5 *3*	100			
3699.9+x	345.3 *3*	32			
	675.4 *3*	100			
3732.3+x	715.9 *3*	100			
	745.1 *3*	86			
3788.4+x	695.6 *3*	100	(E2)@	0.00772	
3804.3+x	670.4 *3*	100			
3923.95+x	377.2 *1*	37	(M1+E2)	0.058 *22*	
	677.8 *1*	100	(E2)@	0.00819	
3975.90+x	352.2 *3*	2.6			
	667.3 *1*	100	(E2)@	0.00849	
4018.5+x	690.3 *3*	100			
4024.69+x	401.3 *3*	6.5			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†	Mult.†	α
4024.69+x	679.5 *1*	100	(E2)@	0.00814
4058.9+x	359.0 *3*	16		
	704.2 *3*	100		
4136.2+x	687.0 *3*	100	(E2)@	0.00794
4232.54+x	308.9 *3*	23		
	685.8 *1*	100	(E2)@	0.00797
4316.92+x	693.5 *1*	100	(E2)@	0.00777
4328.3+x	629.4 *3*	36		
	687.7 *3*	100		
4359.0+x	660.0 *3*	77		
	718.5 *3*	100		
4391.08+x	704.3 *1*	100	(E2)@	0.00750
4421.0+x	721.1 *3*	100		
4481.8+x	749.5 *3*	100		
4542.3+x	753.9 *3*	100	(E2)@	0.00644
4642.89+x	410.7 *3*	27		
	718.9 *1*	100	(E2)@	0.00716
4697.4+x	721.5 *3*	100	(E2)@	0.00711
4755.8+x	731.1 *3*	100		
4762.7+x	744.2 *3*	100		
4874.2+x	738.0 *3*	100		
4957.64+x	725.1 *1*	100	(E2)@	0.00703
5021.3+x	693.0 *3*	100		
5064.6+x	747.7 *3*	100	(E2)@	0.00656
5111.0+x	751.9 *3*	100		
	782.7 *3*	12.5		
5150.9+x	759.8 *3*	100	(E2)@	0.00633
5346.5+x	804.2 *3*	100	(E2)@	0.00559
5407.2+x	764.3 *3*	100		
5480.3+x	782.9 *3*	100		
5544.9+x	789.1 *3*	100		
5559.3+x	796.6 *3*	100		
5662.6+x	788.4 *3*	100		
5725.5+x	767.9 *3*	100	(E2)@	0.00619
5766.4+x	745.1 *3*	100		
5873.6+x	809.0 *3*	100		
5923.5+x	812.5 *3*	100		
5972.8+x	821.9 *3*	100		
6192.9+x	846.4 *3*	100		
6227.2+x	820.0 *3*	100		
6329.6+x	849.3 *3*	100		
6396.4+x	851.5 *3*	100		
6407.3+x	848.0 *3*	100		
6503.2+x	840.6 *3*	100		
6542.5+x	817.0 *3*	100		
6571.1+x	804.7 *3*	100		
6748.9+x	875.3 *3*	100		
6788.7+x	865.2 *3*	100		
6861.1+x	888.3 *3*	100		
7063.2+x	870.3 *3*	100		
7111.2+x	884.0 *3*	100		
7247.9+x	918.3 *3*	100		
7304.6+x	897.3 *3*	100		
7313.9+x	917.5 *3*	100		
7398.8+x	895.6 *3*	100		
7414.4+x	871.9 *3*	100		
7692.5+x	943.6 *3*	100		
7816.1+x	955.0 *3*	100		
7969.9+x	906.7 *3*	100		
8065.8+x	954.6 *3*	100		
8234.4+x	986.5 *3*	100		
8297.4+x	983.5 *3*	100		
8345.2+x	930.8 *3*	100		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Tm) (continued)

E(level)	Eγ†	Iγ†
8352.7+x	953.9 *3*	100
8692.2+x	999.7 *3*	100
8845.2+x?	1029.1& *3*	100
9338.8+x	993.5 *3*	100

† From (^{11}B,5nγ), except as noted. Intraband transitions are assigned Δπ=(no). ΔIγ ranges between 10% and 50% for (^{11}B,5nγ).

‡ From γ(θ) in (α,3nγ), except as noted.

§ From γ(θ) in (α,3nγ), assigning Δπ=(no) to intraband transitions, unless γ(θ), combined with γγ coin resolving time, definitely eliminates Δπ=yes based on RUL.

From (α,3nγ).

@ Q or (Q) from DCO for intraband transition in (^{11}B,5nγ). Δπ=(no) assigned based on band structure.

& Placement of transition in the level scheme is uncertain.

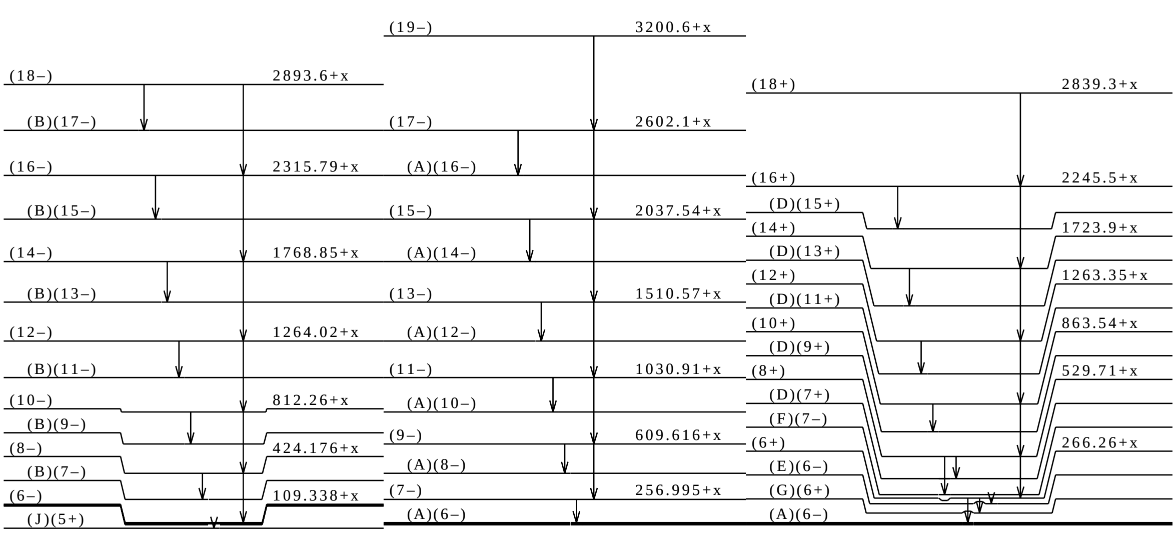
a Multiply placed; intensity suitably divided.

Adopted Levels, Gammas (continued)

(A) Kπ=6–, α=0 (π 7/2[404]) +(ν 5/2[523]) band.

(B) Kπ=6–, α=1 (π 7/2[404]) +(ν 5/2[523]) band.

(C) Kπ=6+, α=0 (π 7/2[523]) +(ν 5/2[523]) band.



$^{166}_{69}Tm_{97}$

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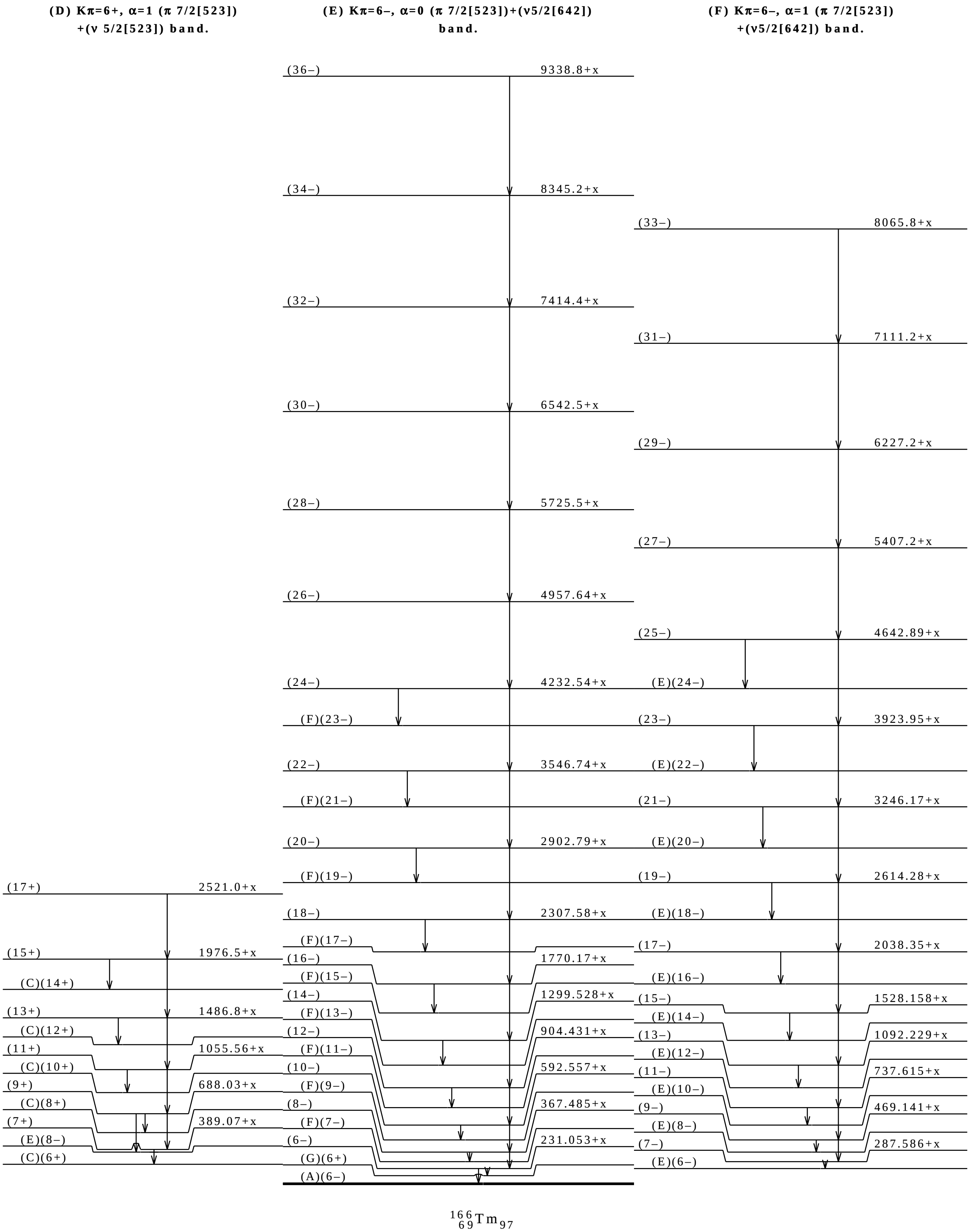
Adopted Levels, Gammas (continued)



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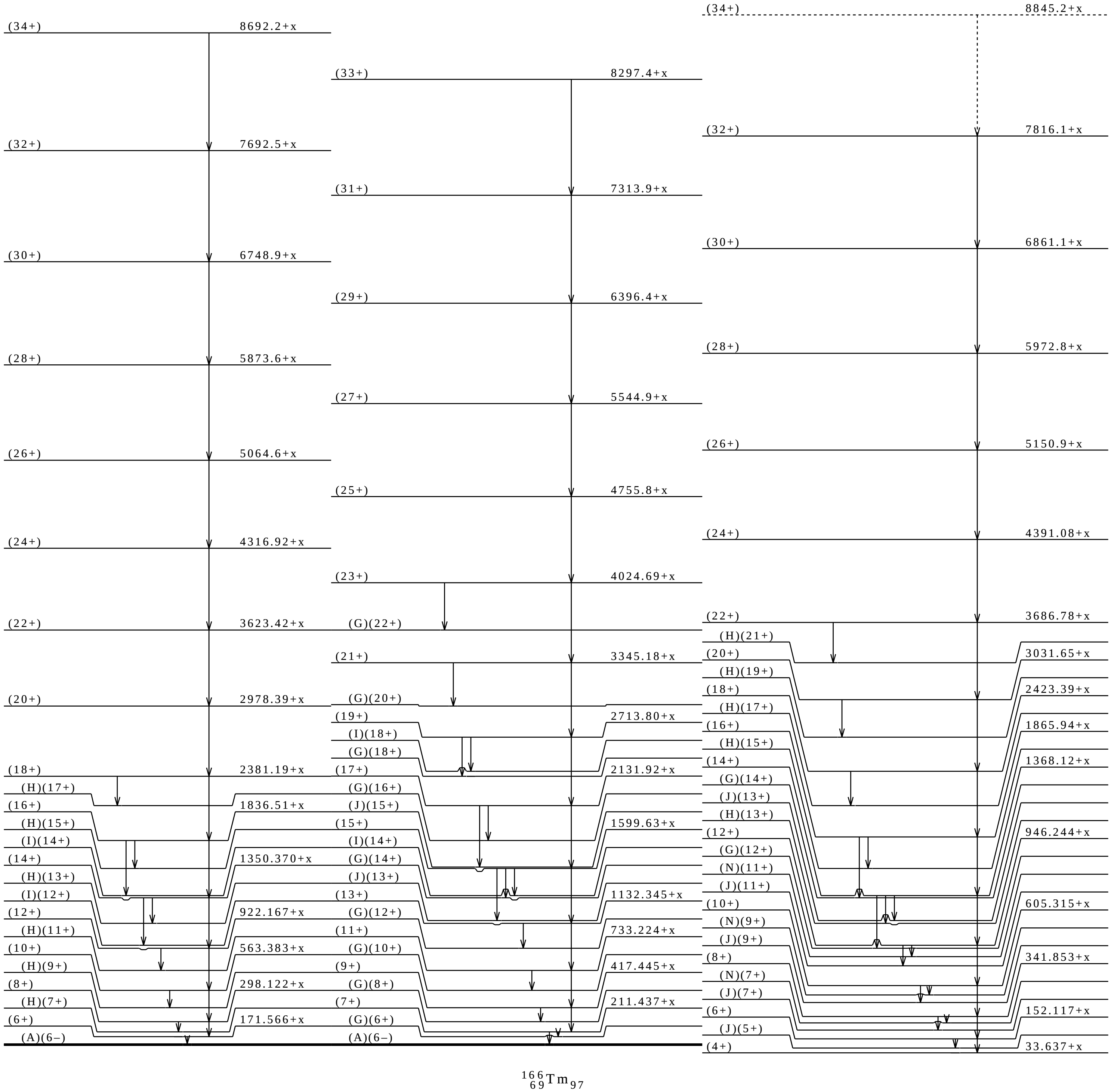
Adopted Levels, Gammas (continued)

(G) Kπ=6+, α=0 (π 7/2[404]) +(ν5/2[642]) band.

(H) Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band.

(I) Kπ=2+,3+, α=0 (π 1/2[411])⊗(ν 5/2[642]) band.



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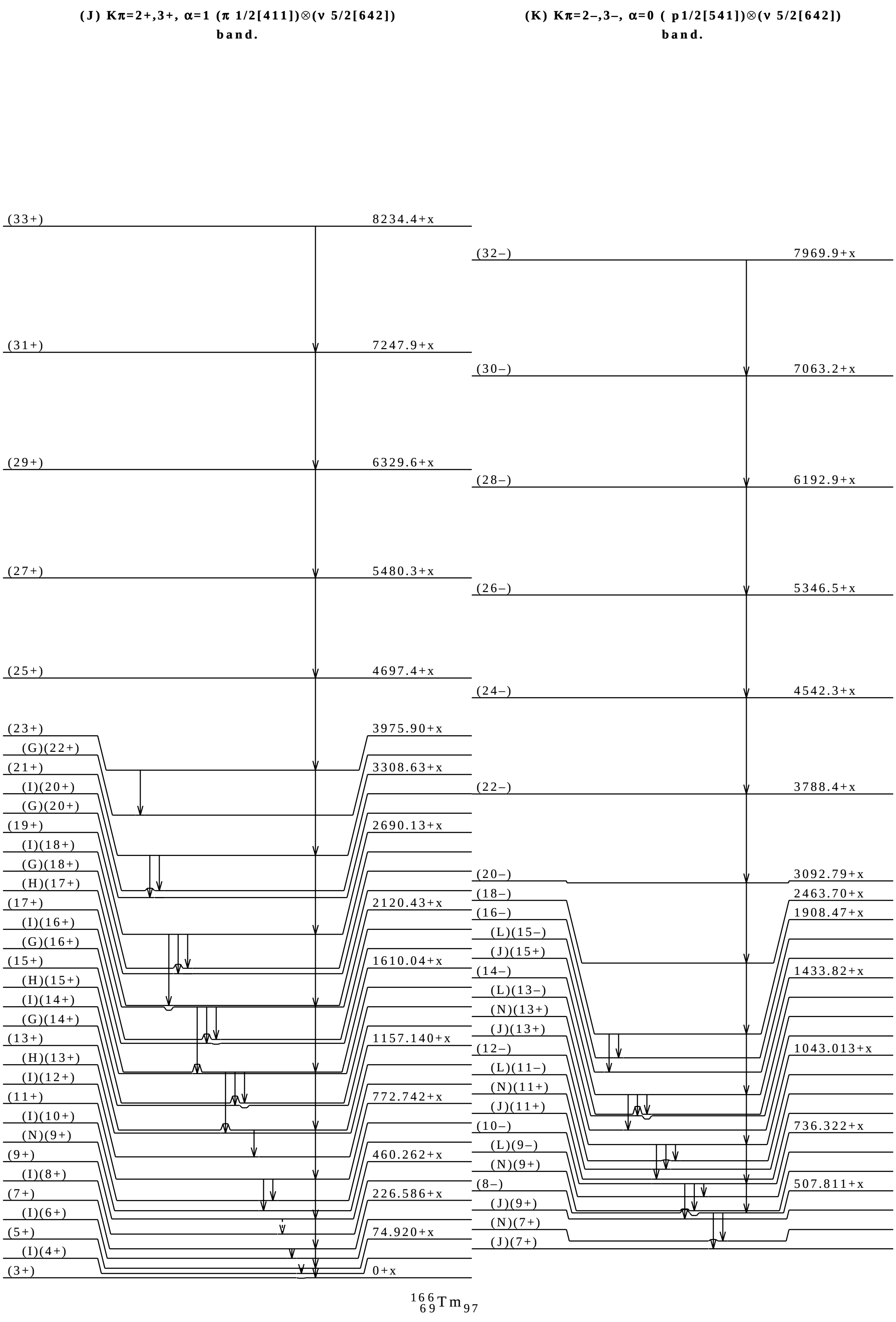
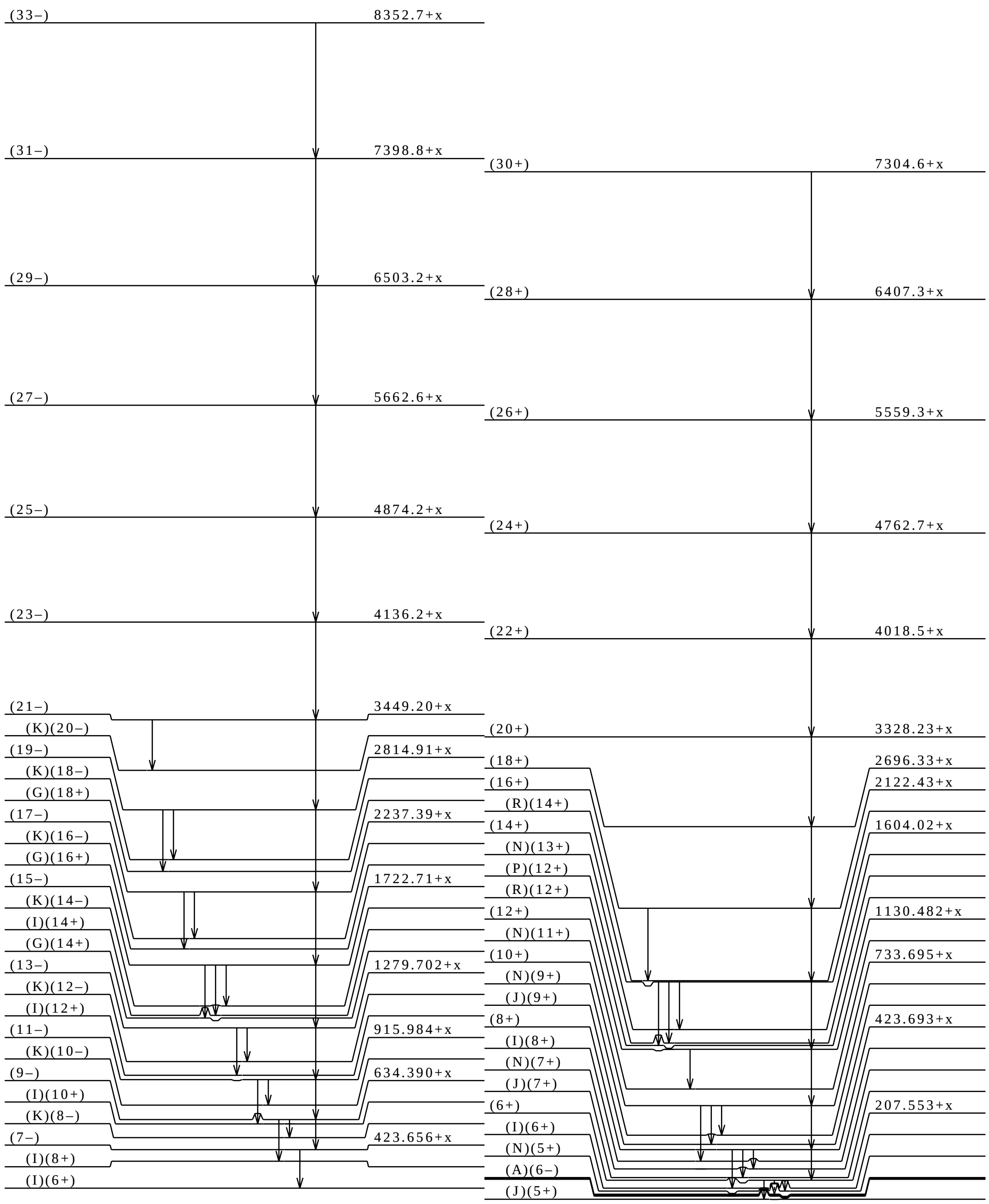
Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)

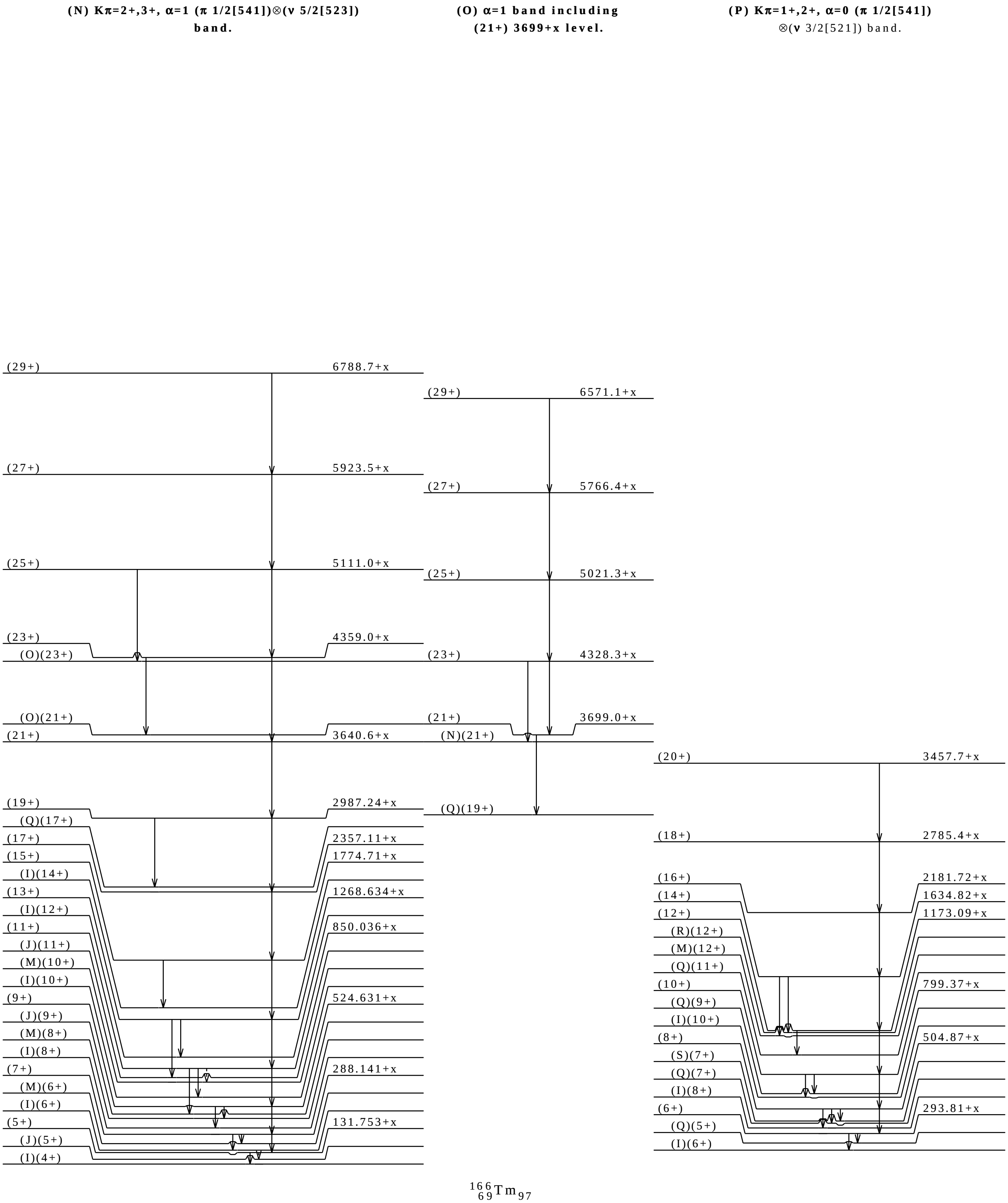
(L) Kπ=2–,3–, α=1 (p1/2[541])⊗(ν 5/2[642]) band.

(M) Kπ=2+,3+, α=0 (π 1/2[541])⊗(ν 5/2[523]) band.



$^{166}_{69}Tm_{97}$

Adopted Levels, Gammas (continued)



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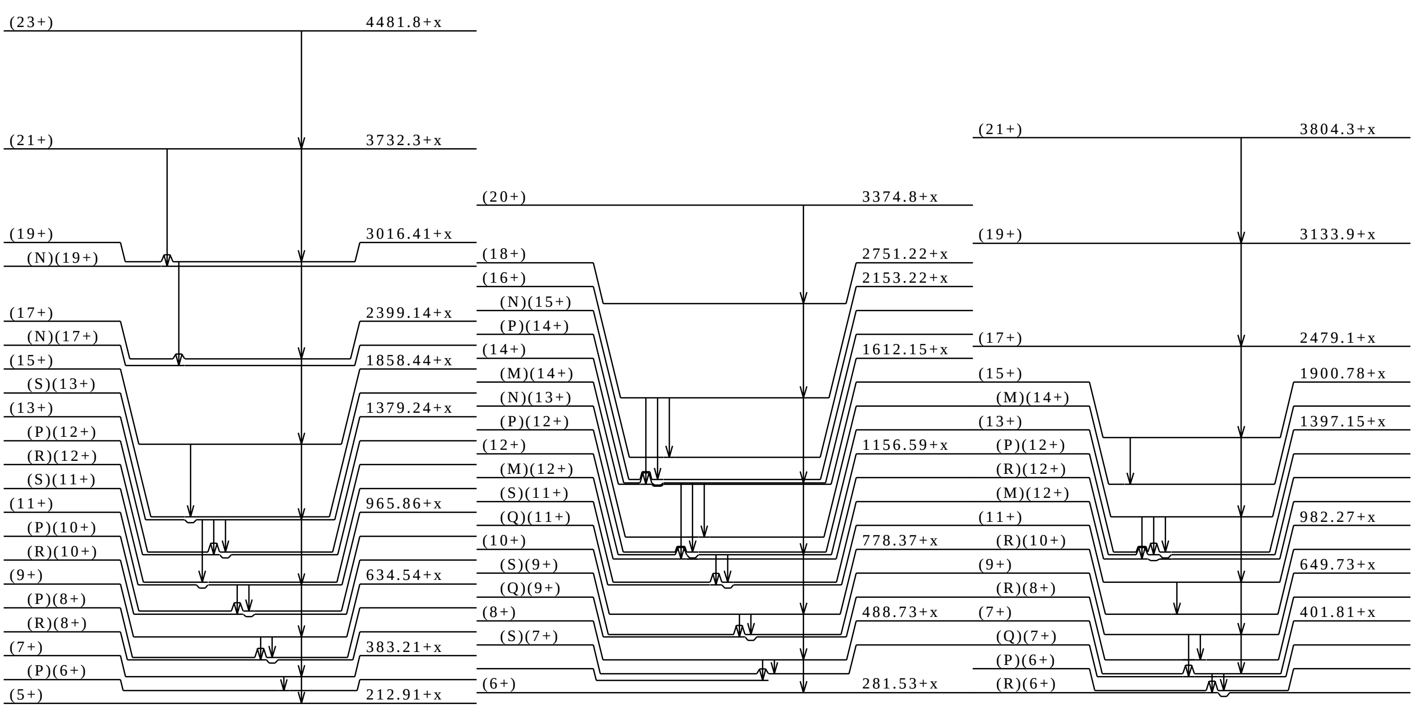
Adopted Levels, Gammas (continued)

(Q) Kπ=1+,2+, α=1 (π 1/2[541]) ⊗(ν 3/2[521]) band.

(R) Kπ=1+, α=0 (π 7/2[404])–(ν 5/2[642]) band.

(S) Kπ=1+, α=1 (π 7/2[404]) –(ν 5/2[642]) band.



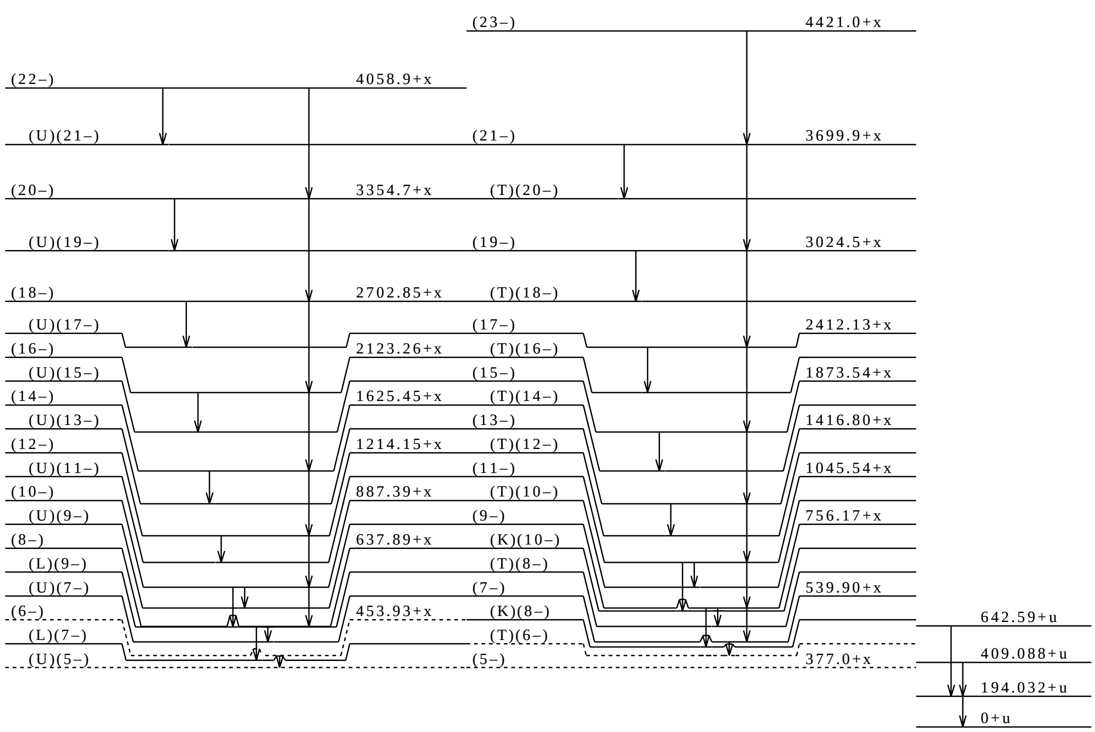
$^{166}_{69}Tm_{97}$

Adopted Levels, Gammas (continued)

(T) Kπ=1–, α=0 (π 7/2[523]) –(ν 5/2[642]) band.

(U) Kπ=1–, α=1 (π 7/2[523]) –(ν 5/2[642]) band.

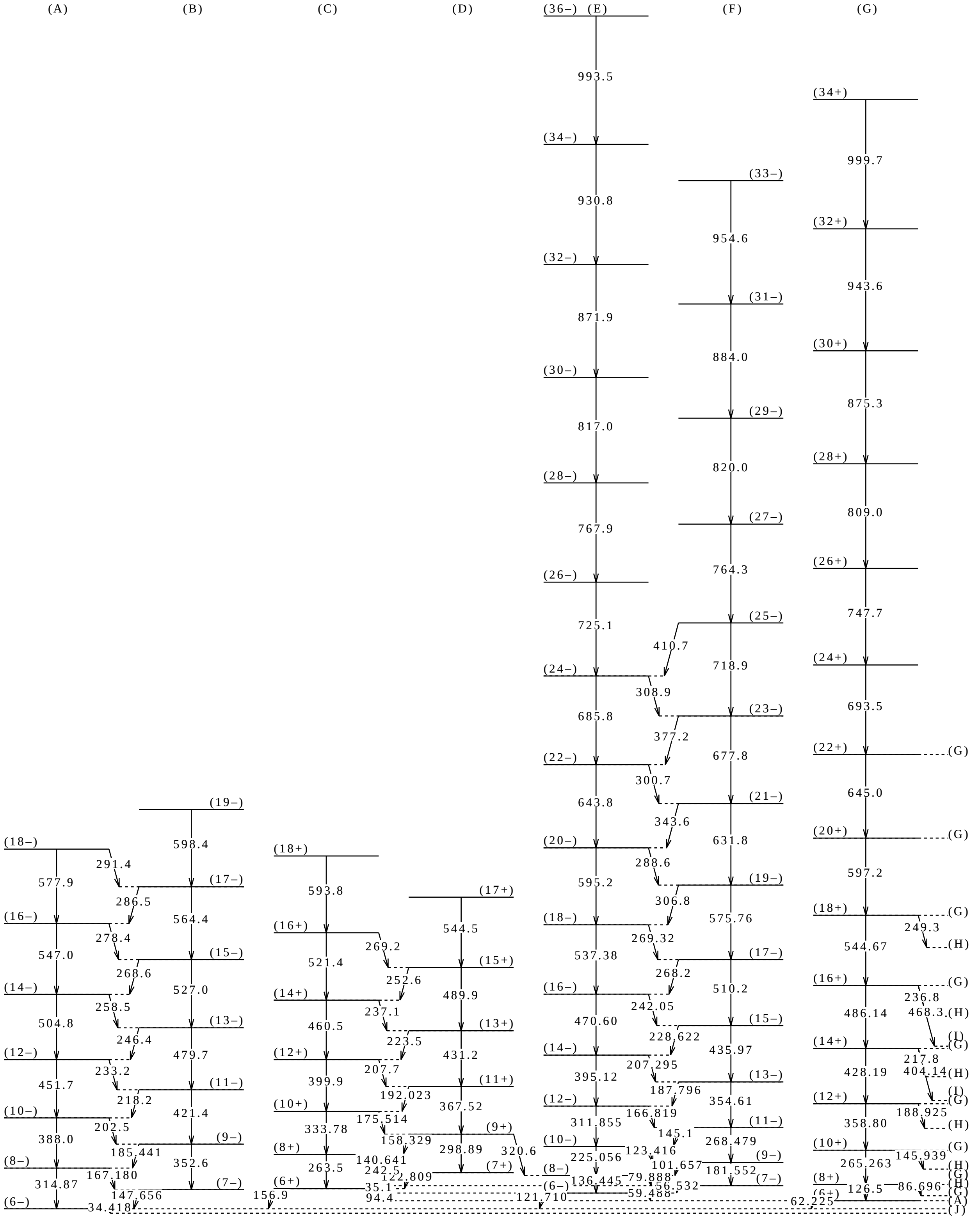
(V) possible band fragment (1995Ma07).



$^{166}_{69}Tm_{97}$

Adopted Levels, Gammas (continued)

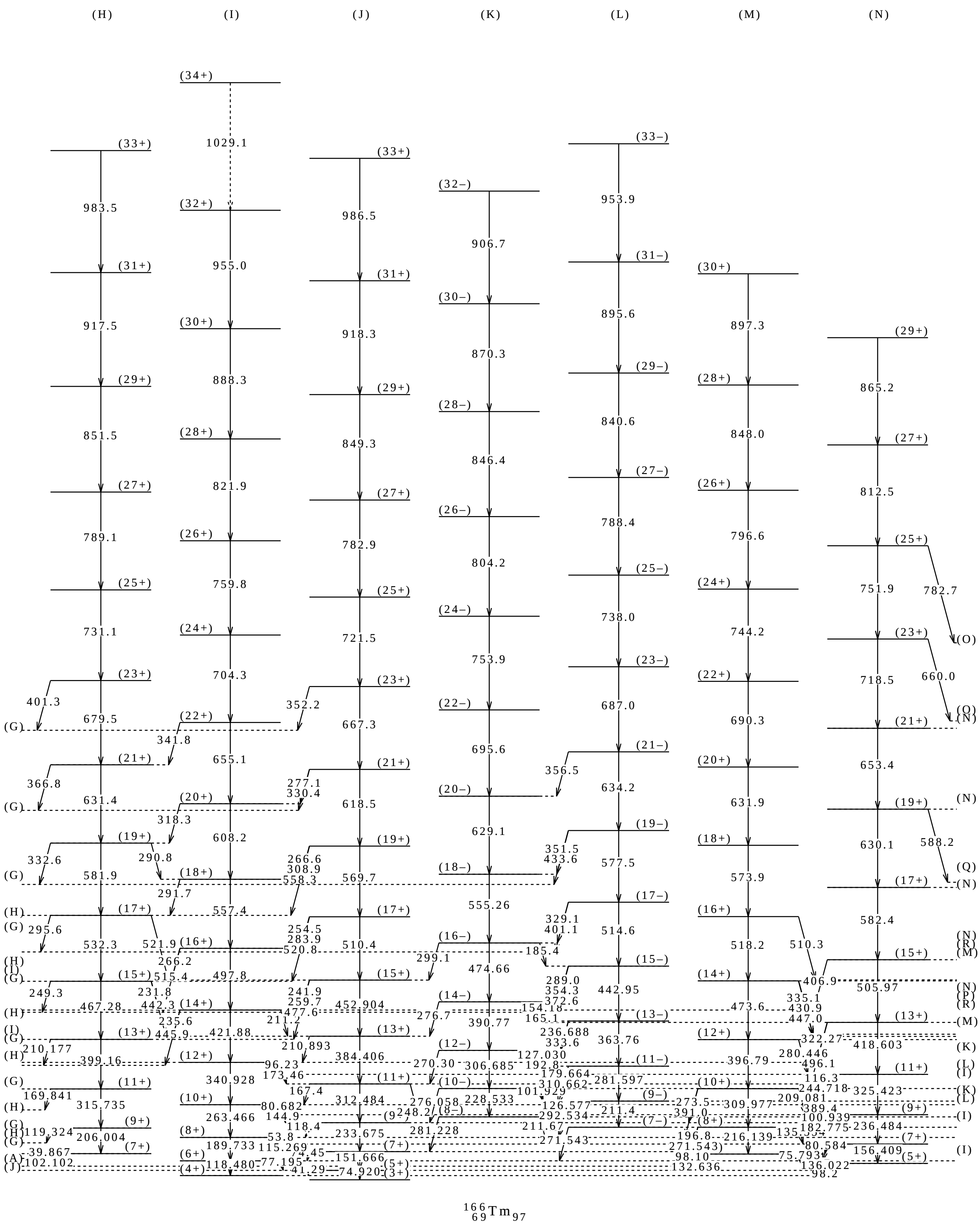
Bands for ^{166}Tm



$^{166}_{69}Tm_{97}$

Adopted Levels, Gammas (continued)

Bands for ^{166}Tm



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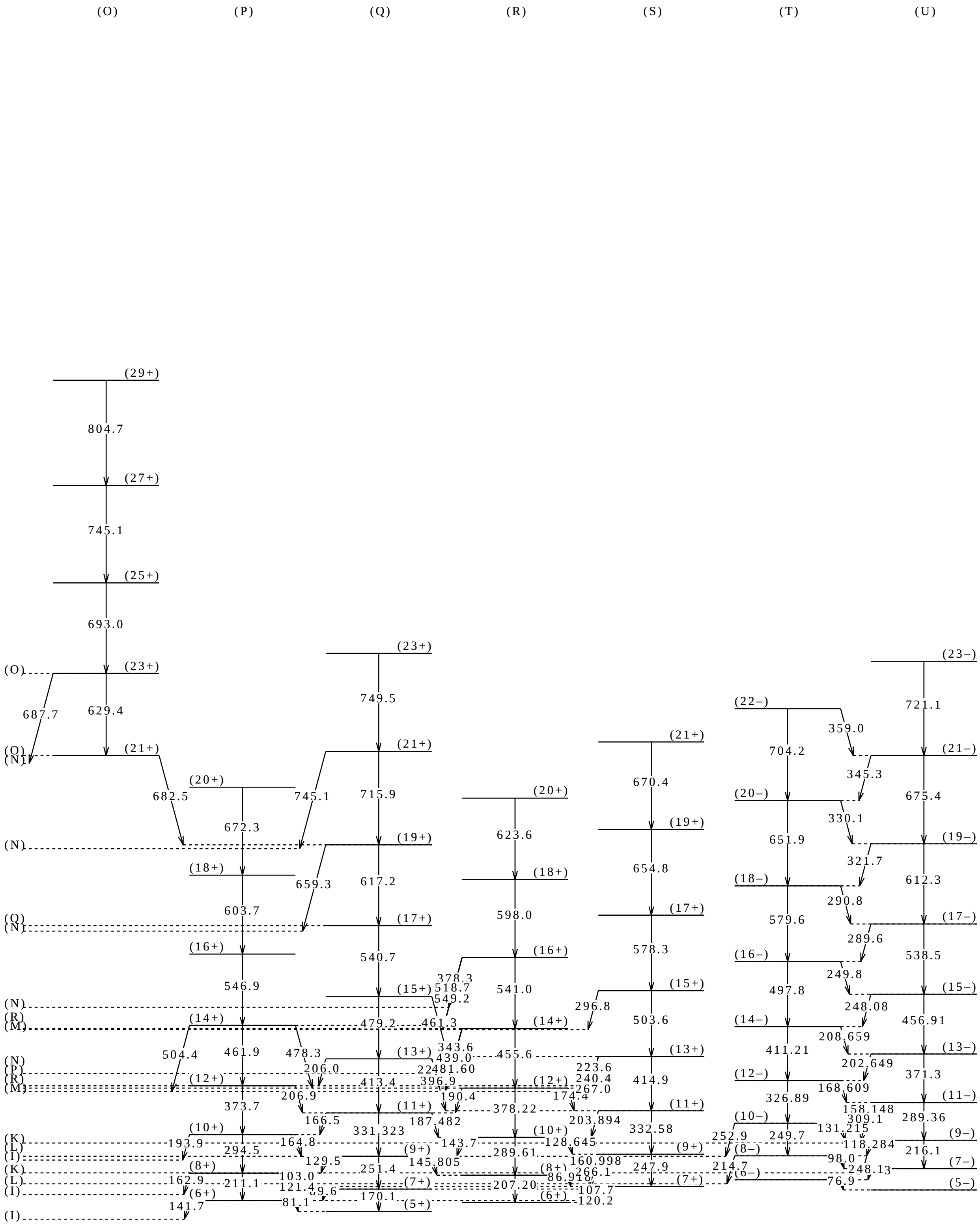
Adopted Levels, Gammas (continued)

Bands for ^{166}Tm



$^{166}_{69}Tm_{97}$

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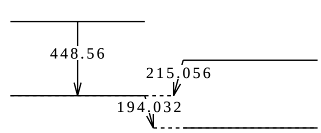
Adopted Levels, Gammas (continued)

Bands for ^{166}Tm

(V)



$^{166}_{69}Tm_{97}$

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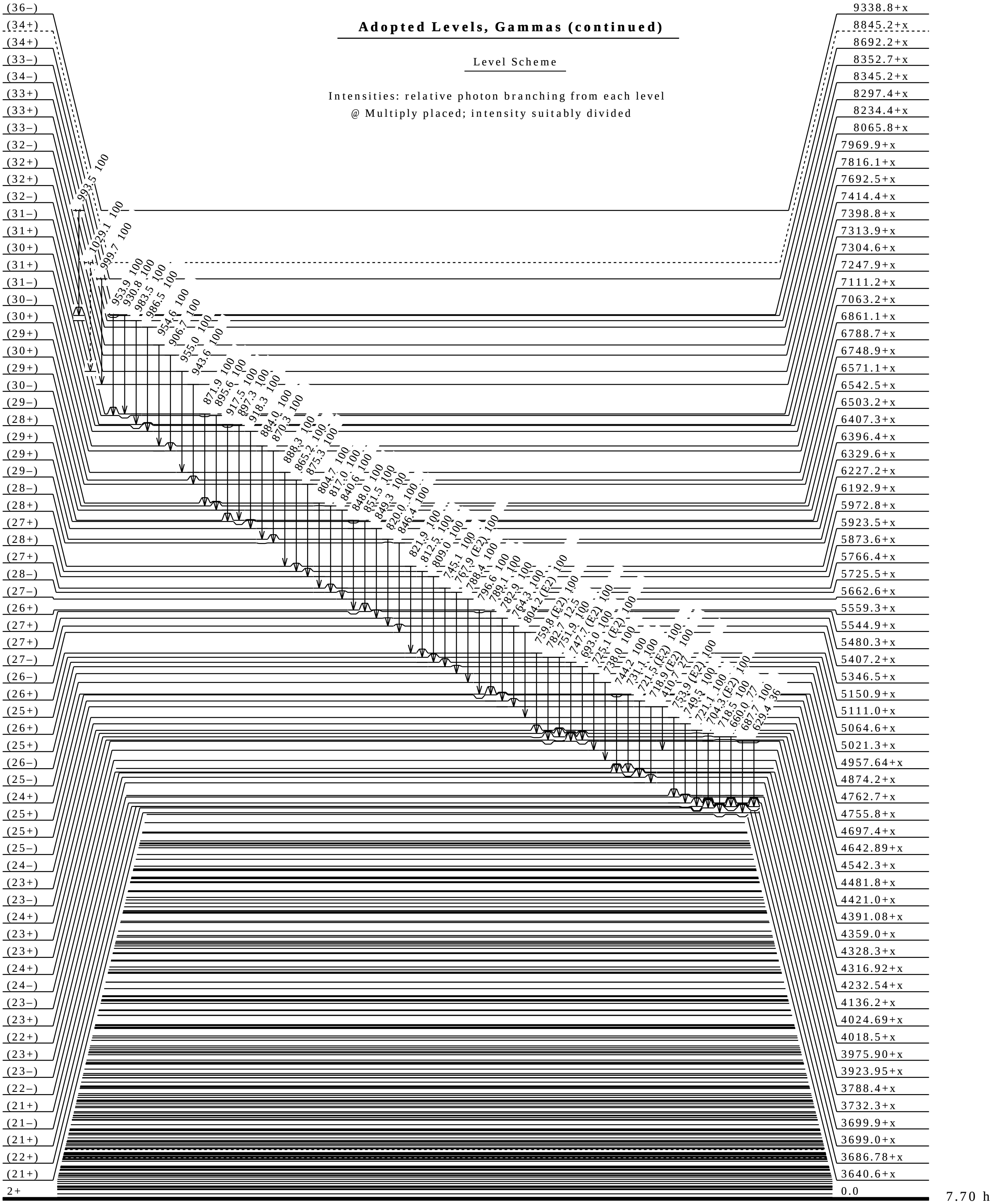
Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

@ Multiply placed; intensity suitably divided



$^{166}_{69}Tm_{97}$

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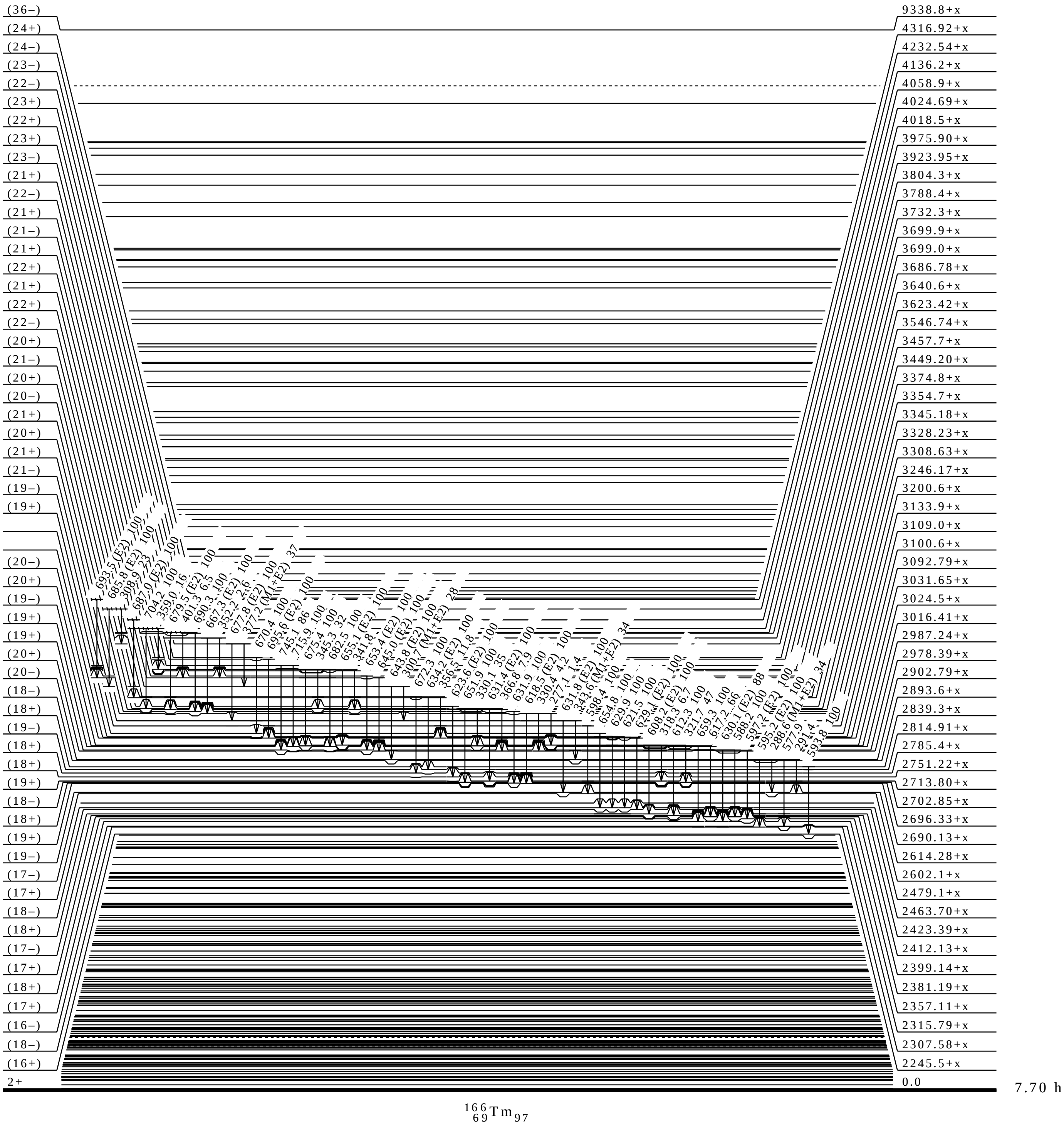
Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



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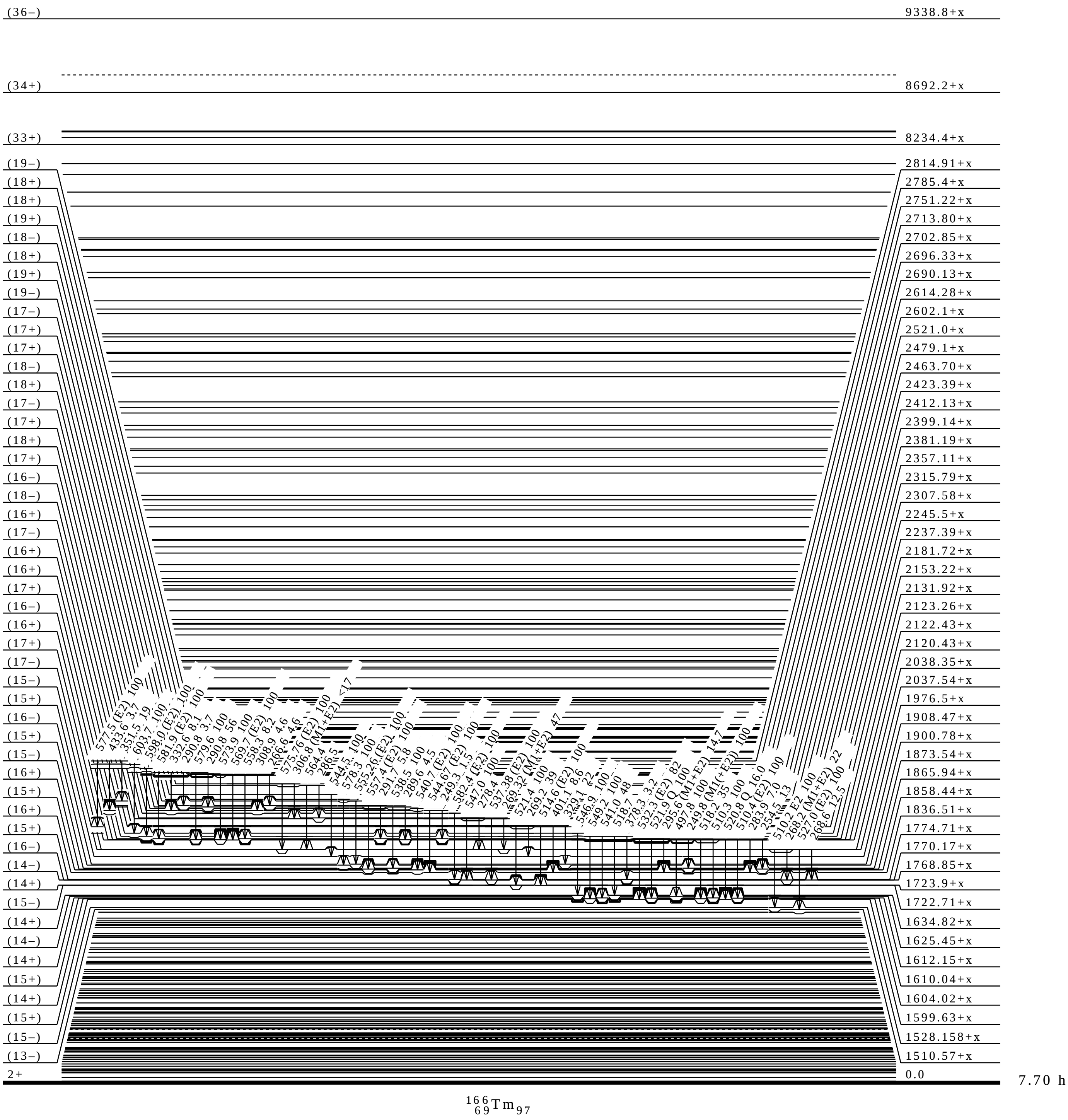
Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



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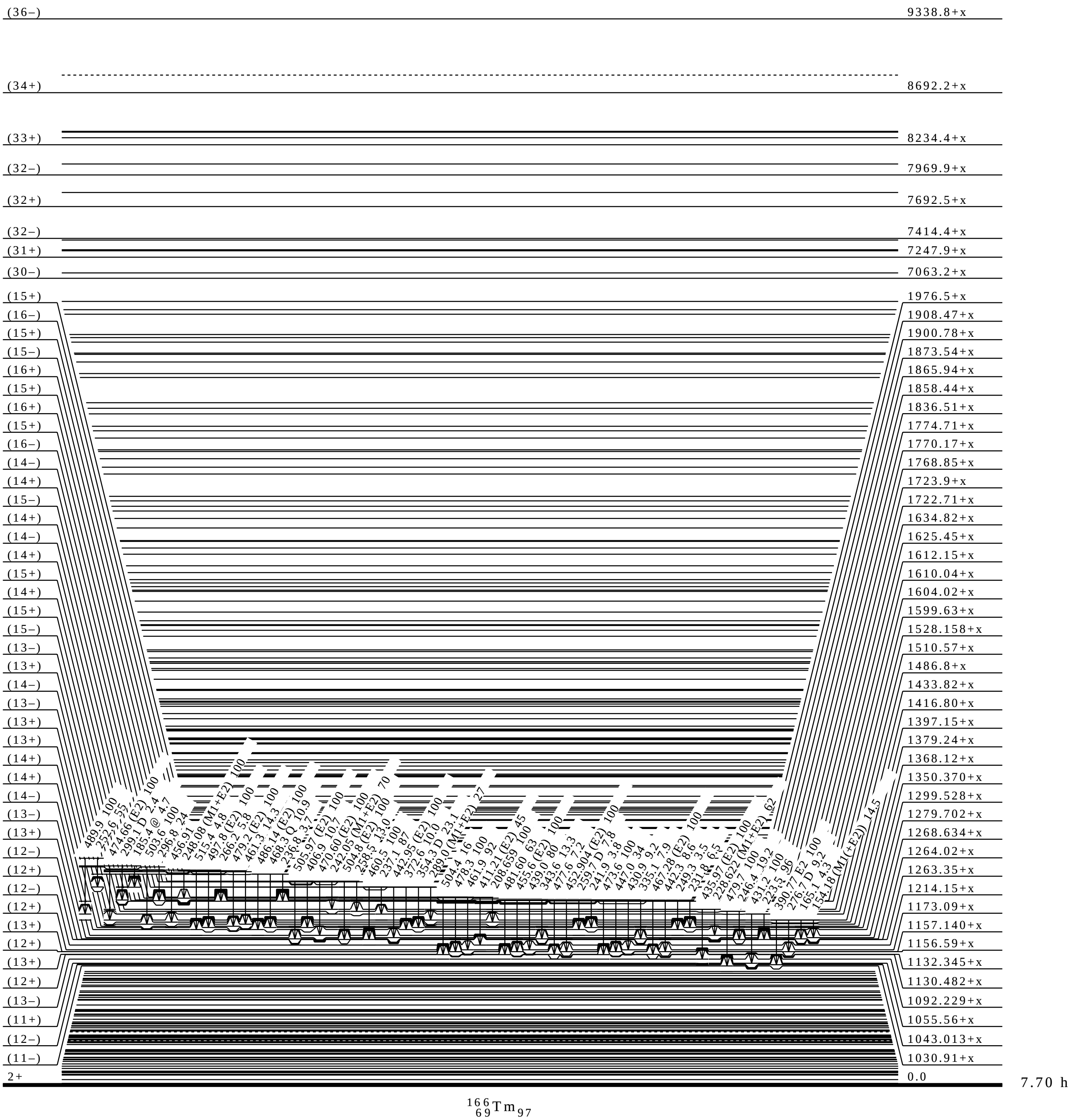
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



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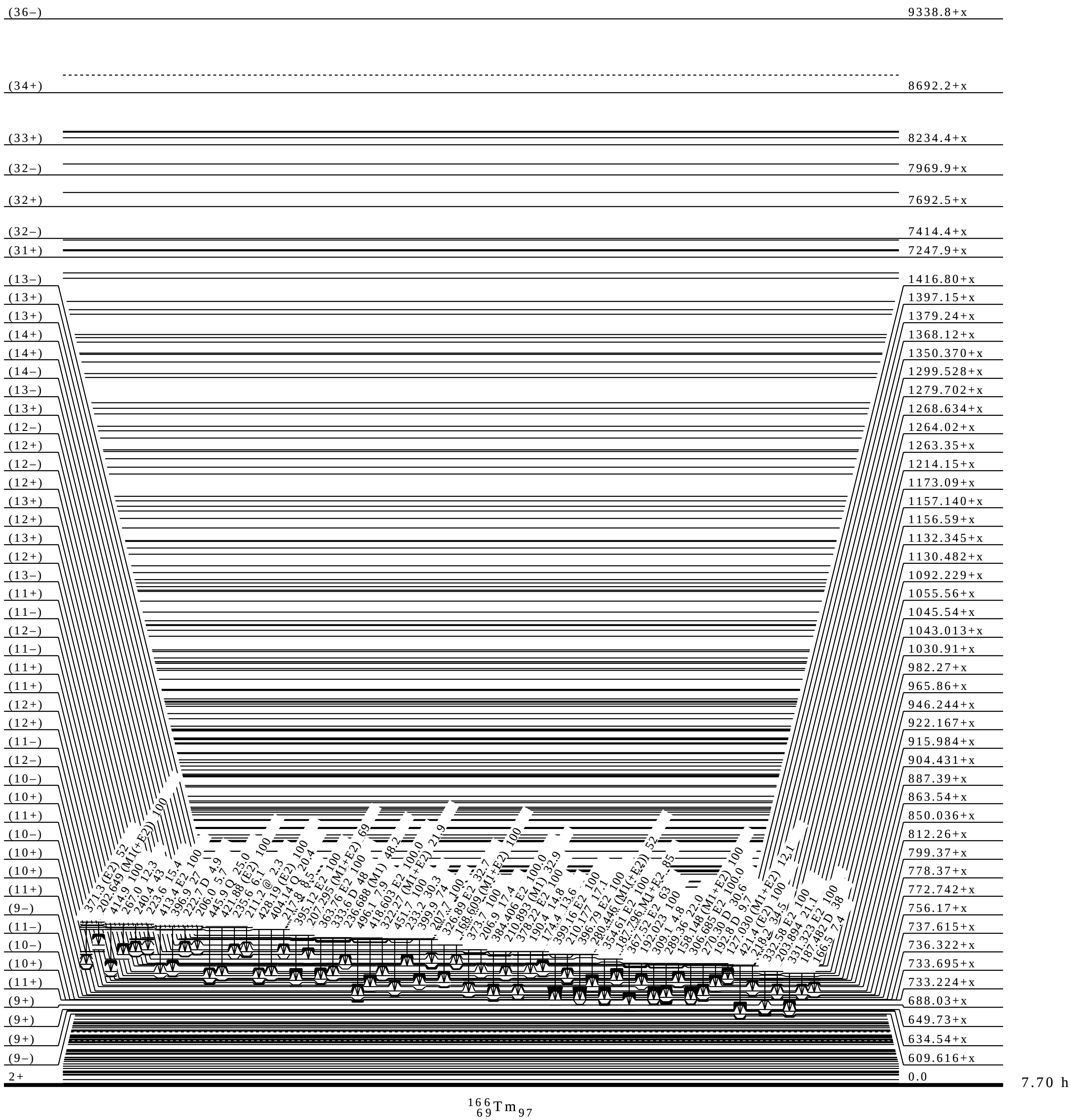
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



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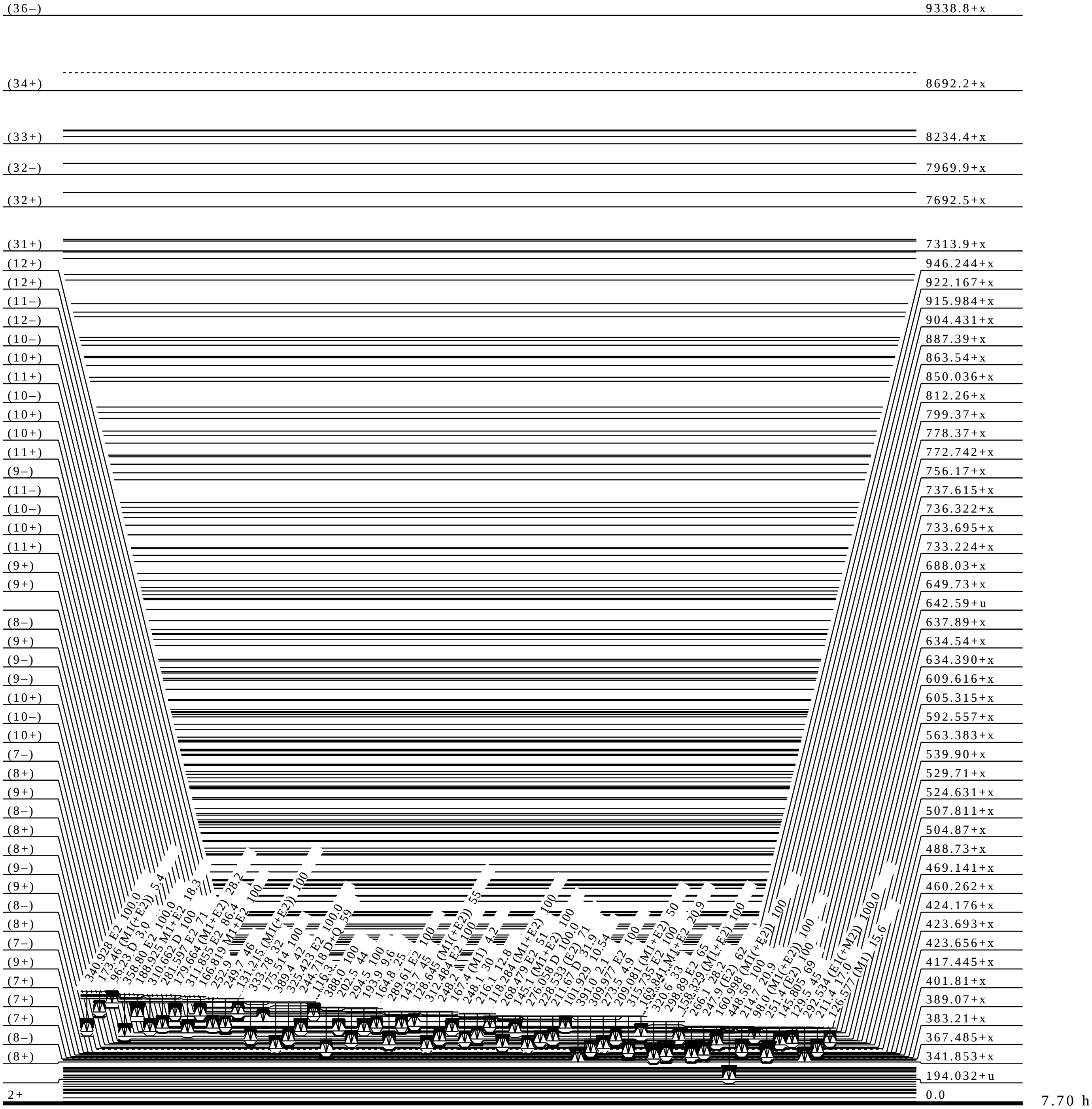
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



$^{166}_{69}Tm_{97}$

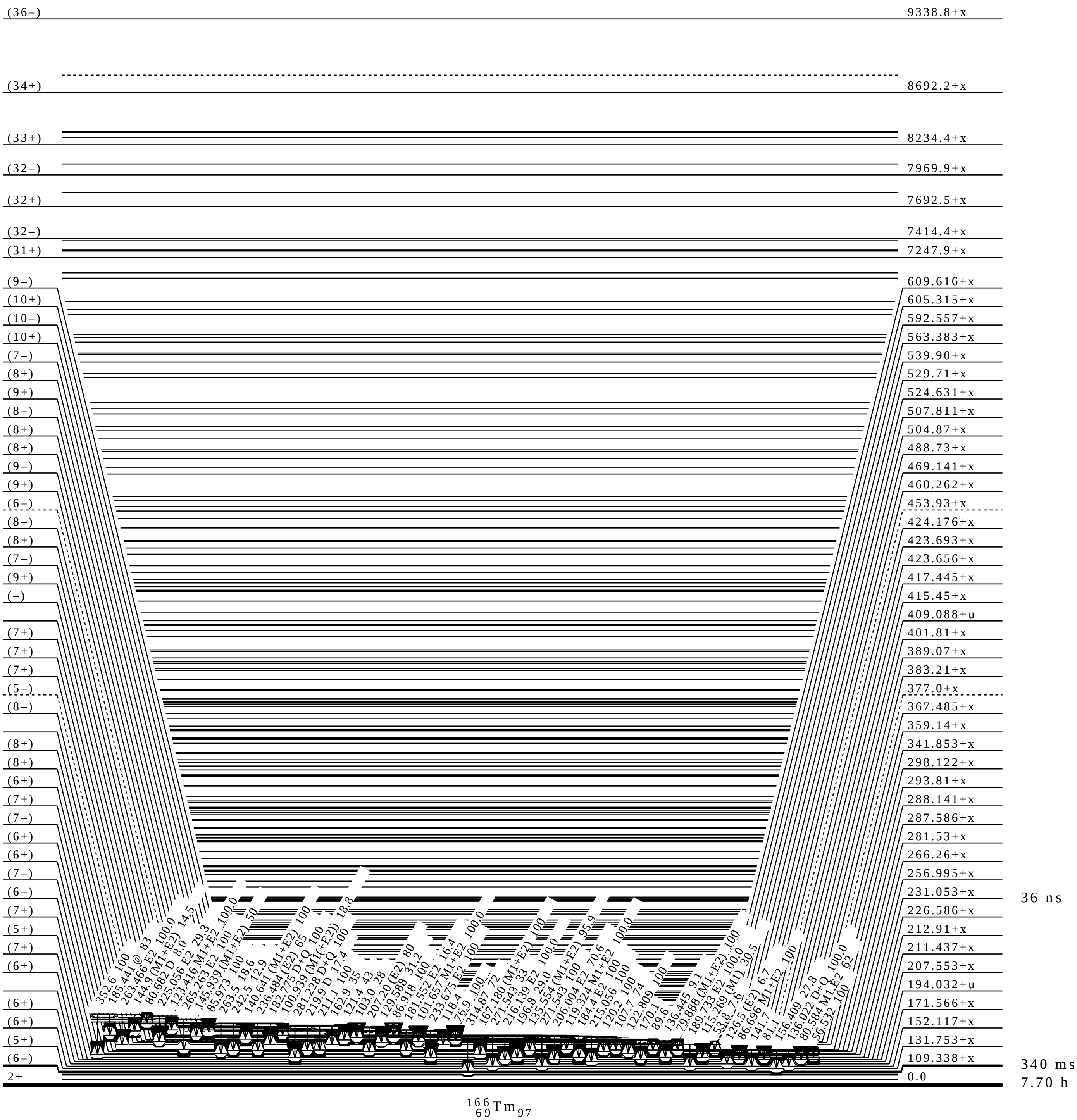
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



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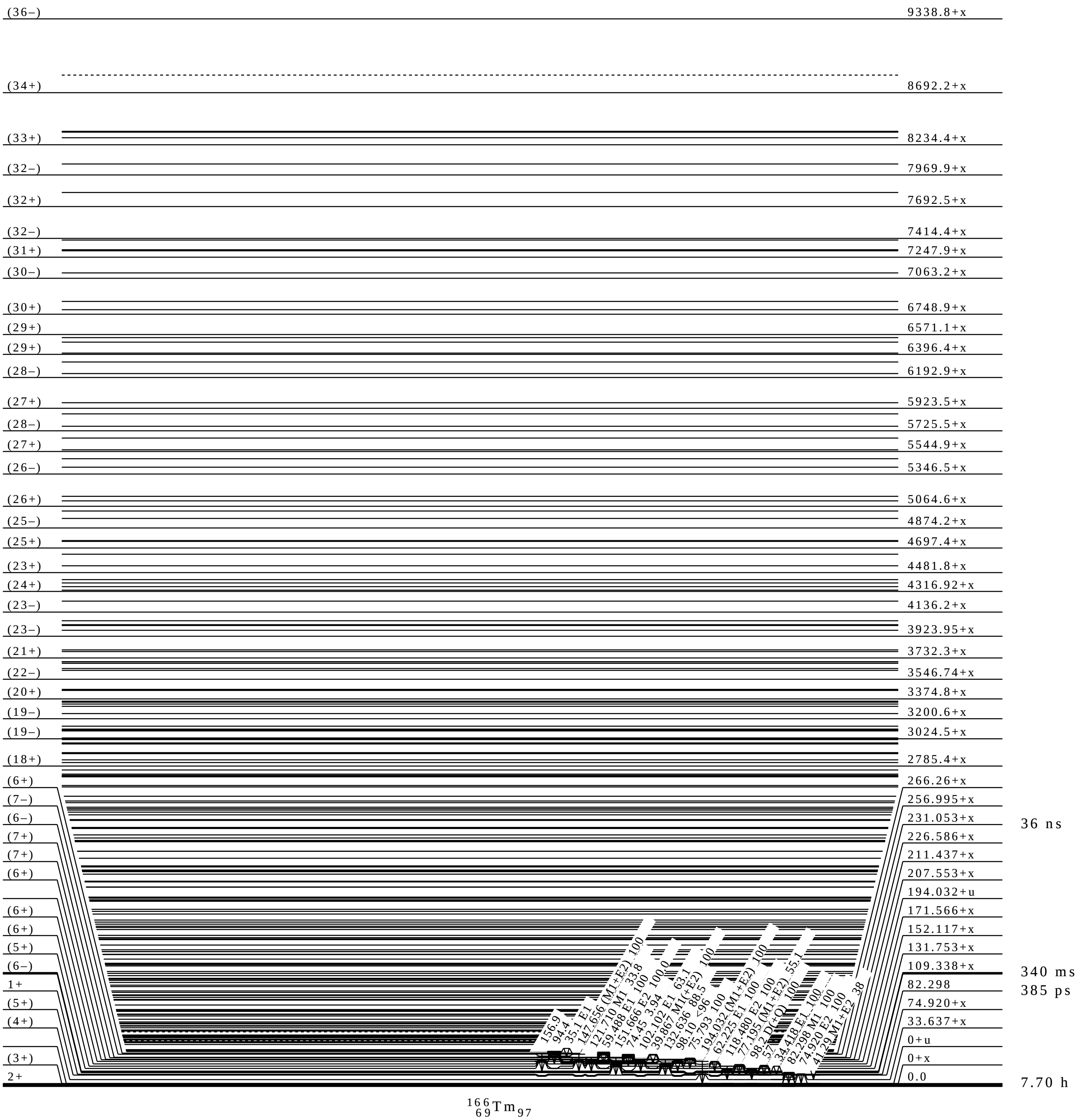
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



^{166}Yb ε Decay 1973De22,1963Ja06,1959Gr06

Parent ^{166}Yb: E=0; Jπ=0+; $T_{1/2}$=56.7 h *1*; Q(g.s.)=305 *14*; %ε decay=100.
Others: 1959Br17, 1961Gr33, 1963Pa08, 1967Bu14, 1995Ma07.

^{166}Tm Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	2+	7.70 h *3*	
82.29 *2*	1+	385 ps *40*	$T_{1/2}$: from Adopted Levels. <3 ns (1973De22, K x ray–82γ delayed coin), <0.45 ns (1966Ja16).

† From Eγ.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)	Iε†	Log *ft*	Comments
(223 *14*)	82.29	100	4.91 *8*	εK=0.748 *9*; εL=0.191 *7*; εM+=0.0612 *23*. εK(exp)/ε=0.73 *+6–2* (1963Ja06).

† Absolute intensity per 100 decays.

γ(^{166}Tm)

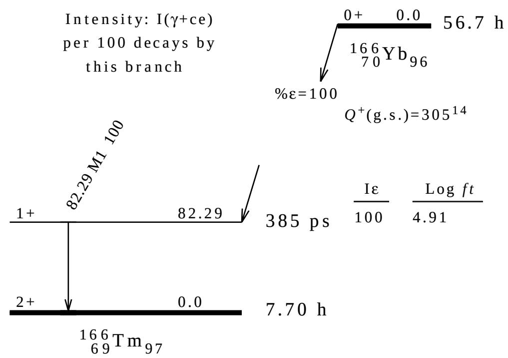
No new γ rays attributable to ^{166}Yb decay found for 10–keV<Eγ<150–keV; authors deduce a limit of 0.3% for such gamma–rays (1973De22). No γ rays attributable to ^{166}Yb decay found for 20–keV<Eγ<65–keV; limit Iγ<0.05 Iγ(82.3γ) (1967Bu14). No γ rays attributable to ^{166}Yb decay found for 86–keV<Eγ<250–keV; limit Iγ<0.003 Iγ(82.3γ) (1967Bu14).
No transitions with 20≤Eγ≤500 were found in coincidence with 82.3γ (1995Ma07).
Iγ(Tm K x ray)/Iγ(82.3γ)=8.68 *21* (1973De22); =8.17 *23* (1963Ja06).

Eγ	E(level)	Mult.	α	I(γ+ce)†	Comments
82.29 *2*	82.29	M1	5.43	100	ce(K)/(γ+ce)=0.707 *6*; ce(L)/(γ+ce)=0.1075 *19*; ce(M)/(γ+ce)=0.0240 *5*; ce(N+)/(γ+ce)=0.00646 *12*. ce(N)/(γ+ce)=0.00561 *11*; ce(O)/(γ+ce)=0.000806 *15*; ce(P)/(γ+ce)=4.35×10^{-5} *8*. Mult.: α(K)exp=4.2 *+3–2* (1963Ja06); K:L=580 *50*:100 (1959Br17), K:L12:L3:M=630 *200*:100:1.1 *2*:14 *2* (1959Gr06). Eγ: from 1973De22. Others: 82.3 *1* (1961Gr33); 82.0 *1* (1963Pa08).

† Absolute intensity per 100 decays.

^{166}Yb ε Decay 1973De22,1963Ja06,1959Gr06 (continued)

Decay Scheme



^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07

2002Ca46:
^{160}Gd(^{11}B,5nγ), E(^{11}B)=61 MeV; GASP array (40 Compton–suppressed large volume Ge detectors, and a multiplicity filter of 80 BGO elements); measured Eγ, Iγ (for E(^{11}B)=61 MeV), γγ coin, γγ(θ)(DCO).
^{164}Dy(^{6}Li,4nγ), E(^{6}Li)=38 MeV. Measured lifetimes in the 10–100 ns range using a high resolution planar Ge detector and an 11–element NaI(Tl) multiplicity filter.

1996Dr07: ^{160}Gd(^{11}B,5nγ) E=57–66 MeV; 95.1% ^{160}Gd metallic target; pulsed beam; three HPGe detectors (two low energy detectors and one coaxial). Isomers in ^{166}Tm identified. Measured Eγ, Iγ (for E(^{11}B)=61 MeV), γγ coin, $T_{1/2}$ (recoil shadow method).

^{166}Tm Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0[e]	2+		
0+x[f]	(3+)		E(level): x<16 keV from estimated Eγ<50 keV for (4+) to 2+ transition.
33.65+x[e] *8*	(4+)		
74.92+x[f] *4*	(5+)		
109.34+x[§] *5*	(6−)	340 ms *25*	E(level): 1996Dr07 assumed that the isomer depopulated via an unseen transition of energy x<25 keV. However, based on energy differences, 2002Ca46 find x=0.2 *5* and conclude that the isomer decays directly via a 34.42γ to the 75+x level. $T_{1/2}$: 34.4γ(t) (1996Dr07). Other: 370 ms *40* from K x ray(t) (1996Dr07). Pulsed beam (1 s on, 4 s off).
131.69+x[j] *19*	(5+)		
152.11+x[e] *8*	(6+)		
171.56+x[c] *7*	(6+)		
207.32+x[i] *11*	(6+)		
211.44+x[d] *8*	(7+)		
212.8+x[m] *3*	(5+)		
226.55+x[f] *9*	(7+)		
231.05+x[a] *8*	(6−)	36 ns *2*	$T_{1/2}$: from 2002Ca46. Other $T_{1/2}$: 2 µs *1* from 59.5γ(t) and 62.2γ(t) measured with pulsed beam (90 µs on, 90 µs off) (1996Dr07) and <2 µs from 121.7γ(t).
256.52+x[#] *21*	(7−)		
266.29+x[@] *16*	(6+)		
281.4+x[n] *3*	(6+)		
287.54+x[b] *17*	(7−)		
287.89+x[j] *10*	(7+)		
293.73+x[l] *17*	(6+)		
298.12+x[c] *10*	(8+)		
341.74+x[e] *9*	(8+)		
367.45+x[a] *17*	(8−)		
376.9+x?[q] *5*	(5−)		
383.13+x[m] *18*	(7+)		
389.05+x[&] *18*	(7+)		

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CITATION: Nuclear Data Sheets (1992) From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

^{166}Tm Levels (continued)

E(level)[†]	Jπ[‡]
401.64+x[o] 20	(7+)
417.45+x[d] 10	(9+)
423.21+x[h] 18	(7−)
423.48+x[i] 11	(8+)
423.92+x[§] 21	(8−)
453.8+x?[p] 4	(6−)
460.30+x[f] 10	(9+)
469.13+x[b] 18	(9−)
488.59+x[n] 17	(8+)
504.79+x[l] 16	(8+)
507.83+x[g] 11	(8−)
524.54+x[j] 9	(9+)
529.72+x[@] 18	(8+)
539.76+x[q] 21	(7−)
563.37+x[c] 11	(10+)
592.48+x[a] 18	(10−)
605.20+x[e] 9	(10+)
609.06+x[#] 20	(9−)
634.34+x[h] 11	(9−)
634.48+x[m] 17	(9+)
637.74+x[p] 19	(8−)
649.49+x[o] 17	(9+)
687.86+x[&] 19	(9+)
733.18+x[d] 11	(11+)
733.49+x[i] 11	(10+)
736.29+x[g] 10	(10−)
737.66+x[b] 19	(11−)
756.05+x[q] 19	(9−)
772.73+x[f] 11	(11+)
778.48+x[n] 16	(10+)
799.30+x[l] 15	(10+)
811.92+x[§] 22	(10−)
849.96+x[j] 10	(11+)
863.5+x[@] 3	(10+)
887.29+x[p] 18	(10−)
904.47+x[a] 20	(12−)
915.99+x[h] 10	(11−)
922.13+x[c] 11	(12+)
946.15+x[e] 10	(12+)
965.93+x[m] 16	(11+)
982.17+x[o] 17	(11+)
1030.41+x[#] 22	(11−)
1043.03+x[g] 11	(12−)
1045.40+x[q] 19	(11−)
1055.5+x[&] 3	(11+)
1092.35+x[b] 20	(13−)
1130.28+x[i] 13	(12+)
1132.36+x[d] 11	(13+)
1156.45+x[n] 15	(12+)
1157.08+x[f] 12	(13+)
1173.02+x[l] 16	(12+)
1213.99+x[p] 21	(12−)
1263.3+x[@] 4	(12+)
1263.64+x[§] 23	(12−)
1268.67+x[j] 11	(13+)
1279.73+x[h] 11	(13−)
1299.71+x[a] 21	(14−)
1350.26+x[c] 11	(14+)
1368.06+x[e] 11	(14+)
1379.26+x[m] 17	(13+)
1397.05+x[o] 17	(13+)
1416.61+x[q] 21	(13−)
1433.82+x[g] 12	(14−)
1486.7+x[&] 4	(13+)
1510.09+x[#] 23	(13−)
1528.34+x[b] 21	(15−)
1599.57+x[d] 12	(15+)
1603.88+x[i] 14	(14+)
1609.95+x[f] 12	(15+)
1612.04+x[n] 16	(14+)
1625.27+x[p] 21	(14−)
1634.69+x[l] 20	(14+)
1722.83+x[h] 13	(15−)
1723.9+x[@] 4	(14+)
1768.45+x[§] 24	(14−)
1770.39+x[a] 22	(16−)
1774.78+x[j] 14	(15+)
1836.42+x[c] 13	(16+)
1858.45+x[m] 18	(15+)
1865.88+x[e] 13	(16+)
1873.38+x[q] 22	(15−)
1900.7+x[o] 3	(15+)
1908.53+x[g] 14	(16−)
1976.4+x[&] 4	(15+)
2037.1+x[#] 3	(15−)
2038.61+x[b] 22	(17−)
2120.36+x[f] 13	(17+)
2122.31+x[i] 18	(16+)
2123.08+x[p] 22	(16−)
2131.85+x[d] 12	(17+)
2153.10+x[n] 16	(16+)
2181.59+x[l] 22	(16+)
2237.44+x[h] 14	(17−)
2245.5+x[@] 5	(16+)
2307.60+x[a] 22	(18−)
2315.4+x[§] 4	(16−)
2357.18+x[j] 16	(17+)
2381.20+x[c] 14	(18+)
2399.16+x[m] 20	(17+)
2411.96+x[q] 23	(17−)
2423.33+x[e] 14	(18+)
2463.43+x[g] 16	(18−)
2479.0+x[o] 4	(17+)
2520.9+x[&] 5	(17+)
2601.7+x[#] 4	(17−)
2614.30+x[b] 23	(19−)
2690.07+x[f] 14	(19+)
2696.21+x[i] 20	(18+)
2702.68+x[p] 24	(18−)
2713.74+x[d] 14	(19+)
2751.10+x[n] 19	(18+)
2785.3+x[l] 4	(18+)
2814.92+x[h] 16	(19−)
2839.3+x[@] 6	(18+)
2893.2+x[§] 4	(18−)
2902.81+x[a] 23	(20−)
2978.39+x[c] 16	(20+)
2987.29+x[j] 24	(19+)
3016.45+x[m] 24	(19+)
3024.4+x[q] 3	(19−)
3031.59+x[e] 16	(20+)
3092.54+x[g] 19	(20−)
3100.5+x 5	
3108.9+x 5	
3133.8+x[o] 5	(19+)
3200.1+x[#] 5	(19−)
3246.19+x[b] 24	(21−)
3308.58+x[f] 16	(21+)
3328.11+x[i] 23	(20+)
3345.13+x[d] 16	(21+)
3354.5+x[p] 4	(20−)
3374.7+x[n] 4	(20+)
3449.1+x[h] 3	(21−)
3457.6+x[l] 5	(20+)
3546.76+x[a] 24	(22−)
3623.41+x[c] 17	(22+)
3640.6+x[j] 4	(21+)
3686.72+x[e] 18	(22+)
3699.0+x[k] 4	(21+)
3699.8+x[q] 4	(21−)
3732.4+x[m] 3	(21+)
3788.1+x[g] 4	(22−)
3804.2+x[o] 6	(21+)
3923.98+x[b] 25	(23−)
3975.85+x[f] 18	(23+)
4018.4+x[i] 4	(22+)
4024.64+x[d] 18	(23+)
4058.7+x[p] 4	(22−)
4136.1+x[h] 4	(23−)
4232.6+x[a] 3	(24−)
4316.91+x[c] 20	(24+)
4328.4+x[k] 4	(23+)
4359.1+x[j] 4	(23+)
4391.02+x[e] 21	(24+)
4420.9+x[q] 5	(23−)
4481.9+x[m] 5	(23+)
4542.0+x[g] 5	(24−)
4642.9+x[b] 3	(25−)
4697.4+x[f] 4	(25+)
4755.7+x[d] 4	(25+)
4762.6+x[i] 5	(24+)
4874.1+x[h] 5	(25−)
4957.7+x[a] 3	(26−)
5021.4+x[k] 5	(25+)
5064.6+x[c] 4	(26+)
5111.0+x[j] 4	(25+)
5150.8+x[e] 4	(26+)
5346.2+x[g] 6	(26−)
5407.2+x[b] 4	(27−)
5480.3+x[f] 5	(27+)
5544.8+x[d] 5	(27+)
5559.2+x[i] 6	(26+)
5662.5+x[h] 6	(27−)
5725.6+x[a] 5	(28−)
5766.5+x[k] 6	(27+)
5873.6+x[c] 5	(28+)
5923.5+x[j] 5	(27+)
5972.7+x[e] 5	(28+)
6192.6+x[g] 7	(28−)
6227.2+x[b] 5	(29−)
6329.6+x[f] 6	(29+)
6396.3+x[d] 6	(29+)
6407.2+x[i] 7	(28+)
6503.1+x[h] 7	(29−)
6542.6+x[a] 5	(30−)
6571.2+x[k] 7	(29+)
6748.9+x[c] 6	(30+)
6788.7+x[j] 6	(29+)
6861.0+x[e] 6	(30+)

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^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07 (continued)

^{166}Tm Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
7062.9+x[g] *7*	(30−)	7692.5+x[c] *7*	(32+)	8352.6+x[h] *8*	(33−)
7111.2+x[b] *6*	(31−)	7816.0+x[e] *7*	(32+)	8692.2+x[c] *7*	(34+)
7247.9+x[f] *7*	(31+)	7969.7+x[g] *8*	(32−)	8845.1+x?[e] *7*	(34+)
7304.5+x[i] *7*	(30+)	8065.8+x[b] *7*	(33−)	9338.8+x[a] *8*	(36−)
7313.9+x[d] *7*	(31+)	8234.4+x[f] *7*	(33+)		
7398.7+x[h] *8*	(31−)	8297.4+x[d] *7*	(33+)		
7414.5+x[a] *6*	(32−)	8345.3+x[a] *7*	(34−)		

† From least−squares fit to Eγ.
‡ Authors' values, based on measured DCO ratios, intensity balance, deduced band properties, B(M1)/B(E2) ratios for intraband transitions and alignment.
§ (A): Kπ=6−, α=0 (π 7/2[404])+(ν 5/2[523]) band.
\# (B): Kπ=6−, α=1 (π 7/2[404])+(ν 5/2[523]) band.
@ (C): Kπ=6+, α=0 (π 7/2[523])+(ν 5/2[523]) band.
& (D): Kπ=6+, α=1 (π 7/2[523])+(ν 5/2[523]) band.
a (E): Kπ=6−, α=0 (π 7/2[523])+(ν 5/2[642]) band.
b (F): Kπ=6−, α=1 (π 7/2[523])+(ν 5/2[642]) band.
c (G): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band.
d (H): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band.
e (I): Kπ=2+,3+, α=0 (π 1/2[411])⊗(ν 5/2[642]) band.
f (J): Kπ=2+,3+, α=1 (π 1/2[411])⊗(ν 5/2[642]) band.
g (K): Kπ=2−,3−, α=0 (π 1/2[541])⊗(ν 5/2[642]) band.
h (L): Kπ=2−,3−, α=1 (π 1/2[541])⊗(ν 5/2[642]) band.
i (M): Kπ=2+,3+, α=0 (π 1/2[541])⊗(ν 5/2[523]) band.
j (N): Kπ=2+,3+, α=1 (π 1/2[541])⊗(ν 5/2[523]) band.
k (O): α=1 band including (21+) 3699+x level.
l (P): Kπ=1+,2+, α=0 (π 1/2[541])⊗(ν 3/2[521]) band.
m (Q): Kπ=1+,2+, α=1 (π 1/2[541])⊗(ν 3/2[521]) band.
n (R): Kπ=1+, α=0 (π 7/2[404])−(ν 5/2[642]) band.
o (S): Kπ=1+, α=1 (π 7/2[404])−(ν 5/2[642]) band.
p (T): Kπ=1−, α=0 (π 7/2[523])−(ν 5/2[642]) band.
q (U): Kπ=1−, α=1 (π 7/2[523])−(ν 5/2[642]) band.

γ(^{166}Tm)

Eγ†	E(level)	Iγ§	Mult.‡	δ#	Comments
34.42 *2*	109.34+x		E1		Eγ: from 1996Dr07. Mult.: from intensity balance at the 109+x level (1996Dr07).
35.1 *3*	266.29+x		E1		Mult.: α(exp)≤3 (2002Ca46).
39.9 *1*	211.44+x	25.0	M1(+E2)		Mult.: α(exp)=9 *3* (2002Ca46).
41.29 *7*	74.92+x	23	M1+E2	0.33	Eγ: from 1996Dr07. Other Iγ: I(41.29γ):I(74.92γ)=6.7 *9*:17.8 *9* in 1996Dr07. Mult.,δ: from intensity balance at the 74.9+x level (1996Dr07).
53.8 *3*	341.74+x	4.7			
56.4 *3*	287.54+x				
59.49 *7*	231.05+x		E1		Eγ: from 1996Dr07. Other Eγ: 59.3 *3* (2002Ca46). Mult.: α(K)exp=1.18 *24* (1996Dr07) from I(K x ray) in coincidence with 59γ.
62.22 *5*	171.56+x	≥112	E1		DCO=0.8 *1*. Eγ: from 1996Dr07; 62.2 *1* in 2002Ca46. Mult.: from α(K)exp=1.21 *24* (1996Dr07) from I(K x ray) in coincidence with 62γ.
74.5 *3*	226.55+x	5.0			
74.92 *4*	74.92+x	62	E2		DCO=0.95 *7*. Eγ: from 1996Dr07. Eγ=74.9 *1* in 2002Ca46. Mult.: from α(K)exp=2.0 *3* (1996Dr07); Q from DCO.
75.7 *3*	207.32+x				
76.9 *3*	453.8+x?				
77.3 *1*	152.11+x	41			
79.9 *1*	367.45+x	44	D+Q		DCO=0.83 *8*.

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From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

Eγ[†]	E(level)	Iγ[§]	Mult.[‡]	δ[#]	Comments
80.6 *1*	287.89+x	5.2	M1,E2		Mult.: α(exp)=7 *2* (2002Ca46).
	605.20+x	5.9	D		DCO=0.54 *9*.
81.1 *3*	293.73+x				
86.0 *3*	539.76+x				
86.7 *1*	298.12+x	33	D+Q		DCO=0.8 *1*.
86.8 *3*	488.59+x	4.8			
89.6 *3*	383.13+x				
94.4 *3*	266.29+x				
96.2 *3*	946.15+x	3.6	D		DCO=0.50 *8*.
98.0 *1*	637.74+x	13.9	D(+Q)		DCO=0.57 *15*.
98.2 *3*	131.69+x		D(+Q)		DCO=0.7 *2*.
100.8 *3*	524.54+x	4.9	D(+Q)		DCO=0.7 *2*.
101.6 *1*	469.13+x	60	D+Q		DCO=0.80 *7*.
101.8 *3*	736.29+x	2.6			
102.1 *1*	211.44+x	18.0	E1		DCO=0.66 *8*. Mult.: α(exp)≤1.5 (2002Ca46).
103.0 *3*	504.79+x	2.2			
107.7 *3*	401.64+x	3.4			
115.2 *1*	341.74+x	22.1	D		DCO=0.66 *8*.
118.2 *1*	756.05+x	13.3	D+Q		DCO=0.75 *12*.
118.4 *1*	152.11+x	52	(E2)[@]		DCO=1.0 *1*.
119.3 *1*	417.45+x	35			DCO=0.97 *12*.
120.2 *3*	401.64+x	4.6			
121.4 *3*	504.79+x	3.4			
121.7 *1*	231.05+x				Eγ: from 1996Dr07. Other Eγ: 121.5 *3* (2002Ca46). Iγ: I(121.71γ):I(59.488γ)=7.5 *25*:16.5 *26* (1996Dr07).
122.7 *1*	389.05+x	10.0			
123.2 *1*	592.48+x	78			DCO=0.9 *1*.
126.5 *3*	298.12+x	2.2	(E2)[@]		DCO=1.1 *2*.
	634.34+x	2.2	D		DCO=0.5 *1*.
127.0 *3*	1043.03+x	4.4	D+Q		DCO=0.49 *7*.
128.7 *3*	778.48+x	4.1	D(+Q)		DCO=0.59 *15*.
129.5 *3*	634.48+x	2.6			
131.1 *1*	887.29+x	16.9	D(+Q)		DCO=0.75 *25*.
132.0 *3*	207.32+x				
135.6 *1*	423.48+x	6.4			
135.7 *1*	287.89+x	9.0	D		DCO=0.72 *8*.
136.6 *3*	367.45+x	1.7			
140.6 *1*	529.72+x	7.0	D+Q		DCO=0.8 *2*.
141.7 *3*	293.73+x				
143.7 *3*	778.48+x	4.2			DCO=0.9 *2*.
144.9 *1*	605.20+x	9.4	D		DCO=0.69 *8*.
145.1 *1*	737.66+x	69	D+Q		DCO=0.79 *9*.
145.7 *3*	634.48+x	4.0			DCO=1.0 *2*.
145.8 *1*	563.37+x	25.0	(M1+E2)	+0.54 *14*	DCO=1.06 *10*. δ: +0.40 to +0.67 from DCO.
147.5 *3*	256.52+x				
151.6 *1*	226.55+x	100	(E2)[@]		DCO=0.98 *5*.
154.0 *3*	1433.82+x	2.9	D(+Q)		DCO=0.67 *13*.
156.3 *3*	287.89+x	2.5			
156.9 *3*	266.29+x				
158.1 *1*	687.86+x	5.1			
	1045.40+x	18.6			DCO=0.9 *2*.
160.9 *1*	649.49+x	7.8	D(+Q)		DCO=0.62 *20*.
162.9 *3*	504.79+x	2.8			Eγ: 162.6 keV in figure 1 of 2002Ca46.
164.8 *3*	799.30+x	2.6			
165.1 *3*	1433.82+x	1.5			
166.5 *3*	965.93+x	0.8			
166.8 *1*	904.47+x	59	D+Q		DCO=0.85 *8*.
167.2 *3*	423.92+x				
167.4 *3*	772.73+x	2.8	D		DCO=0.67 *12*.
168.5 *1*	1213.99+x	15.3	D(+Q)		DCO=0.7 *2*.
169.7 *1*	733.18+x	16.0			DCO=1.2 *2*.

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From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

Eγ†	E(level)	Iγ§	Mult.‡	δ#	Comments
170.1 3	383.13+x				
173.5 3	946.15+x	2.4	(M1(+E2))	−0.11 14	DCO=0.5 1. δ: −0.25 to +0.03.
174.4 3	1156.45+x	1.2			
175.4 3	863.5+x	4.4			
179.7 1	915.99+x	5.3	(M1+E2)	−0.15 10	DCO=0.46 7.
181.6 1	469.13+x	7.3			
182.9 1	524.54+x	26.0	D		DCO=0.55 6.
185.4& 3	609.06+x	5.5&			
	1908.53+x	1.2&			
187.4 3	965.93+x	4.8	D		DCO=0.70 15.
187.8 1	1092.35+x	48	M1+E2	+0.23 8	DCO=0.80 8.
188.9 1	922.13+x	10.2			DCO=1.1 2.
189.7 1	341.74+x	62	(E2)@		DCO=0.93 8.
190.4 3	1156.45+x	1.3			
191.9 3	1055.5+x	3.8			
192.8 3	1043.03+x	4.3	D		DCO=0.55 11.
193.9 3	799.30+x	1.0			
196.8 3	423.48+x	3.8			
202.5 3	811.92+x	3.2			
202.5 1	1416.61+x	14.0	D(+Q)		DCO=0.66 15.
203.8 3	982.17+x	2.9			
206.0 1	417.45+x	24.0	(E2)@		DCO=0.92 17.
206.0 3	1379.26+x	0.7			
206.9 3	1173.02+x	1.6			
207.2 3	488.59+x	3.0	(E2)@		DCO=0.9 2.
207.3 1	1299.71+x	33.8	D+Q		DCO=0.85 7.
207.7 3	1263.3+x	3.4			
208.6 1	1625.27+x	10.8			
209.0 1	733.49+x	8.4	D+Q		DCO=0.3 2.
210.2 1	1132.36+x	6.6			DCO=1.1 2.
210.9 3	1157.08+x	4.0	D		DCO=0.6 2.
211.1 1	504.79+x	8.0			
211.2& 3	736.29+x	5.0&	D		DCO=0.60 12.
	1368.06+x	1.0&			
211.4 3	634.34+x	2.6			
214.7 3	637.74+x	2.9			
216.1 1	423.48+x	13.1	(E2)@		DCO=0.9 2.
216.1 3	756.05+x	1.7			
217.8 3	1350.26+x	3.8			DCO=1.1 2.
218.2 3	1030.41+x	2.0			
219.9 3	507.83+x	1.9	D		DCO=0.60 15.
222.7 3	1379.26+x	0.6	D		DCO=0.7 2.
223.5 3	1486.7+x	2.2			
223.6 3	1397.05+x	1.0			
225.1 1	592.48+x	20.8			
228.5 1	736.29+x	6.6	(E2)@		DCO=1.02 8.
228.6 1	1528.34+x	26.6	D+Q		DCO=0.80 9.
231.8 3	1599.57+x	2.4			
233.2 3	1263.64+x	1.7			
233.7 1	460.30+x	107	(E2)@		DCO=1.08 5.
235.6 3	1368.06+x	2.7			
236.6 1	524.54+x	17.0	(E2)@		DCO=1.0 2.
236.7 1	1279.73+x	7.8	D		DCO=0.56 6.
236.8 3	1836.42+x	1.4			
237.1 3	1723.9+x	2.0			
240.4 3	1397.05+x	2.8			
241.9 3	1609.95+x	1.2			
242.1 1	1770.39+x	19.0	D+Q		DCO=0.77 8.
242.5 3	529.72+x	0.9			
244.8 1	849.96+x	20.1	D+Q		DCO=0.46 9.
246.4 3	1510.09+x	1.0			
247.9 3	649.49+x	4.8	(E2)@		DCO=0.9 2.

Continued on next page (footnotes at end of table)

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

Eγ†	E(level)	Iγ§	Mult.‡	δ#	Comments
248.1 3	756.05+x	4.0			
248.1 1	1873.38+x	9.5			
248.2 3	772.73+x				
249.3 3	1599.57+x	1.3			
	2381.20+x	0.4			
249.7 1	887.29+x	5.9			
249.8 1	2123.08+x	7.0	D(+Q)		DCO=0.68 15.
251.4 1	634.48+x	5.8	(E2)@		DCO=0.9 2.
252.6 3	1976.4+x	1.1			
252.9 3	887.29+x				
254.5 3	2120.36+x	1.9			
258.5 3	1768.45+x	0.7			
259.7 3	1609.95+x	2.5	D		DCO=0.58 12.
263.5 3	529.72+x	1.3			
263.5 1	605.20+x	65	(E2)@		DCO=0.98 7.
265.3 1	563.37+x	50	(E2)@		DCO=0.97 12.
266.1 3	649.49+x	2.2			
266.2 3	1865.88+x	1.8			
266.6 3	2690.07+x	0.9			
267.0 3	1397.05+x	0.8			
268.2 1	2038.61+x	11.6	D+Q		DCO=0.91 8.
268.6 1	737.66+x	28.8			
268.6 3	2037.1+x	0.6			
269.0 1	2307.60+x	14.7	(D+Q)		DCO=0.9 2.
269.2 3	2245.5+x	0.9			
270.3 1	1043.03+x	10.4	D		DCO=0.69 12.
271.1 3	423.21+x	5.0			DCO=0.8 2.
271.7 3	423.48+x	4.5			
273.5 3	733.49+x	0.7			DCO=1.2 3. Eγ: from e–mail reply (of May 12, 2003) from one of the authors (M.A. Cardona). The Eγ=325.7 in Table I and fig. 1 of 2002Ca46 is a typographical error.
276.1 1	736.29+x	18.7	D		DCO=0.58 7.
276.7 3	1433.82+x	3.2	D		DCO=0.56 6.
277.1 3	3308.58+x	0.2			
278.4 3	2315.4+x				
280.4 3	1130.28+x	2.7	D(+Q)		DCO=0.5 2.
281.3 1	507.83+x	10.9	D		DCO=0.60 8.
281.7 1	915.99+x	7.1			
283.9 3	2120.36+x	1.0			
286.5 3	2601.7+x				
288.6 1	2902.81+x	8.7	D+Q		DCO=0.8 2.
289.0 3	1722.83+x	3.5	D+Q		DCO=0.39 7.
289.3 3	1045.40+x	4.1			
289.6 3	2411.96+x	4.5			
289.9 1	778.48+x	9.4	(E2)@		DCO=1.04 12.
290.8 3	2702.68+x	4.0			
	2713.74+x	0.6			
291.4 3	2893.2+x				
291.7 3	2423.33+x	1.3			
292.6 1	634.34+x	15.3	(E1(+M2))	0.0 1	DCO=0.57 8. δ: −0.1 to +0.1 from DCO.
294.5 1	799.30+x	10.4			
295.6 3	2131.85+x	1.9	D+Q		DCO=1.07 8.
296.8 3	1900.7+x	1.0			
298.8 3	687.86+x	2.0			
299.1 3	1908.53+x	0.6	D		DCO=0.6 2.
300.7 1	3546.76+x	5.6	(D+Q)		DCO=0.9 2.
306.8 1	1043.03+x	24.7	(E2)@		DCO=1.00 6.
	2614.30+x	10.3	D+Q		DCO=0.76 8.
308.9 3	2690.07+x	0.9			
	4232.6+x	3.1			
309.1 3	1045.40+x	0.9			

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^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07 (continued)

γ(^{166}Tm) (continued)

Eγ†	E(level)	Iγ§	Mult.‡	δ#	Comments
310.0 *1*	733.49+x	14.4	(E2)@		DCO=1.1 *2*.
310.7 *1*	915.99+x	13.7	D		DCO=0.66 *7*.
312.0 *1*	904.47+x	46	(E2)@		DCO=0.99 *7*.
312.5 *1*	772.73+x	66	(E2)@		DCO=1.00 *6*.
314.7 *3*	423.92+x				Iγ: I(315γ):I(167γ)=5.3 *4*:7.4 *3* from γγ coin (1996Dr07).
315.8 *1*	733.18+x	59	(E2)@		DCO=1.00 *8*.
318.3 *3*	3031.59+x	1.1			
320.6 *3*	687.86+x	1.7			
321.7 *3*	3024.4+x	1.8			
322.6 *1*	1268.67+x	5.2	(M1+E2)	−2.6 *24*	DCO=0.34 *10*. δ: −5.0 to −0.18.
325.5 *1*	849.96+x	31.2	(E2)@		DCO=1.03 *8*.
326.8 *3*	1213.99+x	5.0	(E2)@		DCO=1.1 *2*.
329.1 *3*	2237.44+x	1.8			
330.1 *3*	3354.5+x	1.7			
330.4 *3*	3308.58+x	0.6			
331.5 *1*	965.93+x	10.8	(E2)@		DCO=1.00 *8*.
332.6 *3*	2713.74+x	1.3			
332.7 *1*	982.17+x	8.8			
333.6 *1*	1279.73+x	7.5	D		DCO=0.51 *8*.
333.9 *3*	863.5+x	1.4			
335.1 *3*	1603.88+x	0.6			Eγ: 2002Ca46 show 343.6γ from this level, but level−energy difference supports 335.1γ (placement adjusted by compilers). See comment for 343.6γ from 1611.97+x level. This conclusion is confirmed in an e−mail reply (of May 12, 2003) from one of the authors (M.A. Cardona).
341.0 *1*	946.15+x	61	(E2)@		DCO=1.04 *6*.
341.8 *3*	3686.72+x				
343.6 *3*	1612.04+x	0.8			Eγ: 2002Ca46 show 335.1γ from this level, but level−energy difference supports 343.6γ (placement adjusted by compilers). See comment for 335.1γ from 1603.75+x level. This conclusion is confirmed in an e−mail reply (of May 12, 2003) from one of the authors (M.A. Cardona).
343.6 *1*	3246.19+x	7.7	D+Q		DCO=0.67 *18*.
345.3 *3*	3699.8+x	0.8			
351.5 *3*	2814.92+x	1.0			
352.2 *3*	3975.85+x	0.2			
352.6 *1*	609.06+x	6.6			Iγ: I(353γ):I(185γ)=4.8 *5*:5.8 *4* from γγ coin (1996Dr07).
354.3 *3*	1722.83+x	3.0	D		DCO=0.59 *8*.
354.7 *1*	1092.35+x	49	(E2)@		DCO=1.06 *8*.
356.5 *3*	3449.1+x	0.4			
358.8 *1*	922.13+x	60	(E2)@		DCO=1.08 *10*.
359.0 *3*	4058.7+x	0.5			
363.7 *1*	1279.73+x	15.5	(E2)@		DCO=1.10 *6*.
366.8 *3*	3345.13+x	0.9			
367.7 *3*	1055.5+x	2.4			
371.3 *1*	1416.61+x	7.3	(E2)@		DCO=0.96 *20*.
372.6 *3*	1722.83+x	1.3			
373.7 *1*	1173.02+x	9.2			
377.2 *1*	3923.98+x	5.5	(D+Q)		DCO=0.9 *2*.
377.9 *1*	1156.45+x	8.8			
378.3 *3*	2153.10+x	0.2			
384.4 *1*	1157.08+x	46	(E2)@		DCO=1.02 *5*.
388.0 *1*	811.92+x	7.2			
389.4 *1*	849.96+x	13.0			DCO=1.0 *3*.
390.8 *1*	1433.82+x	34.7	(E2)@		DCO=1.03 *5*.
391.0 *3*	733.49+x	0.3			
395.3 *1*	1299.71+x	50	(E2)@		DCO=0.97 *6*.
396.8 *1*	1130.28+x	11.0			DCO=0.8 *2*.
396.9 *3*	1379.26+x	3.3			
399.2 *1*	1132.36+x	51	(E2)@		DCO=1.03 *7*.
399.9 *3*	1263.3+x	2.5			
401.1 *3*	2237.44+x	0.7			

Continued on next page (footnotes at end of table)

^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07 (continued)

γ(^{166}Tm) (continued)

Eγ†	E(level)	Iγ§	Mult.‡	Comments
401.3 3	4024.64+x	0.4		
404.1 1	1350.26+x	15.3	Q	DCO=0.95 8.
406.9 3	1774.78+x	1.3		
410.7 3	4642.9+x	1.8		
411.3 1	1625.27+x	7.4		
413.4 1	1379.26+x	12.3	(E2)@	DCO=1.07 12.
414.9 1	1397.05+x	6.5		
418.6 1	1268.67+x	17.7	(E2)@	DCO=1.04 8.
421.4 1	1030.41+x	5.8	(E2)@	DCO=1.0 1.
421.9 1	1368.06+x	44	(E2)@	DCO=0.98 7.
428.2 1	1350.26+x	48	(E2)@	DCO=1.07 8.
430.9 3	1603.88+x	0.7		
431.2 3	1486.7+x	2.3		
433.6 3	2814.92+x	0.2		
436.0 1	1528.34+x	43	(E2)@	DCO=1.01 6.
439.0 3	1612.04+x	4.8		
442.3 3	1599.57+x	3.2		
443.1 1	1722.83+x	13.0	(E2)@	DCO=1.03 5.
445.9 1	1368.06+x	11.0	Q	DCO=1.0 1.
447.0 3	1603.88+x	2.6		
451.7 1	1263.64+x	5.6		
452.9 1	1609.95+x	32	(E2)@	DCO=1.08 6.
455.6 1	1612.04+x	6.0	(E2)@	DCO=1.0 2.
456.8 1	1873.38+x	8.2		
460.5 3	1723.9+x	2.3		
461.3 3	1858.45+x	1.5		
461.9 3	1634.69+x	4.6		
467.2 1	1599.57+x	37	(E2)@	DCO=1.16 14.
468.3 3	1836.42+x	4.1	Q	DCO=1.0 1.
470.7 1	1770.39+x	41	(E2)@	DCO=0.98 6.
473.6 1	1603.88+x	7.6		
474.7 1	1908.53+x	25.3	(E2)@	DCO=1.00 3.
477.6 3	1609.95+x	2.3		
478.3 3	1634.69+x	5.0		
479.2 1	1858.45+x	10.5	(E2)@	DCO=0.98 11.
479.7 1	1510.09+x	5.2		
481.6 3	1612.04+x	3.8		
486.2 1	1836.42+x	37.5	(E2)@	DCO=1.06 10.
489.9 3	1976.4+x	2.0		
496.1 3	1268.67+x	1.4		
497.8 1	1865.88+x	31.2	(E2)@	DCO=1.04 8.
	2123.08+x	7.0		
503.6 3	1900.7+x	4.2		
504.4 3	1634.69+x	0.8		
504.8 1	1768.45+x	5.4	(E2)@	DCO=1.1 2.
506.1 1	1774.78+x	12.2	(E2)@	DCO=0.96 10.
510.2 1	2038.61+x	31.3	(E2)@	DCO=0.93 12.
510.3 1	2122.31+x	7.1		
510.4 1	2120.36+x	14.2	(E2)@	DCO=0.93 8.
514.6 1	2237.44+x	8.1	(E2)@	DCO=1.00 5.
515.4 3	1865.88+x	1.5		
518.2 3	2122.31+x	2.5		
518.7 3	2153.10+x			
520.8 1	2120.36+x	16.0	Q	DCO=1.00 5.
521.4 3	2245.5+x	2.3		
521.9 1	2131.85+x	12.9	Q	DCO=1.00 6.
527.0 3	2037.1+x	4.8	(E2)@	DCO=1.2 2.
532.3 1	2131.85+x	10.6	(E2)@	DCO=1.03 8.
537.3 1	2307.60+x	33	(E2)@	DCO=1.01 7.
538.5 1	2411.96+x	6.9		
540.7 1	2399.16+x	9.0	(E2)@	DCO=0.98 15.
541.0 3	2153.10+x	3.0		
544.5 3	2520.9+x	1.3		

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$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

Eγ†	E(level)	Iγ§	Mult.‡	Comments
544.8 *1*	2381.20+x	26.7	(E2)@	DCO=1.04 *15*.
546.9 *1*	2181.59+x	6.2		
547.0 *3*	2315.4+x	3.6		
549.2 *1*	2153.10+x	6.3		
554.9 *1*	2463.43+x	16.6	(E2)@	DCO=1.04 *6*.
557.4 *1*	2423.33+x	22.3	(E2)@	DCO=0.97 *10*.
558.3 *3*	2690.07+x	1.6		
564.4 *3*	2601.7+x	3.2		
569.7 *1*	2690.07+x	19.4	(E2)@	DCO=1.00 *5*.
573.9 *1*	2696.21+x	8.1		
575.6 *1*	2614.30+x	34	(E2)@	DCO=0.99 *15*.
577.5 *1*	2814.92+x	5.4	(E2)@	DCO=1.1 *1*.
577.9 *3*	2893.2+x			
578.3 *3*	2479.0+x	2.7		
579.6 *1*	2702.68+x	7.1		
581.9 *1*	2713.74+x	16.1	(E2)@	DCO=0.99 *8*.
582.4 *1*	2357.18+x	7.1	(E2)@	DCO=1.0 *2*.
588.2 *3*	2987.29+x	3.4		
593.8 *3*	2839.3+x	1.0		
595.2 *1*	2902.81+x	25.6	(E2)@	DCO=0.96 *9*.
597.2 *1*	2978.39+x	20.8	(E2)@	DCO=0.93 *15*.
598.0 *1*	2751.10+x	7.7	(E2)@	DCO=0.9 *2*.
598.4 *3*	3200.1+x			
603.7 *3*	2785.3+x	3.5		
608.2 *1*	3031.59+x	16.4	(E2)@	DCO=1.1 *1*.
612.3 *3*	3024.4+x	3.8		
617.2 *3*	3016.45+x	2.1		DCO=1.0 *2*.
618.5 *1*	3308.58+x	14.2	(E2)@	DCO=1.04 *8*.
621.5 *3*	3100.5+x	0.8		
623.6 *3*	3374.7+x	3.0	(E2)@	DCO=1.0 *2*.
629.1 *1*	3092.54+x	8.6	(E2)@	DCO=1.01 *8*.
629.4 *3*	4328.4+x	0.5		
629.9 *3*	3108.9+x	0.9		
630.1 *3*	2987.29+x	3.0	(E2)@	DCO=1.1 *2*.
631.4 *1*	3345.13+x	11.4	(E2)@	DCO=0.9 *2*.
631.8 *1*	3246.19+x	22.4	(E2)@	DCO=1.05 *8*.
631.9 *1*	3328.11+x	6.2		
634.2 *3*	3449.1+x	3.4	(E2)@	DCO=0.9 *1*.
643.8 *1*	3546.76+x	20.3	(E2)@	DCO=0.98 *8*.
645.0 *1*	3623.41+x	12.0	(E2)@	DCO=0.98 *24*.
651.9 *3*	3354.5+x	4.8		
653.4 *3*	3640.6+x	4.0	(E2)@	DCO=0.9 *2*.
654.8 *3*	3133.8+x	0.7		
655.1 *1*	3686.72+x	10.0	(E2)@	DCO=1.0 *1*.
659.3 *3*	3016.45+x	3.2		DCO=1.2 *2*.
660.0 *3*	4359.1+x	1.0		
667.3 *1*	3975.85+x	7.6	(E2)@	DCO=1.02 *15*.
670.4 *3*	3804.2+x	0.5		
672.3 *3*	3457.6+x	1.2		
675.4 *3*	3699.8+x	2.5		
677.8 *1*	3923.98+x	14.7	(E2)@	DCO=1.06 *9*.
679.5 *1*	4024.64+x	6.2	(E2)@	DCO=1.0 *2*.
682.5 *3*	3699.0+x	0.6		
685.8 *1*	4232.6+x	13.3	(E2)@	DCO=1.1 *1*.
687.0 *3*	4136.1+x	1.6	(E2)@	DCO=0.9 *1*.
687.7 *3*	4328.4+x	1.4		
690.3 *3*	4018.4+x	3.9		
693.0 *3*	5021.4+x	0.6		
693.5 *1*	4316.91+x	6.4	(E2)@	DCO=1.0 *1*.
695.6 *3*	3788.1+x	5.0	(E2)@	DCO=0.95 *1*.
704.2 *3*	4058.7+x	3.2		
704.3 *1*	4391.02+x	5.6	(E2)@	DCO=1.1 *2*.
715.9 *3*	3732.4+x	0.7		

Continued on next page (footnotes at end of table)

From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

Eγ[†]	E(level)	Iγ[§]	Mult.[‡]	Comments
718.5 *3*	4359.1+x	1.3		
718.9 *1*	4642.9+x	6.6	(E2)[@]	DCO=1.1 *2*.
721.1 *3*	4420.9+x	1.5		
721.5 *3*	4697.4+x	4.5	(E2)[@]	DCO=0.9 *2*.
725.1 *1*	4957.7+x	6.3	(E2)[@]	DCO=0.9 *2*.
731.1 *3*	4755.7+x	3.6		
738.0 *3*	4874.1+x	0.6		
744.2 *3*	4762.6+x	1.4		
745.1 *3*	3732.4+x	0.6		
	5766.5+x	0.3		
747.7 *3*	5064.6+x	3.3	(E2)[@]	DCO=0.92 *15*.
749.5 *3*	4481.9+x	0.3		
751.9 *3*	5111.0+x	0.8		
753.9 *3*	4542.0+x	2.2	(E2)[@]	DCO=1.1 *1*.
759.8 *3*	5150.8+x	2.5	(E2)[@]	DCO=1.0 *2*.
764.3 *3*	5407.2+x	3.1		
767.9 *3*	5725.6+x	2.8	(E2)[@]	DCO=1.1 *2*.
782.7 *3*	5111.0+x	0.1		
782.9 *3*	5480.3+x	1.9		
788.4 *3*	5662.5+x	0.4		
789.1 *3*	5544.8+x	1.5		
796.6 *3*	5559.2+x	0.5		
804.2 *3*	5346.2+x	1.0	(E2)[@]	DCO=1.0 *1*.
804.7 *3*	6571.2+x	0.1		
809.0 *3*	5873.6+x	1.5		
812.5 *3*	5923.5+x	0.4		
817.0 *3*	6542.6+x	1.3		
820.0 *3*	6227.2+x	1.0		
821.9 *3*	5972.7+x	1.1		
840.6 *3*	6503.1+x	0.3		
846.4 *3*	6192.6+x	0.6		
848.0 *3*	6407.2+x	0.3		
849.3 *3*	6329.6+x	1.0		
851.5 *3*	6396.3+x	0.7		
865.2 *3*	6788.7+x	0.2		
870.3 *3*	7062.9+x	0.3		
871.9 *3*	7414.5+x	0.6		
875.3 *3*	6748.9+x	0.6		
884.0 *3*	7111.2+x	0.4		
888.3 *3*	6861.0+x	0.6		
895.6 *3*	7398.7+x	0.2		
897.3 *3*	7304.5+x	0.1		
906.7 *3*	7969.7+x	0.1		
917.5 *3*	7313.9+x	0.4		
918.3 *3*	7247.9+x	0.5		
930.8 *3*	8345.3+x	0.2		
943.6 *3*	7692.5+x	0.3		
953.9 *3*	8352.6+x			
954.6 *3*	8065.8+x	0.2		
955.0 *3*	7816.0+x	0.3		
983.5 *3*	8297.4+x	0.2		
986.5 *3*	8234.4+x	0.2		
993.5 *3*	9338.8+x	0.1		
999.7 *3*	8692.2+x	0.1		
1029.1[a] *3*	8845.1+x?			

† ΔE assigned as 0.1 keV for Iγ>5 and 0.3 keV for Iγ≤5 based on a general statement by 2002Ca46 that uncertainties range from 0.1 keV to 0.3 keV.

‡ From α(exp) data based on intensity balance (2002Ca46), when available. From DCO ratios, otherwise; measurements were made using gates on stretched Q transitions, θ_1=(31.7°, 36°, 144°, 148.3°), and θ_2=90°.

§ From 2002Ca46, except as noted. Uncertainties range from 10% to 50%, depending on the intensity and complexity of the peak in the gamma–ray spectrum.

\# From authors' analysis of DCO ratio data (2002Ca46).

Footnotes continued on next page

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

$\gamma(^{166}Tm)$ (continued)

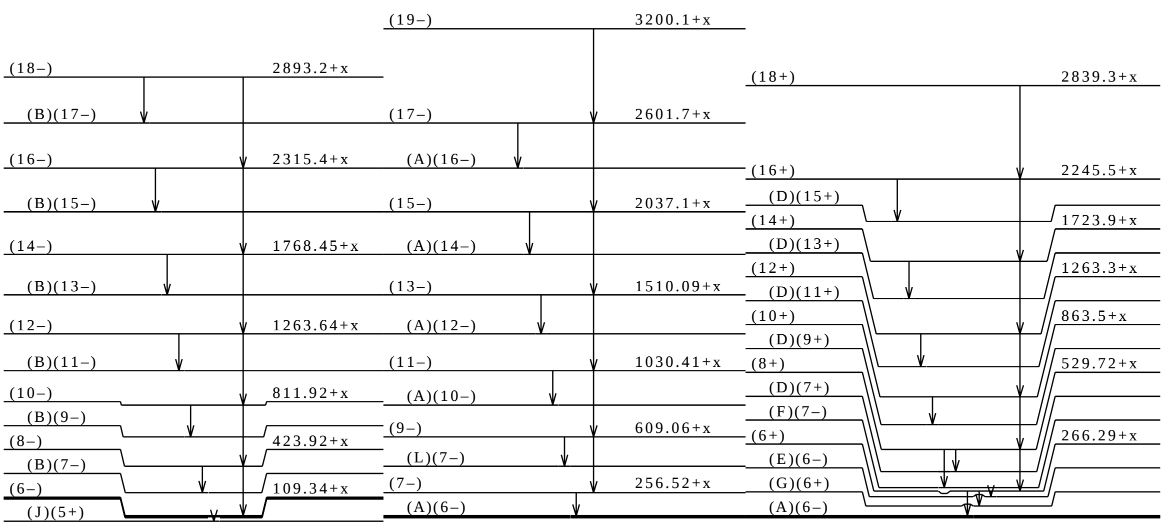
@ Q or (Q) from DCO for intraband transition. $\Delta\pi$=(no) assigned based on band structure.
& Multiply placed; intensity suitably divided.
a Placement of transition in the level scheme is uncertain.

$^{160}Gd(^{11}B,5n\gamma)$,$^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(A) Kπ=6–, α=0 (π 7/2[404]) +(ν 5/2[523]) band.

(B) Kπ=6–, α=1 (π 7/2[404]) +(ν 5/2[523]) band.

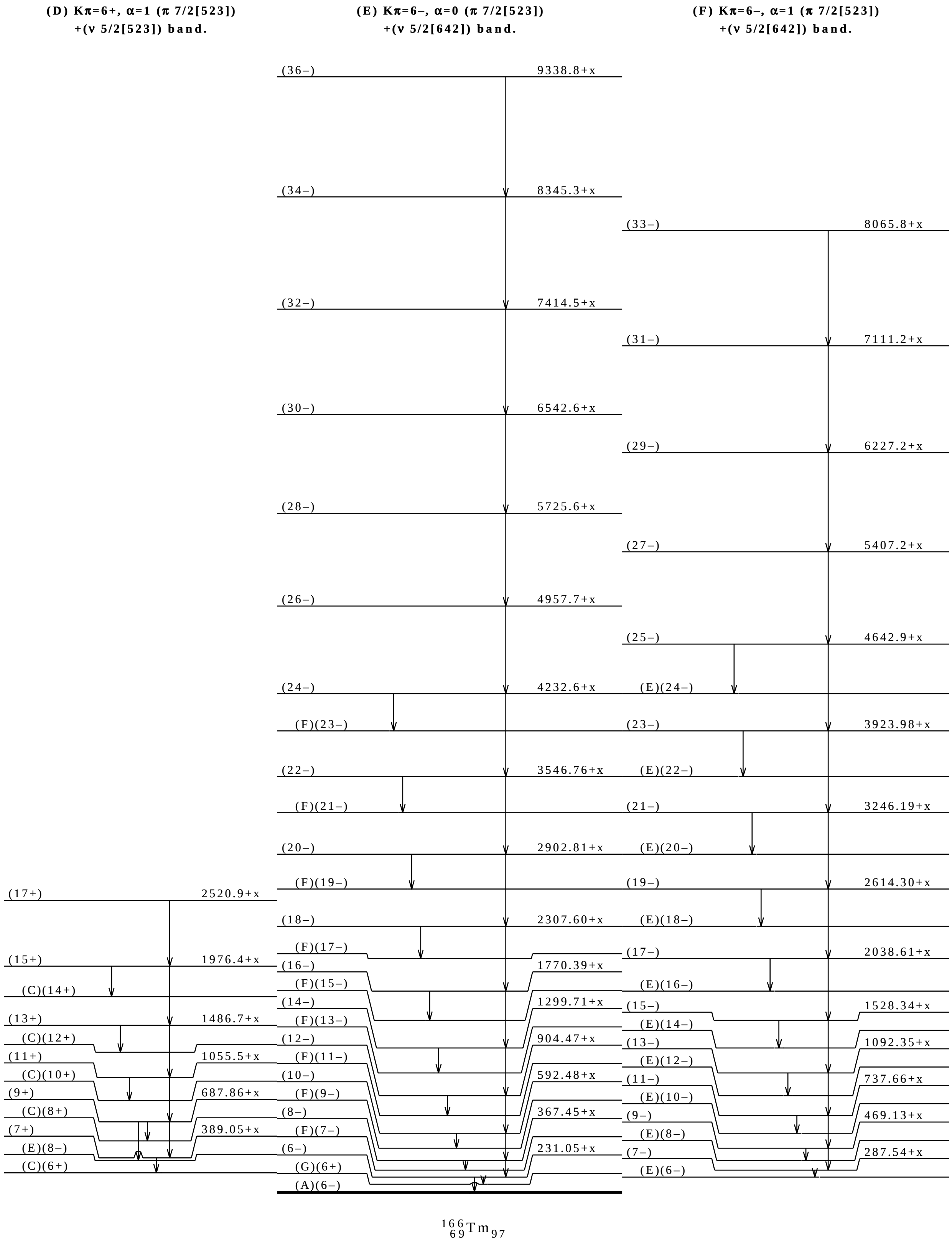
(C) Kπ=6+, α=0 (π 7/2[523]) +(ν 5/2[523]) band.



$^{166}_{69}Tm_{97}$

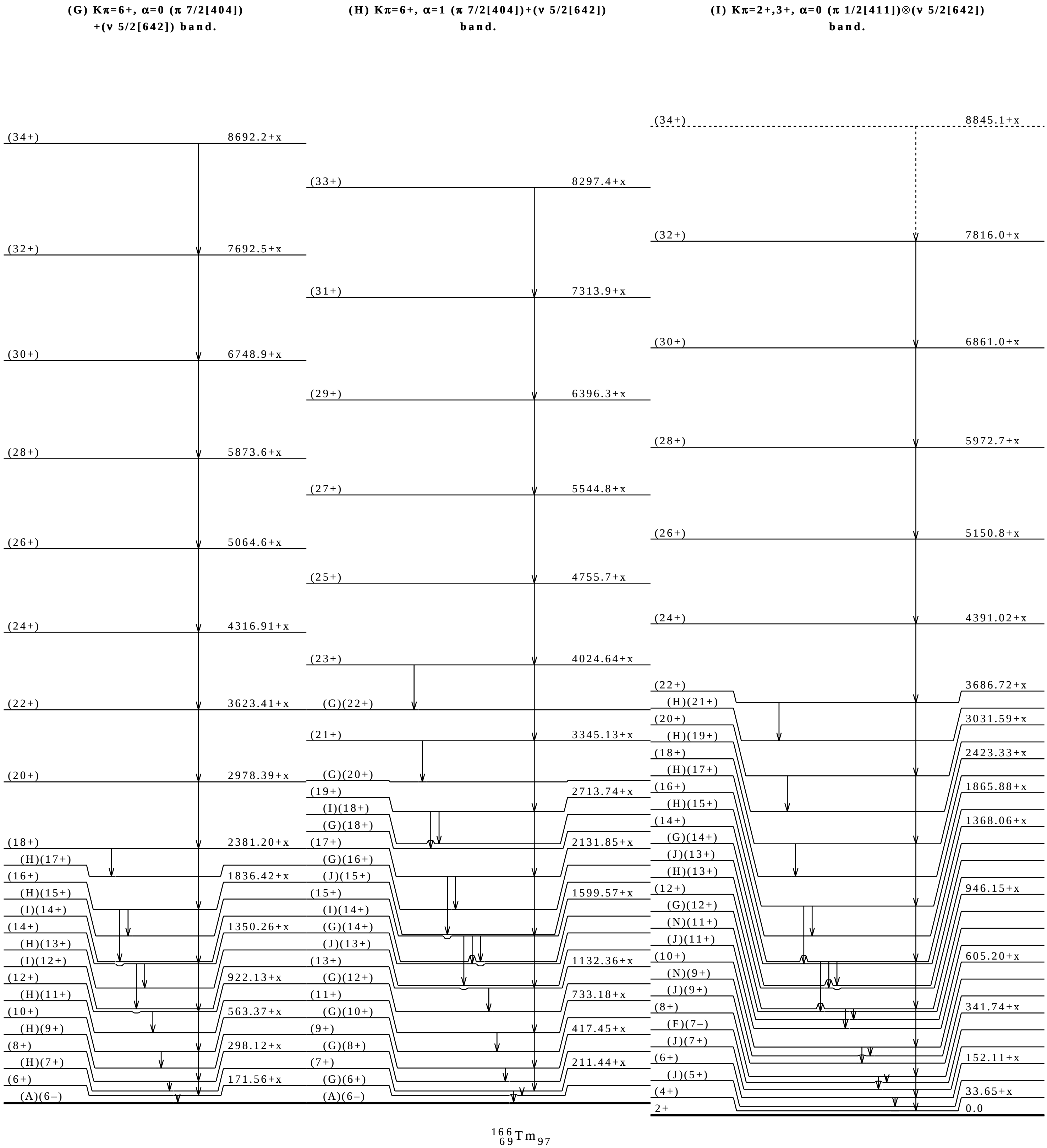
From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)



From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

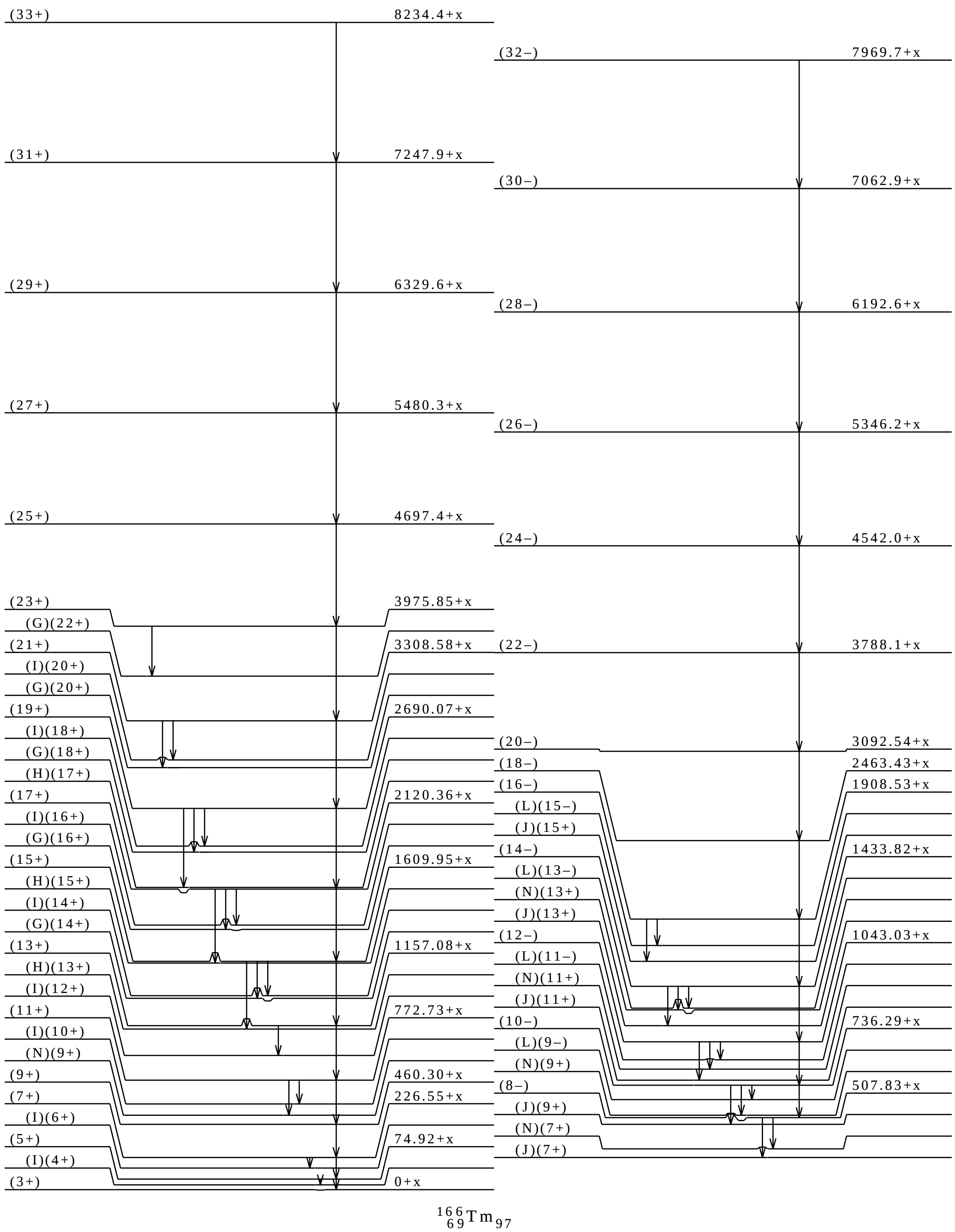


From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(J) Kπ=2+,3+, α=1 (π 1/2[411])⊗(ν 5/2[642]) band.

(K) Kπ=2–,3–, α=0 (π 1/2[541]) ⊗(ν 5/2[642]) band.

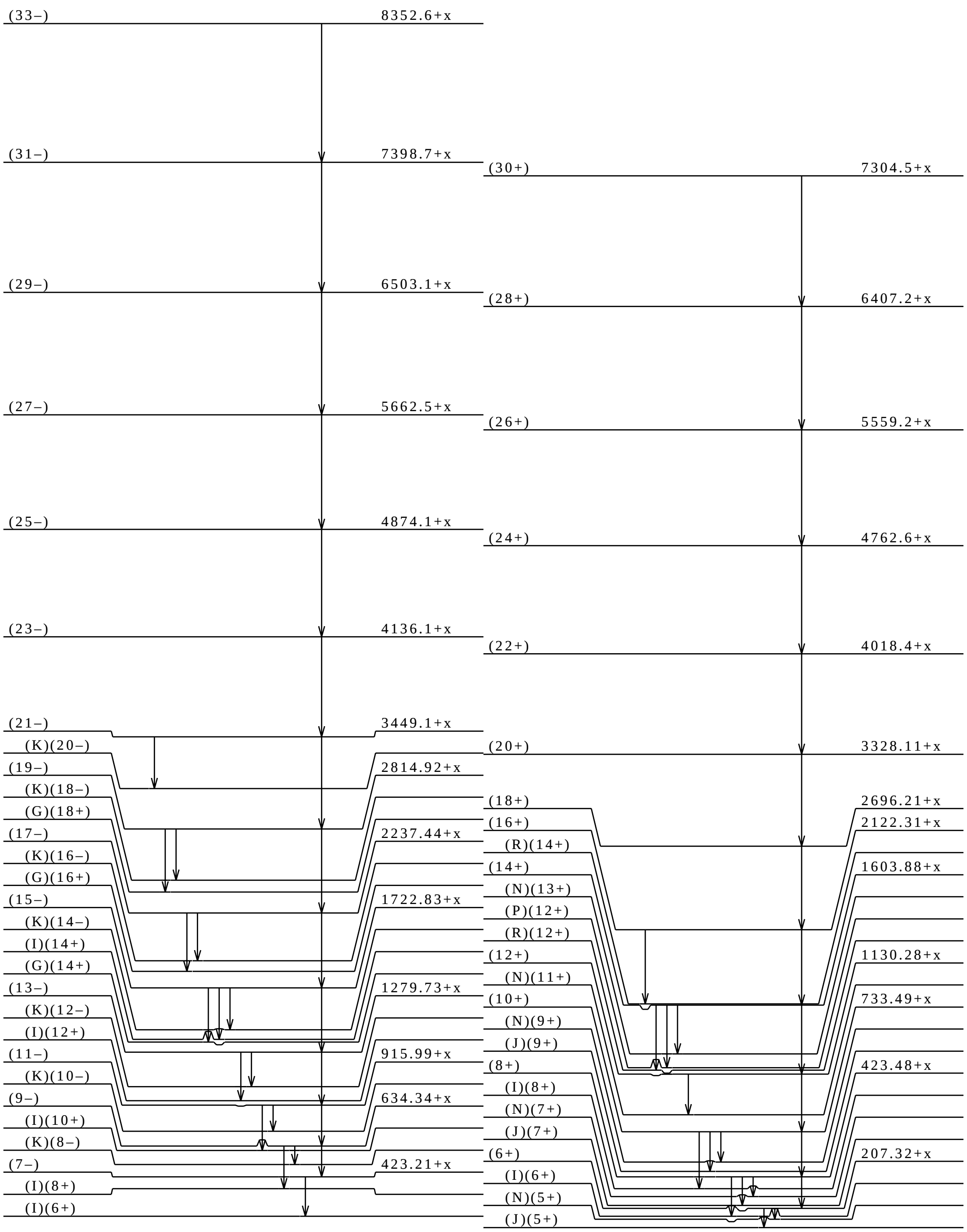


From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(L) Kπ=2−,3−, α=1 (π 1/2[541])⊗(ν 5/2[642]) band.

(M) Kπ=2+,3+, α=0 (π 1/2[541])⊗(ν 5/2[523]) band.



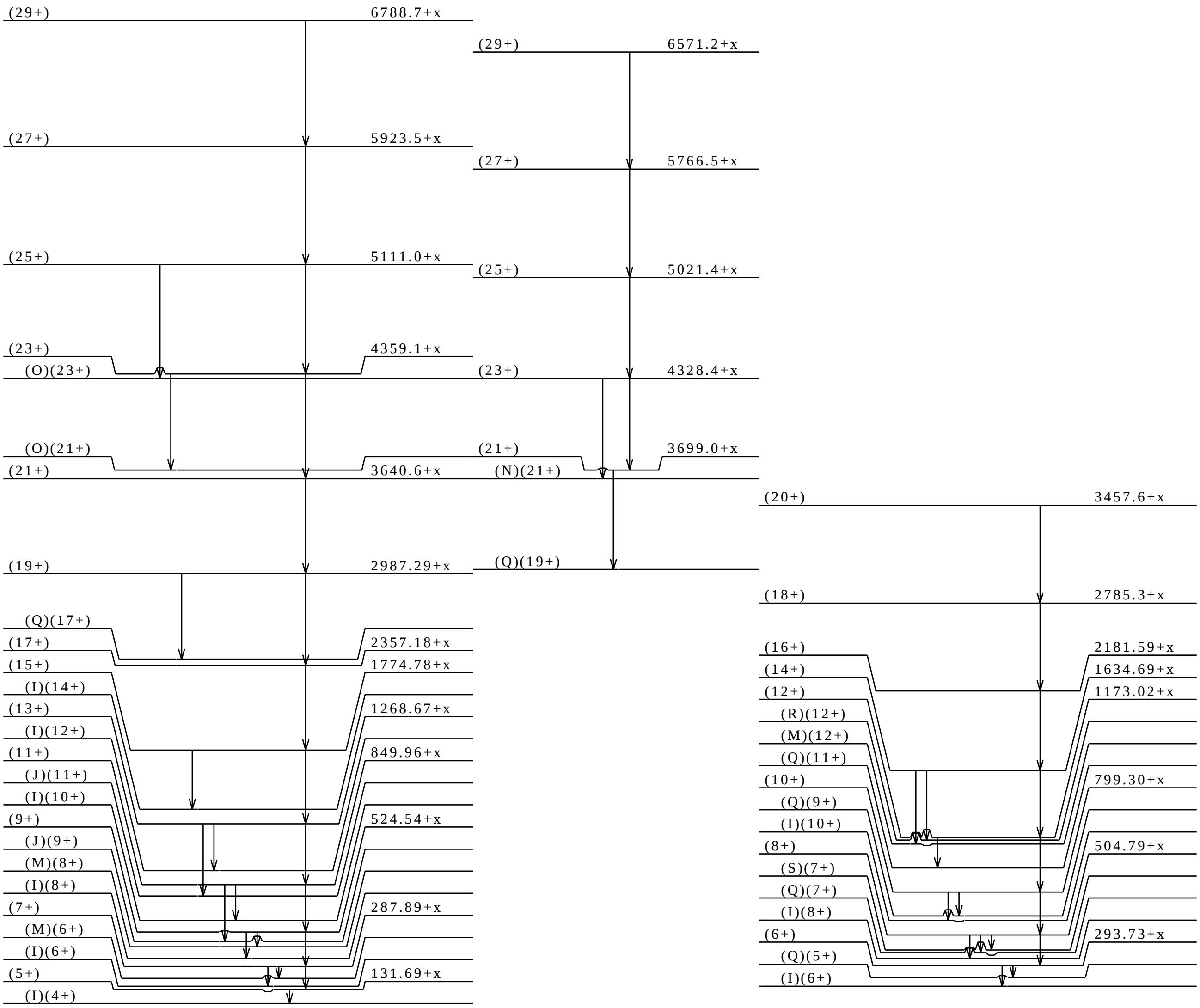
$^{166}_{69}Tm_{97}$

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(N) Kπ=2+,3+, α=1 (π 1/2[541]) ⊗(ν 5/2[523]) band.

(O) α=1 band including (21+) 3699+x level.

(P) Kπ=1+,2+, α=0 (π 1/2[541]) ⊗(ν 3/2[521]) band.



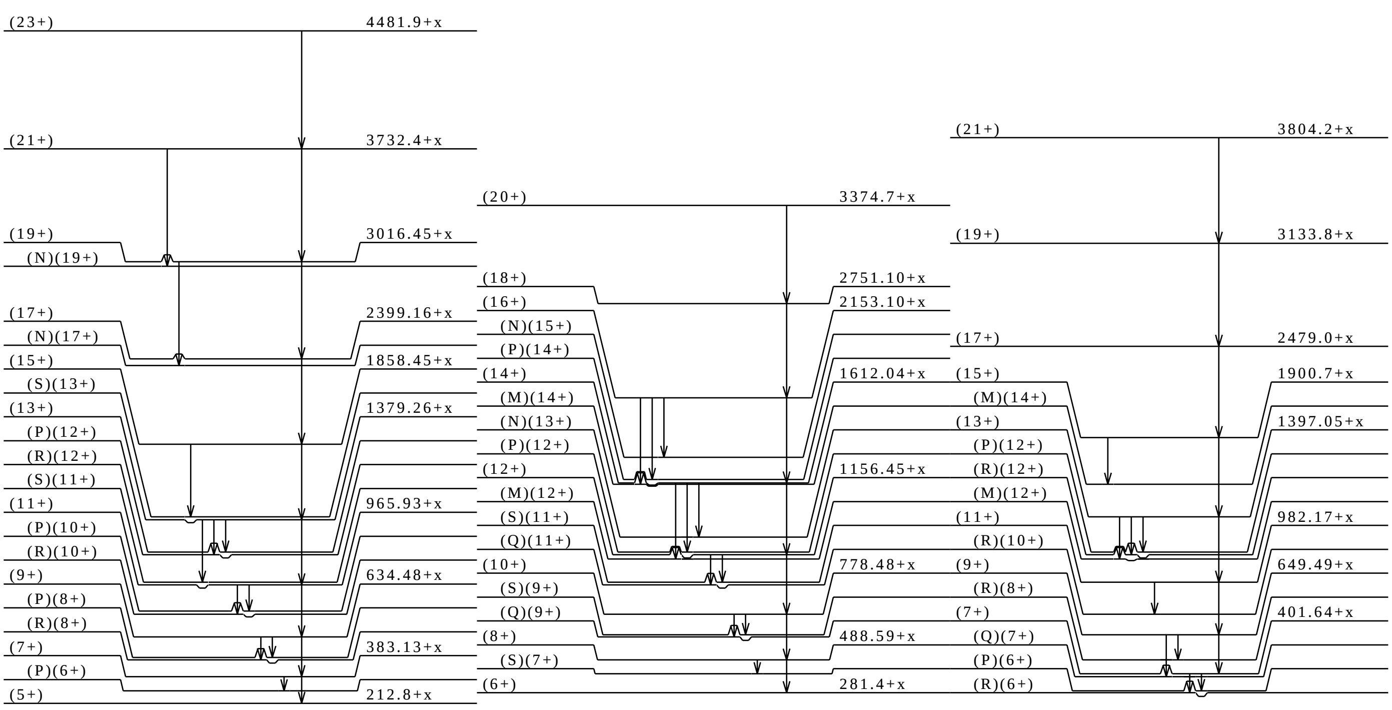
$^{166}_{69}Tm_{97}$

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(Q) Kπ=1+,2+, α=1 (π 1/2[541]) ⊗(ν 3/2[521]) band.

(R) Kπ=1+, α=0 (π 7/2[404])–(ν 5/2[642]) band.

(S) Kπ=1+, α=1 (π 7/2[404]) –(ν 5/2[642]) band.



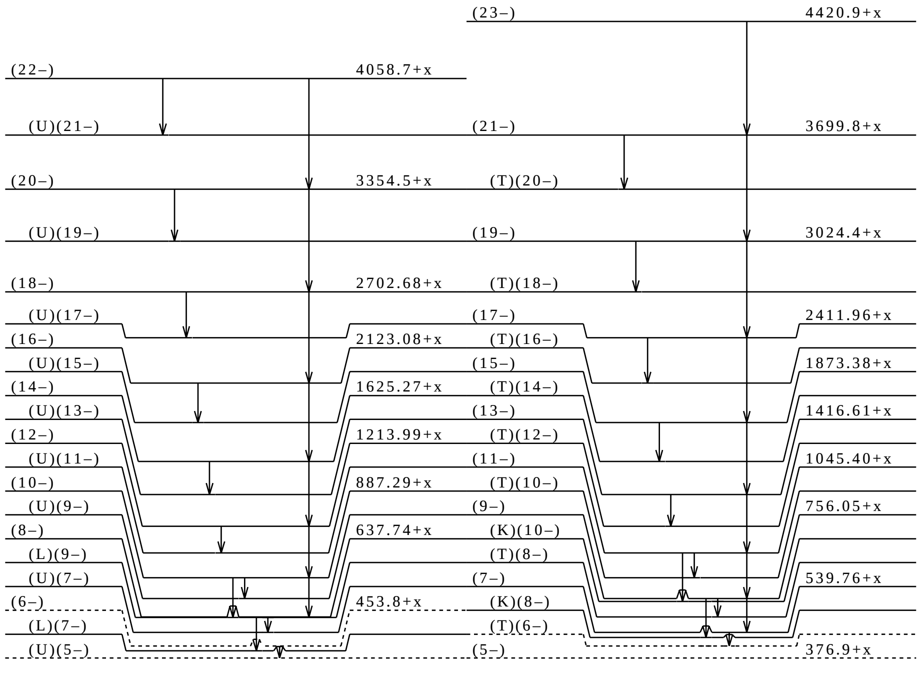
$^{166}_{69}Tm_{97}$

From NNDC(BNL) program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

(T) Kπ=1–, α=0 (π 7/2[523]) –(ν 5/2[642]) band.

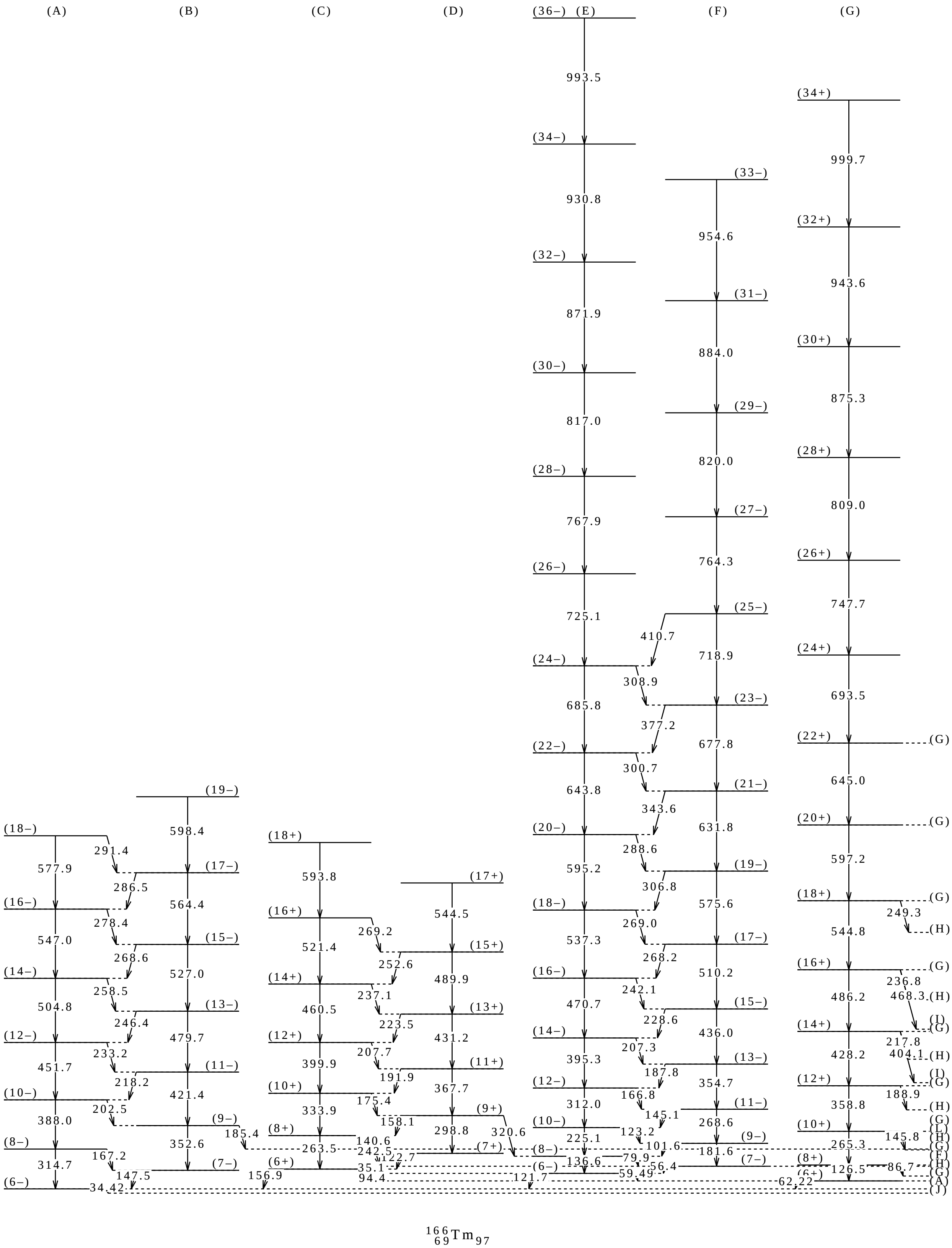
(U) Kπ=1–, α=1 (π 7/2[523]) –(ν 5/2[642]) band.



$^{166}_{69}Tm_{97}$

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Bands for ^{166}Tm

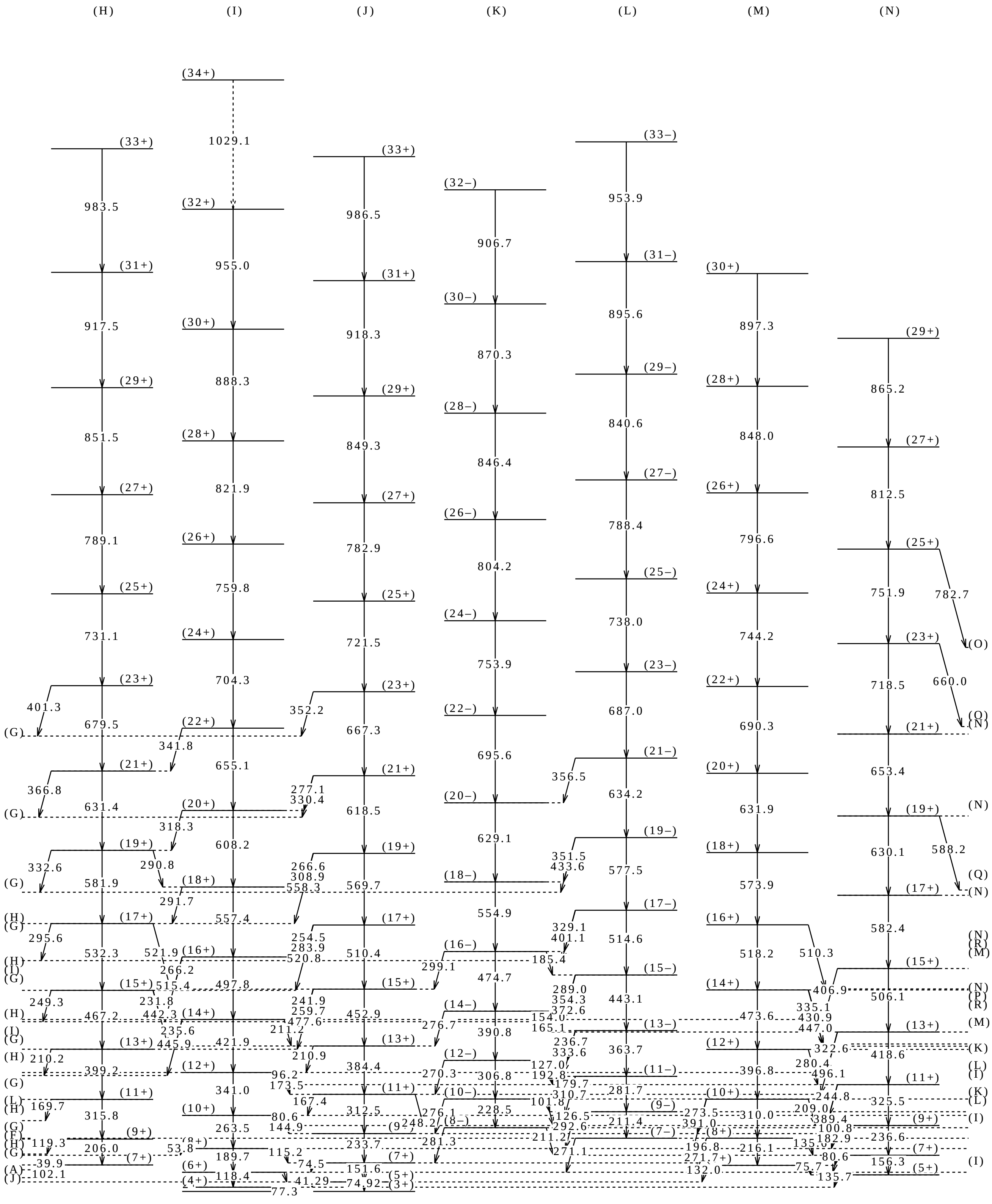


From NNDC(BNL)
program ENSDAT

$^{166}_{69}$Tm$_{97}$–54

^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07 (continued)

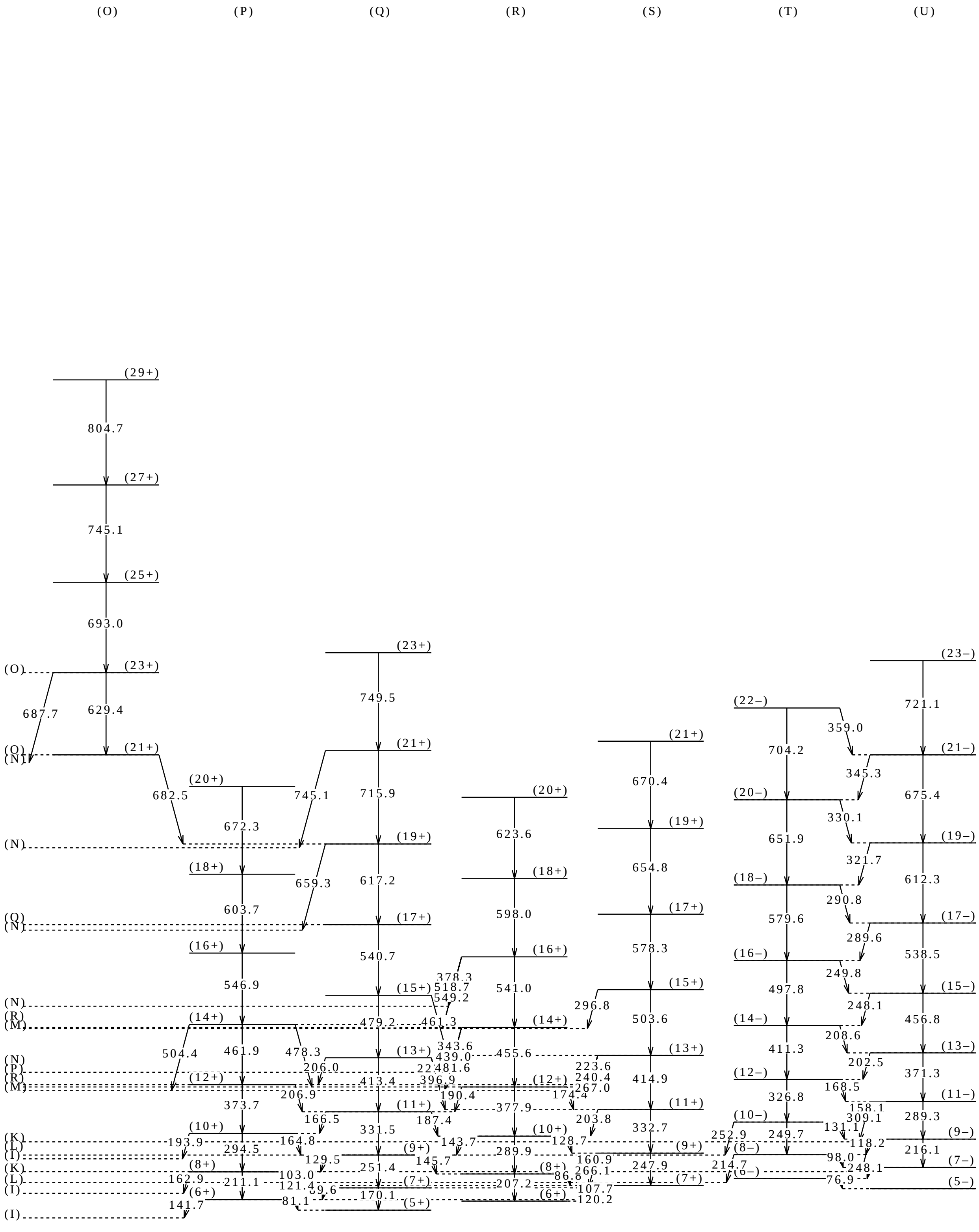
Bands for ^{166}Tm



$^{166}_{69}$Tm$_{97}$

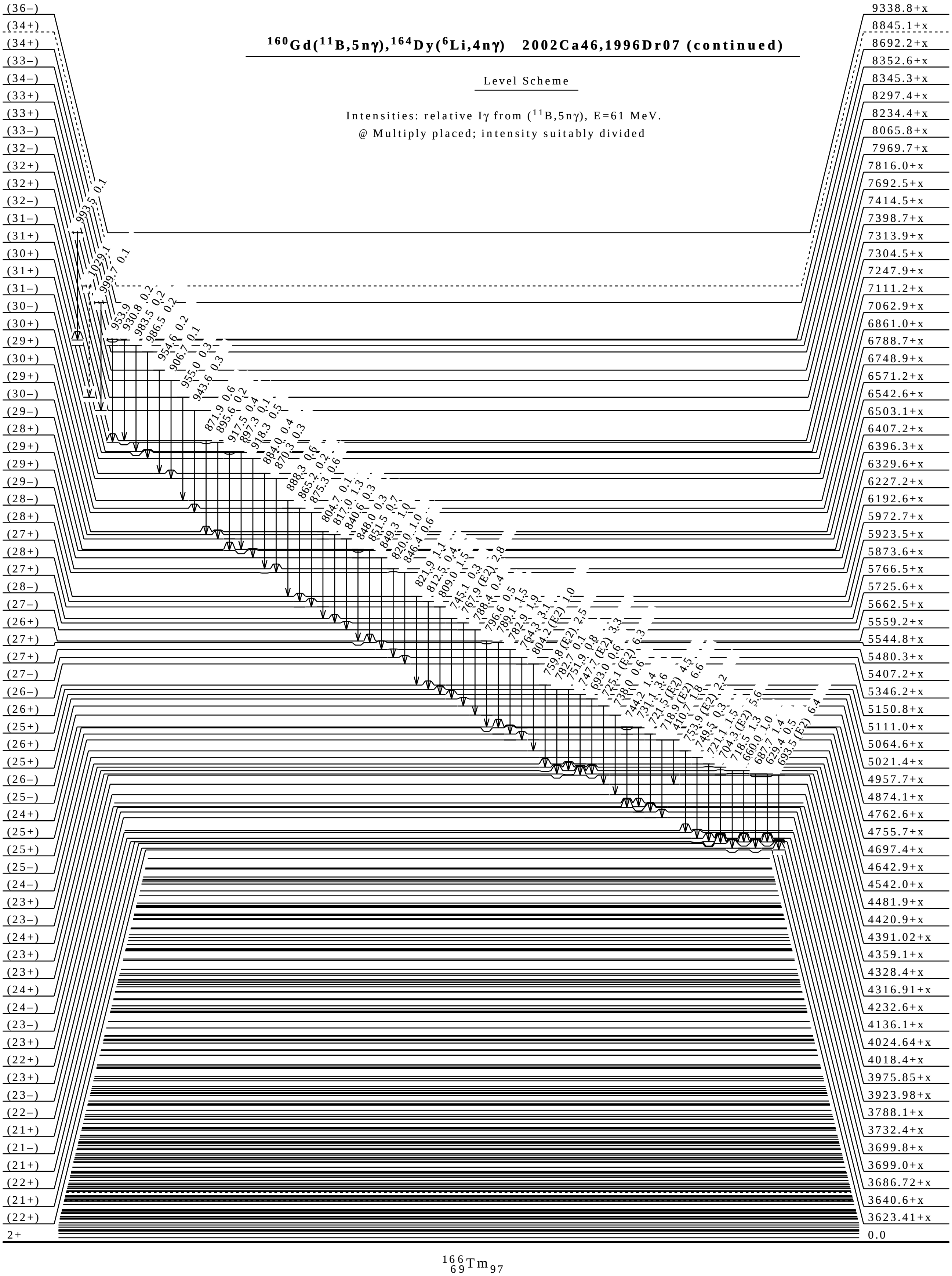
$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Bands for ^{166}Tm



$^{166}_{69}Tm_{97}$

From NNDC(BNL)
program ENSDAT

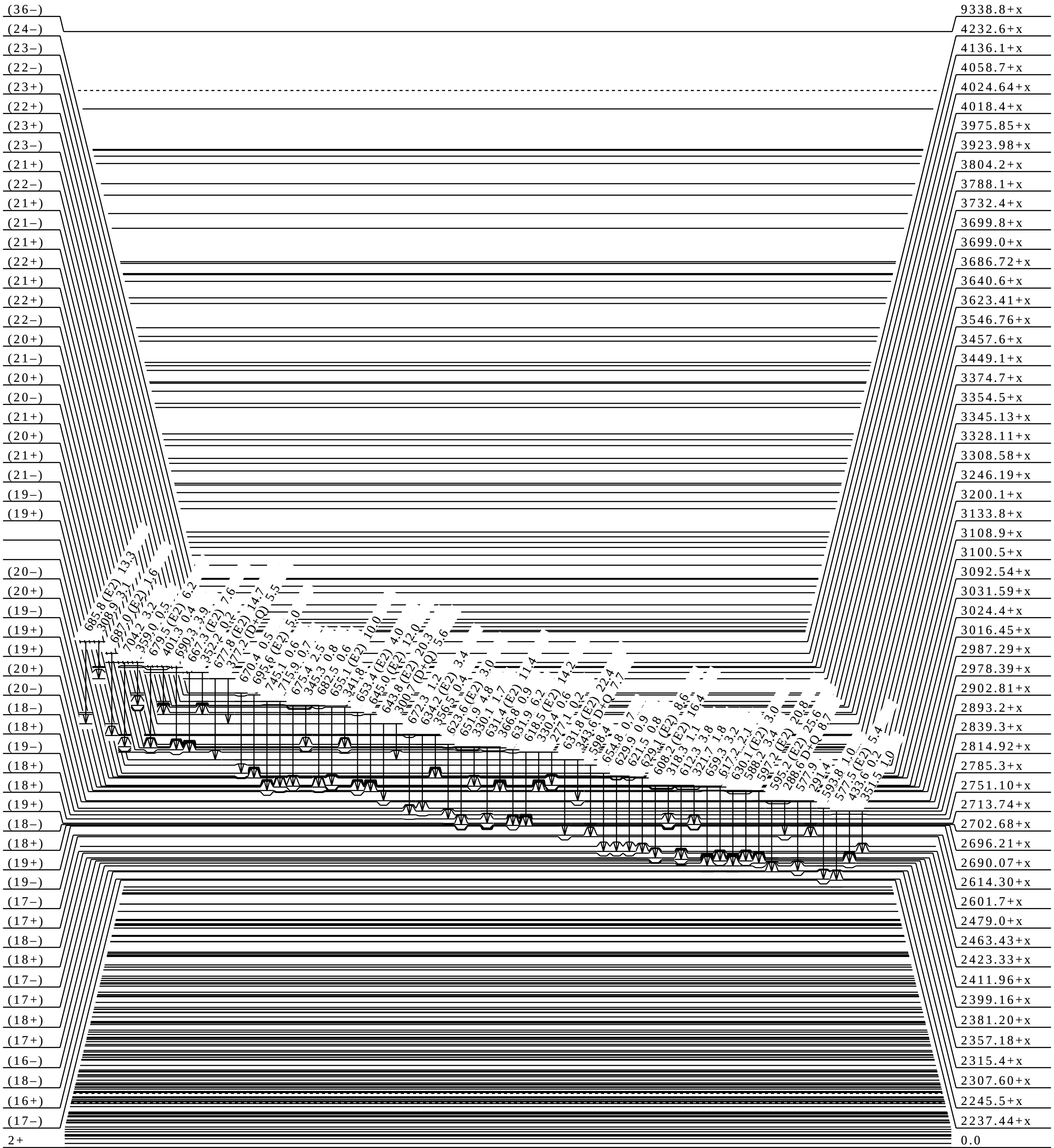


From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from ($^{11}B,5n\gamma$), E=61 MeV.
@ Multiply placed; intensity suitably divided



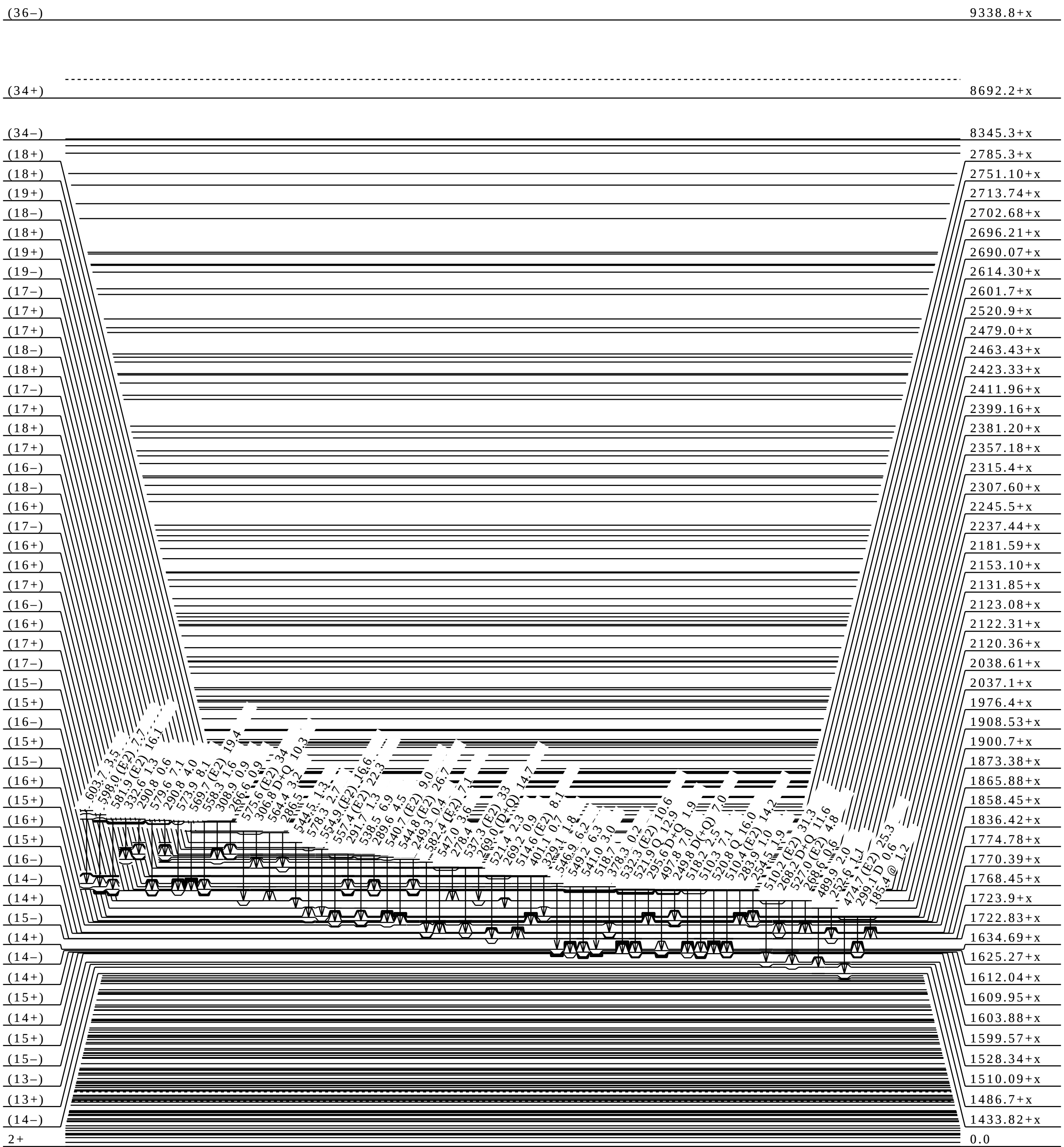
$^{166}_{69}Tm_{97}$

From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from ($^{11}B,5n\gamma$), E=61 MeV.
@ Multiply placed; intensity suitably divided



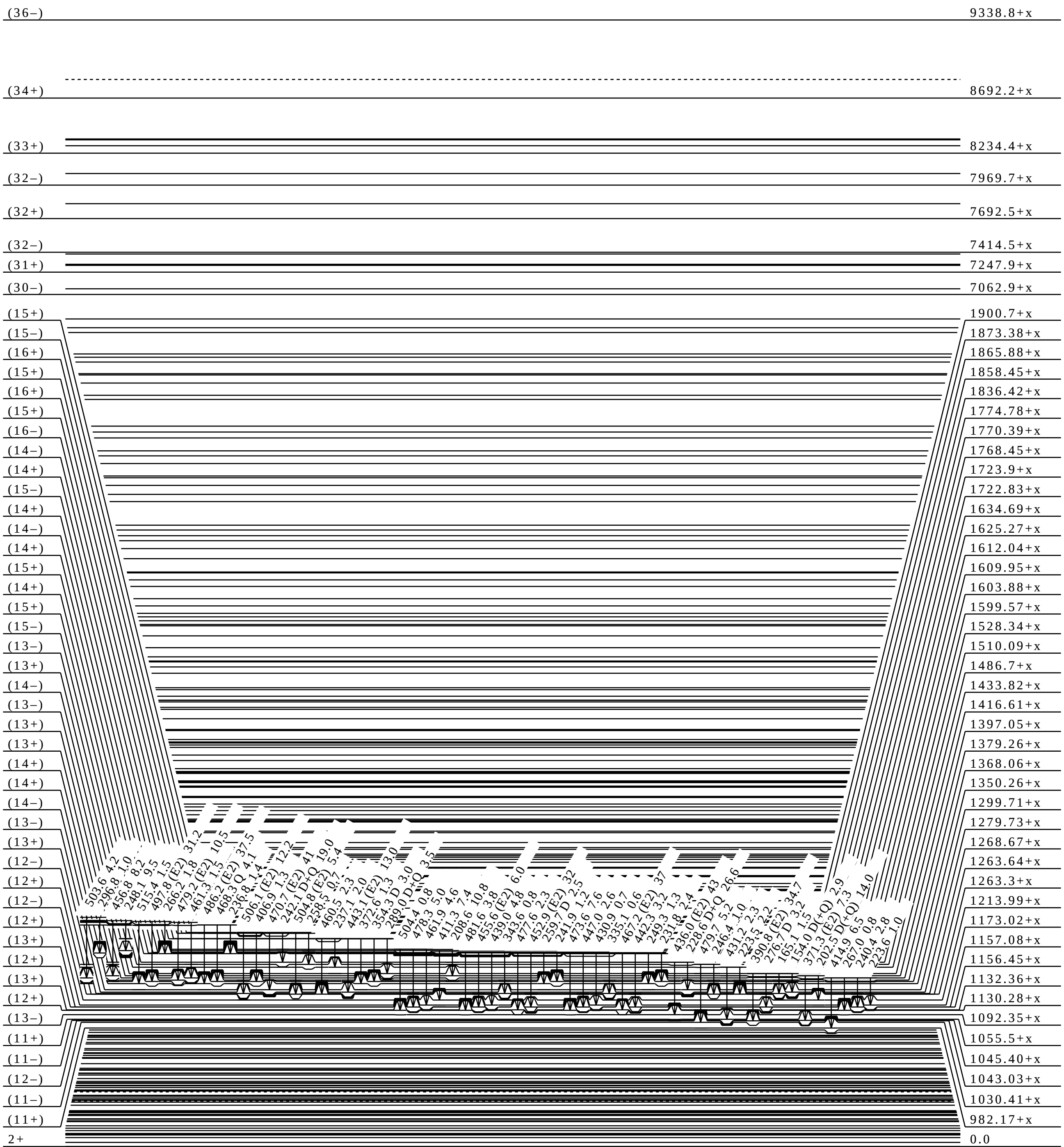
$^{166}_{69}Tm_{97}$

From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from (^{11}B,5nγ), E=61 MeV.
@ Multiply placed; intensity suitably divided



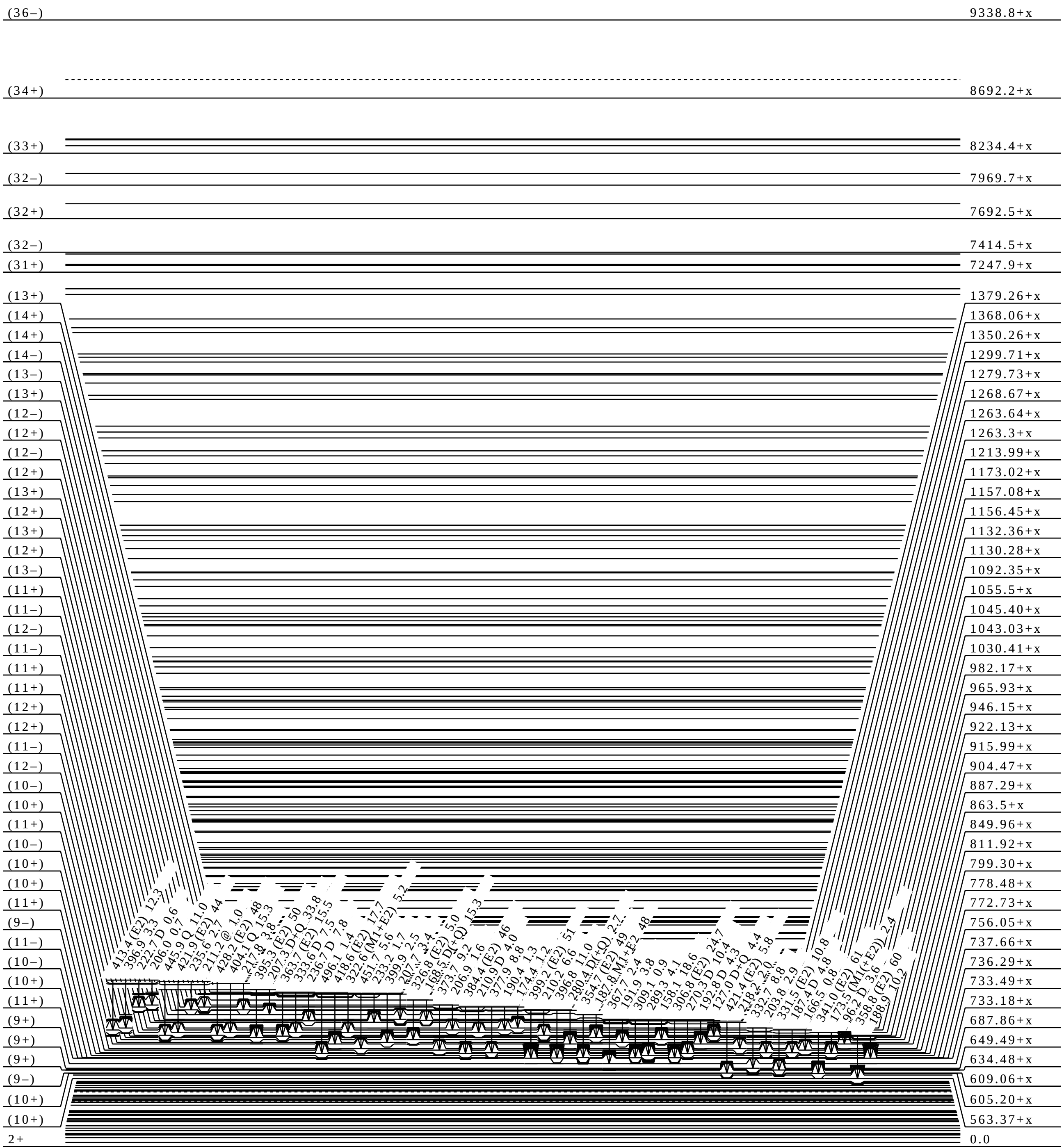
$^{166}_{69}Tm_{97}$

From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from (^{11}B,5nγ), E=61 MeV.
@ Multiply placed; intensity suitably divided



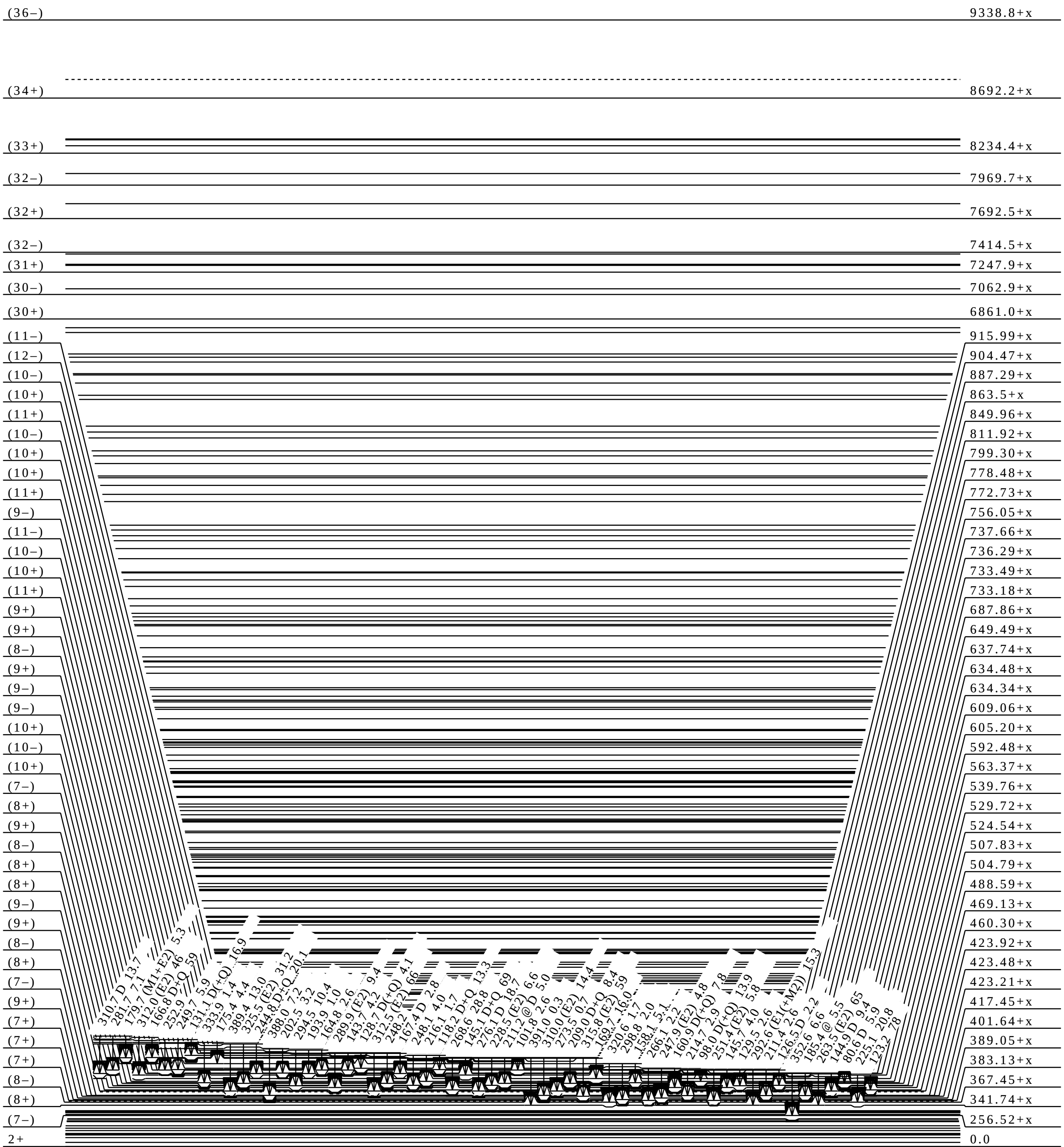
$^{166}_{69}Tm_{97}$

From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from ($^{11}B,5n\gamma$), E=61 MeV.
@ Multiply placed; intensity suitably divided

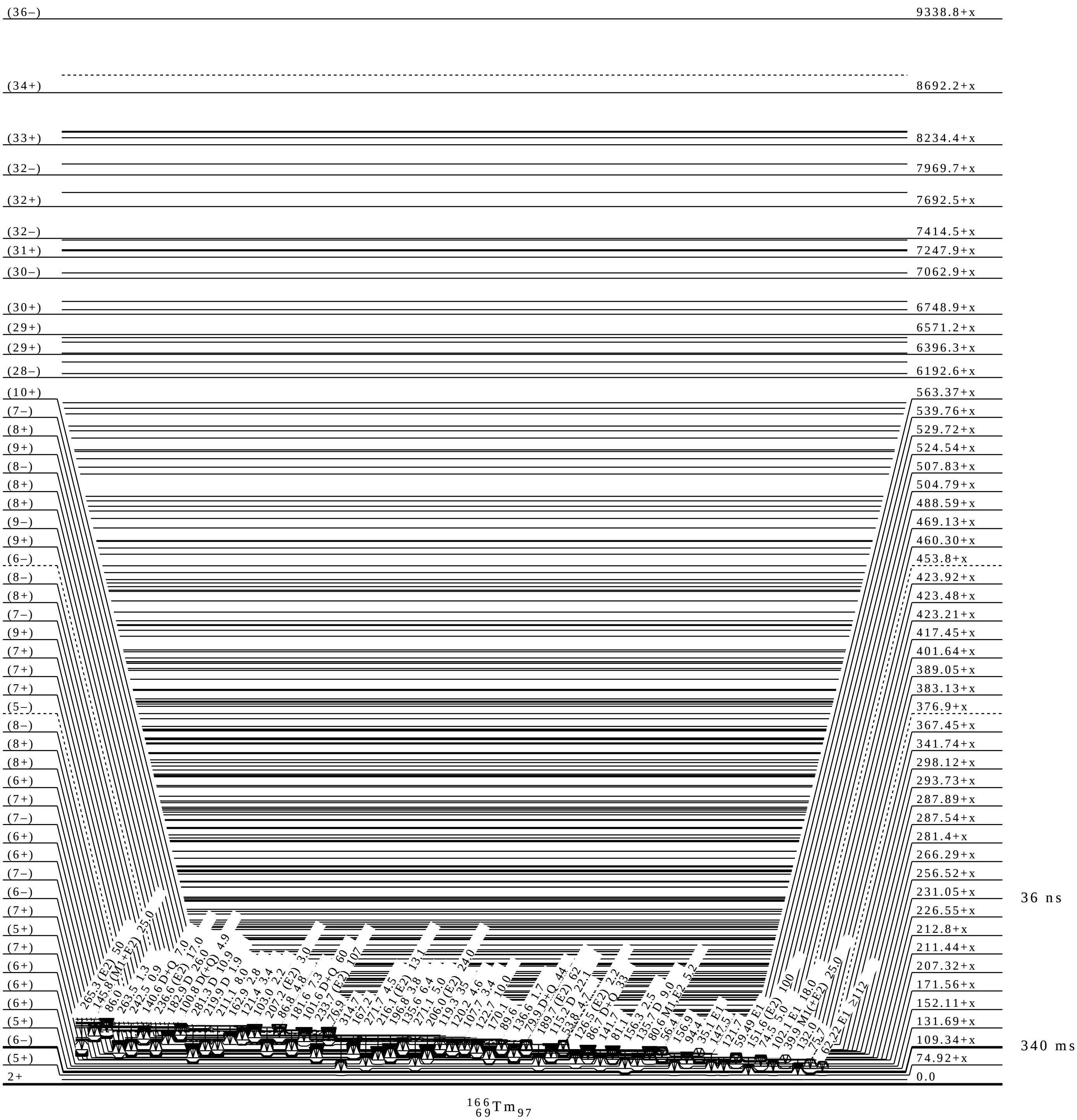


From NNDC(BNL)
program ENSDAT

$^{160}Gd(^{11}B,5n\gamma),^{164}Dy(^{6}Li,4n\gamma)$ 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from ($^{11}B,5n\gamma$), E=61 MeV.
@ Multiply placed; intensity suitably divided

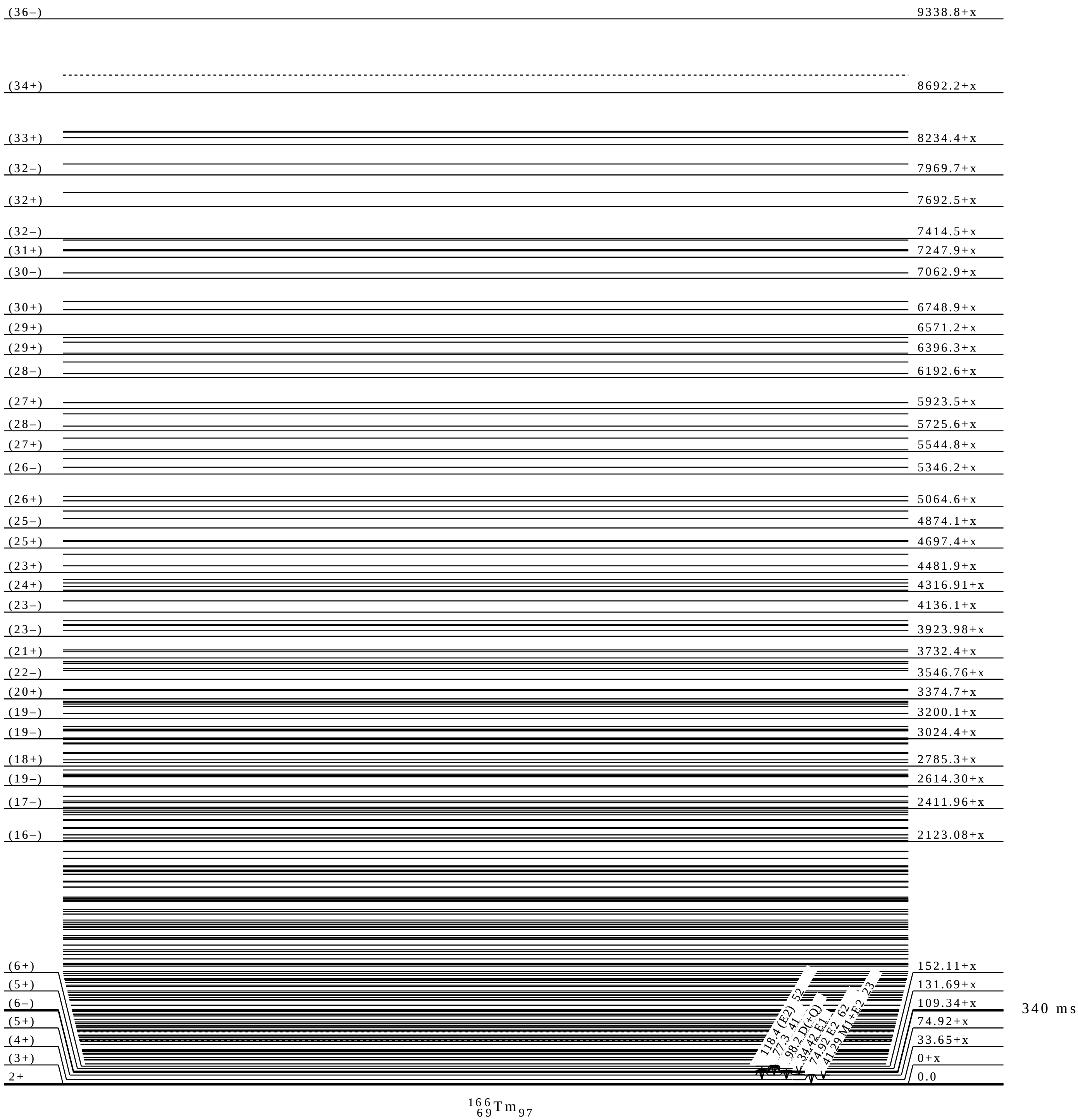


From NNDC(BNL)
program ENSDAT

^{160}Gd(^{11}B,5nγ),^{164}Dy(^{6}Li,4nγ) 2002Ca46,1996Dr07 (continued)

Level Scheme (continued)

Intensities: relative Iγ from (^{11}B,5nγ), E=61 MeV.
@ Multiply placed; intensity suitably divided



From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Others: 1988Pe08 (E(α)=40 MeV; Dumond curved crystal spectrometer); 1982El02 (Eα=41 MeV).
1995Ma07: ^{165}Ho(α,3nγ), Eα=32.6 to 47.9 MeV; iron–free double orange β spectrometer with NE102 plastic scintillator (FWHM=1.4 at 125 keV), curved–crystal spectrometer (reflection orders n=1, 2, 3, 5 recorded, energy resolution≈50 eV at 100 keV for n=2), two Ge detectors (one planar and one 65 cm^3 coaxial). Measured Eγ, γγ coin (15 ns FWHM), Iγ, γ(θ), I(ce) (prompt and delayed), ce–ce coin.
1992Dr03: Eα=32.6, 38.1, 43.1, 47.9 MeV; two intrinsic HPGe detectors and a curved–crystal spectrometer; measured Eγ, Iγ, γγ coin (15 ns FWHM), γ(θ) (15° –90°), γ(t).

^{166}Tm Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0@	2+		Jπ: from Adopted Levels.
0.0+y			E(level): from Adopted Levels, y=x+453.5.
0.0+z n			E(level): from Adopted Levels, z=x+281.
0.0+u o			E(level): from figure 9b of 1995Ma07, u>171.56+x.
0.0+v			E(level): from Adopted Levels, v=0.0.
33.620& *12*	3+		
74.903@ *11*	4+		
74.920 *2*			
77.624+z *9*			
82.298+v *8*	1+		Configuration=(π 7/2[523])–(ν 5/2[523]).
85.973+y k *20*	(4–)		
101.5+z m *10*			
109.338 *4*			Not adopted. In Adopted Levels, Gammas, the 34.4γ deexcites the 109.3+x isomer directly, as proposed in the (^{11}B,5nγ) study by 2002Ca46.
109.338+x §	6–	340 ms *25*	$T_{1/2}$: from Adopted Levels. E(level): see comment on 109.338 level.
120.294+z n	5		E(level): 86.918+x in 1995Ma07 because order of 87γ and 120γ there was the reverse of what is shown here.
131.736c *12*	4–		
149.2083+x *17*	5–,6–,7–		Level not adopted; in Adopted Levels, Gammas, the order of the 39.9γ deexciting it here and the 62.231γ feeding it is reversed, resulting in E(level)=171.6+x.
152.100& *12*	5+		
171.5647+x *19*	7+		1995Ma07 propose configuration=(π 7/2[404])+(ν 7/2[633]).
184.07+y l *6*	(5–)		
194.032+u o			
207.212+z n *7*			
207.536d *12*	5–		
211.4407+x i *17*	6+		
226.569@ *11*	6+		
231.0523+x e *25*	6–	>80 ns	$T_{1/2}$: 80 ns<$T_{1/2}$<1 μs (1992Dr03) from two–parameter Eγ–t measurements. Note, however, that adopted value is 36 ns *2*.
256.997+x # *7*	7–		
287.585+x f *4*	7–		
288.124c *12*	6–		
298.125+x j *6*	7+		
302.36+y k *6*	(6–)		
334.250+x h *5*	(5–)		
341.836& *12*	7+		
353.017+z m *8*			
367.484+x e *6*	8–		
368.208+z n *14*			
409.088+u o *23*			
415.45+x *20*			
417.448+x i *5*	8+		
423.644a *22*	6+		
423.678d *12*	7–		
424.178+x § *9*	8–		
433.57+y l *6*	(7–)		
460.244@ *12*	8+		
469.140+x f *7*	9–		
474.890+x g *13*	(6–)		
496.855+z n *15*			
507.792b *14*	7+		
524.616c *12*	8–		
563.386+x j *6*	9+		

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

^{166}Tm Levels (continued)

E(level)†	Jπ‡	Comments
591.72+y[k] 6	(8−)	
592.556+x[e] 9	10−	
605.300[&] 12	9+	
609.621+x[#] 12	9−	
633.206+x[h] 19	(7−)	
634.371[a] 14	8+	
642.59+u[o] 6		
684.337+z[m] 15		
700.755+z[n] 18		
733.228+x[i] 7	10+	
733.680[d] 15	9−	
736.302[b] 14	9+	
737.614+x[f] 11	11−	
760.33+y[l] 6	(9−)	
772.725[@] 16	10+	
808.715+x[g] 20	(8−)	
850.022[c] 13	10−	
875.08+z[n] 6		
904.430+x[e] 12	12−	
915.964[a] 14	10+	
922.170+x[j] 9	11+	
946.232[&] 15	11+	
962.98+y[k] 6	(10−)	
1000.738+x[h] 22	(9−)	
1042.994[b] 15	11+	
1092.228+x[f] 13	13−	
1097.65+z[m] 4		
1130.469[d] 16	11−	
1132.348+x[i] 9	12+	
1157.129[@] 22	12+	
1171.64+y[l] 6	(11−)	
1208.7+x[g] 10	(10−)	
1268.615[c] 25	12−	
1279.678[a] 20	12+	
1299.527+x[e] 14	14−	
1313.51+z[n] 6		E(level): not adopted; in Adopted Levels, Gammas, a 455.6γ deexcites this band member.
1350.36+x[j] 4		
1368.11[&] 5	13+	
1419.75+y[k] 7	(12−)	
1433.80[b] 3	13+	
1528.157+x[f] 17	15−	
1576.64+z[m] 12		E(level): not adopted. See comment on 478.99γ.
1599.63+x[i] 6	14+	
1610.03[@] 3	14+	
1612.07[d] 16	13−	E(level): not adopted; the 481.6γ deexciting level here is placed elsewhere in Adopted Levels, Gammas.
1669.39+y[l] 7	(13−)	
1722.63[a] 8	14+	
1770.17+x[e] 4	16−	
1774.59[c] 14	14−	
1836.50+x[j] 6	15+	
1865.88[&] 6	15+	
1908.46[b] 5	15+	
2038.33+x[f] 13	17−	
2110.1+x[i] 4	16+	E(level): not adopted. In Adopted Levels, Gammas, a 532.3γ feeds the 1600+x level, not the 510.5 multiply–placed γ suggested in 1995Ma07.
2120.5[@] 4	16+	
2307.61+x[e] 11	18−	
2381.17+x[j] 9	17+	
2450.9[&] 10	17+	E(level): not adopted. In Adopted Levels, Gammas, a 557.4γ feeds the 1866 level, not the 585.0γ suggested in 1995Ma07.
2463.72[b] 10	17+	
2614.09+x[f] 19	19−	

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^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

^{166}Tm Levels (continued)

E(level)[†]	Jπ[‡]	Comments
2725.7?[@] *11*	18+	E(level): not adopted. In Adopted Levels, Gammas, a 569.7γ feeds the 2121 level, not the 605.2γ suggested in 1995Ma07.
2906.4+x[e] *8*	20−	

[†] From least–squares fit to Eγ.
[‡] Authors' values based on deduced band structure and transition multipolarities.
[§] (A): Kπ=6−, α=0 (π 7/2[404])+(ν 5/2[523]) band. 1995Ma07 assigned only the bandhead but a number of unplaced transitions associated with this band were placed by the evaluator in accord with Adopted Levels, Gammas.
[#] (B): Kπ=6−, α=1 (π 7/2[404])+(ν 5/2[523]) band. See comment on signature partner of this band.
[@] (C): Kπ=2+, α=0 (π 1/2[411])−(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here.
[&] (D): Kπ=2+, α=1 (π 1/2[411])−(ν 5/2[642]) band. See comment on signature partner of this band.
[a] (E): Kπ=3+, α=0 (π 1/2[411])+(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here and π is opposite. The configuration proposed in 1995Ma07 also differs from the adopted Kπ=3− configuration=(π 1/2[541])+(ν 5/2[642]).
[b] (F): Kπ=3+, α=1 (π 1/2[411])+(ν 5/2[642]) band. See comment on signature partner of this band.
[c] (G): Kπ=3−, α=0 (π 1/2[411])+(ν 5/2[523]) band. Note that adopted J values are one unit higher than shown here and π is opposite. The configuration proposed in 1995Ma07 also differs from the adopted Kπ=3+ configuration=(π 1/2[541])+(ν 5/2[523]).
[d] (H): Kπ=3−, α=1 (π 1/2[411])+(ν 5/2[523]) band. See comment on signature partner of this band.
[e] (I): Kπ=6−, α=0 (π 7/2[523])+(ν 5/2[642]) band.
[f] (J): Kπ=6−, α=1 (π 7/2[523])+(ν 5/2[642]) band.
[g] (K): Kπ=5−, α=0 (π 7/2[404])+(ν 3/2[521]) band. Note that adopted J values are two units higher than shown here and π is opposite. The configuration proposed in 1995Ma07 also differs from the adopted Kπ=6+ configuration=(π 7/2[523])+(ν 5/2[523]).
[h] (L): Kπ=5−, α=1 (π 7/2[404])+(ν 3/2[521]) band. See comment on signature partner of this band.
[i] (M): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here.
[j] (N): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner of this band.
[k] (O): Kπ=4−, α=0 (π 7/2[404])+(ν 1/2[521]) band. Note that adopted J values are three units higher than shown here. The configuration proposed in 1995Ma07 also differs. From the adopted Kπ=1− configuration=(π 7/2[523])−(ν 5/2[642]).
[l] (P): Kπ=4−, α=1 (π 7/2[404])+(ν 1/2[521]) band. See comment on signature partner of this band.
[m] (Q): Band #1.
[n] (R): Band #2.
[o] (S): Possible band fragment.

γ(^{166}Tm)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	δ[§]	Comments
(v)	0.0+v				
(x)	109.338+x				Eγ: x<25 keV (1995Ma07). However, see comment on 109.338 level.
34.418[#] *1*	109.338	130 *50*			
39.867 *2*	149.2083+x	26 *6*			Placed from 211+x level in Adopted Levels, Gammas.
53.71	341.836				
56.532 *2*	287.585+x	29 *5*			
57[a]	131.736				
[x]57.5					
59.488[#] *2*	231.0523+x	50 *3*	E1		Mult.: α(L)exp<0.5 (1995Ma07).
62.225 *2*	171.5647+x	62 *15*	E1		Mult.: α(L)exp=0.18 *2*, α(M+...)exp<0.1 (1995Ma07).
62.231 *2*	211.4407+x	67 *17*	E1		Mult.: from α(L)exp<0.3 (1995Ma07).
74.45 *3*	226.569	3.94 *25*			
74.903[@] *11*	74.903	11.0[@] *21*	E2		Mult.: α(L)exp=5.6 *15* (1995Ma07).
74.920[#@] *3*	74.920	23.5[@] *25*	E2		Mult.: α(L)exp=5.7 *4*, α(N+...)exp=0.45 *6* (1995Ma07). Transition has both prompt and delayed components.
75.793 *4*	207.536	8.32 *24*			
77.195 *2*	152.100	13.4 *3*	D+Q		Mult.: A_2=−0.41 *3*.
79.888 *9*	367.484+x	11.2 *4*			
80.584 *4*	288.124	7.5 *15*			L/M+=4.07 *12* for 80.6γ+80.7γ (1995Ma07).
80.682 *3*	605.300	4.6 *9*			Mult.: L/M+=4.07 *12* for 80.6γ+80.7γ (1995Ma07).
82.298 *8*	82.298+v	4.50 *20*			
85.973 *20*	85.973+y	4.74 *19*			
86.696 *9*	298.125+x	20.5 *4*	M1+E2	+0.32 *2*	Mult.: α(L)exp=0.44 *20*, α(M+...)exp=0.24 *10*, A_2=+0.20 *2* (1995Ma07).

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^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	δ[§]	Comments
86.918 *4*	207.212+z	5.65 *30*			The evaluator has reversed the order of the 86.9γ and 120.29γ in order to achieve consistency with Adopted Levels, Gammas.
96.23 *4*	946.232	1.29 *15*			
98.10[ab] *5*	131.736	7.0[b] *10*			
	184.07+y	7.0[b] *10*			
	207.536	7.0[b] *10*			
100.939 *3*	524.616	4.18 *19*			
101.657 *3*	469.140+x	27.4 *5*	M1+E2	+0.20 *1*	Mult.: A_2=+0.09 *1* (1995Ma07).
101.929 *5*	736.302	1.77 *3*			
102.102 *2*	211.4407+x	16.4 *3*	D		Mult.: A_2=−0.25 *8* (1995Ma07).
115.269 *2*	341.836	16.6 *7*			
116.3[a]	850.022				
118.284 *4*	302.36+y	7.6 *8*			
118.4[a]	460.244				
118.480 *4*	152.100	24.3 *23*	E2		Mult.: α(L)exp=0.91 *23*; α(M+...)exp=0.22 *6* (1995Ma07).
119.324 *3*	417.448+x	24.8 *4*	M1+E2	+0.44 *1*	Mult.: A_2=+0.37 *3*, A_4=+0.07 *4* (1995Ma07).
120.294 *5*	120.294+z	5.54 *16*			The evaluator has reversed the order of the 86.9γ and 120.29γ in order to achieve consistency with Adopted Levels, Gammas.
121.710[#] *5*	231.0523+x	16.9 *3*	M1		Mult.: K/L=6.7 *15*; L/M+=4.1 *8*; α(L)exp=0.28 *9* (1995Ma07).
122.809 *4*	334.250+x	6.83 *16*			Placed here as a γ linking to a different band; however, in Adopted Levels, Gammas, this is an intraband transition.
123.416 *6*	592.556+x	34.8 *5*	M1+E2	+0.22 *1*	Mult.: A_2=+0.08 *3* (1995Ma07).
126.577 *4*	634.371	2.79 *23*			
127.030 *4*	1042.994	2.5 *3*			
128.645 *7*	496.855+z	3.05 *18*			
129.588 *6*	207.212+z	1.76 *5*			
131.215 *4*	433.57+y	6.5 *4*			
132.636 *4*	207.536	7.36 *21*			
135.554 *3*	423.678	11.8 *3*	D+Q		Mult.: A_2=−0.642 *22* (1995Ma07).
136.022 *3*	288.124	12.05 *25*	D+Q		Mult.: A_2=−0.36 *6* (1995Ma07).
136.445 *9*	367.484+x	1.02 *22*			
140.641 *12*	474.890+x	7.4 *7*			
145.061[c] *3*	605.300	10[c] *3*			
	737.614+x	30[c] *6*			
145.805 *4*	353.017+z	6.6 *7*			
145.939 *3*	563.386+x	15.4 *7*	M1+E2	+0.47 *2*	Mult.: α(K)exp=0.43 *20* (1995Ma07); A_2=+0.41 *3*, A_4=+0.09 *4* (1992Dr03). A_4=+0.09 *40* in 1995Ma07 is presumably a misprint.
147.656 *7*	256.997+x	10.6 *3*	D+Q		Mult.: A_2=+0.47 *7*, A_4=+0.08 *9* (1995Ma07). Placement from 1996Dr07.
151.666 *1*	226.569	100.0 *8*	E2		Mult.: A_2=+0.316 *18*, A_4=−0.036 *25* (1995Ma07).
154.18 *4*	1433.80	2.63 *25*			
156.409 *7*	288.124	5.00 *4*			Mult.: A_2=+0.70 *21* (1995Ma07).
158.148 *14*	591.72+y	8.8 *9*	D+Q		Mult.: A_2=−0.16 *5*, A_4=+0.10 *7* (1995Ma07).
158.329 *15*	633.206+x	6.2 *9*	D+Q		Mult.: A_2=+0.14 *8*, A_4=−0.18 *11* (1995Ma07).
160.998 *15*	368.208+z	6.8 *3*			
166.819 *7*	904.430+x	24.3 *7*	M1+E2	+0.25 *1*	Mult.: A_2=+0.14 *2*, A_4=+0.13 *2* (1995Ma07).
167.180 *5*	424.178+x	7.4 *3*	(D+Q)		Mult.: A_2=+0.29 *5*, A_4=−0.10 *6* (1995Ma07). Placement from 1996Dr07.
167.4	772.725				
168.609 *5*	760.33+y	7.39 *23*	D+Q		Mult.: A_2=−0.139 *22*, A_4=+0.04 *3* (1995Ma07).
169.841 *5*	733.228+x	7.0 *4*	M1+E2	+0.66 *19*	Mult.: A_2=+0.62 *15*, A_4=+0.18 *17* (1995Ma07).
173.46 *8*	946.232	2.3 *3*			
175.514 *9*	808.715+x	4.8 *3*			
179.664 *7*	915.964	3.35 *26*			
181.552 *9*	469.140+x	4.5 *5*	E2		Mult.: A_2=+0.27 *11*, A_4=+0.04 *15* (1995Ma07).
182.775 *8*	524.616	2.58 *10*	D+Q		A_2=−0.47 *3* (1995Ma07).
184.4 *2*	415.45+x		E2		Mult.: α(K)exp=0.21 *8* (1995Ma07).
185.441 *9*	609.621+x	5.8 *4*			Mult.: A_2=+0.36 *16* (1995Ma07). Placement from 1996Dr07.

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^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	δ[§]	Comments
187.482 *6*	684.337+z	4.4 *8*			
187.796 *5*	1092.228+x	18.6 *7*	M1+E2	+0.44 *4*	Mult.: A_2=+0.32 *8* (1995Ma07).
188.925 *8*	922.170+x	6.3 *4*	M1+E2	+0.63 *14*	Mult.: A_2=+0.58 *16*, A_4=+0.30 *21* (1995Ma07).
189.733 *3*	341.836	54.4 *6*	E2		Mult.: A_2=+0.314 *14*, A_4=−0.046 *19* (1995Ma07).
192.023 *11*	1000.738+x	4.0 *5*			
192.8 *2*	1042.994	2.0 *5*			
194.032 *7*	194.032+u	5.0 *3*	D+Q		Mult.: A_2=−0.67 *13*, A_4=+0.23 *18* (1995Ma07).
202.649 *8*	962.98+y	10.5 *3*			
203.894 *12*	700.755+z	2.4 *3*			
206.004 *5*	417.448+x	17.5 *4*	E2		Mult.: A_2=+0.22 *2*, A_4=−0.01 *2* (1995Ma07).
207.20 *4*	207.212+z	4.5 *8*			
207.295 *5*	1299.527+x	14.4 *11*	D+Q	+0.17 *1*	Mult.: A_2=+0.07 *2*, A_4=+0.174 *3* (1995Ma07).
208.0	1208.7+x				
208.659 *15*	1171.64+y	5.8 *3*			
209.081 *13*	733.680	7.2 *6*	D+Q		Mult.: A_2=−0.46 *8* (1995Ma07).
210.177 *3*	1132.348+x	4.4 *4*			
210.7[a]	634.371				
210.893 *25*	1157.129	9.1 *3*			
211.671 *26*	736.302	5.36 *25*			
215.056 *21*	409.088+u	3.68 *12*			
216.139 *12*	423.678	12.3 *3*	E2		Mult.: A_2=+0.33 *6*, A_4=−0.10 *10* (1995Ma07).
218	1350.36+x	1.8 *4*			
[x]219.41 *4*		3.9 *4*			
225.056 *17*	592.556+x	10.2 *4*	E2		Mult.: A_2=+0.31 *4*, A_4=−0.04 *6* (1995Ma07).
228.533 *15*	736.302	12.0 *10*			
228.622 *10*	1528.157+x	13.0 *10*	(D+Q)		Mult.: A_2=+0.23 *2*, A_4=−0.01 *3* (1992Dr03).
233.675 *5*	460.244	95.4 *15*	E2		Mult.: A_2=+0.326 *13*, A_4=−0.054 *18* (1995Ma07).
236.484 *10*	524.616	19.4 *8*			
236.688 *15*	1279.678	4.58 *21*			
242.05 *4*	1770.17+x	7.5 *3*			
244.718 *7*	850.022	13.2 *8*	E1+M2		Mult.: α(K)exp<0.065 (1995Ma07); A_2=−0.73 *3* (1995Ma07).
248.08 *3*	1419.75+y	6.0 *10*	D+Q		Mult.: A_2=+0.08 *4*, A_4=−0.03 *5* (1995Ma07).
249.52[c] *7*	433.57+y	3.0[c] *10*			
	1599.63+x	1.0[c] *5*			
	1669.39+y	2.5[c] *10*			
251.5[a]	353.017+z				
263.466 *6*	605.300	57.5 *6*	E2		Mult.: A_2=+0.326 *12*, A_4=−0.054 *16* (1995Ma07).
265.263 *11*	563.386+x	35.6 *3*	E2		Mult.: A_2=+0.34 *2*, A_4=−0.06 *2* (1995Ma07).
268.479 *10*	737.614+x	15.4 *10*	E2		Mult.: A_2=+0.28 *2*, A_4=−0.04 *3* (1995Ma07).
268.5 *5*	2038.33+x	4.0 *10*			
269.32 *9*	2307.61+x	1.8 *4*			
270.30 *4*	1042.994	6.3 *5*			
271.543 *19*	423.644	4.1 *5*			
276.058 *13*	736.302	16.8 *3*	D		Mult.: A_2=−0.24 *3*.
276.6	1433.80				
280.446 *8*	1130.469	6.2 *10*			
281.228 *16*	507.792	22.0 *20*	D+Q		Mult.: A_2=−0.19 *6* (1995Ma07).
281.597 *13*	915.964	8.5 *10*	E2		Mult.: A_2=+0.32 *15*, A_4=−0.08 *20* (1995Ma07).
288.9	1722.63				
289.36 *7*	591.72+y	6.0 *6*			
289.61 *5*	496.855+z	5.5 *6*			
292.534 *14*	634.371	17.9 *4*	D+Q		Mult.: A_2=−0.109 *26* (1995Ma07).
[x]294.379 *22*		10.4 *4*			A_2=+0.28 *7*, A_4=+0.14 *9* (1995Ma07).
298.89 *9*	633.206+x	4.0 *12*	(E2)		Mult.: A_2=+0.27 *4*, A_4=+0.08 *6* (1995Ma07).
306.5 *5*	2614.09+x	<0.7			
306.685 *9*	1042.994	20.6 *4*	E2		Mult.: A_2=+0.31 *4*, A_4=−0.06 *5* (1995Ma07).
309.977 *16*	733.680	14.3 *4*	E2		Mult.: A_2=+0.353 *16*, A_4=−0.11 *3* (1995Ma07).
310.662 *19*	915.964	11.9 *7*	D		Mult.: A_2=−0.25 *5* (1995Ma07).
311.855 *19*	904.430+x	21.0 *6*	E2		Mult.: A_2=+0.20 *7*, A_4=−0.06 *8* (1995Ma07).
312.484 *12*	772.725	50.9 *9*	E2		Mult.: A_2=+0.363 *19*, A_4=−0.063 *26* (1995Ma07).

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^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	Comments
314.87 *4*	424.178+x			Eγ: from (α,3nγ) experiment of 1995Ma07, but data reported only in conjunction with data from a different reaction in 1996Dr07. Placement from 1996Dr07.
315.735 *17*	733.228+x	33.5 *12*	E2	Mult.: A_2=+0.32 *2*, A_4=0.00 *3* (1995Ma07).
322.27 *7*	1268.615	3.4 *4*	D+Q	Mult.: A_2=−0.73 *16* (1995Ma07).
325.423 *12*	850.022	22.5 *3*	E2	Mult.: A_2=+0.325 *27*, A_4=−0.06 *4* (1995Ma07).
326.89 *8*	760.33+y	5.4 *9*	E2	Mult.: A_2=+0.16 *7*, A_4=−0.12 *10* (1995Ma07).
331.323 *21*	684.337+z	11.7 *5*	E2	Mult.: A_2=+0.33 *4*, A_4=−0.03 *5* (1995Ma07).
332.58 *3*	700.755+z	11.4 *4*	E2	Mult.: A_2=+0.290 *16*, A_4=−0.113 *21* (1995Ma07).
333.5	1279.678			
333.78 *3*	808.715+x	6.4 *7*		
340.928 *10*	946.232	43.0 *4*	E2	Mult.: A_2=+0.314 *25*, A_4=−0.07 *3* (1995Ma07).
352.66 *4*	609.621+x			Eγ: from (α,3nγ) experiment of 1995Ma07 but data reported only in conjunction with data from a different experiment in 1996Dr07. Placement from 1996Dr07.
354.5	1722.63			
354.61 *6*	1092.228+x	21.9 *16*	E2	Mult.: A_2=+0.32 *2*, A_4=−0.07 *2* (1995Ma07).
358.80 *1*	922.170+x	34.5 *8*	E2	Mult.: A_2=+0.324 *21*, A_4=−0.07 *3* (1995Ma07).
363.76 *5*	1279.678	9.5 *4*	E2	Mult.: A_2=+0.21 *3*, A_4=−0.09 *5* (1995Ma07).
367.52 *5*	1000.738+x	6.4 *3*	E2	Mult.: A_2=+0.47 *8*, A_4=−0.24 *9* (1995Ma07).
371.2	962.98+y			
378.22 *5*	875.08+z	9.8 *3*	E2	Mult.: A_2=+0.297 *24*, A_4=−0.12 *3* (1995Ma07).
384.406 *21*	1157.129	27.7 *4*	E2	Mult.: A_2=+0.287 *18*, A_4=−0.032 *24* (1995Ma07).
390.77 *3*	1433.80	18.2 *5*	E2	Mult.: A_2=+0.352 *26*, A_4=−0.08 *4* (1995Ma07).
395.12 *2*	1299.527+x	20.9 *7*	E2	Mult.: A_2=+0.28 *2*, A_4=−0.07 *2* (1995Ma07).
396.79 *4*	1130.469	12.0 *10*	E2	Mult.: A_2=+0.27 *8*, A_4=−0.11 *10* (1995Ma07).
399.16 *2*	1132.348+x	25.8 *9*	E2	Mult.: A_2=+0.31 *2*, A_4=−0.06 *2* (1995Ma07).
404.14 *3*	1350.36+x	4.3 *4*		
411.21 *11*	1171.64+y	2.6 *3*	Q	Mult.: A_2=+0.37 *13*, A_4=+0.08 *13* (1995Ma07).
413.31 *3*	1097.65+z	9.9 *8*	E2	Mult.: A_2=+0.37 *3*, A_4=−0.04 *5* (1995Ma07).
418.603 *22*	1268.615	15.5 *4*	Q	Mult.: A_2=+0.347 *26*, A_4=−0.07 *4* (1995Ma07).
421.88 *4*	1368.11	18.5 *21*	Q	Mult.: A_2=+0.34 *4*, A_4=−0.19 *8* (1995Ma07).
428.19 *4*	1350.36+x	21.1 *8*	Q	Mult.: A_2=+0.37 *1*, A_4=−0.08 *2* (1995Ma07).
435.97 *2*	1528.157+x	21.0 *10*	Q	Mult.: A_2=+0.23 *2*, A_4=−0.12 *3* (1995Ma07).
438.43 *3*	1313.51+z	6.4 *6*		Placement not adopted.
442.95 *7*	1722.63	6.5 *10*	Q	Mult.: A_2=+0.40 *4*, A_4=−0.02 *6* (1995Ma07).
448.56 *6*	642.59+u	4.1 *4*		
452.904 *22*	1610.03	13.5 *4*	Q	Mult.: A_2=+0.34 *6*, A_4=−0.19 *9* (1995Ma07).
456.91 *16*	1419.75+y	1.5 *4*		
467.28 *6*	1599.63+x	13.2 *8*	Q	Mult.: A_2=+0.37 *5*, A_4=−0.04 *7* (1995Ma07).
470.60 *4*	1770.17+x	10.7 *8*	Q	Mult.: A_2=+0.45 *19*, A_4=−0.2 *2* (1995Ma07).
474.66 *3*	1908.46	11.0 *20*	Q	Mult.: A_2=+0.37 *12*, A_4=−0.10 *16* (1995Ma07).
478.99[&] *11*	1576.64+z	8.6 *10*		
481.60 *16*	1612.07	4.7 *6*		
[x]486.1				
486.14 *4*	1836.50+x	15.8 *4*	Q	Mult.: A_2=+0.30 *6*, A_4=−0.03 *8* (1995Ma07).
497.77[c] *3*	1669.39+y	1.0[c] *5*		
	1865.88	10.0[c] *15*		
505.97 *13*	1774.59	6.9 *8*		
510.5 *3*	2038.33+x	18 *4*		
510.5[c] *4*	2110.1+x	7.5[c] *25*		Placement not adopted; see comment on 2110+x level.
	2120.5	8.5[c] *15*		
537.38 *11*	2307.61+x	3.8 *6*		
544.67 *6*	2381.17+x	8.1 *4*	Q	Mult.: A_2=+0.34 *7*, A_4=−0.06 *9* (1992Dr03).
555.26 *9*	2463.72	5.6 *6*		
575.76 *14*	2614.09+x	4.1 *4*		
585.0	2450.9			Placement not adopted; see comment on 2451 level.
598.8 *8*	2906.4+x	<0.5		
605.2[a]	2725.7?			Placement not adopted; see comment on 2726 level.

† From 1995Ma07; many of these data were already reported in 1992Dr03. Eγ data for the six transitions measured by 1988Pe08 using a curved−crystal spectrometer are in excellent agreement.

Footnotes continued on next page

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

‡ From ce data of 1995Ma07, when available; otherwise, from γ(θ) data. 1995Ma07 normalized photon and electron intensity scales using unspecified transitions of known multipolarity from other reaction channels or from ^{166}Tm decay. γ(θ) data combined with 15 ns FWHM for γγ coin have been used by the evaluator to rule out Δπ=yes for a number of transitions, based on RUL.

§ From authors' analysis of γ(θ) (1992Dr03), except as noted.

Delayed transition (1995Ma07).

@ 1995Ma07 report a close doublet in their curved–crystal spectrometer data; Eγ=74.920 *3*, Iγ=23.5 *25* and Eγ=74.903 *11*, Iγ=11.021, the former being the isomeric transition.

& Placement not adopted. In Adopted Levels, Gammas, Eγ=478.3 *3* is placed in the signature partner of the band suggested here and an interband Eγ=479.1 *1* feeds the 875+Z level. However, no other evidence exists for excitation of the signature partner band in (α,3nγ) and the intraband 461.9γ expected to accompany the interband 479γ is absent in (α,3nγ).

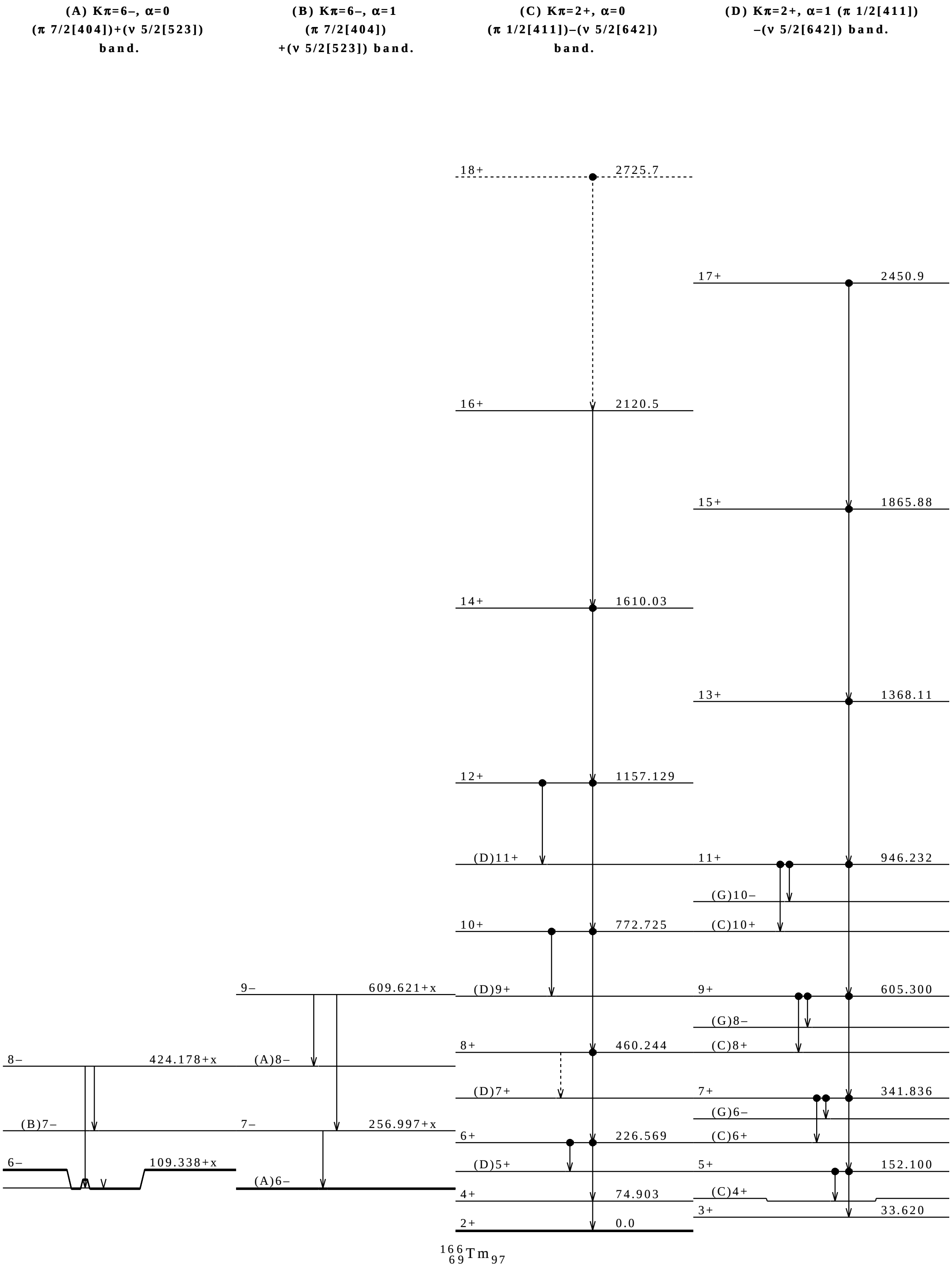
a Placement of transition in the level scheme is uncertain.

b Multiply placed; undivided intensity given.

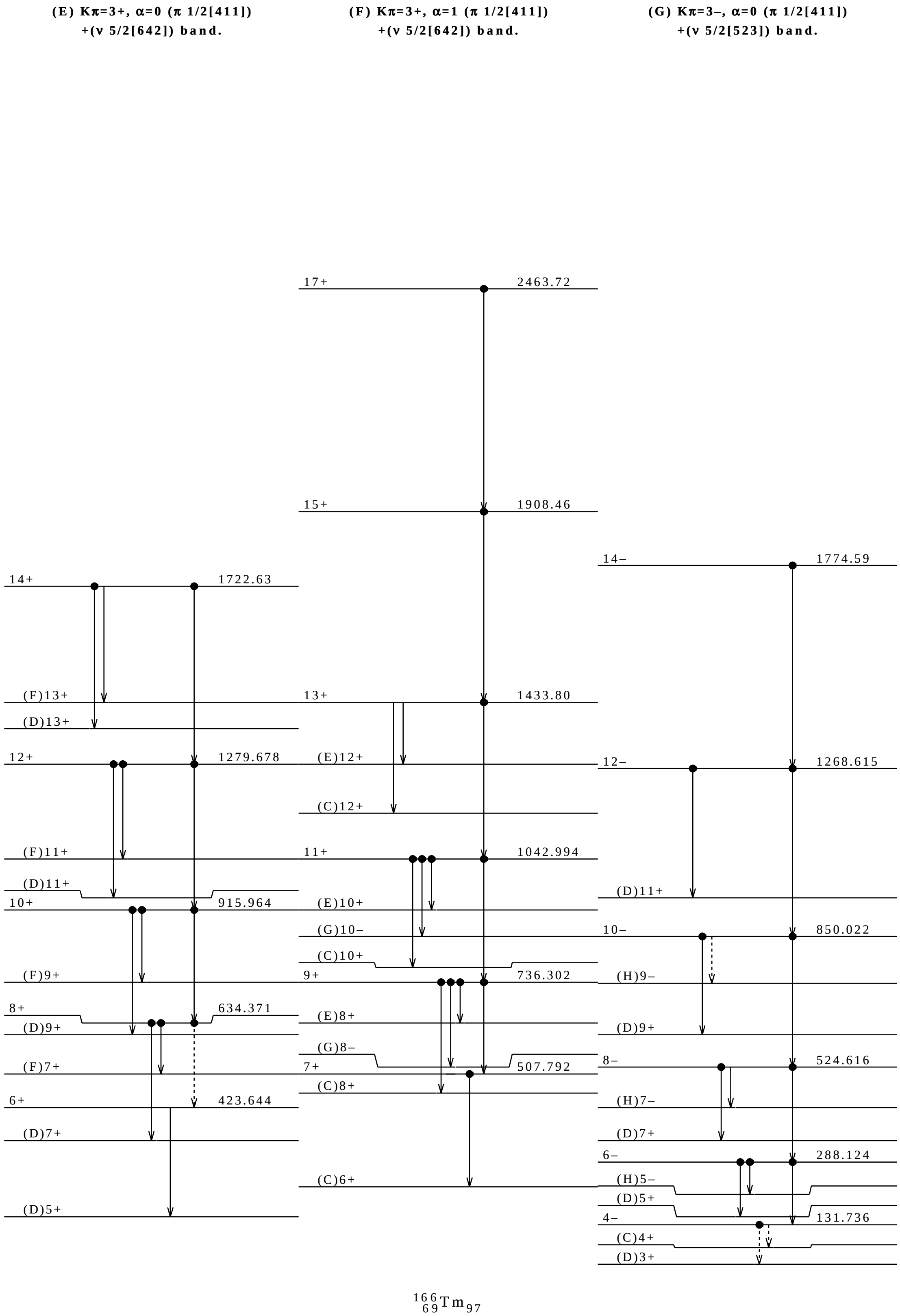
c Multiply placed; intensity suitably divided.

x γ ray not placed in level scheme.

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)



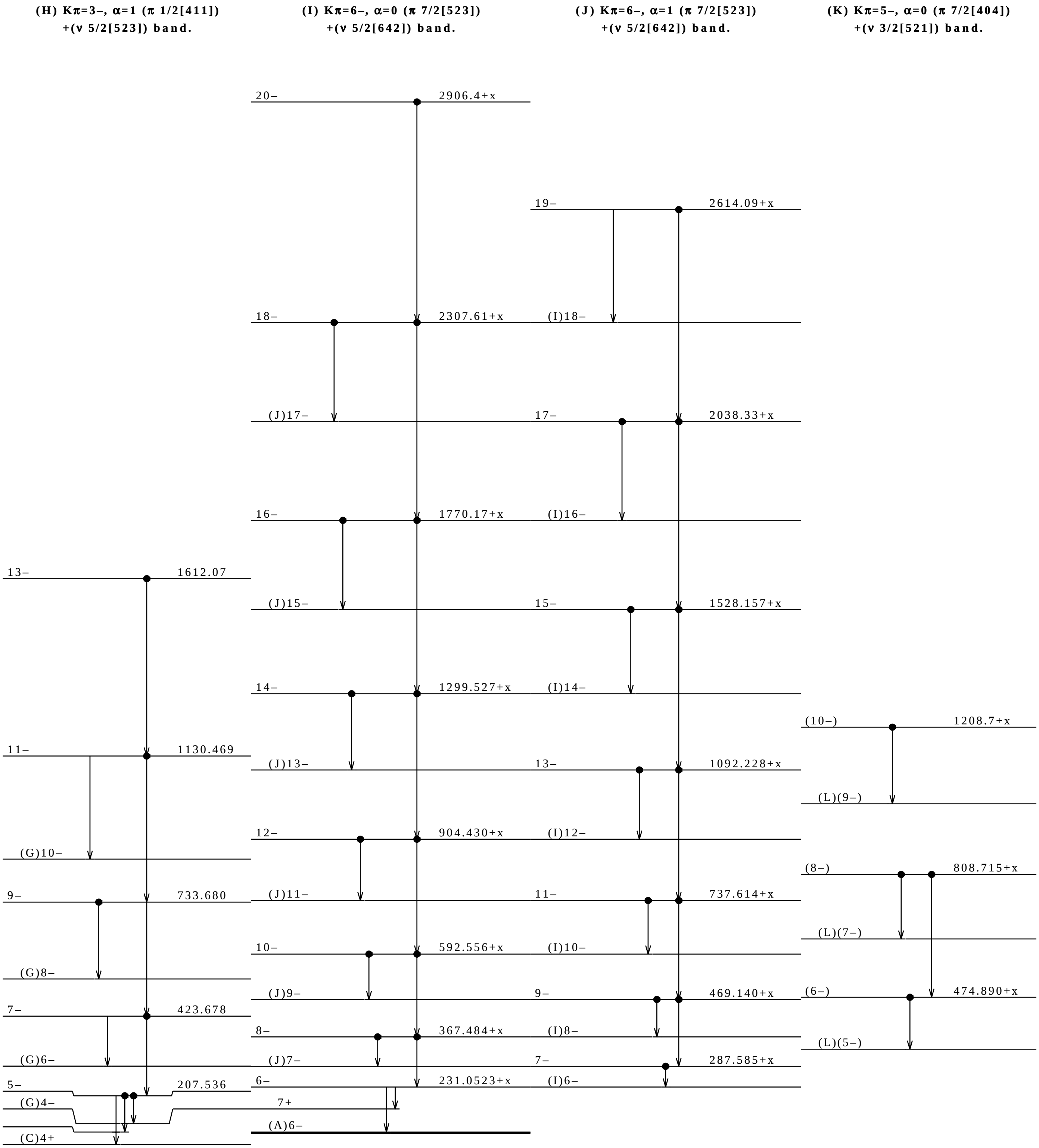
^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

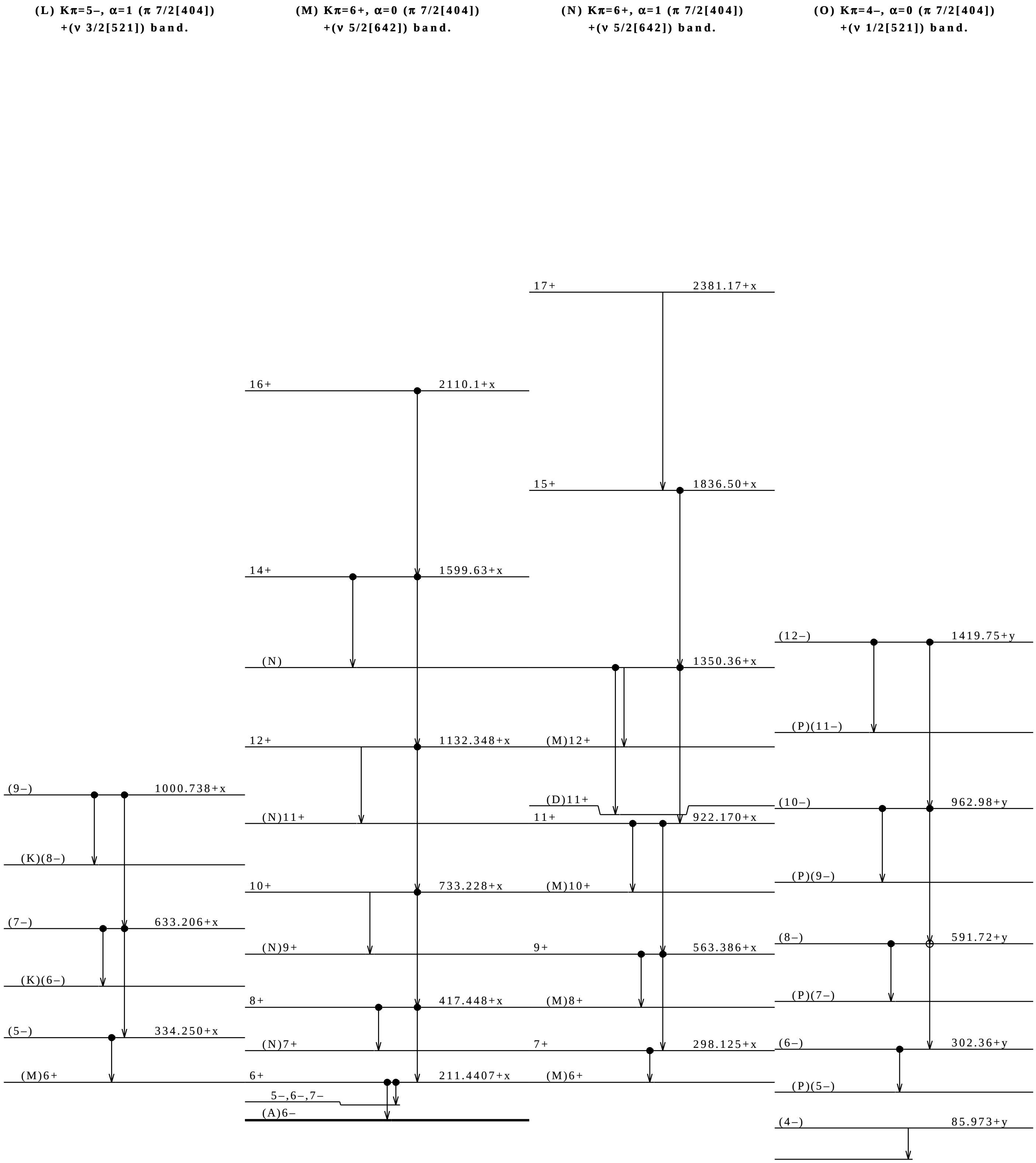


$^{166}_{69}Tm_{97}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

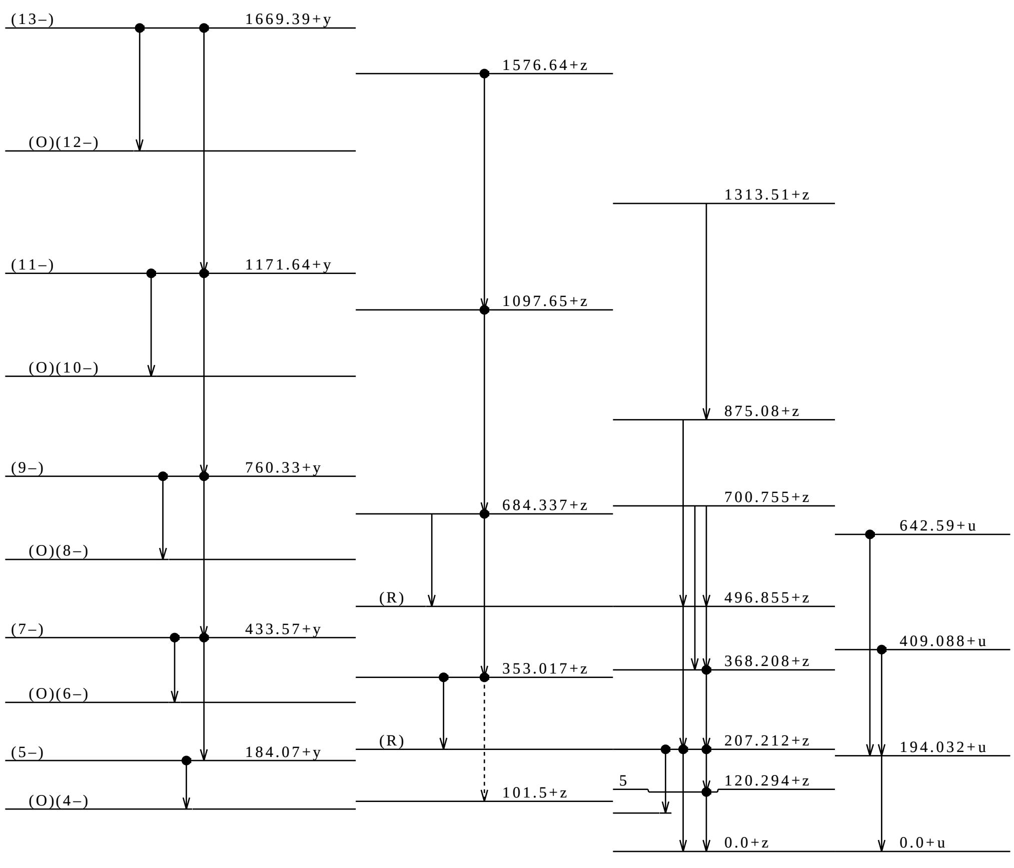


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{165}Ho(\alpha,3n\gamma)$ 1995Ma07,1992Dr03 (continued)

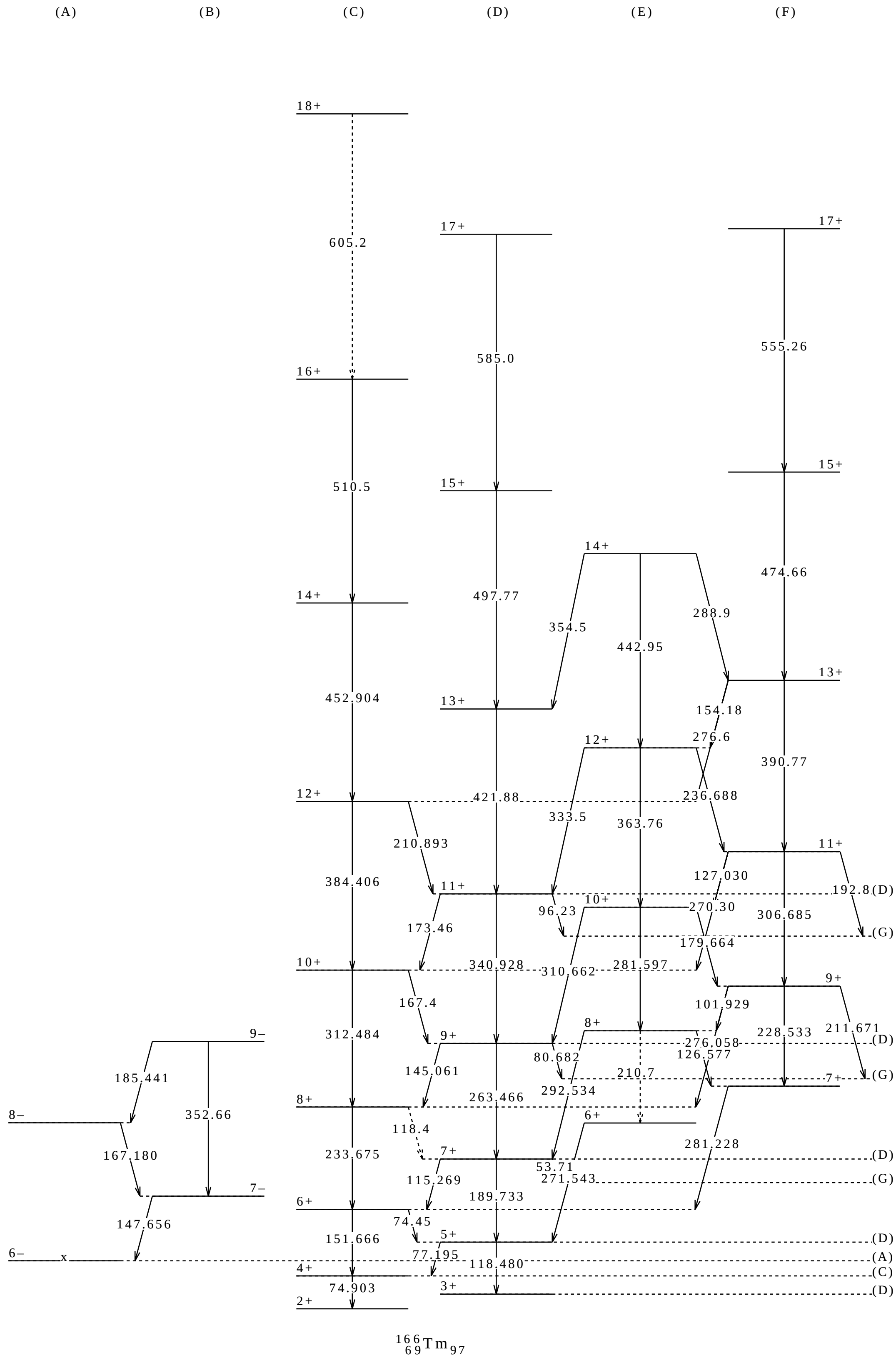
(P) Kπ=4–, α=1 (π 7/2[404]) +(ν 1/2[521]) band. **(Q) Band #1.** **(R) Band #2.** **(S) possible band fragment.**



$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

Bands for ^{166}Tm

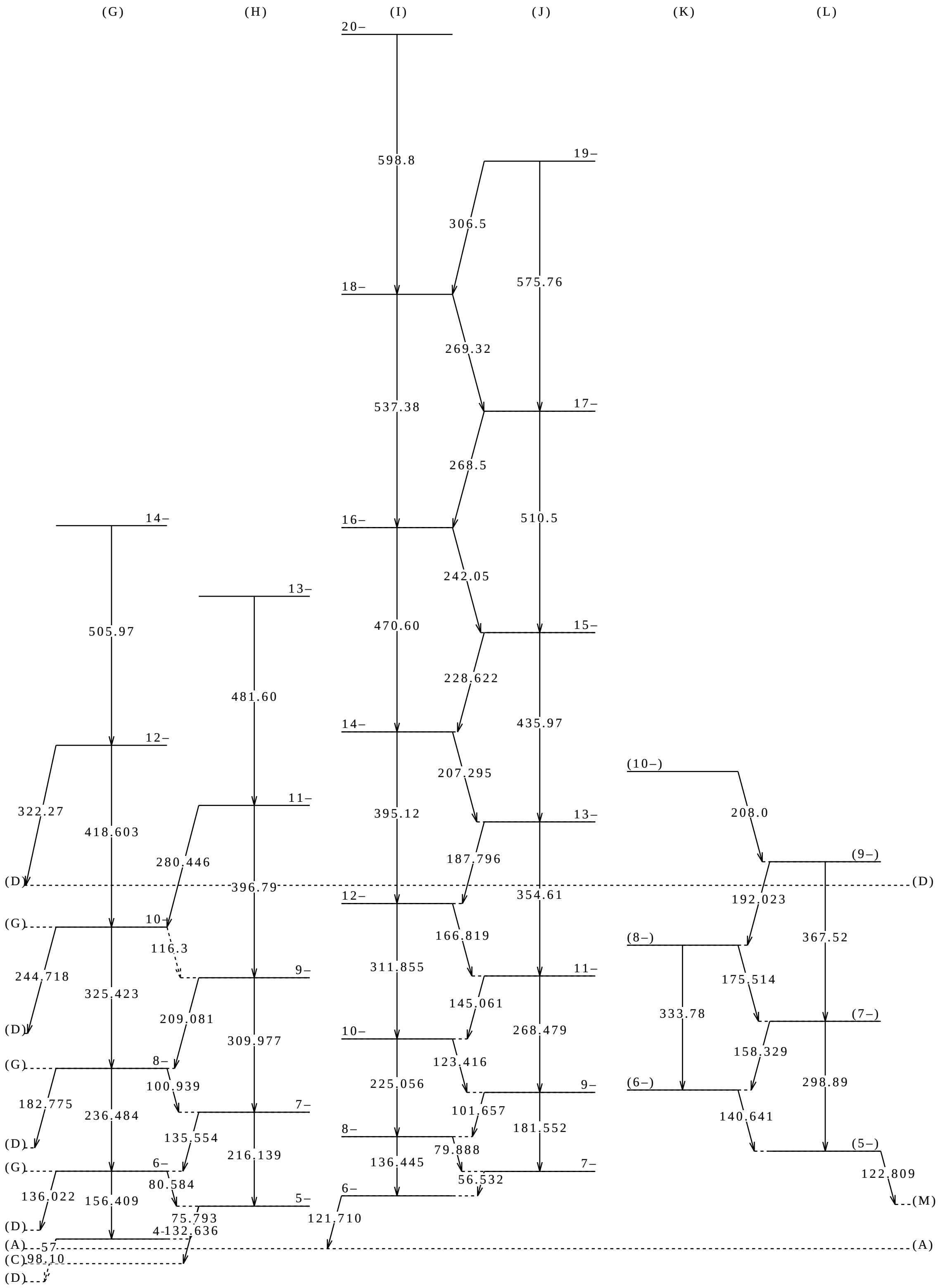


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

Bands for ^{166}Tm



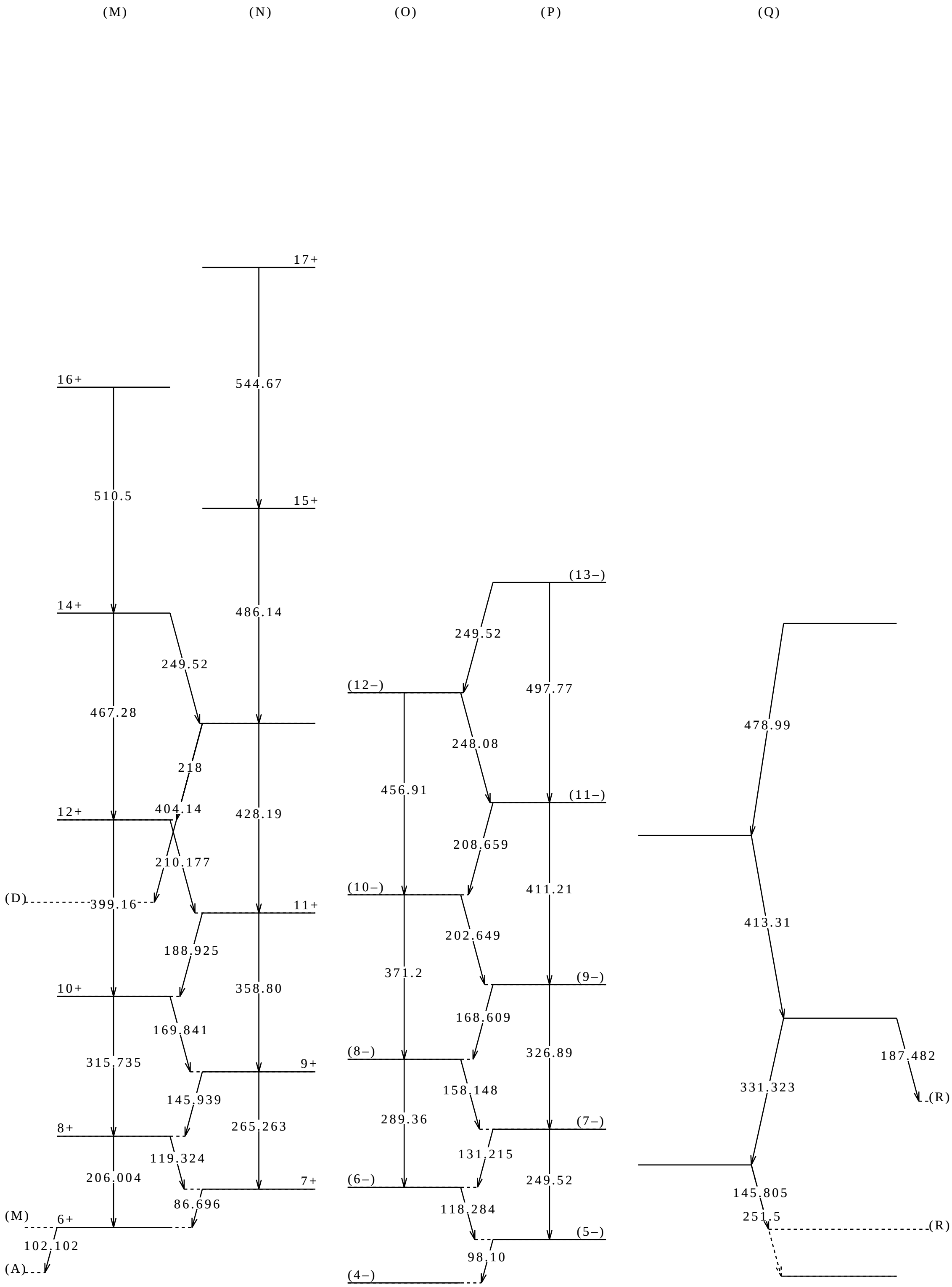
$^{166}_{69}Tm_{97}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

Bands for ^{166}Tm



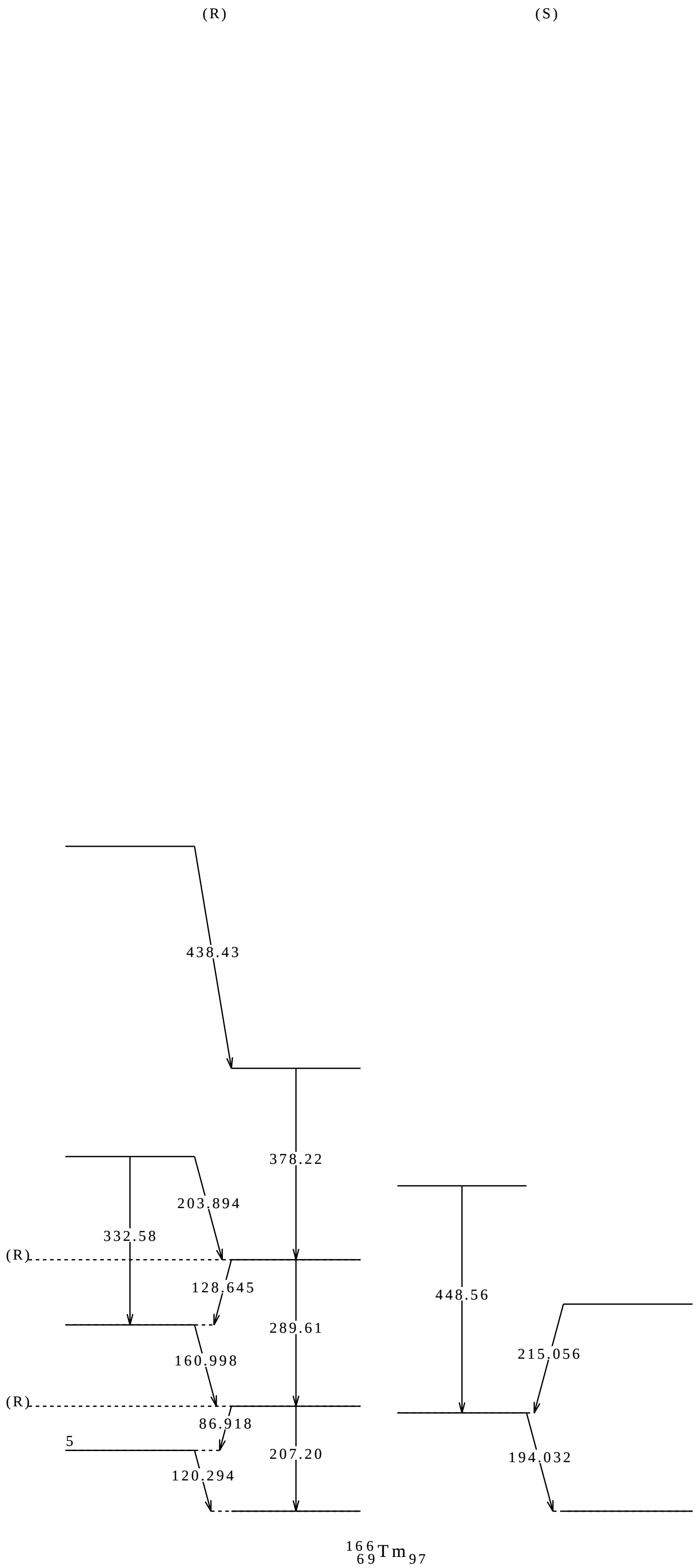
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{166}_{69}Tm_{97}$–79

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

Bands for ^{166}Tm



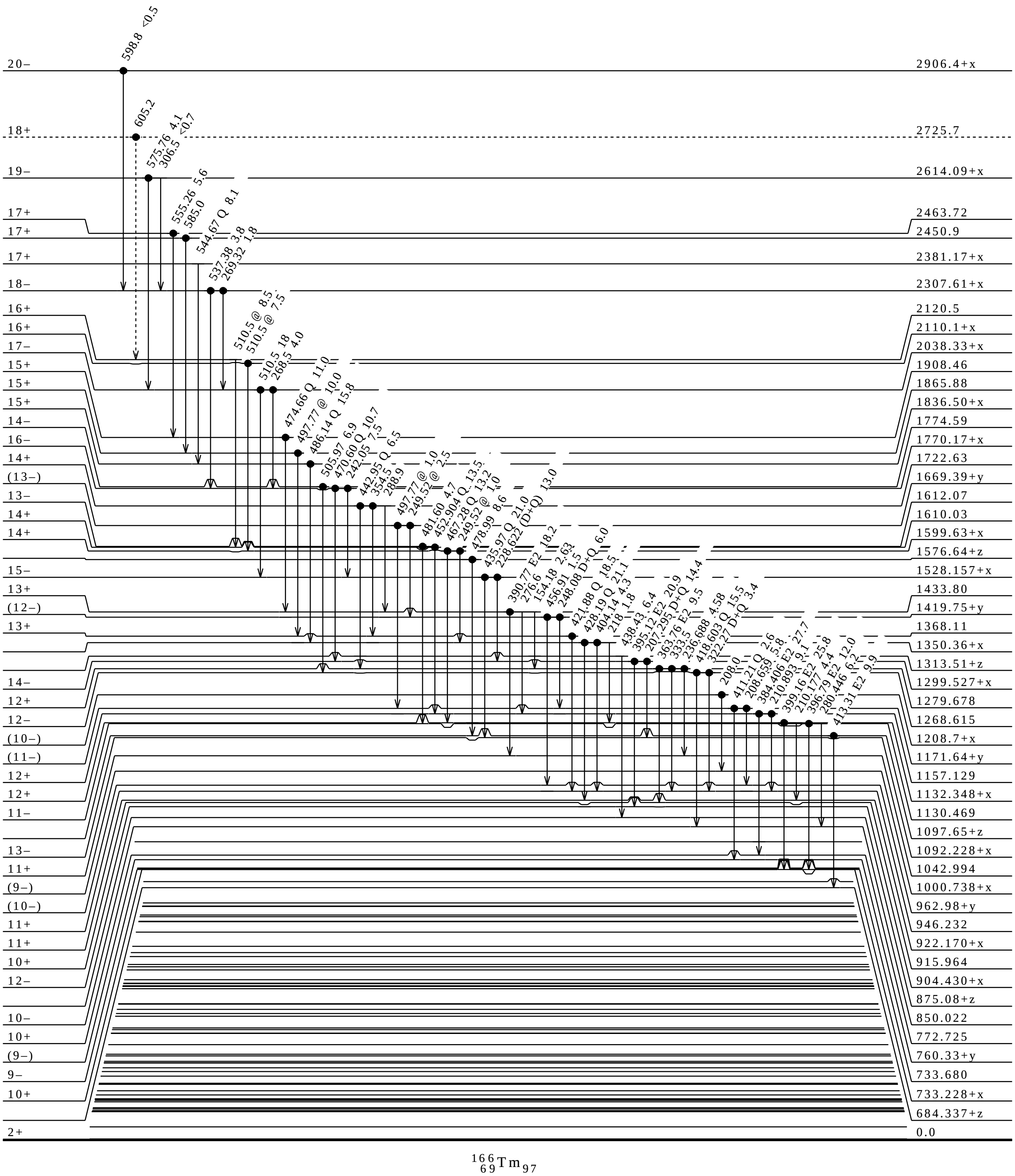
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{165}Ho(\alpha,3n\gamma)$ 1995Ma07,1992Dr03 (continued)

Level Scheme

Intensities: relative Iγ
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



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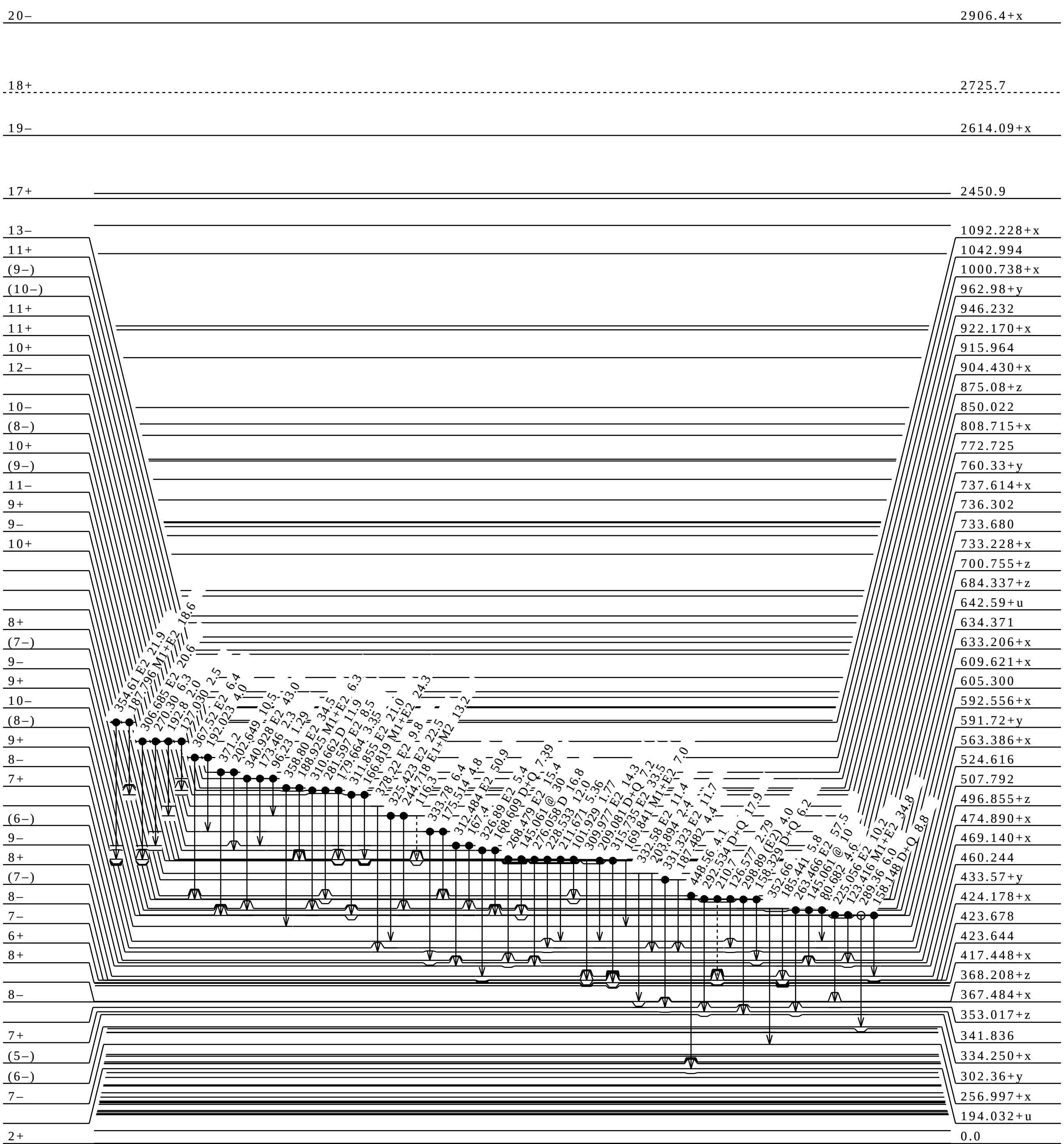
$^{165}Ho(\alpha,3n\gamma)$ 1995Ma07,1992Dr03 (continued)

Level Scheme (continued)

Intensities: relative Iγ
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{69}Tm_{97}$

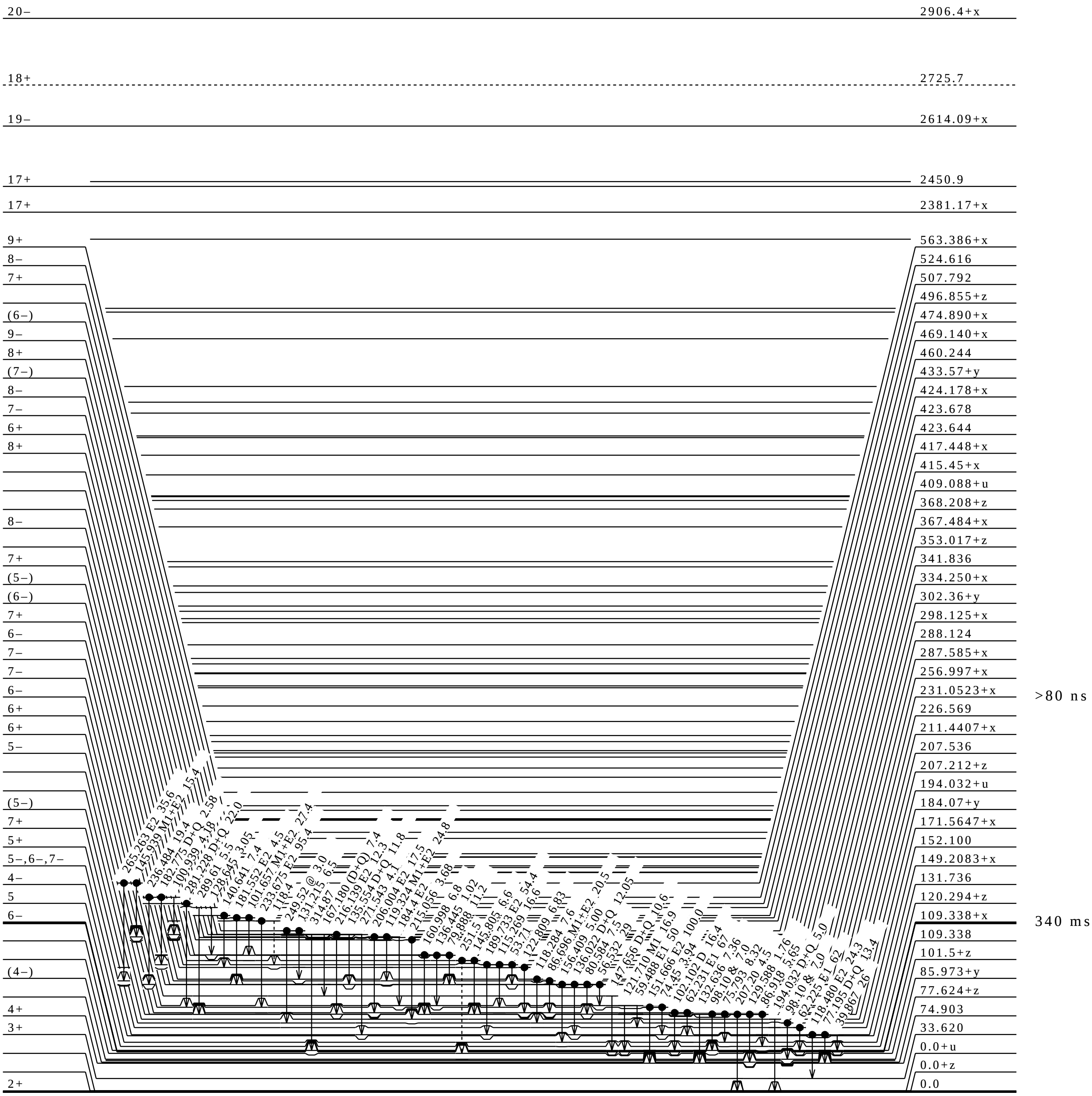
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{165}Ho(\alpha,3n\gamma)$ 1995Ma07,1992Dr03 (continued)

Level Scheme (continued)

Intensities: relative Iγ
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



$^{166}_{69}Tm_{97}$

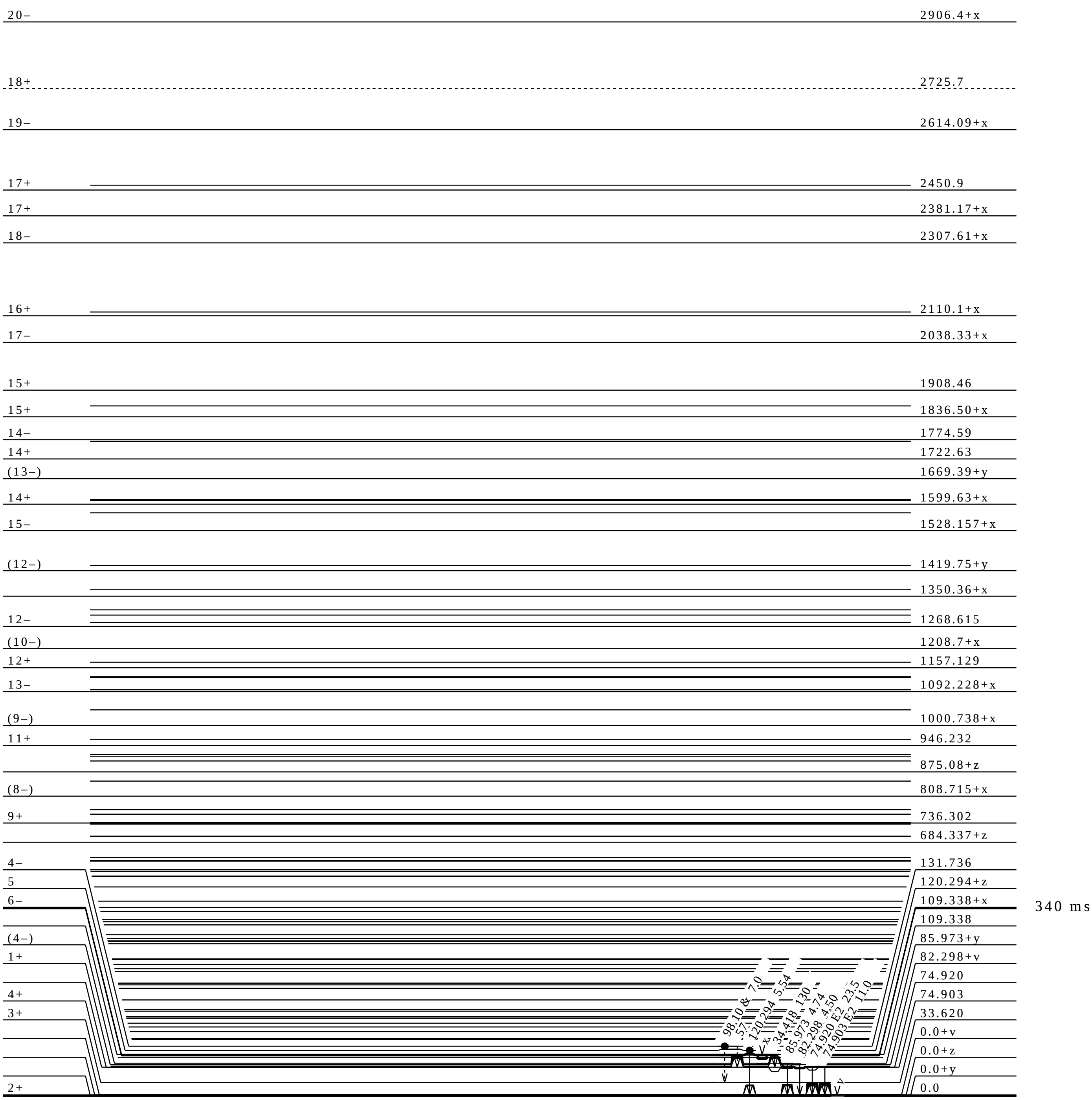
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

Level Scheme (continued)

Intensities: relative Iγ
& Multiply placed; undivided intensity given
@ Multiply placed; intensity suitably divided



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Er(p,xnγ) 1976Sv01

^{167}Er(p,2nγ), E(p)=8–12 MeV; 91.5% ^{167}Er target.
^{166}Er(p,nγ), E(p)=10, 12 MeV; 94.9% ^{166}Er target.
1976Sv01 report a few weak transitions, attributed to ^{166}Tm, observed during their investigations of ^{165}Tm and ^{167}Tm using Er(p,xnγ) reactions. Detectors: LEPS, FWHM 0.5 keV at 80 keV (for Eγ<300 keV); Si(Li) detector mounted in magnetic spectrometer with 16% momentum resolution (for ce measurements). Measured Eγ, E(ce), ce(t).

^{166}Tm Levels

E(level)†	$T_{1/2}$	Comments
0.0		
82.32 *6*	385 ps *40*	$T_{1/2}$: from ce(L)(t) for 82–keV transition.

† From Eγ.

γ(^{166}Tm)

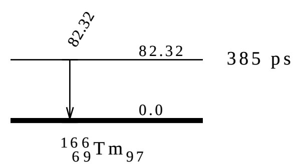
Eγ	E(level)	Comments
x75		
82.32 *6*	82.32	Eγ: from table 1 of 1976Sv01.
x123		
x171		
x182		

x γ ray not placed in level scheme.

$^{166}_{69}Tm_{97}$–85

Er(p,xnγ) 1976Sv01 (continued)

Level Scheme



Adopted Levels, Gammas

Q(β⁻)=–5570 *30*; S(n)=9373 *29*; S(p)=5942 *8*; Q(α)=2329 *8* 2003Au03.
For isotope shift data see, e.g., 1989Sp04, 1991Ho27.
Other reactions:.
^{124}Sn(^{48}Ca,xnγ), E=205 MeV; ESSA30 Compton–suppressed Ge detector array; investigated rotational damping γ quasicontinuum (1989KhZY).

^{166}Yb Levels

Cross Reference (XREF) Flags

A ^{166}Lu ε Decay (2.65 min)	F ^{124}Sn(^{48}Ca,6nγ)
B ^{166}Lu ε Decay (1.41 min)	G ^{186}W(n,4p17nγ)
C ^{166}Lu ε Decay (2.12 min)	H ^{154}Sm(^{16}O,4nγ),^{159}Tb(^{11}B,4nγ)
D ^{130}Te(^{40}Ar,4nγ)	I Er(α,xnγ),^{166}Er(^{3}He,3nγ)...
E ^{168}Yb(p,t)	

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$[§]	Comments
0.0	0+	ABCDEFGHI	56.7 h *1*	%ε=100. $T_{1/2}$: from 1970Ka23 (182γ(t)). Other measurements: 1954Mi16, 1955Ne03, 1957Go40, 1959Ba12, 1960Bu27, 1963Pa08. Assignment: ^{181}Ta(p,4p12n), E(p)=340 MeV, chem, ms, parent ^{166}Tm (1955Ne03); ^{169}Tm(p,4n), E(p)=230 MeV, ion chem, parent ^{166}Tm (1960Bu27). Δ<r^2>(166,176)=+0.577 *17* (1994Ma57, deduced from isotope shift data of 1982Bu21). <r^2>$^{1/2}$(charge)=5.250 *6* (2004An14).
102.37[d] *3*	2+[#]	ABCDEFGHI	1.24 ns *6*	Jπ: stretched E2 102γ to 0+ g.s.
330.48[d] *4*	4+[#]	ABCDEFGHI	52.9 ps *17*	Jπ: stretched E2 228γ to 2+ 102.
667.97[d] *5*	6+[#]	A D GHI	7.8 ps *3*	
932.38[e] *5*	(2)+	B E HI		Jπ: M1 830γ to 2+ 102, 932γ to 0+ g.s., fit to a band.
1039.14[e] *5*	(3)+	AB HI		Jπ: E2 937γ to 2+ 102, (E2) 709γ to 4+ 330, fit to a band.
1043[f] *10*	(0+)	E		E(level): from (p,t). Jπ: L(p,t)=(0).
1098.25[d] *6*	8+[#]	A D GHI	2.14 ps *24*	
1144.29[f] *22*	(2+)	I		Jπ: 1042γ to 2+ 102, 1144γ to 0+ g.s., fit to a band.
1162.74[e] *6*	(4)+	AB I		Jπ: M1+E2 832γ to 4+ 330; 494γ to 6+ 668; 1060γ to 2+ 102.
1315.22 *14*		B		Jπ: 985γ to 4+ 330.
1327.85[e] *5*	(5)+	A D HI		Jπ: M1+E2 997γ to 4+ 330; (E2) 660γ to 6+ 668; E2 289γ to (3)+ 1039; not J=4 from 997γ–228γ(θ) in ^{166}Lu ε decay (2.65 min).
1342.5[f] *3*	(4+)	I		Jπ: γ to 4+, possible γ to 2+, band assignment.
1358.93[g] *7*	1–	C		Jπ: log *ft*=5.3 from J=0 in ^{166}Lu(2.12 min) decay; π from independently–established π=– for band.
1386.05 *11*	(2+,3,4+)	B		Jπ: γ's to 2+ and 4+.
1418.6[g] *3*	(3)–[c]	I		
1451.38 *20*		B		Jπ: gammas to 2+ 102 and (3)+ 1039.
1482.43[e] *6*	(6)+	A I		Jπ: M1 814γ to 6+ 668, 319γ to (4)+ 1163, fit to a band.
1503.37[j] *7*	(2–)[b]	B I		Jπ: γ's to 3+ and 2+, fit to a band.
1505.40 *7*	(5)–	A I		Jπ: E1+M2 838γ to 6+ 668, γ to 4+.
1529.67 *9*	1–	C		Jπ: ^{166}Lu(2.12 min) ε decay from 0– is allowed.
1570.58[g] *15*	(5)–	A I		Jπ: γ's to 4+ and 6+, fit to a π=– band.
1579.87 *25*	(2+)	C E		XREF: E(1581). Jπ: 1578γ to 0+ g.s., 1249γ to 4+ 330.
1605.94[d] *16*	10+[#]	D GHI	1.0 ps *5*	
1607.42 *20*	(2+,3,4+)	B		Jπ: γ's to 2+ and 4+.
1608.01[f] *11*	6+	I		Jπ: 940γ to 6+ 668 has an E0 component.
1616.78[j] *5*	(4–)[b]	A D HI		
1684.80 *14*	(2+,3,4+)	AB		Jπ: 1582γ to 2+ 102, 1354γ to 4+ 330.
1704.54[e] *18*	(7)+	D HI		Jπ: M1+E2 1037γ to 6+ 668, fit to a band.
1724.85 *11*	(6+,7+)	A		Jπ: 397γ to (5)+ 1328, possible 625γ to 8+ 1098.
1744.27 *6*	(3+,4+)	B		Jπ: 812γ to (2)+ 932, 705γ to (3)+ 1039, (E2) 212γ from (5,6)+ 1957.
1790.33[h] *7*	(5–)[@]	A D HI		Jπ: fit to a band, γ's to 4+ and 6+.
1812.47[e] *13*	(8+)[c]	A I		
1818.28 *20*	(4+,5,6+)	A		Jπ: 1151γ to 6+ 668, 1487γ to 4+ 330.
1833.3[g] *5*	(7)–	A I		Jπ: E1 1165γ to 6+ 668, band assignment.
1835.42[j] *20*	(6–)[b]	D HI		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Yb Levels (continued)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$[§]	Comments
1852.91[f] *19*	8+	I		Jπ: 755γ to 8+ 1098 has an E0 component.
1865.41[i] *5*	(6)−[&]	A D HI		Jπ: M1 360γ to (5)− 1505, (E1) 383γ to (6)+ 1482, band assignment.
1923.1 *4*	(1,2+)	C		Jπ: 1923γ to 0+ g.s., 1820γ to 2+ 102.
1940.90[g] *21*	(9)−	I		Jπ: E1 843γ to 8+ 1098, band assignment.
1957.13 *6*	(5,6)+	A H		Jπ: M1 629γ to (5)+ 1328, ΔJ≤1 209γ from J≥6, 2166.
1958.93[h] *7*	7−[@]	A D HI		Jπ: E1 861γ to 8+ 1098, E1 1291γ to 6+ 668.
2016.35 *22*	(4+,5,6+)	A		Jπ: 1482γ to 4+ 330, possible 534γ to (6)+ 1482.
2029.32 *7*	(3−,4−)	B		Jπ: E1 285γ to (3+,4+) 1744, 526γ to (2−) 1503, 1698γ to 4+ 331.
2030.14[k] *22*	8+[a]	I		Jπ: γ to 8+ has an E0 component.
2072.33[i] *19*	(8−)[&]	D HI		Jπ: (E2) 208γ to (6)− 1865, band assignment.
2098.61 *12*	1−	C		Jπ: ^{166}Lu(2.12 min) ε decay from 0− is allowed (log *ft*=5.3).
2137.13[j] *24*	(8−)[b]	D HI		
2143.11[e] *23*	(10)+	I		Jπ: M1 537γ to 10+ 1606, fit to a band.
2150.32[e] *23*	(9)+	D HI		Jπ: M1+E2 1053γ to 8+ 1098, 445γ to (7)+ 1705, fit to a band.
2165.77 *7*	(6,7)+	A		Jπ: 1067γ to 8+ 1098, 1497γ to 6+ 668, M1+E2 209γ to J≤6, π=+ 1957.
2176.02[d] *22*	12+[#]	D GHI	0.64 ps *33*	
2209.90[h] *24*	(9)−[@]	D HI		Jπ: E1 1111γ to 8+ 1098, fit to a band.
2214.89[k] *18*	10+[a]	I		Jπ: γ to 10+ has an E0 component.
2233.36 *6*	6−,7−	A HI	<10 ns	$T_{1/2}$: from ^{166}Lu ε decay (2.65 min). Jπ: ^{166}Lu(2.65 min) ε decay from J=6 is allowed (log *ft*=4.7); M1 274γ to 7− 1959, M1 368γ to (6)− 1865. Low log *ft* from configuration containing the (ν 5/2[523]) orbital implies the presence of the (π 7/2[523]) orbital in the configuration of this level.
2319.56[f] *25*	(10+)	I		Jπ: 713γ to 10+ 1606, 507γ to (8+) 1812, band assignment.
2361.45[i] *21*	(10−)[&]	D HI		
2417.51[h] *24*	(11)−[@]	D HI		
2426.44 *17*	1−	C		Jπ: ^{166}Lu(2.12 min) ε decay from 0− is allowed.
2491.1[j] *3*	(10−)[b]	D HI		
2531.3[k] *3*	12+[a]	D HI		Jπ: γ to 12+ is M1, fit to a band.
2609.6[e] *3*	(12+)[c]	I		Jπ: (M1) 433γ to 12+ 2176, 467γ to (10)+ 2143, band assignment.
2646.7[e] *4*	(11)+	HI		Jπ: stretched E2 intraband 496γ to (9)+ 2150.
2728.9[i] *4*	(12−)[&]	D HI		
2779.5[d] *3*	14+[#]	D GHI	0.51 ps *30*	
2862.9[h] *3*	(13)−[@]	D HI		
2891.6[j] *3*	(12−)[b]	D HI		
2897.9[k] *3*	14+[a]	D H		
3166.5[i] *5*	(14−)[&]	D H		
3196.7[e] *7*	(13+)[c]	H		Jπ: stretched Q intraband 550γ to (11)+ 2647.
3273.7[k] *3*	16+[a]	D HI	1.14 ps *27*	
3350.6[j] *5*	(14−)[b]	D HI		
3354.0[h] *3*	(15−)[@]	D H		
3490.1[d] *3*	16+[#]	D H		
3665.9[i] *5*	(16−)[&]	D H		
3782.0[k] *4*	18+[a]	D HI	0.82 ps *10*	
3878.1[j] *7*	(16−)[b]	D H		
3892.2[h] *4*	(17)−[@]	D H		
4189.9[d] *4*	(18+)[#]	D H		
4218.7[i] *5*	(18−)[&]	D H		
4370.6[k] *4*	20+[a]	D HI	0.41 ps *3*	
4470.8[j] *9*	(18−)[b]	D H		
4478.7[h] *4*	(19)−[@]	D H		
4819.2[i] *6*	(20−)[&]	D H		
4922.8[d] *4*	20+[#]	D		
5036.9[k] *5*	22+[a]	D H	0.201 ps *21*	
5108.7[h] *5*	(21−)[@]	D H		
5119.1[j] *10*	(20−)[b]	D H		
5468.6[i] *6*	(22−)[&]	D H		
5649.7[d] *7*	(22+)[#]	D		
5775.5[k] *5*	24+[a]	D H	0.125 ps *14*	
5782.7[h] *5*	(23−)[@]	D H		
5814.0[j] *11*	(22−)[b]	D		
6173.4[i] *7*	(24−)[&]	D		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Yb Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$§	Comments
6378.1?[d] *10*	(24+)[#]	D		
6507.6[h] *6*	(25−)[@]	D		
6551.8[j] *12*	(24−)[b]	D		
6581.8[k] *6*	26+[a]	D	0.083 ps *7*	
6940.0[i] *7*	(26−)[&]	D		
7294.7[h] *6*	(27−)[@]	D		
7334.6?[j] *15*	(26−)[b]	D		
7452.0[k] *6*	28+[a]	D	0.069 ps *7*	
7773.6[i] *7*	(28−)[&]	D		
8148.5[h] *8*	(29−)[@]	D		
8387.0[k] *6*	30+[a]	D	0.055 ps *7*	
8677.0[i] *9*	(30−)[&]	D		
9071.3[h] *9*	(31−)[@]	D		
9385.8[k] *8*	32+[a]	D	0.042 ps *7*	
9648.6[i] *10*	(32−)[&]	D		
10057.5[h] *11*	(33−)[@]	D		
10445.8[k] *10*	34+[a]	D	0.035 ps *7*	
11102?[h] *2*	(35−)[@]	D		
11557.8[k] *11*	(36+)[a]	D		Jπ: from probable band assignment.
12186?[h] *2*	(37−)[@]	D		
12716?[k] *2*	(38+)[a]	D		Jπ: from probable band assignment.
0.0+x[l]	J	F		
162.6+x[m] *10*	J+1	F		
334.9+x[l] *13*	J+2	F		
524.9+x[m] *13*	J+3	F		
735.5+x[l] *16*	J+4	F		
966.4+x[m] *16*	J+5	F		
1217.0+x[l] *18*	J+6	F		
1486.2+x[m] *18*	J+7	F		
1772.7+x[l] *18*	J+8	F		
2075.2+x[m] *19*	J+9	F		
2392.6+x[l] *19*	J+10	F		
2722.6+x[m] *20*	J+11	F		
3064.1+x[l] *20*	J+12	F		
3416.6+x[m] *21*	J+13	F		
3778.4+x[l] *21*	J+14	F		
4149.6+x[m] *22*	J+15	F		
4531.2+x[l] *23*	J+16	F		
4921.6+x[m] *24*	J+17	F		

† From least–squares fit to Eγ, assigning 1 keV uncertainty to data for which authors did not state an uncertainty.
‡ Values given without comment are based on band structure deduced in the (α,xnγ), (^{16}O,4nγ) and (^{40}Ar,4nγ) reaction studies and supported in part by transition multipolarities.
§ The half–lives of excited states are from (^{40}Ar,4nγ), unless otherwise noted.
# Based on known Jπ=0+ for the g.s. bandhead, stretched E2 character for the 102γ connecting the J=0 and 2 members and stretched Q character for a number of other intraband transitions, firm Jπ assignments are adopted for J≤22 members of the g.s. band.
@ Based on established Jπ=7− for the 1959 level and regular progression of Eγ and Iγ for cascade gammas in band, many of which are stretched Q.
& The regularity and the stretched Q character of the cascade transitions populating the (6)− 1865 level justify the classification of this cascade as a band.
a Based on established Jπ=8+ and 10+ for the 2030 and 2215 levels, respectively, and E2 character of the 375γ connecting the J=16 and 14 members of the band, firm Jπ assignments have been adopted for the J=8 through 36 members of this band.
b Tentatively assigned on the basis of systematics (1984Fi18).
c Fit to a band.
d (A): Kπ=0+ g.s. band. A=16.99, B=−=0.027.
e (B): Kπ=2+ γ–vibrational band. A=13.86, B=0.021 (even J); A=17.58, B=−0.036 (odd J).
f (C): Kπ=0+ β–vibrational band. A=17 if B=0.
g (D): Kπ=(0)− band. π=− for band is established by E1 1165γ and 843γ to π=+ g.s. levels.
h (E): Kπ=5−, α=1 band.
i (F): Kπ=5−, α=0 band.
j (G): Kπ=(2−) band.
k (H): π=+ super band. Becomes yrast for J≥16.

Footnotes continued on next page

Adopted Levels, Gammas (continued)

^{166}Yb Levels (continued)

l (I): ((π 7/2[523])+(π 7/2[404]))(ν $i_{13/2}^2$)? band. Configuration assignment supported by large B(M1)/B(E2) ratios, bandhead energy and crossing frequency arguments (1994O104).
m (J): ((π 7/2[523])+(π 7/2[404]))(ν $i_{13/2}^2$)? band. See comment on signature partner of this band.

γ(^{166}Yb)

E(level)	Eγ‡	Iγ†	Mult.§	δ	α	Comments
102.37	102.38[a] 3	100[a]	E2		2.93	Mult.: from ce data in ^{166}Lu ε decay (2.65 min). B(E2)(W.u.)=191 10.
330.48	228.12[a] 3	100[a]	E2		0.1743	Mult.: from ce data in ^{166}Lu ε decay (2.65 min). B(E2)(W.u.)=272 9.
667.97	337.50[a] 3	100[a]	E2		0.0521	Mult.: from α(L)exp in ^{166}Lu ε decay (2.65 min) and α(K)exp and γ(θ) in (α,xnγ). B(E2)(W.u.)=291 12.
932.38	830.06[b] 9	100[b] 5	M1		0.01134	
	932.35[b] 7	78[b] 5				
1039.14	708.82[a] 7	20.0[a] 21	(E2)		0.00774	Other Iγ: 17 5 in ε decay (1.41 min), 25 in (^{16}O,4nγ), 54 6 in (α,xnγ).
	936.79[a] 7	100[a] 4	E2		0.00424	
1098.25	430.28[a] 3	100[a]	E2[e]		0.0264	B(E2)(W.u.)=320 40.
1144.29	1042.0[#] 3	100[#]				
	1144.2 3					Eγ: for doubly–placed transition in (α,xnγ).
1162.74	494.2[a] 8	4[a] 2				
	832.20[a] 8	100[a] 7	M1+E2	+0.6 2	0.0097 8	δ: from 832γ–228γ(θ) in ^{166}Lu ε decay (2.65 min); larger δ solution rejected based on measured α(K)exp.
	1060.28[a] 11	21.8[a] 14				
1315.22	152.49[a] 13	65[a] 5				
	984.6[a] 6	100[a] 20				
1327.85	289.3 3	7.9 8	E2		0.0829	Eγ: from (α,xnγ). Iγ: from (α,xnγ). Others: <10.9 in ε decay (2.65 min).
	659.93[a] 5	20.5[a] 14	(E2)		0.00911	Other Eγ: 659.2 3 in (α,xnγ). Other Iγ: 30 3 in (α,xnγ).
	997.38[a] 5	100[a] 4	M1+E2	−10 +3−13	0.00376 7	δ: −0.2 1 or −10 +3−13 from 997γ–228γ(θ) (2007Mc08) in ^{166}Lu ε decay (2.65 min); α(K)exp=0.0036 3 in (α,xnγ) rules out the first option.
1342.5	1012.0 3					Eγ: from (α,xnγ).
	1238.9[f] 3					Eγ: from (α,xnγ).
1358.93	1256.64[a] 10	100[a] 10				
	1358.79[a] 10	88[a] 11				
1386.05	345.0[bfg] 6	<14[bg]				
	1054.7[b] 6	23[b] 11				
	1283.45[b] 21	100[b] 20				
1418.6	1316.2[#] 3	100[#]				
1451.38	412.20[b] 20	100[b] 9				
	1349.4[b] 6	45[b] 18				
1482.43	318.6[#f] 3	24.3[#] 24				
	814.46 5	100 9	M1		0.01189	Eγ: from ε decay (2.65 min). Iγ: from (α,xnγ).
	1151.7[g] 4	<8.5[g]				Eγ: weighted average of 1151.1 4 in ε decay (2.65 min) and 1152.0 3 in (α,xnγ). Iγ: from ε decay (2.65 min).
1503.37	464.29[b] 7	24[b] 7				
	570.93[b] 9	100[b] 10				
1505.40	837.57[a] 8	62[a] 4	E1+M2	0.31 +3−4	0.0044 6	
	1174.80[a] 13	100[a] 9				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{166}Yb) (continued)

E(level)	Eγ‡	Iγ†	Mult.§	δ	α	Comments
1529.67	1427.18[c] *14*	100[c] *10*				
	1529.73[c] *11*	48[c] *3*				
1570.58	901.5[a] *6*	30[a] *12*				
	1240.05[a] *25*	100[a] *12*				
1579.87	1249.4[c] *8*	56[c] *22*				
	1477.5[c] *3*	100[c] *17*				
	1579.4[c] *6*	39[c] *17*				
1605.94	507.2 *2*	100	E2		0.01718	Mult.: Q from γ(θ) in (^{16}O,4nγ); not M2 from RUL. B(E2)(W.u.)=310 *160*.
1607.42	568.5[b] *6*	64[b] *27*				
	1276.92[b] *22*	100[b] *27*				
	1504.9[b] *6*	100[b] *27*				
1608.01	939.5[#] *3*	100[#]	E0+M1+E2		0.0063 *21*	
1616.78	288.87[ag] *5*	<48[ag]				
	453.86[a] *8*	38.9[a] *25*				Other Iγ: 55 *5* in (α,xnγ).
	577.70[a] *5*	100[a] *6*	[E1]		0.00444	
1684.80	1354.35[a] *15*	100[a] *21*				
	1582.2[a] *6*	14[a] *7*				
1704.54	376.9[#] *3*	42[#] *4*				
	1036.6[#] *3*	100[#] *11*	M1+E2		0.0050 *16*	
1724.85	397.02[a] *10*	70.6[a] *20*				
	625.29[af] *46*	20[a] *6*				
	1056.3[a] *6*	100[a] *22*				
1744.27	705.08[b] *11*	45[b] *4*				
	811.92[b] *6*	100[b] *6*				
1790.33	219.4[a] *3*	4.2[a] *5*				
	1122.38[a] *8*	52[a] *3*				
	1459.63[a] *10*	100[a] *5*				
1812.47	330.9[ag] *5*	<87[ag]				
	714.39[a] *15*	100[a] *10*				
	1144.5[a] *5*	80[a] *20*				
1818.28	490.4[a] *5*	42[a] *12*				
	1151.1[ag] *4*	42[ag] *12*				
	1487.3[a] *4*	100[a] *19*				
1833.3	735.2[a] *6*	90[a] *30*				
	1165.2[a] *6*	100[a] *40*	E1		1.14×10^{-3}	
1835.42	217.9[#] *3*	<4[#]				
	507.4[#] *3*	100[#] *10*				
1852.91	754.8[#] *3*	100[#] *10*	E0+M1+E2		0.011 *4*	α: based on α(K)exp in (HI,xnγ).
	1184.1[#] *3*	90[#] *10*				
1865.41	74.92[a] *10*	11.0[a] *15*	M1,E2		8.9 *12*	Mult.: from α(exp) in ^{166}Lu ε decay (2.65 min).
	248.53[a] *7*	59[a] *3*	(E2)		0.1324	Mult.: from α(K)exp in ^{166}Lu ε decay (2.65 min).
	294.8[a] *3*	4.5[a] *10*				
	360.09[a] *7*	44[a] *4*	M1		0.0966	Mult.: from α(K)exp in ^{166}Lu ε decay (2.65 min).
	382.97[a] *4*	37.5[a] *25*	(E1)		0.01110	Mult.: from α(K)exp in ^{166}Lu ε decay (2.65 min).
	537.64[a] *4*	100[a] *4*	(E1)		0.00518	Mult.: D from γ(θ) in (^{16}O,4nγ) from α(K)exp in ^{166}Lu ε decay (2.65 min).
	1197.2[a] *3*	7.0[a] *10*				
1923.1	1820.4[a] *6*	38[a] *19*				
	1923.2[a] *4*	100[a] *13*				
1940.90	843.3[#] *3*	100[#]	E1		0.00207	
1957.13	139.0[a] *3*	5.9[a] *18*				
	166.6[a]	[a]				
	212.4[a] *3*	16.4[a] *18*	(E2)		0.220	Mult.: from ^{166}Lu ε decay (2.65 min).
	272.2[a] *5*	23[a] *3*				
	386.7[a] *6*	4.1[a] *18*				
	474.74[a] *6*	39.2[a] *23*				

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Adopted Levels, Gammas (continued)

γ(^{166}Yb) (continued)

E(level)	Eγ[‡]	Iγ[†]	Mult.[§]	δ	α	Comments
1957.13	629.32[a] 7	100[a] 6	M1		0.0227	Mult.: from α(K)exp in ^{166}Lu ε decay (2.65 min).
	794.41[a] 5	43[a] 3				
	1626.6[a] 3	13.5[a] 23				
1958.93	93.2[a] 5	2.1[a] 4	[M1,E2]		4.17 11	
	860.56[a] 11	33.5[a] 21	E1+(M2)		0.014 13	Other Iγ: 98 10 in (α,xnγ).
	1290.71[a] 20	100[a] 7	E1		1.01×10^{-3}	Mult.: from α(K)exp in (α,xnγ) and γ(θ) in (^{16}O,4nγ).
2016.35	330.9[fg] 5	<100[g]				
	445.8[a] 4	41[a] 16				
	534.2[af] 6	100[a] 31				
	1685.85[a] 25	92[a] 15				
2029.32	285.07[b] 5	100[b] 5	E1		0.0226	Mult.: from α(K)exp in ε decay (1.41 min).
	345.0[bg] 6	<5[bg]				
	421.26[b] 9	19[b] 1				
	526.01[b] 10	27[b] 3				
	643.2[b] 1	32[b] 3				
	866.4[b] 4	11[b] 2				
	1698.7[b] 4	12[b] 3				
2030.14	547.5[#] 3	<14[#]				
	932.1[#] 3	100[#] 10	E0+M1		0.116 12	α: from α(K)exp in (α,xnγ).
2072.33	112.9 3	10 5				Iγ: from (^{40}Ar,4nγ).
	207.6 3	100 50	(E2)		0.237	Other Eγ: 206.0 5 in (^{16}O,4nγ) and (^{40}Ar,4nγ). Iγ: from (^{40}Ar,4nγ).
2098.61	518.0[a] 8	7[a] 3				
	1996.25[a] 15	21[a] 6				
	2098.6[a] 2	100[a] 12				
2137.13	300.8[#] 3	100[#] 11	(E2)		0.0733	Mult.: Q intraband γ in (^{16}O,4nγ).
	433.2[#] 3	<22[#]				
2143.11	331.0[#g] 3	<110[#g]				
	537.2[#] 3	100[#] 10	M1		0.0340	
2150.32	445.4[#] 3	<207[#]	[E2]		0.0241	
	1052.5[#] 3	100[#] 10	E2+M1		0.00334	Mult.: D+Q from γ(θ) in (^{16}O,4nγ); α(K)exp in (α,4nγ).
2165.77	208.65[a] 10	100[a] 10	M1+E2	0.9 4	0.34 5	Mult.: from ^{166}Lu ε decay (2.65 min).
	1067.34[a] 20	68[a] 9				
	1497.33[a] 23	20[a] 4				
2176.02	570.6[#] 3	100[#]	E2[e]		0.01290	Other Eγ: 569.4 2 in (^{40}Ar,4nγ), 569.7 2 in (^{16}O,4nγ). B(E2)(W.u.)=270 140.
2209.90	1111.4[#] 3	100[#]	E1		1.24×10^{-3}	
2214.89	361.3[#] 3	<45[#]				
	402.7[#] 3	<45[#]				
	608.9[#] 3	77[#] 8	E0+M1+E2		0.052 26	α: based on α(K)exp in (α,xnγ).
	1117.1[#] 3	100[#] 10				
2233.36	67.57[a] 4	12.7[a] 13	E1		0.943	Mult.: from ^{166}Lu ε decay (2.65 min). B(E1)(W.u.)>4.2×10^{-6}.
	274.41[a] 4	31.8[a] 20	M1		0.200	Mult.: from ^{166}Lu ε decay (2.65 min). B(M1)(W.u.)>1.5×10^{-5}.
	276.28[a] 4	43.6[a] 26	(E1)		0.0244	Mult.: from ^{166}Lu ε decay (2.65 min). B(E1)(W.u.)>2.1×10^{-7}.
	367.95[a] 3	100[a] 3	M1		0.0913	Mult.: from ^{166}Lu ε decay (2.65 min). B(M1)(W.u.)>2.0×10^{-5}.
	442.87[a] 20	1.7[a] 4				
2319.56	507.4[g] 3					Eγ: from (α,xnγ).
	713.3 3					Eγ: from (α,xnγ).
2361.45	151.3[#] 3	59[#] 6				Iγ: see comment on 289.2γ.

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Adopted Levels, Gammas (continued)

γ(^{166}Yb) (continued)

E(level)	Eγ‡	Iγ†	Mult.§	α	Comments
2361.45	289.2# *2*	100# *6*	(E2)	0.0831	Mult.: Q from DCO ratio in (^{40}Ar,4nγ) for intraband γ. However, γ may be a doublet in this reaction based on I(289γ)/I(151γ)=8 *4* cf. adopted value of 1.7 *2*.
	420.6# *3*	94# *9*			
2417.51	477.2# *3*	<34#			
	811.0# *3*	100# *10*	(E1)	0.00223	Mult.: D from γ(θ) in (^{16}O,4nγ), Δπ=(yes) from level scheme.
2426.44	1067.32c *20*	60c *10*			
	2324.6c *3*	100c *8*			
	2425.9c *6*	6c *3*			
2491.1	341.0 *5*				Eγ: from (^{16}O,4nγ). Iγ: weak γ in (^{16}O,4nγ).
	353.7 *3*	100	(E2)	0.0455	Eγ: from (α,xnγ). Mult.: Q intraband γ from γ(θ) in (^{16}O,4nγ).
2531.3	355.8# *3*	65# *7*	M1	0.0998	
	924.7# *3*	100# *10*			
2609.6	433.2# *3*	<200#	(M1)	0.0594	
	466.9# *3*	100# *10*			
2646.7	496.4# *3*	100#	E2	0.0182	
2728.9	367.5# *3*	100#	(E2)	0.0409	Mult.: Q intraband γ from DCO ratio in (^{40}Ar,4nγ).
2779.5	603.6# *2*	100#	E2e	0.01122	B(E2)(W.u.)=250 *150*.
2862.9	445.4# *3*	72# *8*	(E2)	0.0240	Mult.: Q intraband γ from DCO ratio in (^{40}Ar,4nγ).
	686.3# *3*	100# *10*	E1	0.00310	
2891.6	400.2# *3*	100# *11*	(E2)	0.0322	
	715.8# *3*	<36#			
2897.9	366.0 *5*	9 *5*	(E2)	0.0413	Mult.: Q from DCO ratio in (^{40}Ar.4nγ) for intraband γ.
	722.1 *2*	100 *10*	(E2)	0.00742	Mult.: Q from DCO ratio in (^{40}Ar.4nγ), Δπ=no from level scheme.
3166.5	437.6 *2*	100	(E2)	0.0252	Mult.: Q intraband γ from DCO in (^{40}Ar,4nγ) and from γ(θ) in (^{16}O,4nγ).
3196.7	550.0& *5*	100&	(E2)	0.01405	Mult.: from γ(θ) in (^{16}O,4nγ) for intraband γ.
3273.7	375.8 *2*	22.6 *23*	E2e	0.0383	B(E2)(W.u.)=220 *60*.
	494.3 *2*	100 *10*	E2e	0.0184	B(E2)(W.u.)=250 *70*.
3350.6	459.0# *3*	100#	(E2)	0.0222	Mult.: Q from γ(θ) in (^{16}O,4nγ) for intraband γ.
3354.0	490.8 *2*	100 *10*	(E2)d	0.0187	
	575.1 *5*	32 *16*	D		Mult.: from γ(θ) in (^{16}O,4nγ).
3490.1	592.5 *2*	63 *6*			
	710.5 *2*	100 *10*	(E2)d	0.00770	
3665.9	499.4 *2*	100	(E2)d	0.0179	
3782.0	508.3 *2*	100	[E2]	0.01711	B(E2)(W.u.)=370 *50*.
3878.1	527.5& *5*	100&	(E2)d	0.01557	
3892.2	403.0& *5*	49&			Iγ: for possible doublet.
	538.1 *2*	100	(E2)d	0.01483	Iγ: from (^{16}O,4nγ).
4189.9	699.8 *2*	100	(E2)d	0.00797	
4218.7	552.8 *2*	100	(E2)d	0.01388	
4370.6	588.5 *2*	100	E2e	0.01192	B(E2)(W.u.)=360 *30*.
4470.8	592.7 *5*	100	[E2]	0.01172	
4478.7	586.5 *2*	100	(E2)d	0.01202	
4819.2	600.4 *2*	100	(E2)d	0.01137	
4922.8	732.9 *2*	100	(E2)d	0.00718	
5036.9	666.3 *2*	100	E2e	0.00891	B(E2)(W.u.)=390 *40*.
5108.7	630.0 *2*	100	(E2)d	0.01015	
5119.1	648.3 *5*	100			
5468.6	649.4 *2*	100	(E2)e	0.00945	
5649.7	726.9 *5*	100	(E2)d	0.00731	
5775.5	738.6 *2*	100	[E2]	0.00706	B(E2)(W.u.)=380 *50*.
5782.7	674.0 *2*	100	(E2)d	0.00868	
5814.0	694.9 *5*	100			
6173.4	704.8 *2*	100	(E2)d	0.00784	
6378.1?	728.5f *5*	100	(E2)d	0.00728	
6507.6	724.9 *2*	100	[E2]	0.00736	
6551.8	737.8 *5*	100			
6581.8	806.3 *2*	100	E2e	0.00583	B(E2)(W.u.)=370 *30*.

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Adopted Levels, Gammas (continued)

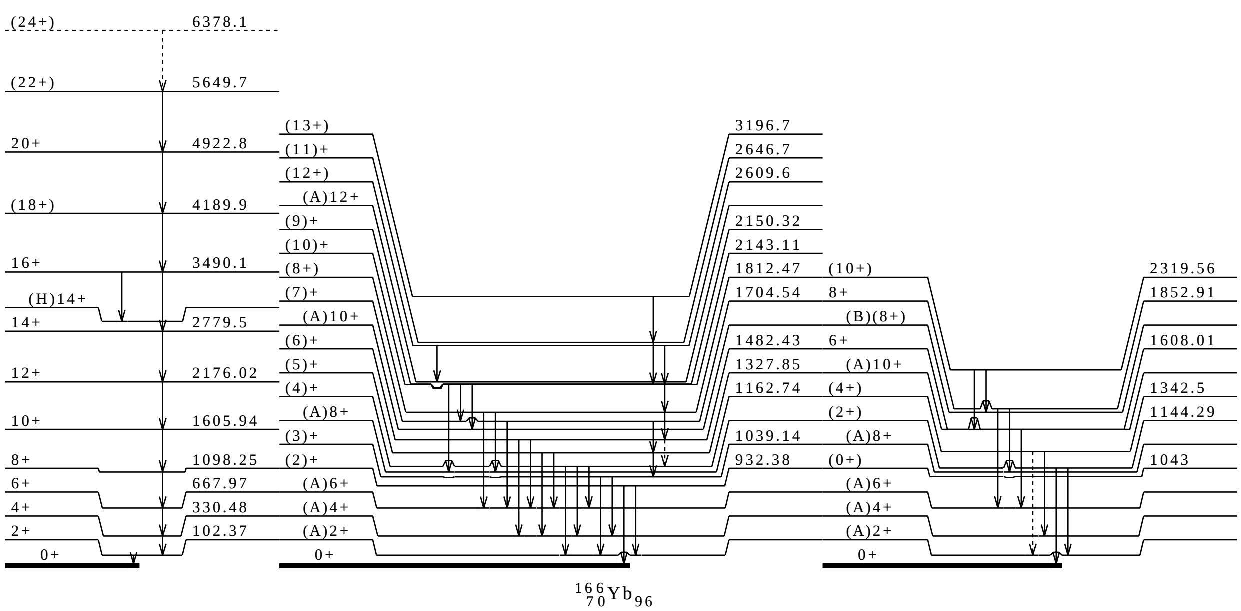
γ(^{166}Yb) (continued)

E(level)	Eγ‡	Iγ†	Mult.§	α	Comments
6940.0	766.6 *2*	100	(E2)[d]	0.00650	
7294.7	787.1 *2*	100	(E2)[d]	0.00614	
7334.6?	783.0[f] *5*	100			
7452.0	870.2 *2*	100	[E2]	0.00495	B(E2)(W.u.)=300 *30*.
7773.6	833.6 *2*	100	(E2)[d]	0.00542	
8148.5	853.8 *5*	100	(E2)[d]	0.00515	
8387.0	935.0 *2*	100	E2[e]	0.00426	B(E2)(W.u.)=260 *40*.
8677.0	903.4 *5*	100	(E2)[d]	0.00457	
9071.3	922.8 *5*	100	[E2]	0.00438	
9385.8	998.8 *5*	100	(E2)[d]	0.00372	B(E2)(W.u.)=250 *50*.
9648.6	971.6 *5*	100	(E2)[d]	0.00393	
10057.5	986.2 *5*	100	(E2)[d]	0.00381	
10445.8	1060.0 *5*	100	[E2]	0.00329	B(E2)(W.u.)=220 *50*.
11102?	1045.0[f] *5*	100			
11557.8	1112.0 *5*	100			
12186?	1084.0[f] *5*	100			
12716?	1158.0[f] *5*	100			
162.6+x	162.6[@]	100			
334.9+x	172.3[@]	100			
524.9+x	190.0[@]				
	362.3[@]				
735.5+x	210.6[@]				
	400.6[@f]				
966.4+x	230.9[@]				
	441.5[@]				
1217.0+x	250.6[@]				
	481.5[@f]				
1486.2+x	269.2[@]				
	519.8[@]				
1772.7+x	286.5[@]				
	555.7[@]				
2075.2+x	302.5[@]				
	589.0[@]				
2392.6+x	317.4[@]				
	619.9[@]				
2722.6+x	330.0[@]				
	647.4[@]				
3064.1+x	341.5[@]				
	671.5[@]				
3416.6+x	352.5[@]				
	694.0[@]				
3778.4+x	361.8[@]				
	714.3[@]				
4149.6+x	371.2[@]				
	733.0[@]				
4531.2+x	381.6[@]				
	752.8[@]				
4921.6+x	390.4[@f]				
	772.0[@]				

† Relative photon intensity normalized to 100 at strongest photon deexciting each level. From (^{40}Ar,4nγ), except as noted.
‡ From ^{130}Te(^{40}Ar,4nγ), unless otherwise noted.
§ From α(K)exp in (α,xnγ), except as noted.
# From Er(α,xnγ).
@ From ^{124}Sn(^{48}Ca,6nγ).
& From ^{154}Sm(^{16}O,4nγ).
a From ^{166}Lu ε decay (2.65 min) (1974De09).
b From ^{166}Lu ε decay (1.41 min) (1974De09).
c From ^{166}Lu ε decay (2.12 min) (1974De09).
d Q from γ(θ) in (^{16}O,4nγ) and/or from DCO ratio in (^{40}Ar,4nγ) for intraband transition.
e Q from DCO ratio in (^{40}Ar,4nγ); not M2 from RUL.
f Placement of transition in the level scheme is uncertain.
g Multiply placed; undivided intensity given.

Adopted Levels, Gammas (continued)

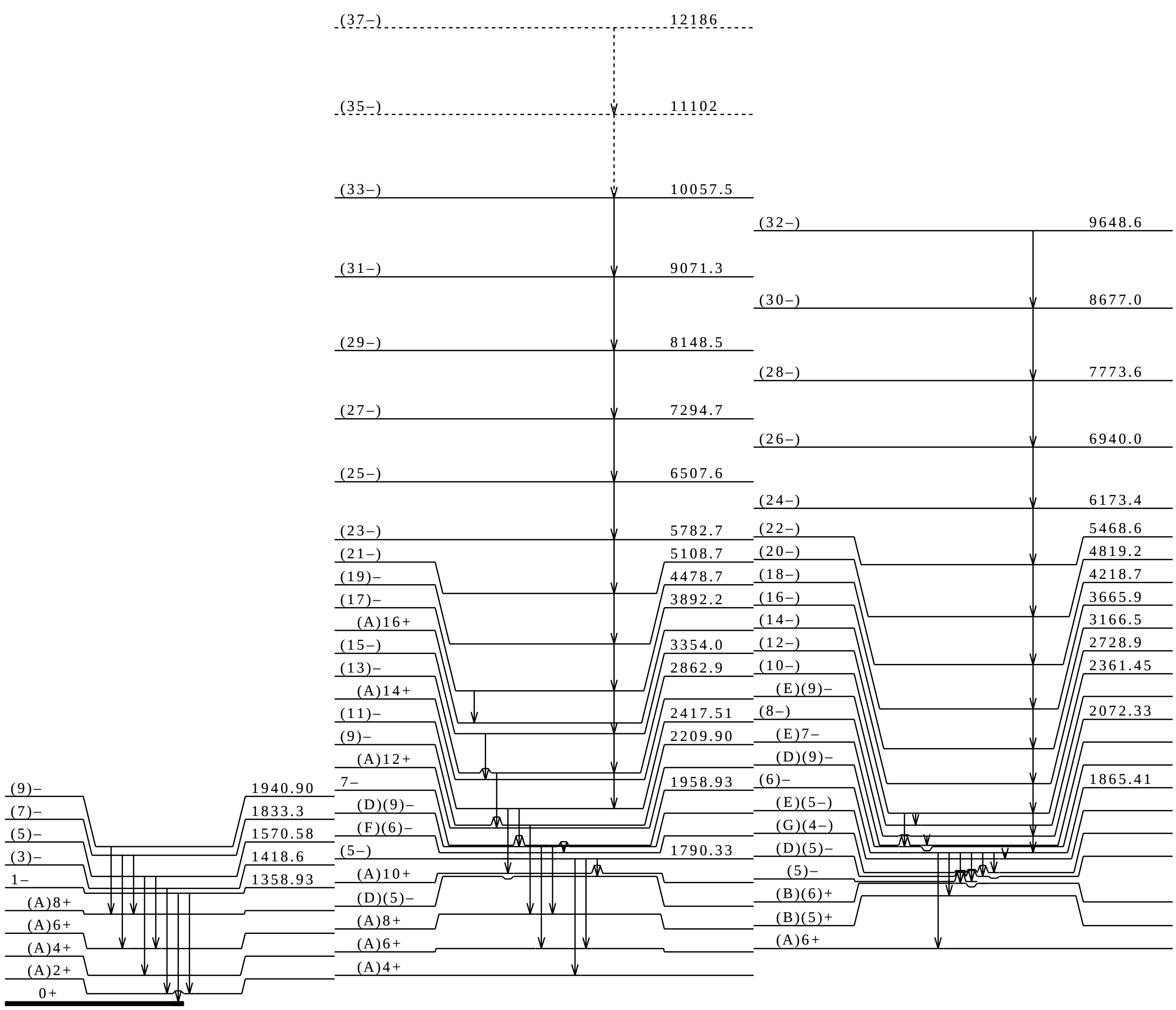
(A) Kπ=0+ g.s. band. **(B) Kπ=2+ γ–vibrational band.** **(C) Kπ=0+ β–vibrational band.**



$^{166}_{70}Yb_{96}$

Adopted Levels, Gammas (continued)

(D) Kπ=(0)– band. **(E) Kπ=5–, α=1 band.** **(F) Kπ=5–, α=0 band.**

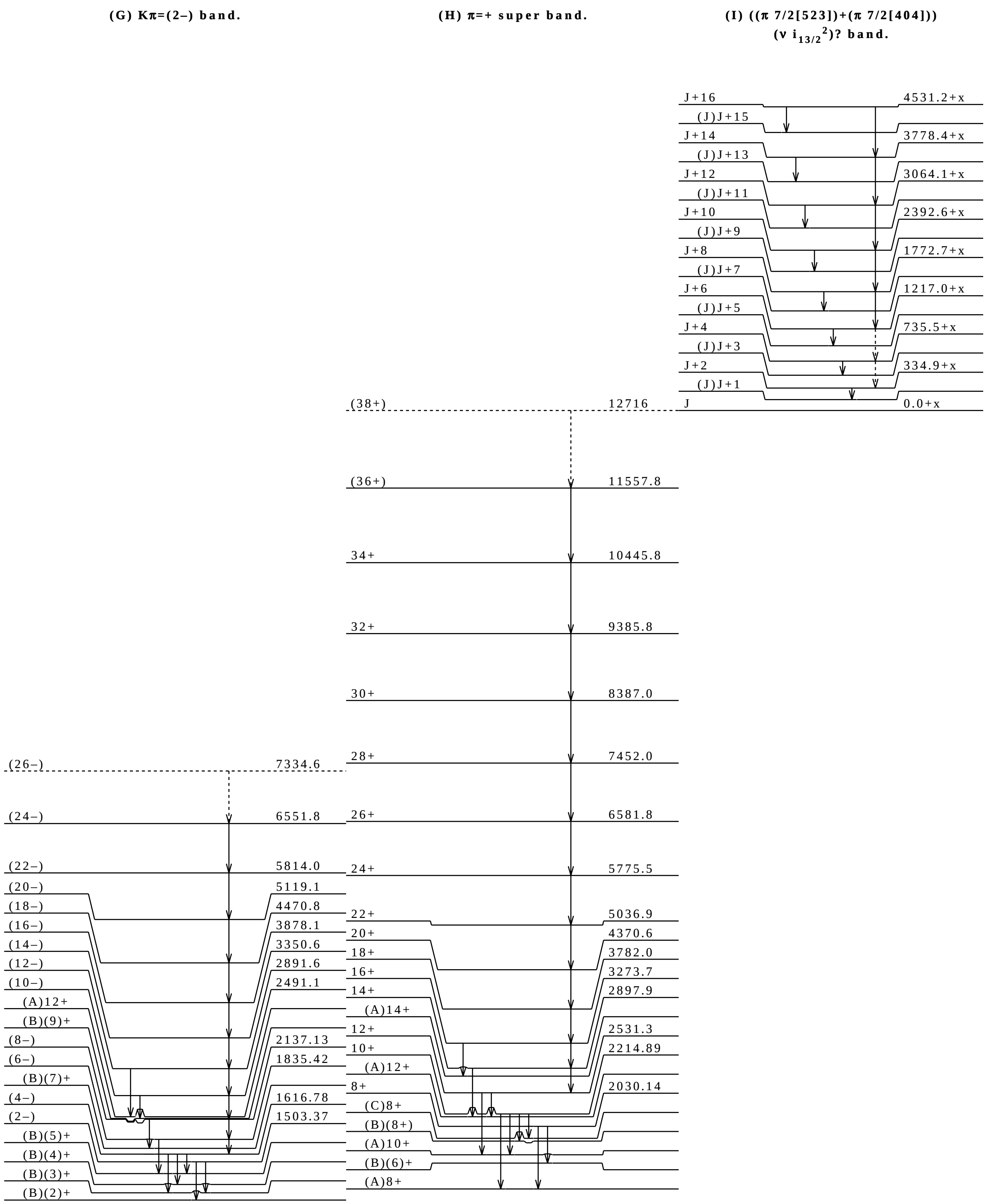


$^{166}_{70}Yb_{96}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

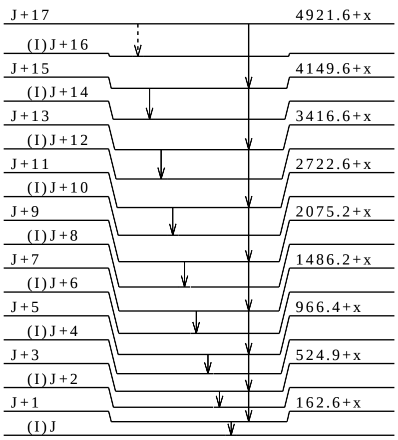
Adopted Levels, Gammas (continued)



$^{166}_{70}Yb_{96}$

Adopted Levels, Gammas (continued)

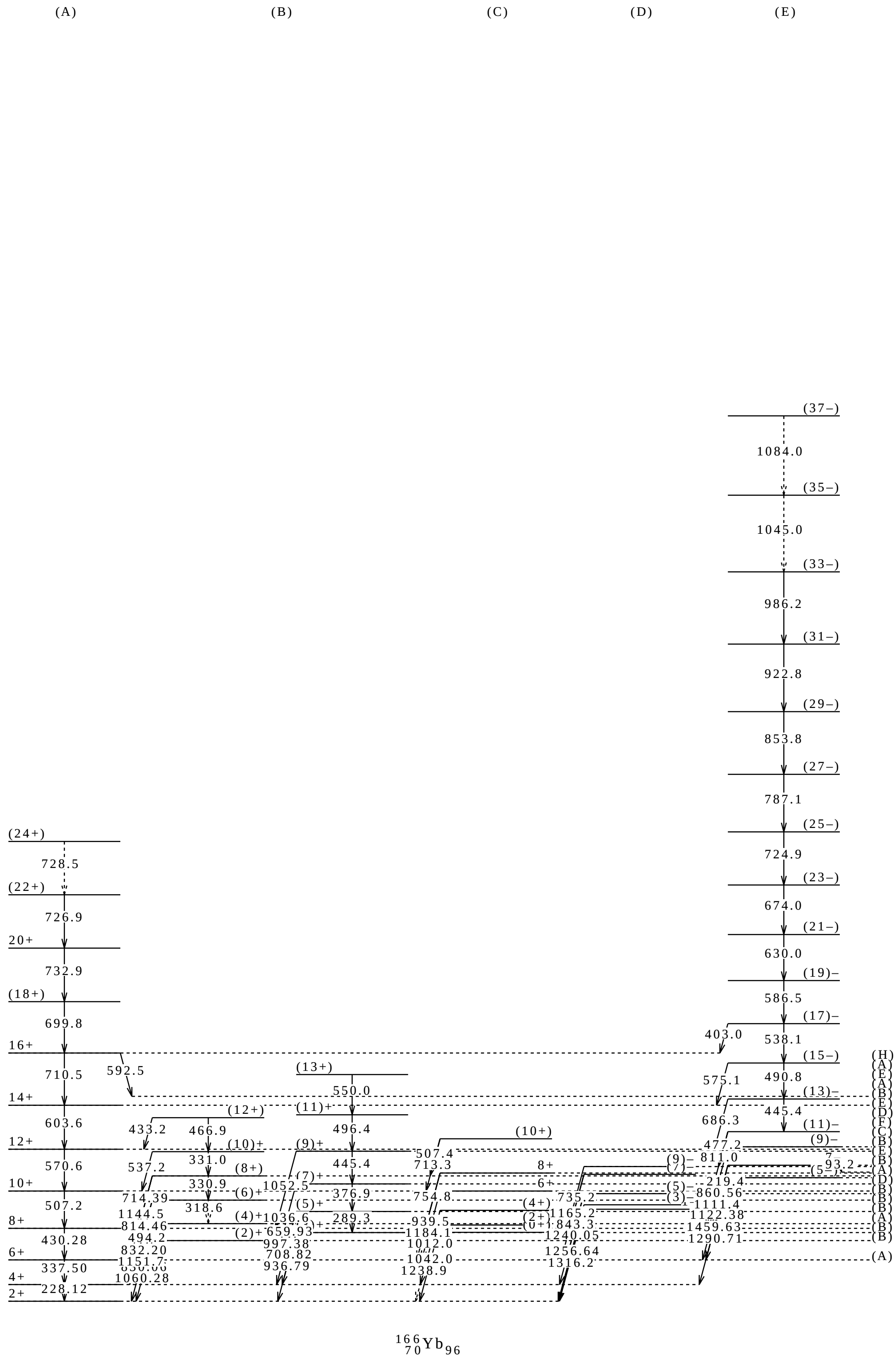
(J) ((π 7/2[523])+(π 7/2[404])) (ν $i_{13/2}{}^2$)? band.



$^{166}_{70}Yb_{96}$

Adopted Levels, Gammas (continued)

Bands for ^{166}Yb

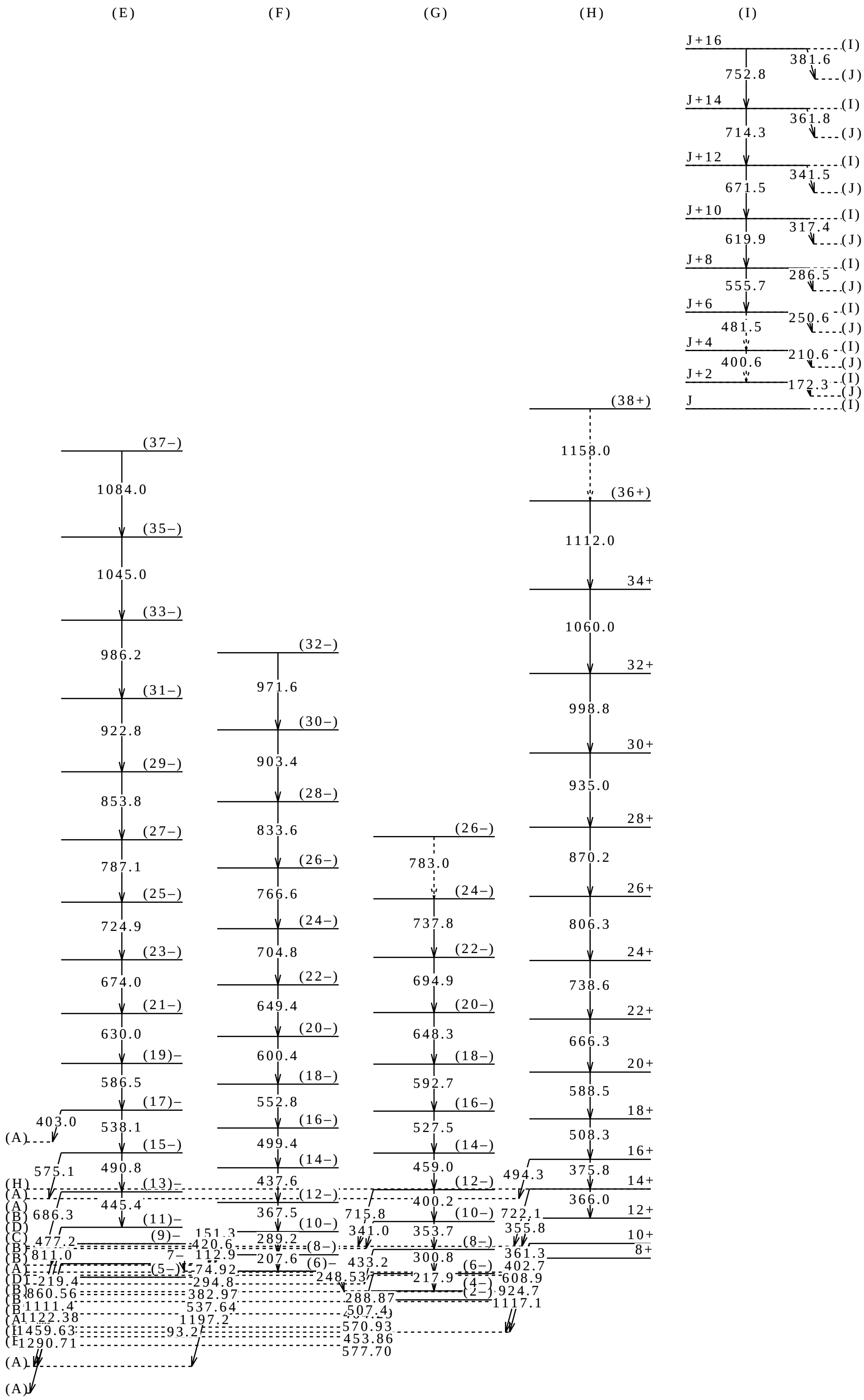


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Yb



$^{166}_{70}Yb_{96}$

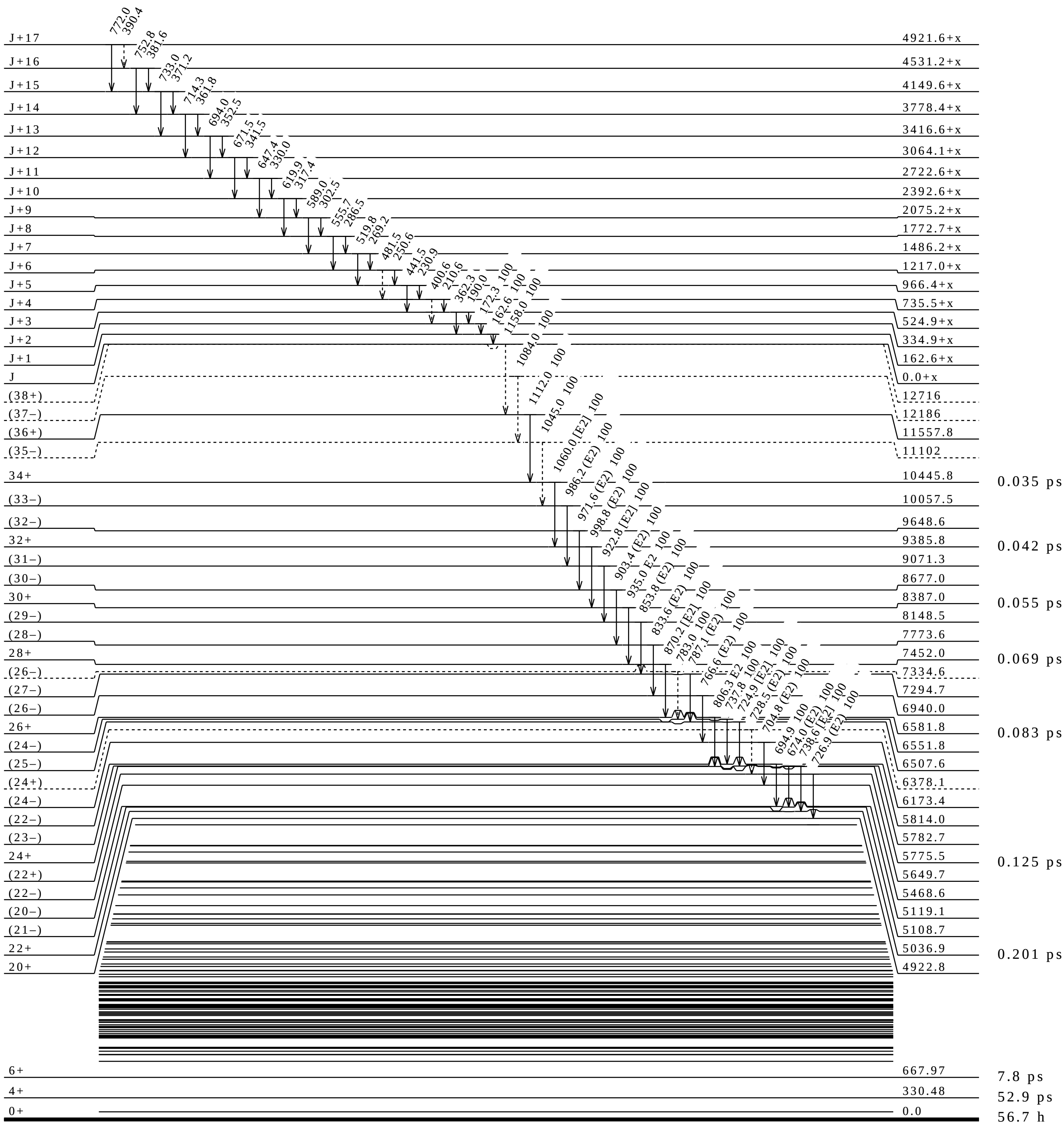
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given



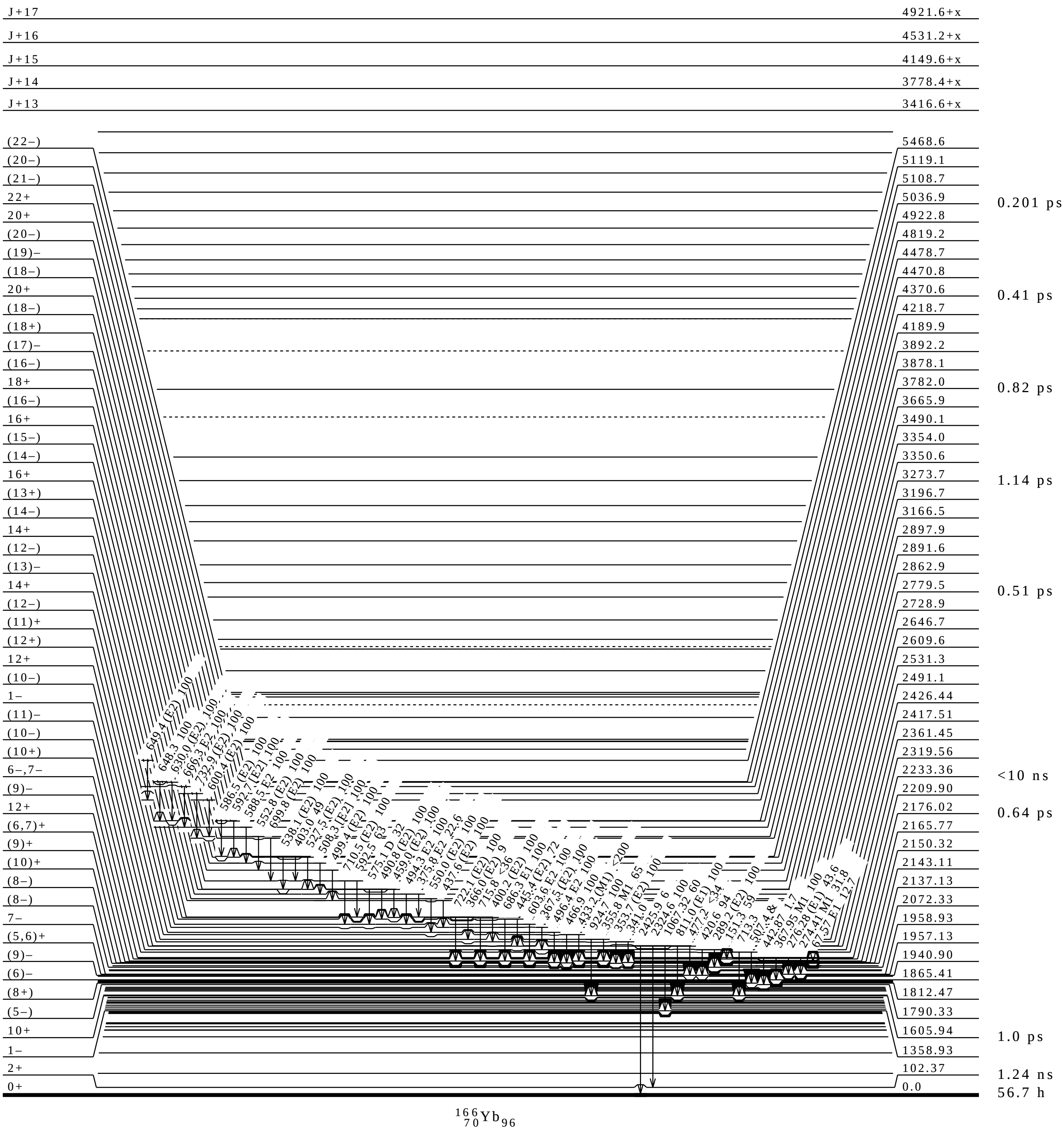
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given



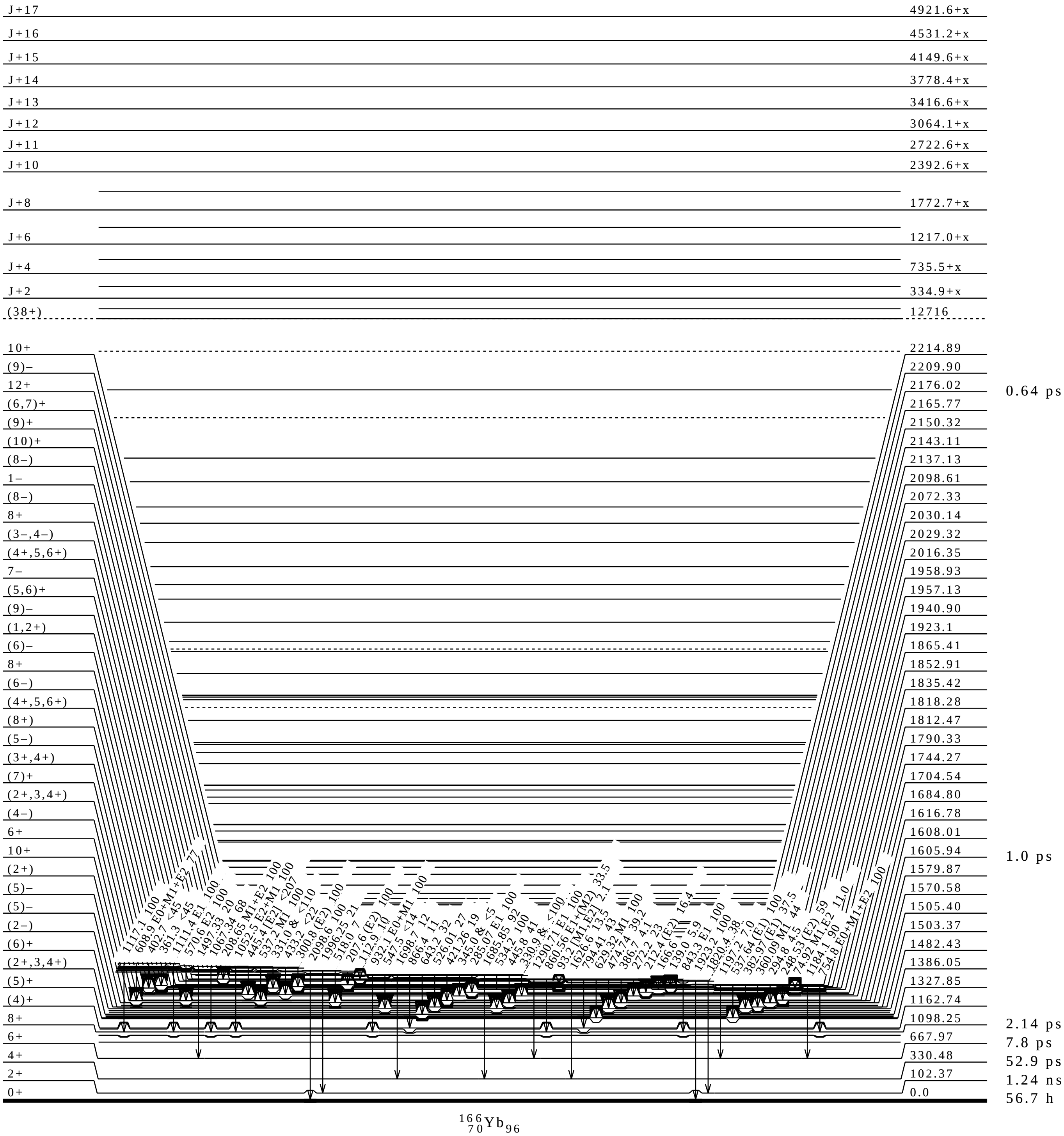
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given



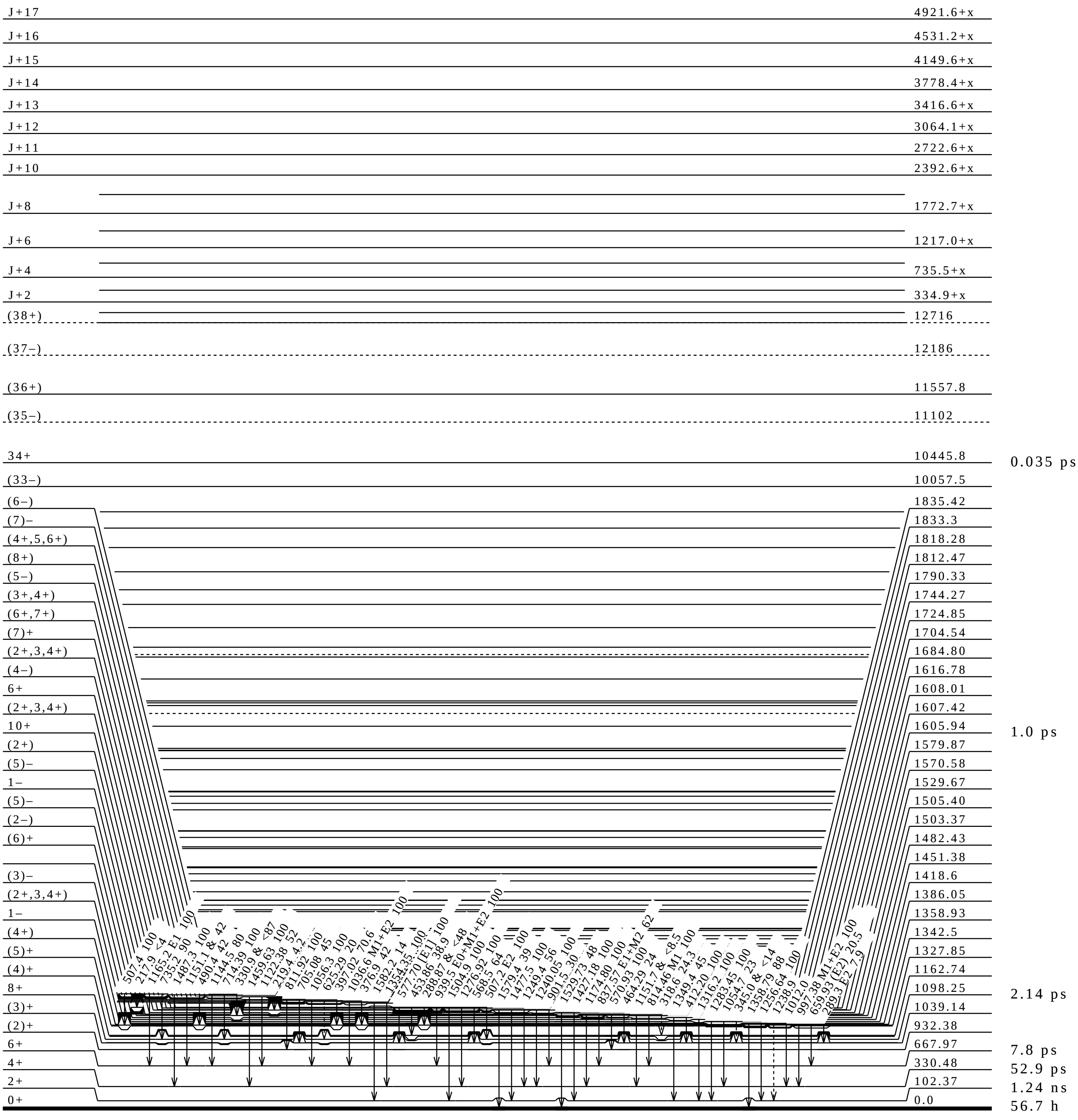
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given



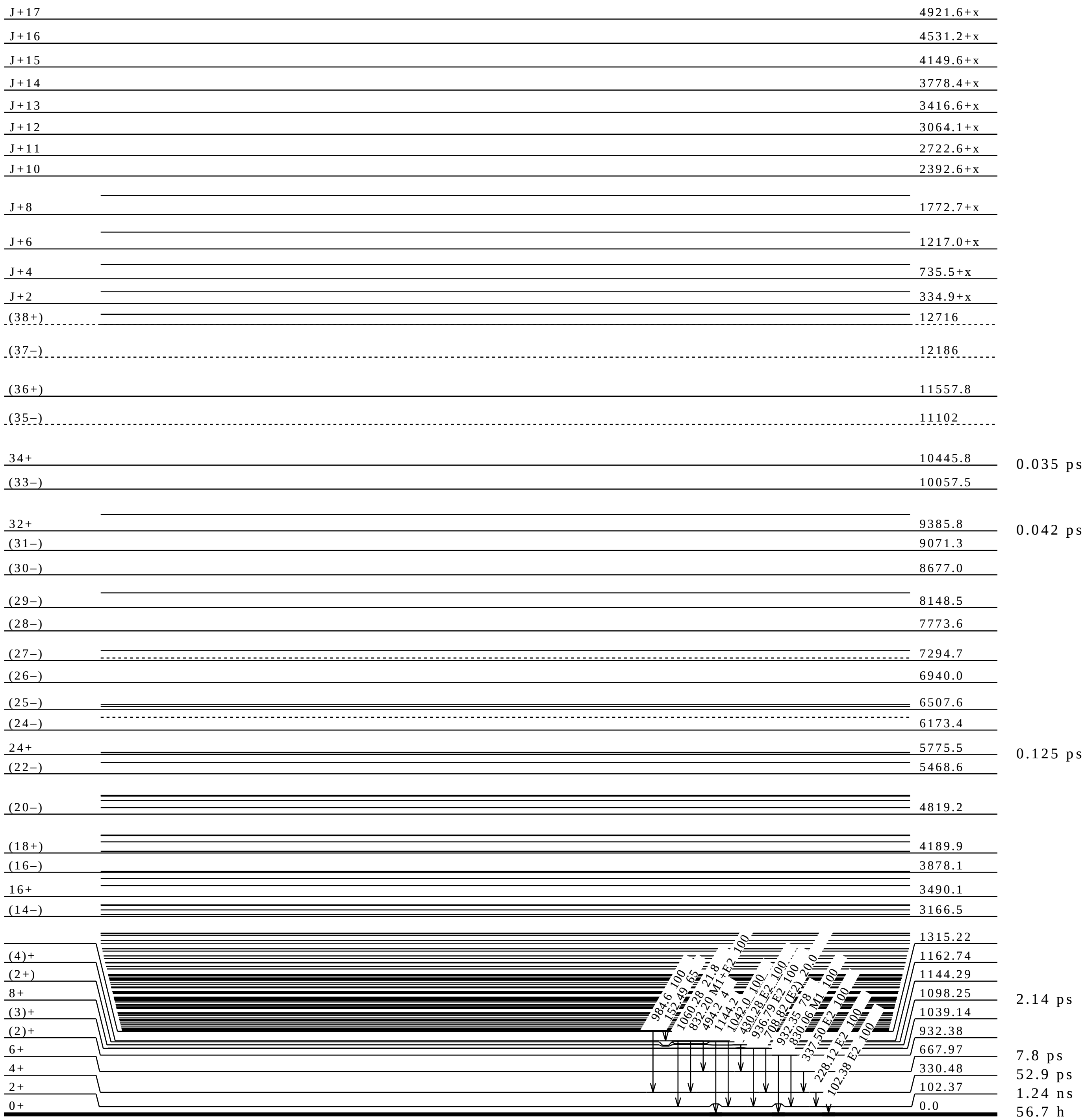
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
& Multiply placed; undivided intensity given



$^{166}_{70}Yb_{96}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08

Parent ^{166}Lu: E=0. ; Jπ=6−; $T_{1/2}$=2.65 min *10*; Q(g.s.)=5570 *30*; %ε+%β^+ decay=100.
2007Mc08: measured γγ(θ) out−of−beam for three cascades using 8 Compton suppressed segmented YRAST Ball Clover HPGe detectors. These data are a byproduct of a study of ^{168}Ta ε decay for which the source was produced using 130−MeV ^{16}O bombardment of ^{159}Tb; the ^{166}Lu component may be a mixture of all three isomers, but the 6− isomer's presence is confirmed by the observation of the 997γ which is known from that decay but not from the 0− or 3(−) isomer decays.

^{166}Yb Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0+		
102.38 *3*	2+		
330.48 *4*	4+		
667.95 *5*	6+		
(932.38 *5*)			E(level): from Adopted Levels.
1039.20 *6*	(3)+		
1098.24 *6*	8+		
1162.87 *6*	(4)+		
1327.81 *5*	(5)+		
1482.39 *6*	(6)+		
1505.38 *7*	(5)−		
1570.55 *15*	(5)−		
1616.85 *6*	(4−)		
1684.82 *15*	(2+,3,4+)		
1724.81 *11*	(6+,7+)		
1744.6 *3*	(3+,4+)		
1790.31 *7*	(5−)		
1812.62 *16*	(8+)		
1818.01 *23*	(4+,5,6+)		
1833.2 *5*	(7)−		
1865.39 *6*	(6)−		
1957.06 *6*	(5,6)+		
1958.89 *7*	7−		
2016.34 *22*	(4+,5,6+)		
2165.73 *7*	(6,7)+		
2233.32 *6*	6−,7−	<10 ns	

† From least−squares fit to Eγ.
‡ From Adopted Levels.

β^+,ε Data

Eε‡	E(level)	$I\beta^+$§	Iε†§	Log *ft*†	$I(\varepsilon+\beta^+)$§	Comments
3247	2233.32	19 *1*	50 *4*	4.69 *4*	69 *5*	av Eβ=1046 *14*; εK=0.608 *7*; εL=0.0953 *11*; εM+=0.0287 *4*.
(3610# *30*)	1957.06	0.7 *4*	1.5 *7*	6.30 *22*	2.2 *11*	av Eβ=1171 *14*; εK=0.548 *7*; εL=0.0857 *11*; εM+=0.0258 *4*.
(3780# *30*)	1790.31	1.1 *7*	1.7 *11*	6.3 *3*	2.8 *18*	av Eβ=1246 *14*; εK=0.512 *7*; εL=0.0800 *11*; εM+=0.0241 *3*.
(3850 *30*)	1724.81	1.5 *2*	2.3 *4*	6.16 *8*	3.8 *6*	av Eβ=1276 *14*; εK=0.498 *7*; εL=0.0778 *10*; εM+=0.0234 *3*.
(4060 *30*)	1505.38	1.5 *3*	1.7 *3*	6.32 *9*	3.2 *6*	av Eβ=1376 *14*; εK=0.453 *6*; εL=0.0706 *10*; εM+=0.0212 *3*.
(4240 *30*)	1327.81	2.2 *8*	2.3 *8*	6.25 *16*	4.5 *16*	av Eβ=1458 *14*; εK=0.418 *6*; εL=0.0651 *9*; εM+=0.0196 *3*.
(4410 *30*)	1162.87	1.4 *5*	3.1 *11*	8.00^{1u} *16*	4.5 *16*	av Eβ=1513 *14*; εK=0.577 *5*; εL=0.0921 *9*; εM+=0.0278 *3*.
(4900 *30*)	667.95	3.6 *8*	2.1 *4*	6.40 *10*	5.7 *12*	av Eβ=1762 *14*; εK=0.307 *5*; εL=0.0477 *7*; εM+=0.01433 *21*.
(5240 *30*)	330.48	2.0 *7*	2.2 *7*	8.45^{1u} *15*	4.2 *14*	av Eβ=1885 *14*; εK=0.441 *5*; εL=0.0698 *8*; εM+=0.02104 *23*.

† The total intensity of γ rays not placed in the decay scheme is 14%; consequently, Iε and log *ft* values are given for only the strongest branches, and the values for the 2233 level alone can be considered to be reliable.
‡ E(β^+) to the 2233−keV level has been measured as 2225 keV *160*.
§ Absolute intensity per 100 decays.
\# Existence of this branch is questionable.

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

γ(^{166}Yb)

1974De09 pointed out that the following γ rays definitely belong to ^{166}Lu decay but could not be assigned with sufficient certainty to one of the three activities. The intensity given for these lines is normalized to the ground–state decay values of ^{166}Lu.

Eγ	Iγ	Eγ	Iγ
308.8 *6*	0.6 *3*	1389.8 *6*	1.2 *6*
312.9 *4*	0.8 *4*	1548.2 *6*	0.5 *3*
401.7 *3*	1.1 *3*	1594.5 *6*	0.6 *3*
416.1 *5*	0.6 *3*	1620.2 *6*	0.6 *3*
549.6 *6*	0.8 *4*	1654.0 *6*	0.8 *4*
612.1 *6*	1.6 *4*	1693.9 *6*	0.6 *3*
671.6 *4*	1.5 *4*	1809.3 *6*	0.6 *3*
697.3 *6*	0.9 *3*	1888.1 *6*	0.6 *3*
735.2 *6*	0.9 *3*	2149.2 *6*	0.6 *3*
769.4 *8*	0.4 *2*	2259.0 *6*	1.0 *3*
915.9 *6*	0.7 *4*	2262.8 *6*	1.0 *3*
942.6 *6*	0.9 *4*	2362.6 *10*	1.0 *3*
948.0 *6*	1.0 *4*	2448.5 *6*	1.2 *3*
962.1 *6*	0.8 *4*	2481.5 *6*	0.5 *3*
1011.6 *6*	0.9 *4*	2489.6 *6*	0.5 *3*
1171.0 *6*	1.0 *4*	2547.5 *6*	0.5 *2*
1316.6 *10*	0.6 *3*	2762.5 *5*	0.4 *2*

Conversion coefficient data from 1974De09 normalized so α(K)exp(337.5γ)=0.0383=α(K)(E2 theory).
Iγ normalization: no β^+ or ε feeding to ^{166}Yb g.s. is expected (ΔJ=6), so Σ(I(γ+ce) to g.s.)=100.

Eγ	E(level)	Iγ‡	Mult.†	δ	α	I(γ+ce)‡	Comments
67.57 *4*	2233.32	9.7 *10*	E1		0.943		α(K)=0.767 *11*; α(L)=0.1379 *20*; α(M)=0.0310 *5*; α(N+..)=0.00802 *12*. α(N)=0.00708 *10*; α(O)=0.000901 *13*; α(P)=3.22×10^{-5} *5*. Mult.: from α(exp)=0.70 *26* (α(exp) have been deduced from γγ coincidence measurement) (1974De09).
74.92 *10*	1865.39	2.2 *3*	M1,E2		8.9 *12*		α(K)=4.0 *25*; α(L)=4 *3*; α(M)=0.9 *7*; α(N+..)=0.23 *18*. α(N)=0.21 *16*; α(O)=0.024 *17*; α(P)=0.00024 *16*. Mult.: from α(exp)=9.4 *20* deduced from γγ–coincidence measurement (1974De09).
93.2 *5*	1958.89	0.5 *1*	[M1,E2]		4.17 *11*		α(K)=2.3 *12*; α(L)=1.4 *9*; α(M)=0.35 *23*; α(N+..)=0.09 *6*. α(N)=0.08 *6*; α(O)=0.009 *6*; α(P)=0.00013 *8*.
ˣ99.53 *20*		1.1 *1*					
102.38 *3*	102.38	61.5 *30*	E2		2.93		α(K)=0.968 *14*; α(L)=1.501 *22*; α(M)=0.370 *6*; α(N+..)=0.0941 *14*. α(N)=0.0844 *12*; α(O)=0.00970 *14*; α(P)=4.10×10^{-5} *6*. Mult.: from α(K)exp=1.1 *3*, α(L)exp=1.4 *3* and α(M+N)=0.51 *9* (1974De09). %Iγ=25.4 *6* assuming recommended normalization.
139.0 *3*	1957.06	1.0 *3*					
ˣ160.0 *6*		0.6 *3*					
166.6#	1957.06						From fig. 7 of 1974De09; absent from tabulated data.
ˣ191.8 *3*		1.2 *2*					
ˣ195.54 *15*		2.1 *3*					

Continued on next page (footnotes at end of table)

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

γ(^{166}Yb) (continued)

Eγ	E(level)	Iγ‡	Mult.†	δ	α	I(γ+ce)‡	Comments
208.65 *10*	2165.73	9.1 *9*	M1+E2	0.9 *4*	0.34 *5*		α(K)=0.26 *6*; α(L)=0.060 *4*; α(M)=0.0138 *11*; α(N+..)=0.00365 *24*. α(N)=0.00321 *23*; α(O)=0.000423 *13*; α(P)=1.5×10^{-5} *4*. Mult.: from α(K)exp=0.27 *5* (1974De09).
212.4 *3*	1957.06	2.8 *3*	(E2)		0.220		α(K)=0.1391 *21*; α(L)=0.0621 *10*; α(M)=0.01499 *23*; α(N+..)=0.00387 *6*. α(N)=0.00344 *6*; α(O)=0.000417 *7*; α(P)=6.59×10^{-6} *10*. Mult.: from α(K)exp=0.28 *18* (1974De09).(α(K)exp consistent with M1 or E2 but ΔJ=2 from decay scheme).
219.4 *3*	1790.31	0.8 *1*					
228.12 *3*	330.48	188.5 *14*	E2		0.1743		α(K)=0.1136 *16*; α(L)=0.0466 *7*; α(M)=0.01121 *16*; α(N+..)=0.00290 *4*. α(N)=0.00258 *4*; α(O)=0.000314 *5*; α(P)=5.47×10^{-6} *8*. Mult.: from α(K)exp=0.10 *1*, α(L)exp=0.045 *4* (1974De09) and A_2=+0.104 *20*, A_4=+0.005 *26* for 228γ–102γ(θ) (2007Mc08).
248.53 *7*	1865.39	11.8 *6*	(E2)		0.1324		α(K)=0.0891 *13*; α(L)=0.0333 *5*; α(M)=0.00797 *12*; α(N+..)=0.00206 *3*. α(N)=0.00183 *3*; α(O)=0.000226 *4*; α(P)=4.38×10^{-6} *7*. Mult.: from α(K)exp=0.14 *6* (1974De09).
x268.16 *16*		2.0 *2*					
272.2 *5*	1957.06	4.0 *5*					
274.41 *4*	2233.32	24.4 *15*	M1		0.200		α(K)=0.1678 *24*; α(L)=0.0252 *4*; α(M)=0.00564 *8*; α(N+..)=0.001523 *22*. α(N)=0.001324 *19*; α(O)=0.000190 *3*; α(P)=1.015×10^{-5} *15*. Mult.: from α(K)exp=0.184 *26* (1974De09).
276.28 *4*	2233.32	33.4 *20*	(E1)		0.0244		α(K)=0.0205 *3*; α(L)=0.00304 *5*; α(M)=0.000677 *10*; α(N+..)=0.000180 *3*. α(N)=0.0001575 *22*; α(O)=2.18×10^{-5} *3*; α(P)=1.031×10^{-6} *15*. Mult.: from α(K)exp=0.058 *20* (1974De09).
288.87§ *5*	1327.81	4.67§ *11*	E2		0.0829		α(K)=0.0585 *9*; α(L)=0.0187 *3*; α(M)=0.00446 *7*; α(N+..)=0.001159 *17*. α(N)=0.001028 *15*; α(O)=0.0001286 *18*; α(P)=2.97×10^{-6} *5*.
	1616.85	4.67§ *11*					

Continued on next page (footnotes at end of table)

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

γ(^{166}Yb) (continued)

Eγ	E(level)	Iγ‡	Mult.†	δ	α	I(γ+ce)‡	Comments
294.84 *26*	1865.39	0.95 *20*					
x319.37 *15*		1.85 *25*					
330.9§ *5*	1812.62	1.1§ *2*					
	2016.34	1.1§ *2*					
337.50 *3*	667.95	100	E2		0.0521		α(K)=0.0383 *6*; α(L)=0.01066 *15*; α(M)=0.00252 *4*; α(N+..)=0.000657 *10*. α(N)=0.000581 *9*; α(O)=7.40×10^{-5} *11*; α(P)=2.00×10^{-6} *3*. Mult.: from α(L)exp=0.011 *3* (1974De09).
x353.96 *20*		1.3 *3*					
360.09 *7*	1865.39	8.8 *7*	M1		0.0966		α(K)=0.0811 *12*; α(L)=0.01210 *17*; α(M)=0.00270 *4*; α(N+..)=0.000730 *11*. α(N)=0.000635 *9*; α(O)=9.09×10^{-5} *13*; α(P)=4.89×10^{-6} *7*. Mult.: from α(K)exp=0.103 *25* (1974De09).
367.95 *3*	2233.32	76.7 *23*	M1		0.0913		α(K)=0.0766 *11*; α(L)=0.01142 *16*; α(M)=0.00255 *4*; α(N+..)=0.000689 *10*. α(N)=0.000599 *9*; α(O)=8.58×10^{-5} *12*; α(P)=4.61×10^{-6} *7*. Mult.: from α(K)exp=0.085 *8*, α(L)exp=0.014 *3* (1974De09).
x377.4 *4*		0.9 *2*					
382.97 *4*	1865.39	7.5 *5*	(E1)		0.01110		α(K)=0.00936 *14*; α(L)=0.001357 *19*; α(M)=0.000302 *5*; α(N+..)=8.06×10^{-5} *12*. α(N)=7.03×10^{-5} *10*; α(O)=9.82×10^{-6} *14*; α(P)=4.84×10^{-7} *7*. Mult.: from α(K)exp=0.029 *14* (1974De09).
386.7 *6*	1957.06	0.7 *3*					
397.02 *10*	1724.81	3.6 *1*					
430.28 *3*	1098.24	12.2 *7*	E2		0.0264		α(K)=0.0203 *3*; α(L)=0.00470 *7*; α(M)=0.001096 *16*; α(N+..)=0.000288 *4*. α(N)=0.000254 *4*; α(O)=3.32×10^{-5} *5*; α(P)=1.098×10^{-6} *16*.
442.87 *20*	2233.32	1.3 *3*					
445.8 *4*	2016.34	0.53 *21*					
453.86 *8*	1616.85	3.85 *25*					
x467.6 *5*		0.9 *3*					
474.74 *6*	1957.06	6.7 *4*					
x487.2 *3*		1.5 *4*					
490.4 *5*	1818.01	1.1 *3*					
494.2 *8*	1162.87	0.6 *3*					
x523.9 *5*		1.24 *12*					
534.2# *6*	2016.34	1.3 *4*					Eγ, Iγ from table 1a of 1974De09, assignment to 2.65 min decay from fig. 7 of 1974De09.

Continued on next page (footnotes at end of table)

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

γ(^{166}Yb) (continued)

Eγ	E(level)	Iγ‡	Mult.†	δ	α	I(γ+ce)‡	Comments
537.64 *4*	1865.39	20.0 *8*	(E1)		0.00518		α(K)=0.00438 *7*; α(L)=0.000622 *9*; α(M)=0.0001379 *20*; α(N+..)=3.70×10^{-5} *6*. α(N)=3.22×10^{-5} *5*; α(O)=4.53×10^{-6} *7*; α(P)=2.31×10^{-7} *4*. Mult.: from α(K)exp=0.016 *8* (1974De09).
577.70 *5*	1616.85	9.9 *6*	[E1]		0.00444		α(K)=0.00376 *6*; α(L)=0.000531 *8*; α(M)=0.0001177 *17*; α(N+..)=3.16×10^{-5} *5*. α(N)=2.75×10^{-5} *4*; α(O)=3.88×10^{-6} *6*; α(P)=1.99×10^{-7} *3*.
625.3# *5*	1724.81	1.0 *3*					
629.32 *7*	1957.06	17.1 *10*	M1		0.0227		α(K)=0.0191 *3*; α(L)=0.00280 *4*; α(M)=0.000624 *9*; α(N+..)=0.0001688 *24*. α(N)=0.0001466 *21*; α(O)=2.10×10^{-5} *3*; α(P)=1.140×10^{-6} *16*. Mult.: from α(K)exp=0.016 *6* (1974De09).
x648.1 *6*		1.0 *3*					
659.93 *5*	1327.81	9.0 *6*	(E2)		0.00911		α(K)=0.00738 *11*; α(L)=0.001343 *19*; α(M)=0.000307 *5*; α(N+..)=8.15×10^{-5} *12*. α(N)=7.14×10^{-5} *10*; α(O)=9.72×10^{-6} *14*; α(P)=4.12×10^{-7} *6*.
(705.08)	1744.6					≈1.0	Eγ,I(γ+ce): from Adopted Gammas. I(γ+ce) based on adopted branching and I(γ+ce) feeding level, assuming no ε+β$^+$ branch to level.
708.82 *7*	1039.20	2.8 *3*	(E2)		0.00774		α(K)=0.00631 *9*; α(L)=0.001113 *16*; α(M)=0.000253 *4*; α(N+..)=6.75×10^{-5} *10*. α(N)=5.91×10^{-5} *9*; α(O)=8.08×10^{-6} *12*; α(P)=3.53×10^{-7} *5*.
714.39 *15*	1812.62	1.50 *15*					
735.2 *6*	1833.2	0.9 *3*					
x760.9 *6*		0.6 *3*					
794.11 *5*	1957.06	7.3 *5*					
(811.92)	1744.6					≈2.4	Eγ,I(γ+ce): from Adopted Gammas. I(γ+ce) based on adopted branching and I(γ+ce) feeding level, assuming no ε+β$^+$ branch to level.
814.46 *5*	1482.39	16.5 *9*	M1		0.01189		α(K)=0.01002 *14*; α(L)=0.001454 *21*; α(M)=0.000324 *5*; α(N+..)=8.76×10^{-5} *13*. α(N)=7.61×10^{-5} *11*; α(O)=1.093×10^{-5} *16*; α(P)=5.94×10^{-7} *9*.

Continued on next page (footnotes at end of table)

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

γ(^{166}Yb) (continued)

Eγ	E(level)	Iγ‡	Mult.†	δ	α	Comments
832.20 *8*	1162.87	14.7 *11*	M1+E2	+0.6 *2*	0.0097 *8*	α(K)=0.0082 *7*; α(L)=0.00121 *9*; α(M)=0.000270 *18*; α(N+..)=7.3×10^{-5} *5*. α(N)=6.3×10^{-5} *5*; α(O)=9.1×10^{-6} *7*; α(P)=4.8×10^{-7} *4*. δ: from A_2=+0.019 *15*, A_4=+0.075 *25* for 832γ–228γ(θ) (2007Mc08). (evaluator's analysis gives δ=+0.50 *+8–7* or −2.6 *+5–7*; second solution is rejected because α(K)exp from (α,xnγ) implies pure M1).
837.57 *8*	1505.38	6.7 *4*	E1+M2	0.31 *+3–4*	0.0044 *6*	α(K)=0.0037 *5*; α(L)=0.00056 *8*; α(M)=0.000126 *17*; α(N+..)=3.4×10^{-5} *5*. α(N)=3.0×10^{-5} *4*; α(O)=4.2×10^{-6} *6*; α(P)=2.2×10^{-7} *3*.
860.56 *11*	1958.89	8.0 *5*	E1(+M2)		0.014 *13*	α(K)=0.012 *11*; α(L)=0.0019 *17*; α(M)=0.0004 *4*; α(N+..)=0.00012 *11*. α(N)=0.00010 *9*; α(O)=1.4×10^{-5} *13*; α(P)=$8.\times10^{-7}$ *7*.
901.5 *6*	1570.55	1.0 *4*				
936.79 *7*	1039.20	14.0 *6*	E2		0.00424	α(K)=0.00352 *5*; α(L)=0.000564 *8*; α(M)=0.0001271 *18*; α(N+..)=3.40×10^{-5} *5*. α(N)=2.97×10^{-5} *5*; α(O)=4.14×10^{-6} *6*; α(P)=1.98×10^{-7} *3*.
x975.0 *6*		0.8 *3*				
997.38 *5*	1327.81	43.9 *18*	M1+E2	−10 *+3–13*	0.00376 *7*	α(K)=0.00313 *6*; α(L)=0.000493 *8*; α(M)=0.0001108 *18*; α(N+..)=2.97×10^{-5} *5*. α(N)=2.59×10^{-5} *5*; α(O)=3.62×10^{-6} *6*; α(P)=1.76×10^{-7} *3*. Mult.: from Adopted Gammas. Consistent with α(K)exp=0.006 *4* (1974De09). δ: from Adopted Gammas. δ=−0.2 *1* or −10 *+3–13* from authors' analysis of A_2=−0.21 *2*, A_4=−0.03 *1* for 997γ–228γ(θ) (2007Mc08).
x1021.2 *5*		1.35 *28*				
1056.3 *6*	1724.81	5.1 *11*				
1060.28 *11*	1162.87	3.2 *2*				
1067.34 *20*	2165.73	6.2 *8*				
1122.38 *8*	1790.31	9.9 *5*				
1144.5 *5*	1812.62	1.2 *3*				
1151.1§ *4*	1482.39	1.1§ *3*				
	1818.01	1.1§ *3*				
1165.2 *6*	1833.2	1.0 *4*	E1		1.14×10^{-3}	α(K)=0.000965 *14*; α(L)=0.0001315 *19*; α(M)=2.90×10^{-5} *4*; α(N+..)=1.82×10^{-5} *3*. α(N)=6.79×10^{-6} *10*; α(O)=9.70×10^{-7} *14*; α(P)=5.22×10^{-8} *8*; α(IPF)=1.038×10^{-5} *21*.
1174.80 *13*	1505.38	10.8 *10*				
x1185.2 *6*		2.0 *6*				
x1186.9 *6*		1.0 *4*				
1197.2 *3*	1865.39	1.4 *2*				
x1201.5 *4*		1.0 *2*				
x1234.2 *3*		2.1 *4*				
1240.05 *25*	1570.55	3.3 *4*				
x1261.7 *6*		0.8 *4*				
1290.71 *20*	1958.89	23.9 *17*	E1		1.01×10^{-3}	α(K)=0.000806 *12*; α(L)=0.0001093 *16*; α(M)=2.41×10^{-5} *4*; α(N+..)=6.70×10^{-5} *10*. α(N)=5.65×10^{-6} *8*; α(O)=8.07×10^{-7} *12*; α(P)=4.36×10^{-8} *7*; α(IPF)=6.05×10^{-5} *9*.
x1301.9 *4*		1.6 *3*				
x1306.0 *5*		1.2 *3*				
x1310.8 *7*		1.3 *2*				
x1349.4 *6*		0.8 *4*				
1354.35 *15*	1684.82	4.2 *9*				

Continued on next page (footnotes at end of table)

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

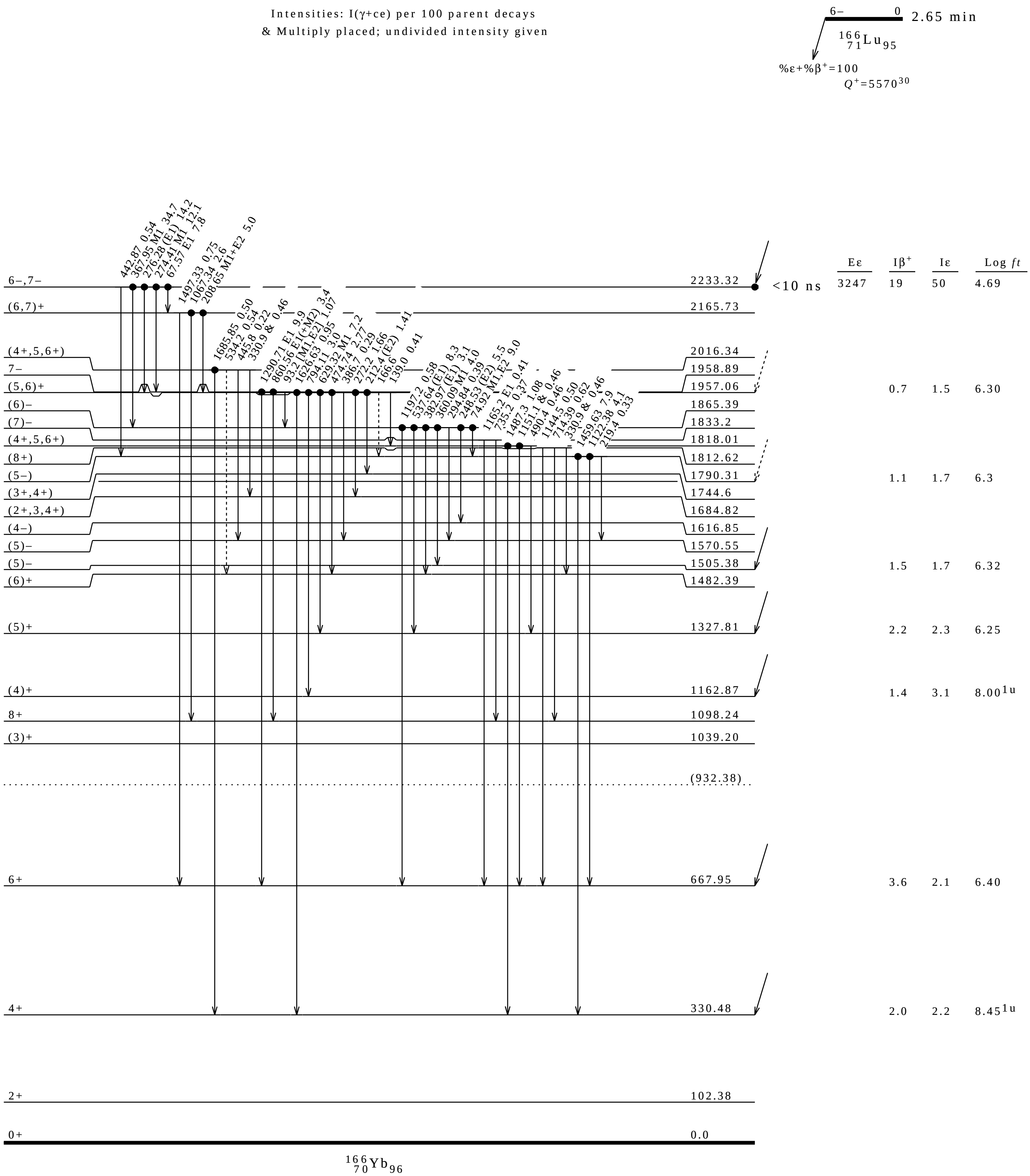
γ(^{166}Yb) (continued)

Eγ	E(level)	Iγ‡	Eγ	E(level)	Iγ‡
x1398.0 *9*		1.8 *5*	1626.63 *25*	1957.06	2.3 *4*
1459.63 *10*	1790.31	19.2 *10*	x1640.3 *6*		0.9 *3*
1487.3 *4*	1818.01	2.6 *5*	x1645.4 *6*		0.7 *3*
1497.33 *23*	2165.73	1.8 *4*	1685.85 *25*	2016.34	1.20 *20*
x1505.1 *4*		1.8 *4*	x1720.3 *6*		0.6 *3*
1582.2 *6*	1684.82	0.6 *3*			

† From Adopted Gammas, unless otherwise noted.
‡ For absolute intensity per 100 decays, multiply by 0.414 *23*.
§ Multiply placed; undivided intensity given.
# Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

Decay Scheme



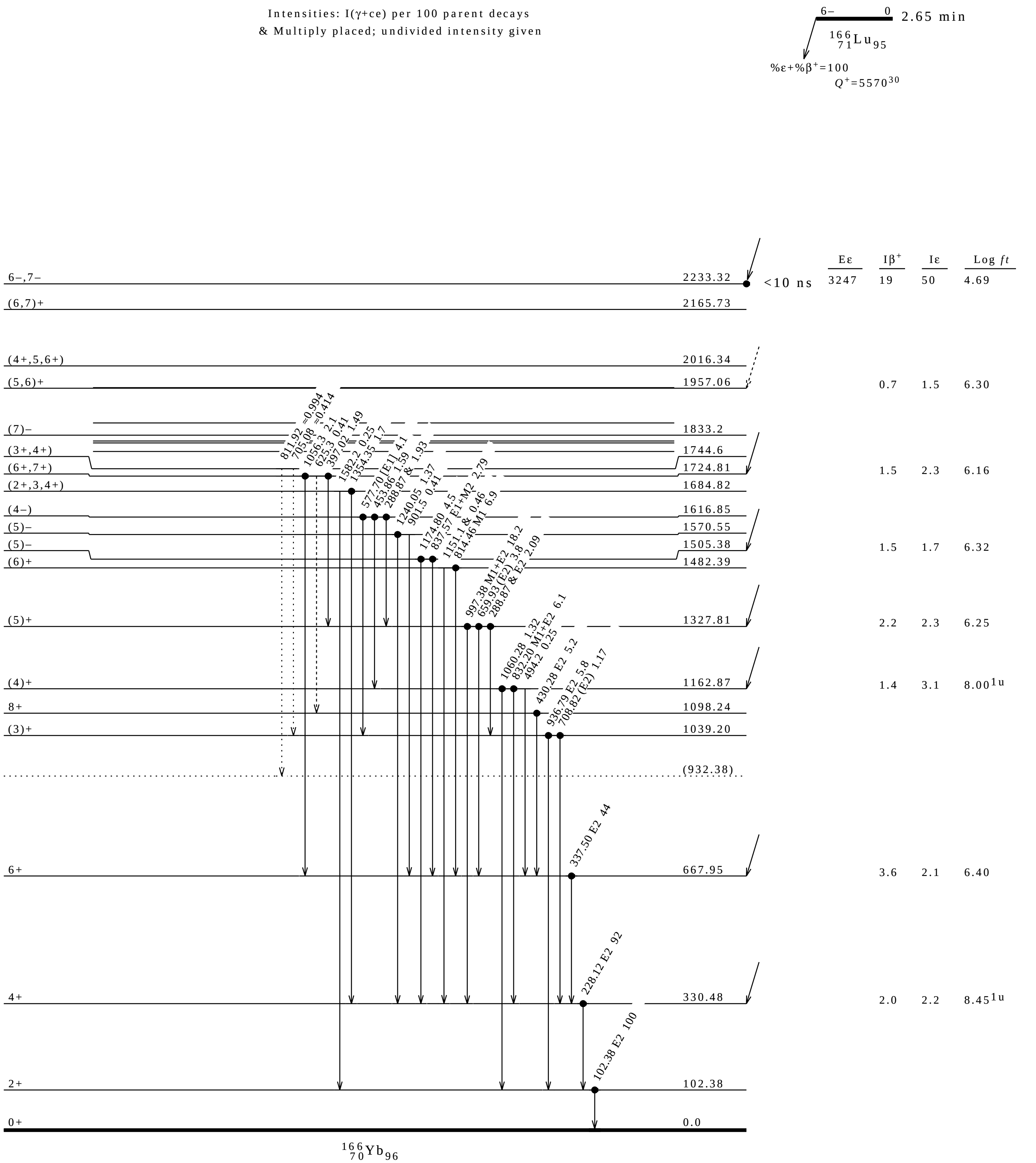
CITATION: Nuclear Data Sheets (1992)

From NNDC(BNL) program ENSDAT

^{166}Lu ε Decay (2.65 min) 1974De09,2007Mc08 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Lu ε Decay (1.41 min) 1974De09

Parent ^{166}Lu: E=34.37 *22*; Jπ=3(−); $T_{1/2}$=1.41 min *10*; Q(g.s.)=5570 *30*; %ε+%β^+ decay=58 *5*.

^{166}Yb Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0	0+	1162.84 *8*	(4)+	1607.93 *10*	(2+,3,4+)
102.38 *3*	2+	1315.32 *15*		1684.84 *15*	(2+,3,4+)
330.50 *4*	4+	1386.02 *11*	(2+,3,4+)	1744.25 *7*	(3+,4+)
932.37 *5*	(2)+	1451.40 *20*		2029.29 *7*	(3−,4−)
1039.16 *5*	(3)+	1503.37 *7*	(2−)		

† From least−squares fit to Eγ.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)	Iβ^+‡	Iε†‡	Log *ft*†	I(ε+β^+)‡	Comments
(3580 *30*)	2029.29	7.6 *17*	15 *3*	4.99 *10*	23 *5*	av Eβ=1154 *14*; εK=0.556 *7*; εL=0.0871 *11*; εM+=0.0262 *4*.
(3860 *30*)	1744.25	1.2 *4*	1.7 *7*	6.01 *17*	2.9 *11*	av Eβ=1283 *14*; εK=0.495 *7*; εL=0.0773 *10*; εM+=0.0232 *3*.
(4150§ *30*)	1451.40	0.86 *24*	0.9 *3*	6.33 *13*	1.8 *5*	av Eβ=1417 *14*; εK=0.435 *6*; εL=0.0679 *10*; εM+=0.0204 *3*.
(4290 *30*)	1315.32	1.8 *5*	1.8 *4*	6.09 *12*	3.6 *9*	av Eβ=1479 *14*; εK=0.409 *6*; εL=0.0637 *9*; εM+=0.0192 *3*.
(4570 *30*)	1039.16	1.3 *6*	1.0 *5*	6.39 *21*	2.3 *11*	av Eβ=1606 *14*; εK=0.360 *5*; εL=0.0560 *8*; εM+=0.01683 *24*.
(4670 *30*)	932.37	3.1 *9*	2.2 *6*	6.07 *13*	5.3 *15*	av Eβ=1656 *14*; εK=0.342 *5*; εL=0.0532 *8*; εM+=0.01599 *23*.

† The total intensity of γ rays not placed in the decay scheme is 7%; consequently, Iε and log *ft* values are shown for only the strongest branches, and the values for the 2029 level alone can be considered to be reliable.
‡ Absolute intensity per 100 decays.
§ Existence of this branch is questionable.

γ(^{166}Yb)

Iγ normalization: The basis of the intensity normalization is that no ε+β^+ feeding to the ground state of ^{166}Yb is expected (ΔJ=3), so Σ(I(γ+ce) to g.s.)=100.

Eγ	E(level)	Iγ‡	Mult.†	δ†	α	Comments
102.38 *3*	102.38	114 *27*	E2		2.93	α(K)=0.968 *14*; α(L)=1.501 *22*; α(M)=0.370 *6*; α(N+..)=0.0941 *14*. α(N)=0.0844 *12*; α(O)=0.00970 *14*; α(P)=4.10×10^{-5} *6*.
152.49 *13*	1315.32	13 *1*				
228.13 *3*	330.50	138 *40*	E2		0.1742	α(K)=0.1135 *16*; α(L)=0.0466 *7*; α(M)=0.01121 *16*; α(N+..)=0.00290 *4*. α(N)=0.00258 *4*; α(O)=0.000314 *5*; α(P)=5.47×10^{-6} *8*.
285.07 *5*	2029.29	100 *5*	E1		0.0226	α(K)=0.0190 *3*; α(L)=0.00281 *4*; α(M)=0.000625 *9*; α(N+..)=0.0001665 *24*. α(N)=0.0001455 *21*; α(O)=2.01×10^{-5} *3*; α(P)=9.57×10^{-7} *14*. Mult.: from α(K)exp=0.026 *20* (1974De09).
345.0§# *6*	1386.02	4§ *1*				
	2029.29	4§ *1*				
×407.0 *6*		4 *2*				
412.20 *20*	1451.40	11 *1*				
421.26 *9*	2029.29	19 *1*				
464.29 *7*	1503.37	7 *2*				
×470.4 *5*		5 *2*				
526.01 *10*	2029.29	27 *3*				
568.5 *6*	1607.93	7 *3*				
570.93 *9*	1503.37	29 *3*				
×581.0 *6*		11 *3*				
×625.3 *6*		6 *2*				
643.20 *10*	2029.29	32 *3*				
×680.9 *4*		6 *2*				
×701.9 *3*		9 *1*				
705.08 *11*	1744.25	40 *4*				

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^{166}Lu ε Decay (1.41 min) 1974De09 (continued)

γ(^{166}Yb) (continued)

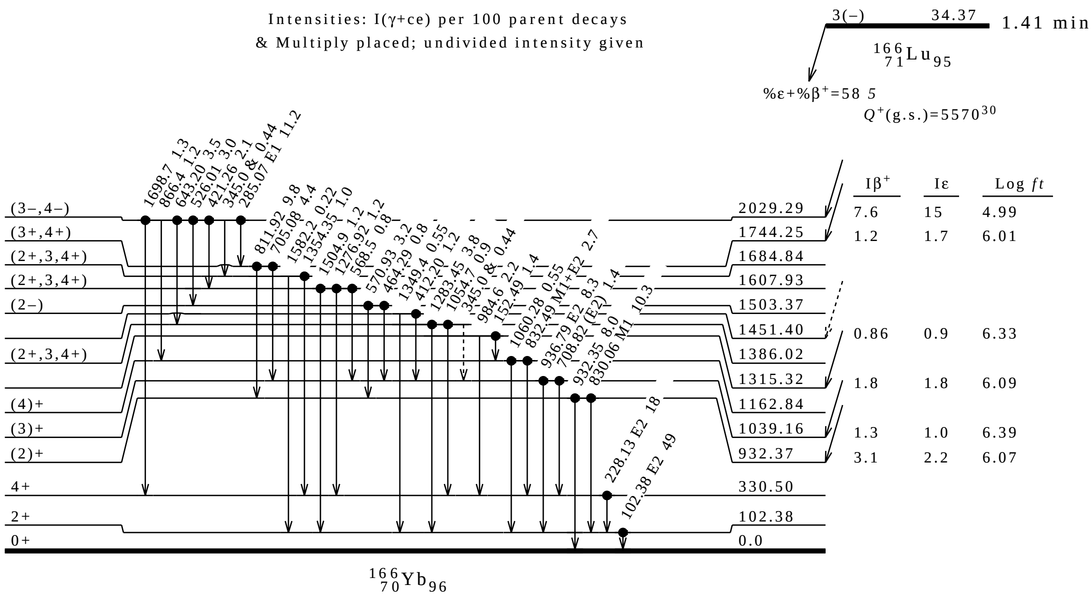
Eγ	E(level)	Iγ‡	Mult.†	δ†	α	Comments
708.82 *13*	1039.16	13 *4*	(E2)		0.00774	α(K)=0.00631 *9*; α(L)=0.001113 *16*; α(M)=0.000253 *4*; α(N+..)=6.75×10^{-5} *10*. α(N)=5.91×10^{-5} *9*; α(O)=8.08×10^{-6} *12*; α(P)=3.53×10^{-7} *5*.
^{x}747.1 *5*		4 *1*				
811.92 *6*	1744.25	89 *5*				
830.06 *9*	932.37	93 *5*	M1		0.01134	α(K)=0.00956 *14*; α(L)=0.001387 *20*; α(M)=0.000309 *5*; α(N+..)=8.35×10^{-5} *12*. α(N)=7.25×10^{-5} *11*; α(O)=1.042×10^{-5} *15*; α(P)=5.67×10^{-7} *8*.
832.49 *10*	1162.84	24 *8*	M1+E2	+0.6 *2*	0.0097 *8*	α(K)=0.0082 *7*; α(L)=0.00121 *9*; α(M)=0.000270 *18*; α(N+..)=7.3×10^{-5} *5*. α(N)=6.3×10^{-5} *5*; α(O)=9.0×10^{-6} *7*; α(P)=4.8×10^{-7} *4*.
866.4 *4*	2029.29	11 *2*				
932.35 *7*	932.37	73 *5*				
936.79 *5*	1039.16	75 *5*	E2		0.00424	α(K)=0.00352 *5*; α(L)=0.000564 *8*; α(M)=0.0001271 *18*; α(N+..)=3.40×10^{-5} *5*. α(N)=2.97×10^{-5} *5*; α(O)=4.14×10^{-6} *6*; α(P)=1.98×10^{-7} *3*.
984.6 *6*	1315.32	20 *4*				
^{x}1023.8 *6*		6 *3*				
1054.7 *6*	1386.02	8 *4*				
1060.28 *11*	1162.84	5 *2*				
1276.92 *22*	1607.93	11 *3*				
1283.45 *21*	1386.02	35 *7*				
1349.4 *6*	1451.40	5 *2*				
1354.35 *15*	1684.84	9 *9*				
1504.9 *6*	1607.93	11 *3*				
1582.2 *6*	1684.84	2 *2*				
1698.7 *4*	2029.29	12 *3*				
^{x}1801.3 *6*		9 *3*				
^{x}1974.0 *6*		6 *3*				

† From Adopted Gammas.
‡ For absolute intensity per 100 decays, multiply by 0.110 *23*.
§ Multiply placed; undivided intensity given.
\# Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{166}Lu ε Decay (1.41 min) 1974De09 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays
& Multiply placed; undivided intensity given



^{166}Lu ε Decay (2.12 min) 1974De09

Parent ^{166}Lu: E=43.0 *4*; Jπ=0−; $T_{1/2}$=2.12 min *10*; Q(g.s.)=5570 *30*; %ε+%β+ decay=90 *10*.
^{166}Lu–%ε+%β+ decay: >0.80 from 1974De09; normalization of decay scheme assumes, therefore, a value of 0.90 *10*.

^{166}Yb Levels

E(level)†	Jπ‡
0.0	0+
102.37 *3*	2+
330.49 *5*	4+
1358.93 *7*	1−
1529.67 *9*	1−
1579.87 *25*	(2+)
1922.8 *6*	(1,2+)
2098.61 *12*	1−
2426.42 *17*	1−

† From least−squares fit to Eγ.
‡ From Adopted Levels.

β+,ε Data

Eε	E(level)	Iβ+†	Iε†	Log *ft*	I(ε+β+)†	Comments
(3190 *30*)	2426.42	3.2 *12*	11 *4*	5.22 *16*	14 *5*	av Eβ=978 *14*; εK=0.639 *7*; εL=0.1005 *11*; εM+=0.0302 *3*.
(3510 *30*)	2098.61	5.7 *22*	12 *5*	5.25 *17*	18 *7*	av Eβ=1126 *14*; εK=0.569 *7*; εL=0.0892 *11*; εM+=0.0268 *4*.
(3690‡ *30*)	1922.8	1.1 *4*	1.9 *7*	6.10 *17*	3.0 *11*	av Eβ=1206 *14*; εK=0.531 *7*; εL=0.0831 *11*; εM+=0.0250 *4*.
(4080 *30*)	1529.67	14 *5*	16 *6*	5.26 *17*	30 *11*	av Eβ=1385 *14*; εK=0.449 *6*; εL=0.0700 *10*; εM+=0.0211 *3*.
(4250 *30*)	1358.93	10 *4*	10 *4*	5.51 *18*	20 *8*	av Eβ=1463 *14*; εK=0.416 *6*; εL=0.0648 *9*; εM+=0.0195 *3*.
(5610 *30*)	0.0	<18	<6.3	>5.9	<24	av Eβ=2093 *14*; εK=0.220 *3*; εL=0.0341 *5*; εM+=0.01024 *15*.

Footnotes continued on next page

^{166}Lu ε Decay (2.12 min) 1974De09 (continued)

β^+,ε Data (continued)

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{166}Yb)

Iγ normalization: The normalization is based on the assumption that the ε+β^+ feeding to the ground state of ^{166}Yb is first–forbidden; log *ft*>5.9 then implies a g.s. branch of <24%, so Σ(I(γ+ce) to g.s.)=88 *12*.

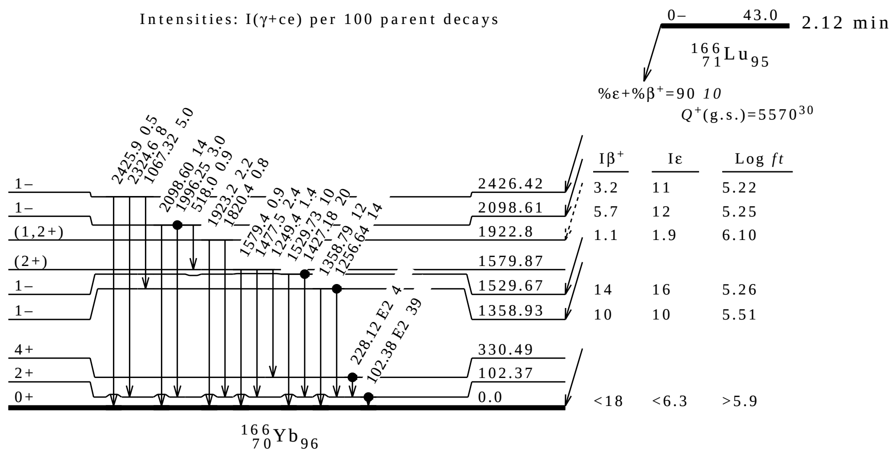
Eγ†	E(level)	Iγ†§	Mult.‡	α	Comments
102.38 *3*	102.37	73 *35*	E2	2.93	α(K)=0.968 *14*; α(L)=1.501 *22*; α(M)=0.370 *6*; α(N+..)=0.0941 *14*. α(N)=0.0844 *12*; α(O)=0.00970 *14*; α(P)=4.10×10^{-5} *6*. %Iγ=10 *4* assuming recommended normalization.
228.12 *3*	330.49	28 *28*	E2	0.1743	α(K)=0.1136 *16*; α(L)=0.0466 *7*; α(M)=0.01121 *16*; α(N+..)=0.00290 *4*. α(N)=0.00258 *4*; α(O)=0.000314 *5*; α(P)=5.47×10^{-6} *8*.
518.0 *8*	2098.61	7 *3*			
1067.32 *20*	2426.42	37 *6*			
1249.4 *8*	1579.87	10 *4*			
1256.64 *10*	1358.93	100 *10*			
1358.79 *10*	1358.93	88 *11*			
1427.18 *14*	1529.67	151 *15*			
1477.5 *3*	1579.87	18 *3*			
1529.73 *11*	1529.67	73 *5*			
1579.4 *6*	1579.87	7 *3*			
1820.4 *6*	1922.8	6 *3*			
1923.2 *4*	1922.8	16 *2*			
1996.25 *15*	2098.61	22 *6*			
2098.60 *20*	2098.61	106 *13*			
2324.6 *3*	2426.42	62 *5*			
2425.9 *6*	2426.42	4 *2*			

† From 1974De09.
‡ From Adopted Gammas.
§ For absolute intensity per 100 decays, multiply by 0.135 *45*.

^{166}Lu ε Decay (2.12 min) 1974De09 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{124}Sn(^{48}Ca,6nγ) 1994Ol04

Other: 2001Bu11; E=215 MeV; measured recoil–gated conversion electron spectra with and without a gate on the L line of the 228–keV 4+ to 2+ g.s. band transition in ^{166}Yb.

1994Ol04: E=210, 220 and 225 MeV; 97% ^{124}Sn target stack; HERA array consisting of 20 Compton–suppressed Ge detectors and an inner ball of 40 BGO detectors; measured Eγ and γγ coin.

^{166}Yb Levels

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
0.0+x‡	J‡	1217.0+x‡ 18	J+6‡	3064.1+x‡ 20	J+12‡
162.6+x§ 10	J+1§	1486.2+x§ 18	J+7§	3416.6+x§ 21	J+13§
334.9+x‡ 13	J+2‡	1772.7+x‡ 18	J+8‡	3778.4+x‡ 21	J+14‡
524.9+x§ 13	J+3§	2075.2+x§ 19	J+9§	4149.6+x§ 22	J+15§
735.5+x‡ 16	J+4‡	2392.6+x‡ 19	J+10‡	4531.2+x‡ 23	J+16‡
966.4+x§ 16	J+5§	2722.6+x§ 20	J+11§	4921.6+x§ 24	J+17§

† From least–squares fit to Eγ, assigning ΔE=1 keV for all data.

‡ (A): ((π 7/2[523])+(π 7/2[404]))(ν $i_{13/2}{}^2$)? band. Configuration assignment supported by large B(M1)/B(E2) ratios, bandhead energy and crossing frequency arguments (1994Ol04).

§ (B): ((π 7/2[523])+(π 7/2[404]))(ν $i_{13/2}{}^2$)? band. See comment on signature partner of this band.

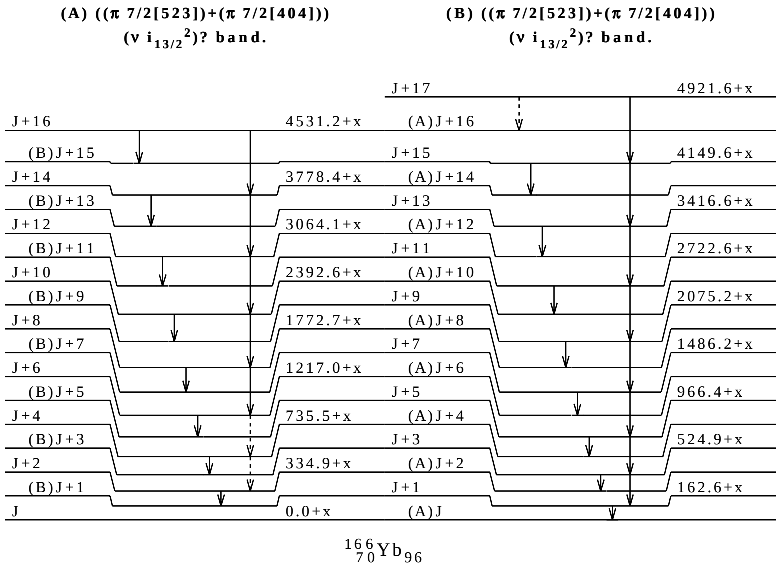
γ(^{166}Yb)

Eγ†	E(level)	Eγ†	E(level)	Eγ†	E(level)
162.6	162.6+x	341.5	3064.1+x	555.7	1772.7+x
172.3	334.9+x	352.5	3416.6+x	589.0	2075.2+x
190.0	524.9+x	361.8	3778.4+x	619.9	2392.6+x
210.6	735.5+x	362.3	524.9+x	647.4	2722.6+x
230.9	966.4+x	371.2	4149.6+x	671.5	3064.1+x
250.6	1217.0+x	381.6	4531.2+x	694.0	3416.6+x
269.2	1486.2+x	390.4‡	4921.6+x	714.3	3778.4+x
286.5	1772.7+x	400.6‡	735.5+x	733.0	4149.6+x
302.5	2075.2+x	441.5	966.4+x	752.8	4531.2+x
317.4	2392.6+x	481.5‡	1217.0+x	772.0	4921.6+x
330.0	2722.6+x	519.8	1486.2+x		

† From 1994Ol04; uncertainty unstated by authors.

‡ Placement of transition in the level scheme is uncertain.

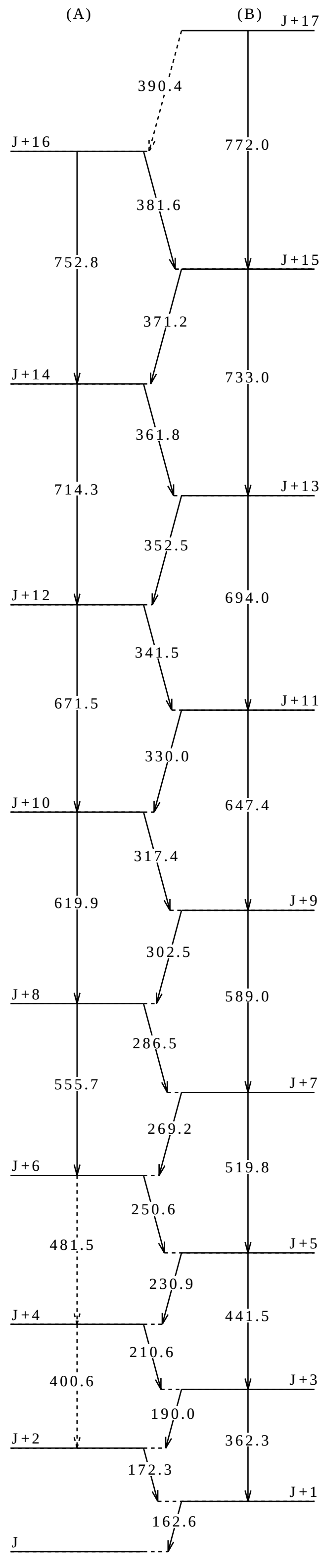
$^{124}Sn(^{48}Ca,6n\gamma)$ 1994Ol04 (continued)



From NNDC(BNL)
program ENSDAT

$^{124}Sn(^{48}Ca,6n\gamma)$ 1994Ol04 (continued)

Bands for ^{166}Yb

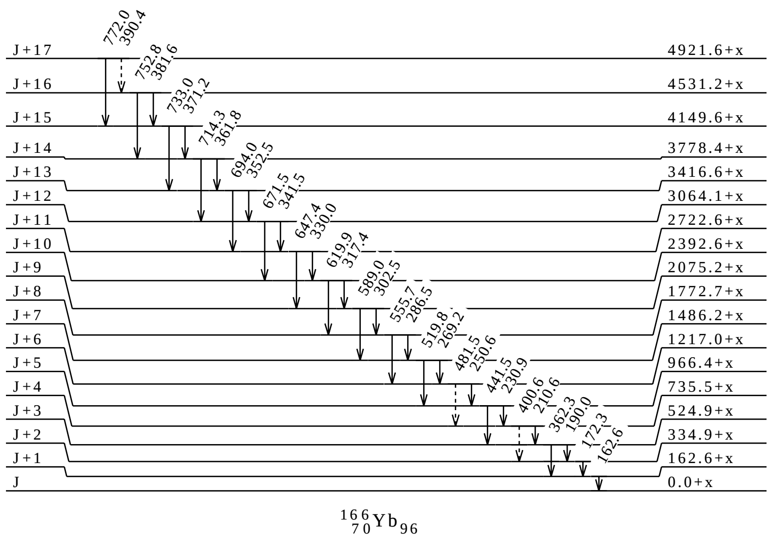


$^{166}_{70}Yb_{96}$

From NNDC(BNL)
program ENSDAT

^{124}Sn(^{48}Ca,6nγ) 1994Ol04 (continued)

Level Scheme



^{130}Te(^{40}Ar,4nγ) 1987Be07,1986Ba61,1976Bo27

Other: 1983De02 (^{130}Te(^{40}Ar,4n), E(^{40}Ar)=185 MeV).

1987Be07: ^{130}Te(^{40}Ar,4n), E(^{40}Ar)=180 MeV; measured Eγ, γγγ–coin, DCO ratios (40°, 90°).

1987Ba06, 1986Ba61: ^{130}Te(^{40}Ar,4n), E(^{40}Ar)=180 MeV; measured lifetimes, Doppler shift attenuation.

1976Bo27: ^{130}Te(^{40}Ar,4nγ), E(^{40}Ar)=170–190 MeV; measured recoil distance Doppler shift, Eγ, semi.

^{166}Yb Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0[§]	0+	56.7 h *1*	Jπ,$T_{1/2}$: from Adopted Levels.
102.37[§] *3*	2+	1.24 ns[c] *6*	
330.27[§] *21*	4+	52.9 ps[c] *17*	
667.8[§] *3*	6+	7.8 ps[c] *3*	
1098.0[§] *4*	8+	2.14 ps[c] *24*	
1328.5[#] *11*	5+		
1605.2[§] *4*	10+	1.0 ps[c] *5*	
1617.5 *9*	(4−)		
1704.8[#] *6*	7+		
1789.8[@] *6*	(5−)		
1836.8[b] *11*	(6−)		
1865.5[&] *8*	6−		
1958.2[@] *5*	(7−)		
2071.5[&] *6*	8−		
2138.0[b] *12*	(8−)		
2151.0[#] *6*	9+		
2174.6[§] *5*	12+	0.64 ps[c] *33*	
2208.9[@] *6*	9−		
2360.7[&] *6*	10−		
2416.7[@] *5*	11−		
2492.4[b] *13*	(10−)		
2530.6[a] *6*	12+		
2727.7[&] *6*	12−		
2778.3[§] *5*	14+	0.51 ps[c] *29*	

Continued on next page (footnotes at end of table)

^{130}Te(^{40}Ar,4nγ) 1987Be07,1986Ba61,1976Bo27 (continued)

^{166}Yb Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$
2862.5[@] 5	13−	
2892.4[b] 14	(12−)	
2896.6[a] 5	14+	
3165.3[&] 7	14−	
3272.5[a] 5	16+	1.14 ps[c] 27
3351.4[b] 15	(14−)	
3353.3[@] 5	15−	
3489.0[§] 5	16+	
3664.7[&] 7	16−	
3780.8[a] 6	18+	0.82 ps[d] 10
3879.1[b] 16	(16−)	
3891.4[@] 6	17−	
4188.8[§] 6	18+	
4217.5[&] 7	18−	
4369.3[a] 6	20+	0.41 ps[d] 3
4471.8[b] 17	(18−)	
4477.9[@] 6	19−	
4817.9[&] 8	20−	
4921.7[§] 6	20+	
5035.6[a] 6	22+	0.201 ps[d] 21
5107.9[@] 6	21−	
5120.1[b] 17	(20−)	
5467.3[&] 8	22−	
5648.6[§] 8	22+	
5774.2[a] 7	24+	0.125 ps[d] 14
5781.9[@] 7	23−	
5815.0[b] 18	(22−)	
6172.1[&] 8	24−	
6377.1?[§] 9	(24+)	
6506.8[@] 8	25−	
6552.8[b] 19	(24−)	
6580.5[a] 7	26+	0.083 ps[d] 7
6938.7[&] 8	26−	
7293.9[@] 9	27−	
7335.8?[b] 19	(26−)	
7450.7[a] 7	28+	0.069 ps[d] 7
7772.3[&] 9	28−	
8147.7[@] 10	29−	
8385.7[a] 8	30+	0.055 ps[d] 7
8675.7[&] 10	30−	
9070.5[@] 11	31−	
9384.5[a] 9	32+	0.042 ps[d] 7
9647.3[&] 11	32−	
10056.7[@] 12	33−	
10444.5[a] 10	34+	0.035 ps[d] 7
11101.7?[@] 13	(35−)	
11556.5[a] 12	36+	
12185.7?[@] 17	(37−)	
12714.5?[a] 13	(38+)	

† From least−squares fit to Eγ.
‡ From fig. 7 of 1987Be07.
§ (A): K=0+ g.s. band.
# (B): K=2+ γ−vibrational band.
@ (C): Kπ=5−, α=1 band.
& (D): Kπ=5−, α=0 band.
a (E): Super band. Becomes yrast for J≥16.
b (F): Kπ=(2−) band. Although no parity assignment is indicated in fig. 7 of 1987Be07, π=− is assigned in table 2.
c From recoil distance Doppler shift (1976Bo27).
d From Doppler shift attenuation (1987Ba06).

γ(^{166}Yb)

Eγ[‡]	E(level)	Iγ[§]	Mult.[†]	α	Comments
102.37[#] 3	102.37				
113.0 5	2071.5	0.50 25			
152.0 5	2360.7	0.8 4			
206.0 5	2071.5	5.0 25	Q		DCO=1.04 13 (1987Be07).
227.9 2	330.27	100 10			
248.0 5	1865.5	0.50 25			
289.0 5	1617.5				Iγ: masked by contaminant γ.
289.2 2	2360.7	6.5 7	Q		DCO=1.07 12 (1987Be07).
301.2 5	2138.0	2.1 11	Q		DCO=0.9 3 (1987Be07).
337.5 2	667.8	93 9	E2[@]	0.0521	DCO=0.97 5 (1987Be07).
354.4 5	2492.4	2.1 11			DCO=0.7 2 (1987Be07).
356.0 5	2530.6	1.1 6			
366.0 5	2896.6	1.4 7	Q		DCO=1.0 2 (1987Be07).
367.0 2	2727.7	11.0 11	Q		DCO=1.03 12 (1987Be07).
375.8 2	3272.5	7.0 7	E2[@]	0.0383	DCO=1.00 12 (1987Be07).
400.0 5	2892.4	3.0 15	Q		Mult.: DCO=1.1 3 (1987Be07).
430.2 2	1098.0	90 9	E2[@]	0.0264	DCO=0.88 6 (1987Be07).
437.6 2	3165.3	12.0 12	(E2)	0.0252	Mult.: DCO=0.98 12 (1987Be07).
445.9 5	2862.5	3.0 15	Q		Mult.: DCO=0.90 18 (1987Be07).
459.0 5	3351.4	3.0 15	(Q)		Mult.: DCO=0.66 17 (1987Be07).
490.8 2	3353.3	10.0 10	(E2)	0.0187	Mult.: DCO=0.92 9 (1987Be07).

Continued on next page (footnotes at end of table)

^{130}Te(^{40}Ar,4nγ) 1987Be07,1986Ba61,1976Bo27 (continued)

γ(^{166}Yb) (continued)

Eγ‡	E(level)	Iγ§	Mult.†	α	Comments
494.3 2	3272.5	31 3	E2@	0.0184	Mult.: DCO=0.77 4 (1987Be07).
499.4 2	3664.7	13.2 13	(E2)	0.0179	Mult.: DCO=0.96 10 (1987Be07).
507.2 2	1605.2	123 12	[E2]	0.01720	Iγ: for 507.2γ+508.3γ triplet. DCO=0.85 4 (1987Be07) for 507.2γ+508.3γ triplet.
508.3& 2	1836.8	123& 12			Iγ: for 507.2γ+508.3γ triplet. DCO=0.85 4 (1987Be07) for 507.2γ+508.3γ triplet.
	3780.8	123& 12	[E2]	0.01711	Iγ: for 507.2γ+508.3γ triplet. DCO=0.85 4 (1987Be07) for 507.2γ+508.3γ triplet.
527.7 5	3879.1	2.2 11			
538.1 2	3891.4	12.0 12	(E2)	0.01483	Mult.: DCO=0.71 12 (1987Be07).
552.8 2	4217.5	12.0 12	(E2)	0.01388	Mult.: DCO=0.71 12 (1987Be07).
569.4 2	2174.6	64 6	E2@	0.01291	DCO=0.84 4 (1987Be07).
575.1 5	3353.3	3.2 16	(D)		Mult.: DCO=1.6 4 (1987Be07).
586.5 2	4477.9	11.1 11	(E2)	0.01202	Mult.: DCO=0.74 11 (1987Be07).
588.5 2	4369.3	31 3	E2@	0.01192	Mult.: DCO=0.74 5 (1987Be07).
592.5 2	3489.0	7.1 7			Mult.: DCO=0.64 12 (1987Be07).
592.7 5	4471.8	2.0 10	[E2]	0.01172	
600.4 2	4817.9	9.5 10	(E2)	0.01137	Mult.: DCO=0.76 12 (1987Be07).
603.6 2	2778.3	48 5	E2@	0.01122	Mult.: DCO=0.89 12 (1987Be07).
630.0 2	5107.9	6.5 7	(E2)	0.01015	Mult.: DCO=0.75 15 (1987Be07).
648.3 5	5120.1	1.9 10			
649.4 2	5467.3	8.2 8	(E2)	0.00945	DCO=0.87 12 (1987Be07).
666.3 2	5035.6	22.0 22	E2@	0.00891	Mult.: DCO=0.76 7 (1987Be07).
674.0 2	5781.9	6.1 6	(E2)	0.00868	Mult.: DCO=0.95 13 (1987Be07).
687.8 2	2862.5	6.9 7	(D)		Mult.: DCO=1.4 4 (1987Be07).
694.9 5	5815.0	1.4 7			
699.8 2	4188.8	7.5 8	(E2)	0.00797	Mult.: DCO=1.01 12 (1987Be07).
704.8 2	6172.1	7.5 8	(E2)	0.00784	Mult.: DCO=0.98 15 (1987Be07).
710.5 2	3489.0	11.3 11	(E2)	0.00770	Mult.: DCO=1.03 12 (1987Be07).
722.1 2	2896.6	15.0 15	Q		Mult.: DCO=1.02 12 (1987Be07).
724.9 5	6506.8	5.0 25	[E2]	0.00736	Mult.: DCO=0.65 3 (1987Be07).
726.9 5	5648.6	4.3 22	(E2)	0.00731	Mult.: DCO=1.0 2 (1987Be07).
728.5a 5	6377.1?	1.9 10	(E2)	0.00728	Mult.: DCO=1.0 2 (1987Be07).
732.9 2	4921.7	5.9 6	(E2)	0.00718	DCO=1.0 2 (1987Be07).
737.8 5	6552.8	1.2 6			
738.6 2	5774.2	16.2 17	[E2]	0.00706	Mult.: DCO=0.68 12 (1987Be07).
766.6 2	6938.7	5.8 6	(E2)	0.00650	Mult.: DCO=0.9 2 (1987Be07).
783.0a 5	7335.8?	1.0 5			
787.1 2	7293.9	4.6 23	(E2)	0.00614	Mult.: DCO=0.9 2 (1987Be07).
806.3 2	6580.5	12.0 12	E2@	0.00583	Mult.: DCO=0.89 10 (1987Be07).
811.6 2	2416.7	5.8 6			Eγ,Iγ: possibly contaminated by another transition (1987Be07). DCO=1.33 19 (1987Be07) for possibly contaminated γ.
833.6 2	7772.3	5.1 5	(E2)	0.00542	Mult.: DCO=0.77 14 (1987Be07).
853.8 5	8147.7	3.5 18	(E2)	0.00515	Mult.: DCO=0.75 16 (1987Be07).
860.0 5	1958.2	0.6 3			
870.2 2	7450.7	7.8 8	[E2]	0.00495	Mult.: DCO=1.0 12 (1987Be07).
903.4 5	8675.7	3.1 16	(E2)	0.00457	Mult.: DCO=0.7 2 (1987Be07).
922.8 5	9070.5	2.5 13	[E2]	0.00438	Mult.: DCO=0.50 17 (1987Be07).
935.0 2	8385.7	6.4 6	E2@	0.00426	Mult.: DCO=0.82 15 (1987Be07).
971.6 5	9647.3	1.3 7	(E2)	0.00393	Mult.: DCO=0.7 2 (1987Be07).
986.2 5	10056.7	1.6 8	(E2)	0.00381	Mult.: DCO=0.7 2 (1987Be07).
998.8 5	9384.5	3.7 18	(E2)	0.00372	Mult.: DCO=0.77 15 (1987Be07).
1037.0 5	1704.8	2.5 12			
1045.0a 5	11101.7?	1.3 7			
1053.0 5	2151.0	1.0 5			
1060.0 5	10444.5	2.9 15	[E2]	0.00329	Mult.: DCO=1.4 3 (1987Be07) for contaminated line.
1084a	12185.7?	1.0 5			
1111.2 5	2208.9	2.5 13			
1112.0 5	11556.5	1.6 8			Mult.: DCO=1.0 3 (1987Be07).
1122.0 5	1789.8	0.8 4			
1158.0a 5	12714.5?	1.0 5			
1290.5 5	1958.2	1.2 6			

Footnotes continued on next page

^{130}Te(^{40}Ar,4nγ) 1987Be07,1986Ba61,1976Bo27 (continued)

γ(^{166}Yb) (continued)

† From DCO ratios, assigning Δπ=(no) for stretched Q intraband transitions, unless otherwise noted. Note that expected values for DCO ratios from 1987Be07 are 2 for stretched D and 1 for Q (ΔJ=2) or D (ΔJ=0); however, due to deorientation of the reference state, values for expected ΔJ=2 transitions from J>10 states are systematically low (DCO=0.50 *17* in the worst case).

‡ From 1987Be07, unless otherwise noted. ΔE=0.2 keV, except for weakest transitions; ΔE=0.5 keV for the latter and the evaluator assigns this uncertainty if Iγ≤5.

§ From ^{130}Te(^{40}Ar,4n), E(^{40}Ar)=180 MeV (1987Be07). Iγ data are mostly obtained from gated coincidence spectra and normalized to the 228.1γ. Intensity values are known to 10%, except for weakest peaks for which uncertainties can be up to 50%. The evaluator assumes the latter to be those for which Iγ≤5.

From Adopted Gammas.

@ Q from DCO ratio; not M2 from RUL.

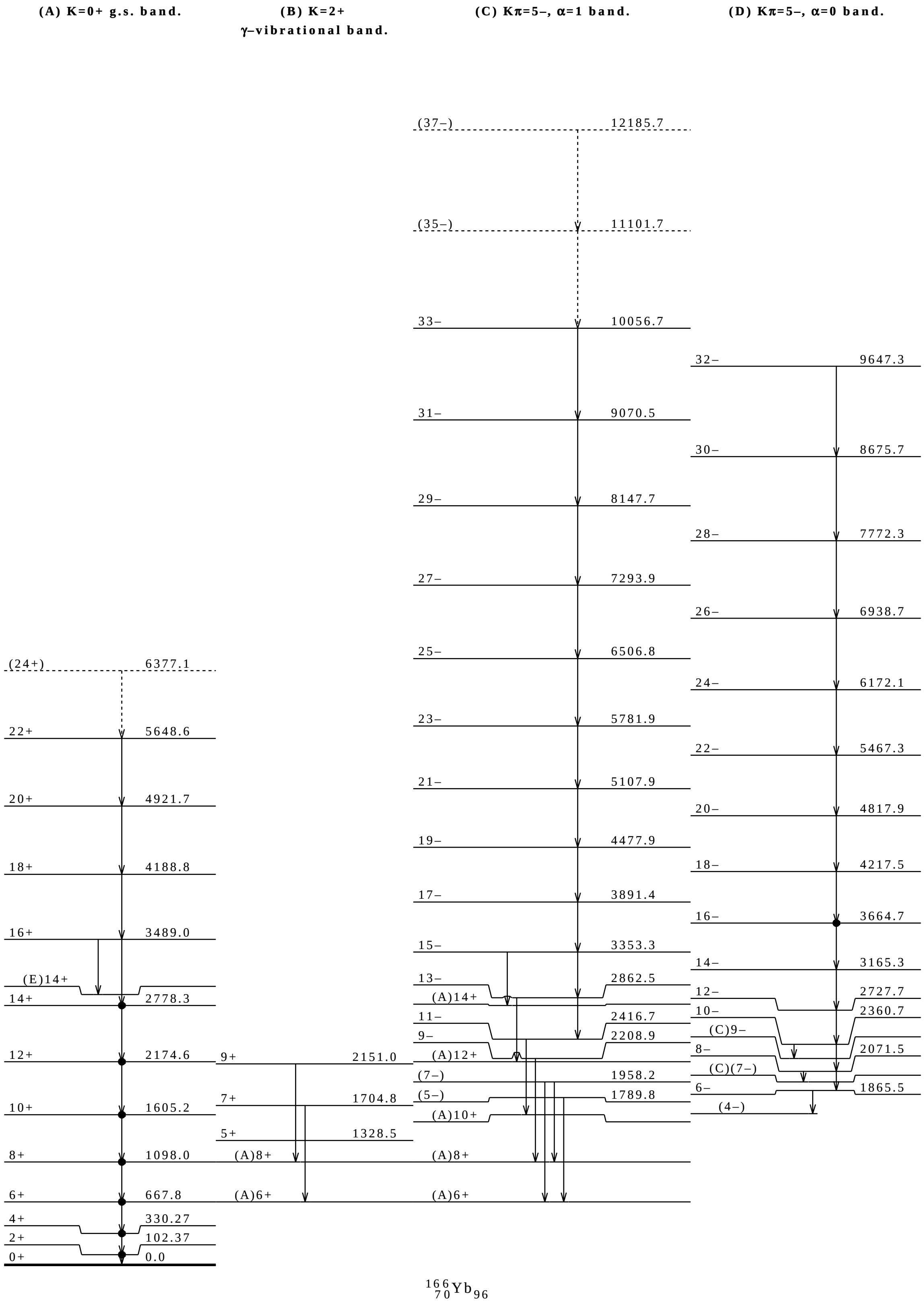
& Multiply placed; undivided intensity given.

a Placement of transition in the level scheme is uncertain.

CITATION:
Nuclear Data Sheets (1992)

$^{166}_{70}Yb_{96}$–40

$^{130}Te(^{40}Ar,4n\gamma)$ 1987Be07,1986Ba61,1976Bo27 (continued)



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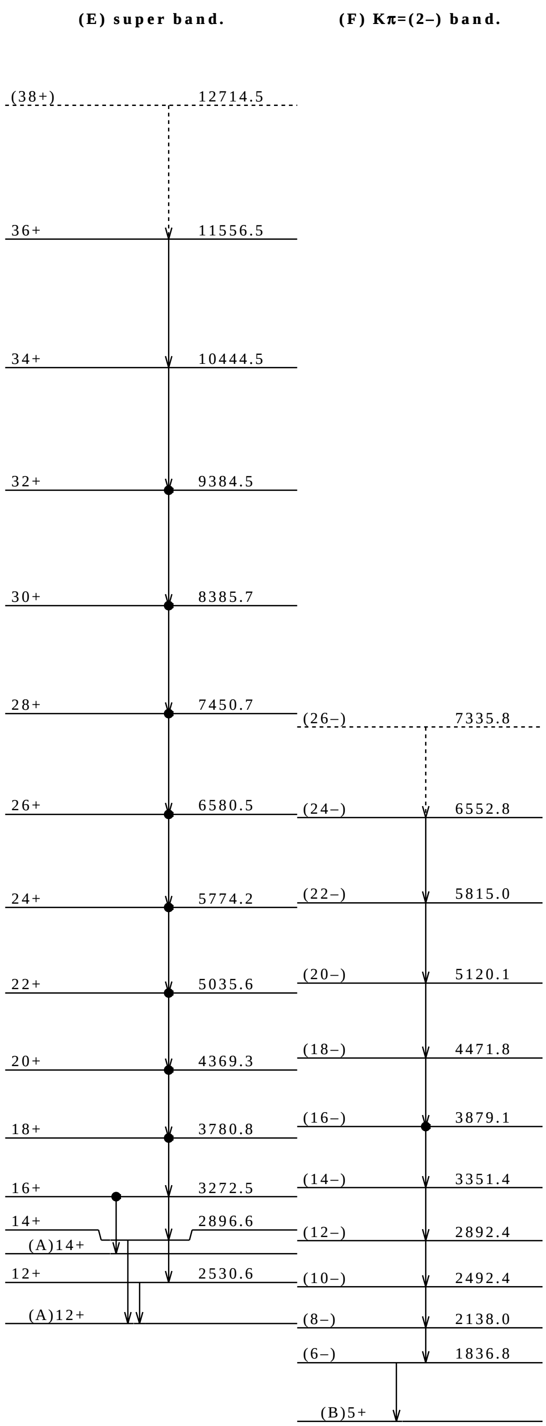
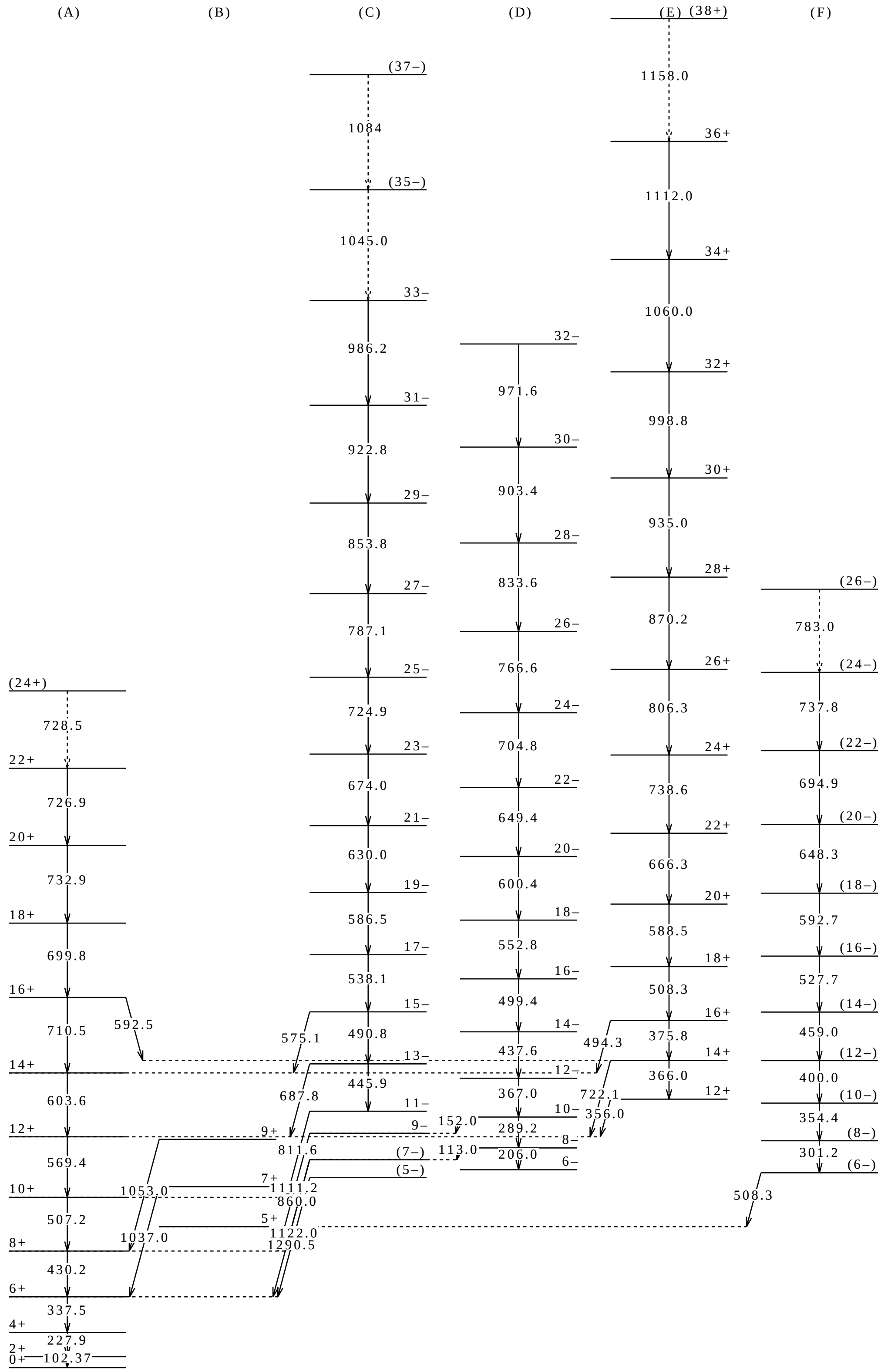
program ENSDAT

$^{130}Te(^{40}Ar,4n\gamma)$ 1987Be07,1986Ba61,1976Bo27 (continued)



$^{130}Te(^{40}Ar,4n\gamma)$ 1987Be07,1986Ba61,1976Bo27 (continued)

Bands for ^{166}Yb



$^{166}_{70}Yb_{96}$

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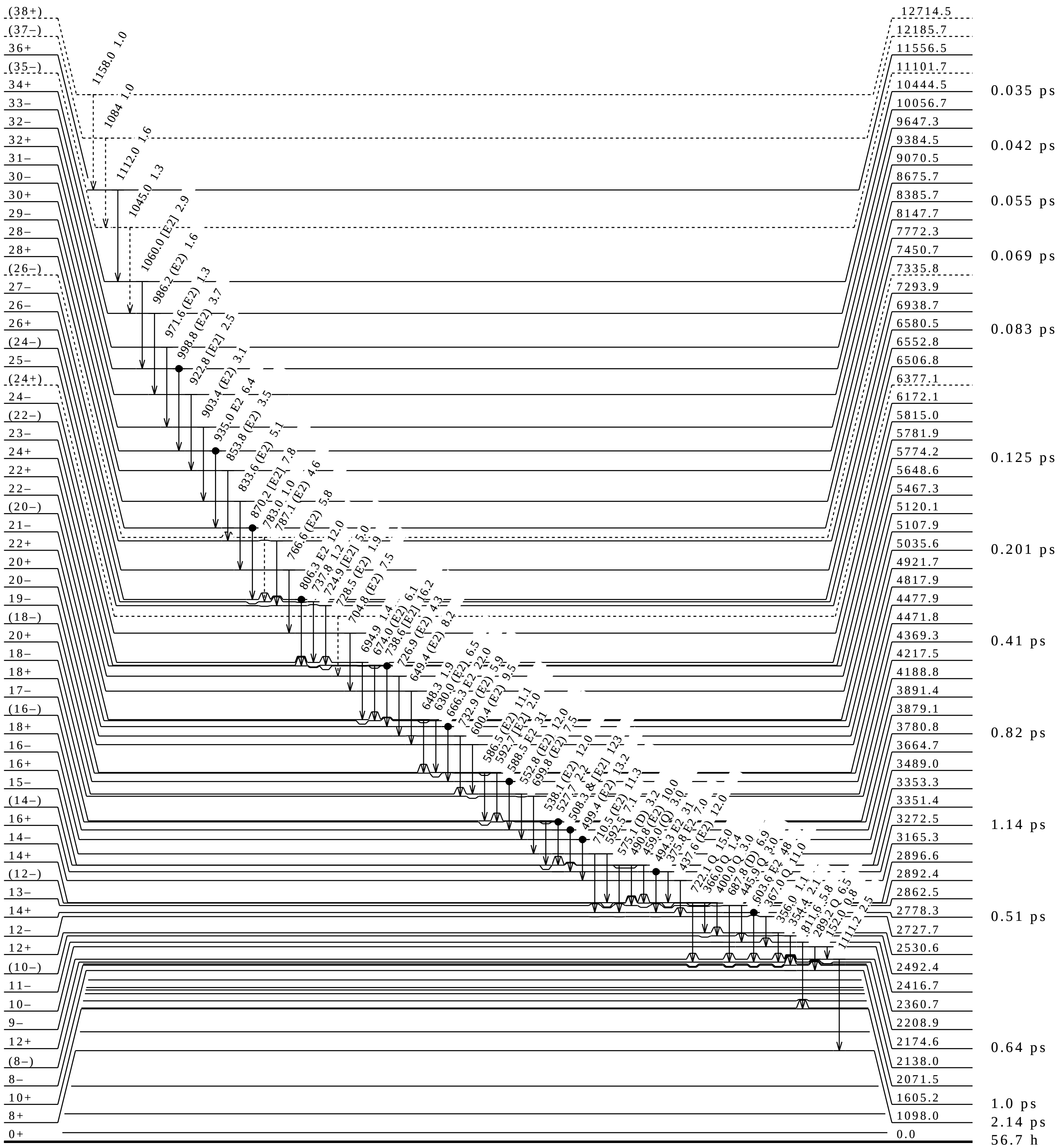
$^{130}Te(^{40}Ar,4n\gamma)$ 1987Be07,1986Ba61,1976Bo27 (continued)

Level Scheme

Intensities: relative Iγ
& Multiply placed; undivided intensity given



$^{166}_{70}Yb_{96}$

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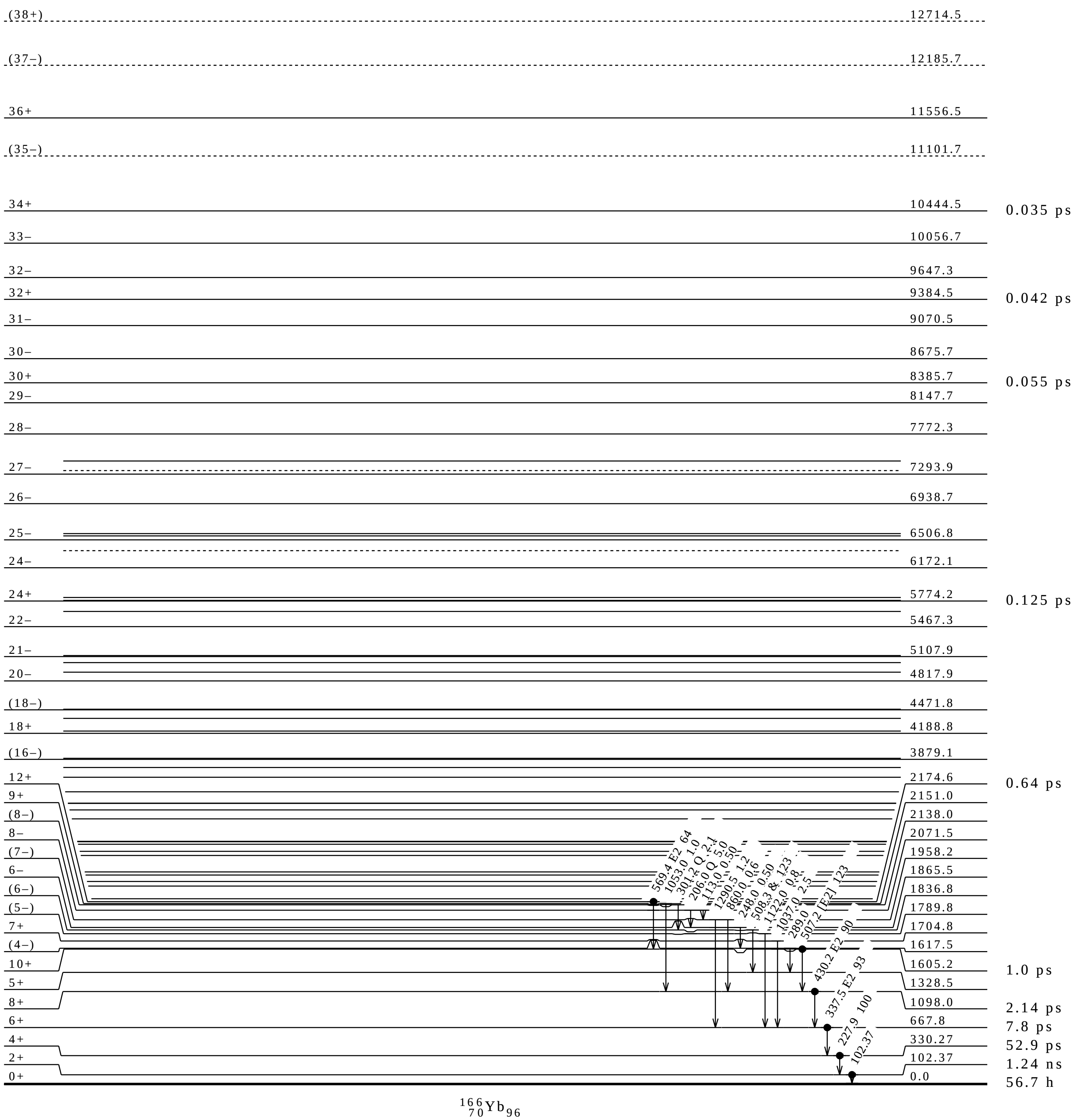
$^{130}Te(^{40}Ar,4n\gamma)$ 1987Be07,1986Ba61,1976Bo27 (continued)

Level Scheme (continued)

Intensities: relative Iγ
& Multiply placed; undivided intensity given



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$^{154}Sm(^{16}O,4n\gamma),^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02

Other measurements: 1965St03; $^{159}Tb(^{11}B,4n\gamma)$, E=56 MeV, measured Eγ.
Includes $^{154}Sm(^{16}O,4n\gamma)$, $^{159}Tb(^{14}N,\alpha\gamma)$, $^{159}Tb(^{14}N,x)$, $^{158}Dy(^{12}C,4n\gamma)$, $^{159}Tb(^{11}B,4n\gamma)$. 1977HaYI ($^{158}Dy(^{12}C,4n\gamma)$) 1977InZV ($^{159}Tb(^{14}N,x)$, E=95 MeV), 1978KaZK ($^{159}Tb(^{14}N,\alpha\gamma)$, E=115 MeV),.
1981Si02: $^{154}Sm(^{16}O,4n\gamma)$, E=73, 85 MeV; measured Eγ, Iγ, γγ coin, γ multiplicity.
1981Wa23: $^{154}Sm(^{16}O,4n\gamma)$, E(^{16}O)=80 MeV; measured γγ–coin, Eγ, Iγ, γ(θ), unenumerated Ice.
1967Ne02: $^{159}Tb(^{11}B,4n\gamma)$, E=54 MeV; measured Eγ, Iγ, γ(θ).

^{166}Yb Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$
0.0[#]	0+[§]	56.7 h[§] *1*
102.1[#] *4*	2+	
330.2[#] *5*	4+	
667.7[#] *5*	6+	
932.1[@] *4*	2+	
1038.6[@] *6*	3+	
1097.9[#] *6*	8+	
1327.5[@] *6*	5+	
1605.6[#] *6*	10+	
1616.8 *7*	(4−)	
1704.8[@] *7*	7+	
1789.9[&] *6*	(5−)	
1835.5[c] *7*	(6−)	
1865.1[a] *6*	6−	
1956.5 *7*	(6+)	
1957.9[&] *6*	(7−)	
2071.5[a] *7*	8−	
2137.0[c] *7*	(8−)	
2150.7[@] *7*	9+	
2175.2[#] *6*	12+	
2209.0[&] *7*	9−	
2232.5 *7*	(7−)	
2360.9[a] *7*	10−	
2417.2[&] *7*	11−	
2491.5[c] *7*	(10−)	
2531.2[b] *7*	12+	
2647.4[@] *8*	(11+)	
2728.5[a] *7*	12−	
2778.8[#] *7*	14+	
2863.0[&] *7*	13−	
2891.9[c] *8*	(12−)	
2897.2[b] *6*	14+	
3166.1[a] *7*	14−	
3197.4[@] *10*	(13+)	
3273.1[b] *7*	16+	
3351.3[c] *9*	(14−)	
3353.9[&] *7*	15−	
3489.1[#] *7*	16+	
3665.6[a] *9*	16−	
3782.1[b] *8*	18+	
3878.8[c] *11*	(16−)	
3892.1[&] *8*	17−	
4190.1[#] *9*	18+	
4218.4[a] *10*	18−	
4370.5[b] *9*	20+	
4470.8[c] *12*	(18−)	
4478.3[&] *9*	19−	
4818.5[a] *12*	20−	
5037.5[b] *10*	22+	
5108.3[&] *11*	21−	
5119.8[c] *13*	(20−)	
5467.5[a] *13*	22−	
5776.5[b] *11*	24+	
5782.3[&] *11*	23−	

† From least–squares fit to Eγ.
‡ From table I of 1981Wa23.
§ From Adopted Levels.
\# (A): K=0+ g.s. band.
@ (B): K=2+ γ–vibrational band.
& (C): Kπ=5−, α=1 band.
a (D): Kπ=5−, α=0 band.
b (E): Super band. Becomes yrast for J≥16.
c (F): Kπ=(2−) band. Although no parity assignment is indicated in fig. 3 of 1981Wa23, π=(−) is assigned in table I.

γ(^{166}Yb)

γ(θ): A_2,A_4, extracted by 1967Ne02, 1981Wa23.

Eγ[‡]	E(level)	Iγ[§]	Mult.[†]	α	Comments
102.2 *5*	102.1		(E2)	2.95 *7*	Eγ: from 1973Sa14. Other Eγ: 102.2 *3* (1972Li34). A_2=+0.27 *3*, A_4=−0.06 *3* (1981Wa23); A_2=+0.063 *9*, A_4=−0.027 *12* (1967Ne02).
114.0 *5*	2071.5				
152.0 *5*	2360.9				
206.0 *5*	2071.5	16	[E2]	0.243	A_2=+0.21 *7*, A_4=−0.05 *8* (1981Wa23) for possible doublet.
228.1 *2*	330.2	987	(E2)	0.1743	A_2=+0.30 *3*, A_4=−0.09 *3* (1981Wa23); A_2=+0.210 *7*, A_4=−0.061 *9* (1967Ne02).
248.0 *5*	1865.1	8			Eγ,Iγ: for possible doublet.
274.0 *5*	2232.5				Iγ: weak (1981Wa23).
276.0 *5*	2232.5				Iγ: weak (1981Wa23).
289.0 *5*	1616.8				
289.4 *2*	2360.9	55	(E2)	0.0824	A_2=+0.30 *2*, A_4=−0.10 *2* (1981Wa23).
301.4 *5*	2137.0	14	(E2)	0.0729	A_2=+0.42 *5*, A_4=+0.02 *5* (1981Wa23).
337.5 *2*	667.7	1000	(E2)	0.0521	A_2=+0.32 *3*, A_4=−0.11 *3* (1981Wa23); A_2=+0.233 *10*, A_4=−0.069 *13* (1967Ne02).
341.0 *5*	2491.5				Iγ: weak.
354.4 *5*	2491.5	28	(E2)	0.0453	A_2=+0.28 *3*, A_4=−0.03 *4* (1981Wa23).
356.0 *5*	2531.2	16			Eγ,Iγ: for possible doublet.
366.0 *5*	2897.2	5			

Continued on next page (footnotes at end of table)

$^{154}Sm(^{16}O,4n\gamma),^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02 (continued)

$\gamma(^{166}Yb)$ (continued)

Eγ‡	E(level)	Iγ§	Mult.†	α	Comments
367.6 *2*	2728.5	65	(E2)	0.0408	A_2=+0.29 *2*, A_4=−0.15 *2* (1981Wa23) for doublet dominated by this transition.
368.0 *5*	2232.5				
375.8 *5*	3273.1	37	(E2)	0.0383	A_2=+0.27 *2*, A_4=−0.12 *3* (1981Wa23).
400.4 *2*	2891.9	51	(E2)	0.0321	A_2=+0.34 *3*, A_4=−0.10 *3* (1981Wa23).
403.0 *5*	3892.1	17			Eγ,Iγ: for possible doublet.
430.2 *2*	1097.9	856	(E2)	0.0264	A_2=+0.31 *3*, A_4=−0.13 *3* (1981Wa23); A_2=+0.242 *16*, A_4=−0.073 *20* (1967Ne02).
432.0 *5*	2137.0				Iγ: weak.
437.6 *2*	3166.1	63	(E2)	0.0252	A_2=+0.27 *3*, A_4=−0.08 *3* (1981Wa23).
445.8 *5*	2863.0	33			A_2=+0.14 *9*, A_4=−0.02 *7* (1981Wa23) for doublet. Iγ: for 446.0γ+445.8γ doublet.
446.0 *5*	2150.7	33	[E2]	0.0240	Iγ: for 446.0γ+445.8γ doublet. A_2=+0.14 *9*, A_4=−0.02 *7* (1981Wa23) for doublet.
459.4 *5*	3351.3	27	(E2)	0.0222	A_2=+0.36 *5*, A_4=−0.19 *5* (1981Wa23).
490.8 *5*	3353.9	43	(E2)	0.0187	A_2=+0.32 *6*, A_4=−0.07 *9* (1981Wa23).
494.3 *2*	3273.1	128	(E2)	0.0184	A_2=+0.35 *1*, A_4=−0.09 *1* (1981Wa23).
496.7 *5*	2647.4	22	(E2)	0.0181	A_2=+0.38 *4*, A_4=−0.18 *5* (1981Wa23).
499.5 *5*	3665.6	45	(E2)	0.0179	A_2=+0.33 *3*, A_4=−0.13 *3*(1981Wa23).
507.7 *2*	1605.6	645	(E2)	0.01716	A_2=+0.32 *8*, A_4=−0.09 *1* (1981Wa23); A_2=+0.217 *17*, A_4=−0.058 *22* (1967Ne02).
508.0 *5*	1835.5				Iγ: weak or doublet.
509.0 *5*	3782.1	160	(E2)	0.01705	A_2=+0.23 *3*, A_4=−0.11 *3* (1981Wa23).
527.5 *5*	3878.8	14 *1*	(E2)	0.01559	A_2=+0.26 *7*, A_4=−0.01 *11* (1981Wa23).
538.0 *5*	1865.1	19	D		A_2=−0.26 *24*, A_4=−0.16 *25* (1981Wa23).
538.2 *5*	3892.1	35	(E2)	0.01483	A_2=+0.47 *13*, A_4=+0.04 *14* (1981Wa23).
550.0 *5*	3197.4	15	[E2]	0.01405	A_2=+0.22 *4*, A_4=+0.03 *7* (1981Wa23) for possible doublet. Eγ,Iγ: for possible doublet.
552.8 *5*	4218.4	32	(E2)	0.01388	A_2=+0.20 *5*, A_4=−0.03 *8* (1981Wa23).
569.7 *2*	2175.2	480	(E2)	0.01290	A_2=+0.33 *3*, A_4=−0.11 *3* (1981Wa23); A_2=+0.26 *4*, A_4=−0.05 *5* (1967Ne02).
575.1 *5*	3353.9	17	D(+Q)		A_2=−0.30 *18*, A_4=+0.15 *17* (1981Wa23).
586.2 *5*	4478.3	30	[E2]	0.01204	Eγ,Iγ,Mult.: A_2=+0.22 *7*, A_4=+0.34 *9* (1981Wa23) for possible doublet.
588.4 *2*	4370.5	69	(E2)	0.01193	A_2=+0.36 *5*, A_4=−0.02 *8* (1981Wa23).
592.0 *5*	3489.1	14			A_2=+0.27 *17*, A_4=−0.07 *22* (1981Wa23) for doublet.
	4470.8	10			A_2=+0.27 *17*, A_4=−0.07 *22* (1981Wa23) for doublet.
600.1 *5*	4818.5	25	(E2)	0.01138	A_2=+0.25 *12*, A_4=+0.05 *13* (1981Wa23).
603.5 *2*	2778.8	250	(E2)	0.01123	Mult.: A_2=+0.31 *2*, A_4=−0.13 *2* (1981Wa23); A_2=+0.19 *7*, A_4=−0.02 *9* (1967Ne02).
629.0 *5*	1956.5	24			Eγ,Iγ: for 629.0γ+630.0γ doublet. A_2=+0.29 *3*, A_4=−0.05 *7* (1981Wa23) for doublet.
630.0 *5*	5108.3	25 *7*			Iγ: for 629.0γ+630.0γ doublet. A_2=+0.29 *3*, A_4=−0.05 *7* (1981Wa23) for doublet.
649.0 *5*	5119.8				Iγ: weak.
	5467.5	10			Eγ: for doublet.
660.0 *5*	1327.5	7			Eγ,Iγ: for possible doublet.
667.0 *5*	5037.5	25			
674.0 *2*	5782.3	13	[E2]	0.00868	A_2=+0.13 *9*, A_4=−0.33 *9* (1981Wa23) for possible doublet.
687.8 *5*	2863.0	45	D		A_2=−0.21 *2*, A_4=+0.10 *3* (1981Wa23).
701.0 *5*	4190.1				
709.0 *5*	1038.6	4			
710.3 *5*	3489.1	39	(E2)	0.00770	A_2=+0.34 *3*, A_4=−0.02 *5* (1981Wa23).
722.0 *2*	2897.2	69	Q		A_2=+0.35 *1*, A_4=−0.05 *2* (1981Wa23).
739.0 *5*	5776.5				
811.6 *5*	2417.2	39	D	0.00223	A_2=−0.15 *7*, A_4=+0.01 *6* (1981Wa23).
830.0 *5*	932.1	22			
860.0 *5*	1957.9	10			
925.6 *5*	2531.2	15			A_2=+0.27 *5*, A_4=−0.16 *7* (1981Wa23).
932.0 *5*	932.1	21			
936.0 *5*	1038.6	16			
997.3 *5*	1327.5	38	D+Q		Mult.: A_2=−0.19 *3*, A_4=+0.15 *7* (1981Wa23).
1037.0 *5*	1704.8	22	D+Q		A_2=−0.31 *6*, A_4=+0.05 *7* (1981Wa23).
1053.0 *5*	2150.7	16	D+Q		Mult.: from A_2=−0.31 *7*, A_4=+0.03 *8* (1981Wa23).

Continued on next page (footnotes at end of table)

From NNDC(BNL)
program ENSDAT

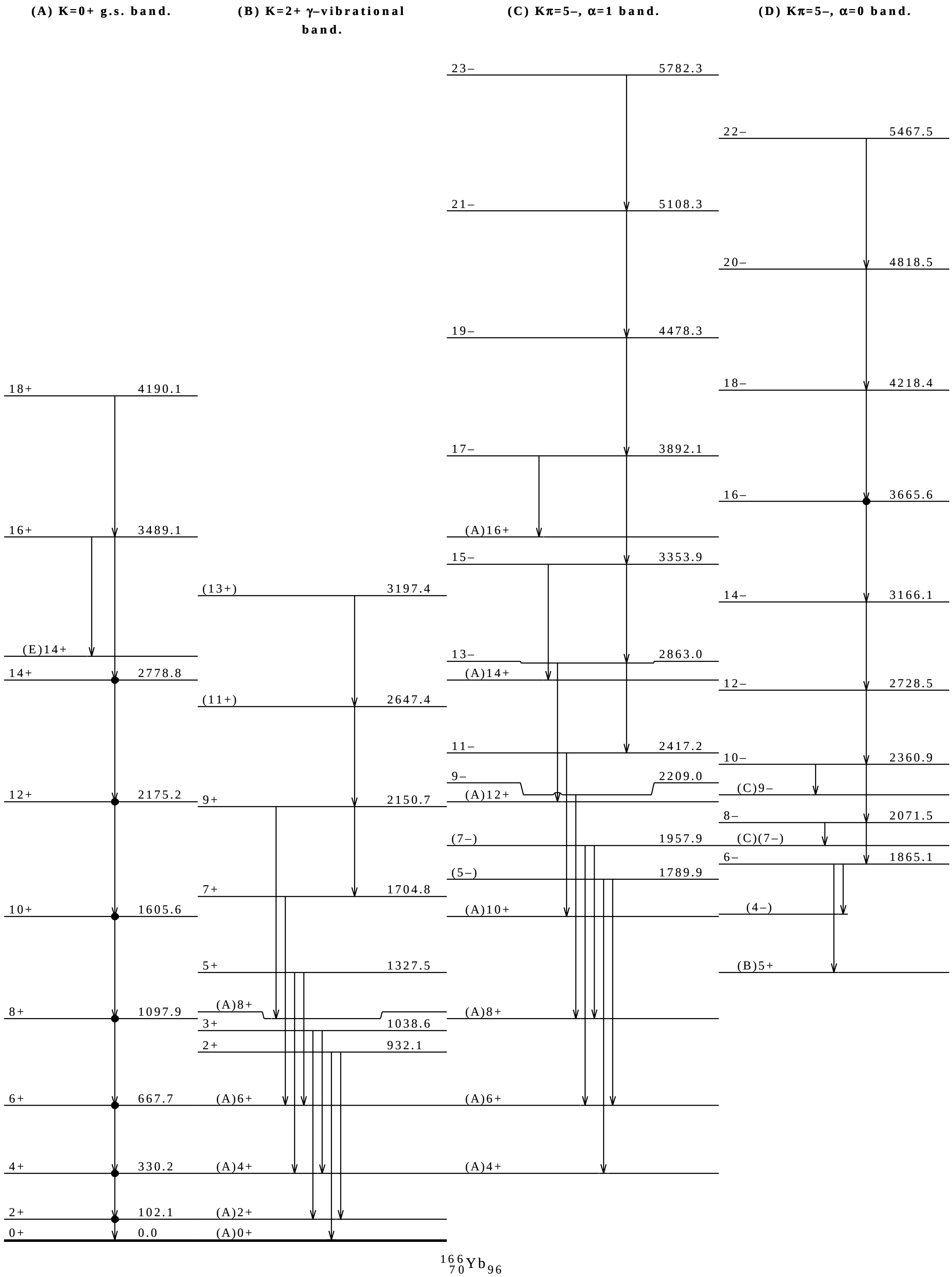
^{154}Sm(^{16}O,4nγ),^{159}Tb(^{11}B,4nγ) 1981Wa23,1967Ne02 (continued)

γ(^{166}Yb) (continued)

Eγ‡	E(level)	Iγ§	Mult.†	α	Comments
1111.2 *5*	2209.0	19	E1	1.24×10^{-3}	Mult.: from A_2=−0.22 *4*, A_4=+0.04 *5* and conversion coefficient measurements of 1981Wa23.
1122.0 *5*	1789.9	8			
1290.0 *5*	1957.9	25	D		A_2=−0.19 *4*, A_4=+0.06 *4* (1981Wa23).
1460.0 *5*	1789.9				

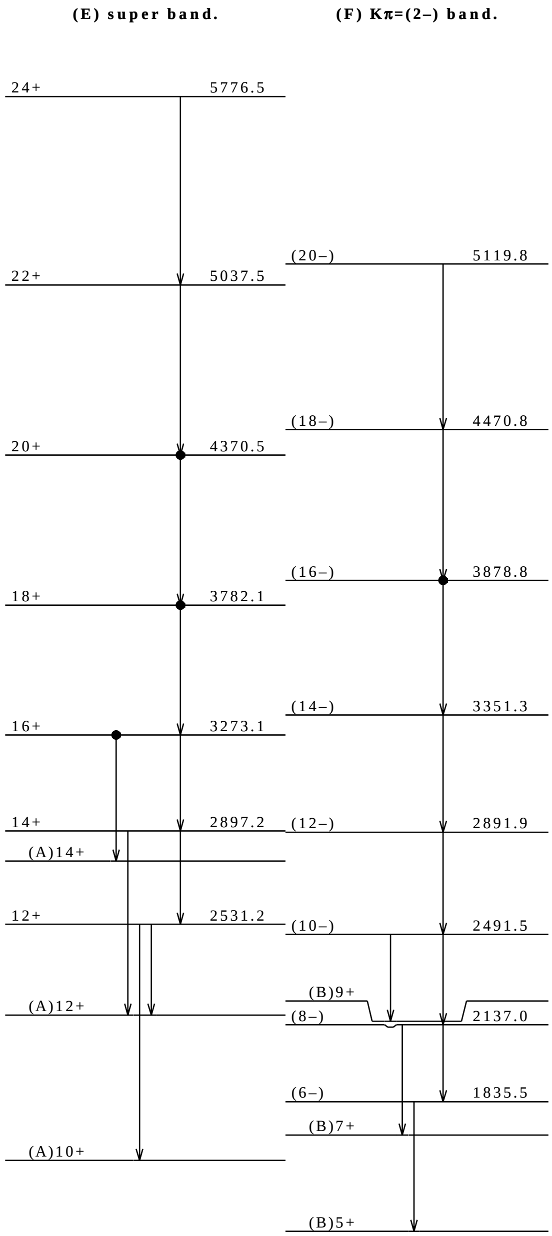
† From γ(θ), assigning Δπ=(no) for stretched Q intraband transitions, unless otherwise noted.
‡ From 1981Wa23, unless otherwise noted. ΔE=0.2 keV if Iγ≥50 but ΔE rises to 0.5 keV for weaker transitions.
§ From ^{154}Sm(^{16}O,4nγ), E(^{16}O)=80 MeV (1981Wa23). Uncertainties unstated by the authors.

$^{154}Sm(^{16}O,4n\gamma),^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02 (continued)



From NNDC(BNL)
program ENSDAT

$^{154}Sm(^{16}O,4n\gamma)$,$^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02 (continued)

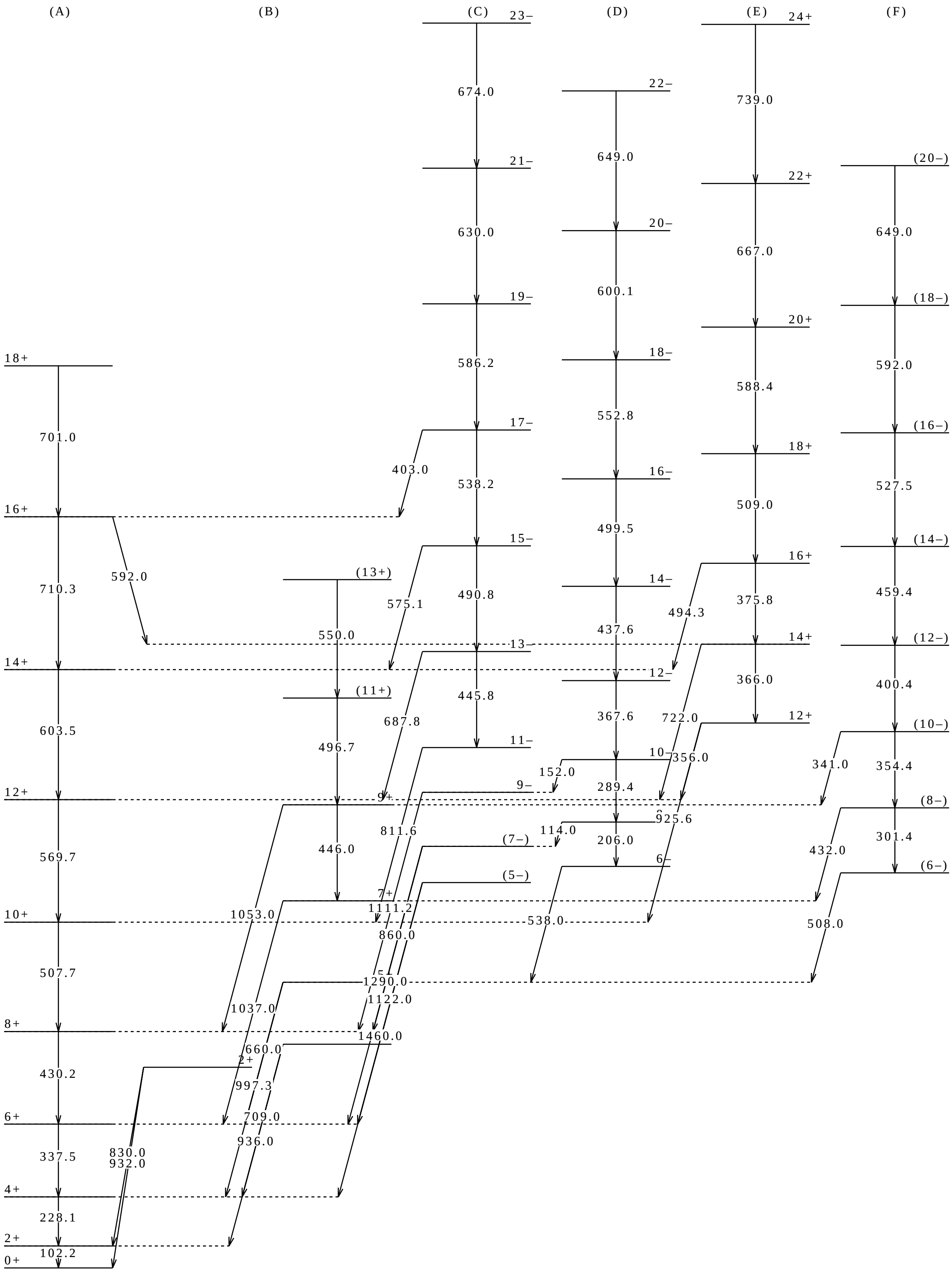


$^{166}_{70}Yb_{96}$

$^{166}_{70}Yb_{96}$–50

$^{154}Sm(^{16}O,4n\gamma),^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02 (continued)

Bands for ^{166}Yb



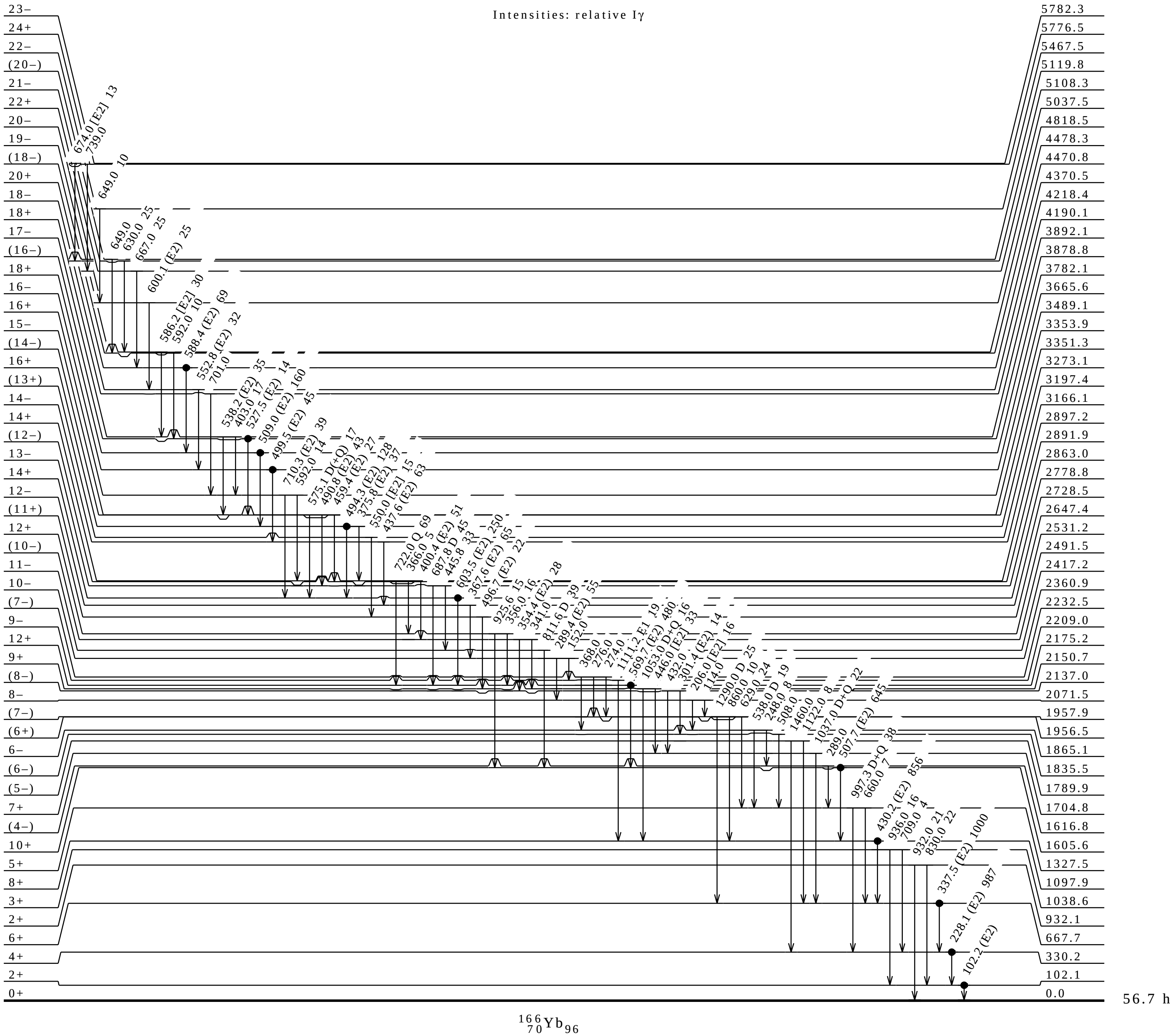
$^{166}_{70}Yb_{96}$

From NNDC(BNL)
program ENSDAT

$^{154}Sm(^{16}O,4n\gamma),^{159}Tb(^{11}B,4n\gamma)$ 1981Wa23,1967Ne02 (continued)

Level Scheme

Intensities: relative Iγ



From NNDC(BNL) program ENSDAT

$^{166}_{70}Yb_{96}$–51

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34

Includes ^{164}Er(α,2nγ), ^{166}Er(α,4nγ), ^{170}Er(α,8nγ), ^{166}Er(^{3}He,3nγ), ^{169}Tm(d,5nγ), ^{169}Tm(p,4nγ).

Others: 1966Mo01, 1971DeZE, 1972Be39, 1972Da33, 1973Sa14, 1973Bi10, 1983Fa11, 1983Fi12, 1983Na14.

1984Fi18,1983Fi12: ^{166}Er(^{3}He,3nγ), E(^{3}He)=33 MeV; measured Eγ, γγ–coin. ^{164}Er(α,2n), Eα=24 MeV; measured Eγ, Iγ, α(K)exp. 1984Fi18 presumably supersedes 1983Fi12; however, several transitions are reported in 1983Fi12 alone and some α(K)exp values differ in the two publications.

1983Fa11: ^{169}Tm(d,5nγ), E=52 MeV; Si(Li) detector; measured ce(θ).

1983Na14: ^{166}Er(α,4nγ), Eα=47 MeV; Ge and LEPS detectors, triple focusing electron spectrometer; measured Eγ, Iγ, γγ coin, γ(θ), I(ce) (θ=90° and 180°).

1973Bi10: ^{169}Tm(p,4nγ), E(p)=30–57 MeV; measured Eγ, Iγ, excit.

1973Sa14: Er(α,xnγ), E=20–43 MeV; measured Eγ.

1972Li34: ^{170}Er(α,8nγ), E=100–112 MeV; measured Eγ, γ(θ), γγ coin; deduced level $T_{1/2}$<2 ns for J=2–14 members of g.s. band and J=16, 18, 20 members of γ band based on prompt γγ coin. See also 1972Da33 and 1972Be39.

1966Mo01: ^{166}Er(α,4nγ), Eα=52 MeV; measured Eγ (g.s. band, J≤10).

^{166}Yb Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$
0.0[§]	0+[i]	56.7 h[i] *1*
102.26[§] *10*	2+	
330.28[§] *14*	4+	
667.75[§] *21*	6+	
931.6[#] *3*	2+	
1038.56[#] *20*	3+	
1097.70[§] *24*	8+	
1144.23[@] *22*	2+	
1162.5[#] *3*	4+	
1327.27[#] *21*	5+	
1342.3[@] *4*	4+	
1418.5[c] *4*	3–	
1481.60[#] *24*	6+	
1502.1[d] *3*	(2–)	
1504.5 *3*		
1569.0[c] *3*	5–	
1605.4[§] *3*	10+	
1607.0[@] *3*	6+	
1616.16[d] *24*	(4–)	
1704.1[#] *3*	7+	
1789.6[&] *3*	5–	
1811.7[#] *3*	8+	
1833.6[c] *4*	7–	
1834.71[d] *25*	(6–)	
1852.5[@] *3*	8+	
1864.40[a] *23*	6–	
1940.5[c] *3*	9–	
1958.1[&] *3*	7–	
2029.5[b] *3*	8+	
2071.7[a] *3*	8–	
2136.6[d] *3*	(8–)	
2142.6[#] *3*	10+	
2149.9[#] *3*	9+	
2176.0[§] *3*	12+	
2209.2[&] *4*	9–	
2214.3[b] *3*	10+	
2232.40 *25*		
2318.9[@] *4*	10+	
2360.6[a] *3*	10–	
2417.7[&] *4*	11–[h]	
2490.7[d] *4*	(10–)	
2531.7[be] *4*	12+	
2609.3[#] *4*	12+	
2646.3[#] *5*	11+	
2728.1[a] *5*	12–	
2779.3[§] *5*	14+	
2862.7[&] *4*	13–[g]	
2891.4[d] *4*	(12–)	
3273.8[b] *6*	16+	
3350.4[d] *5*	(14–)[f]	
3782.9[b] *6*	18+	
4371.7[b] *7*	20+	

† From least–squares fit to Eγ.
‡ From 1984Fi18.
§ (A): K=0+ g.s. band.
\# (B): K=2+ γ–vibrational band.
@ (C): K=0+ β–vibrational band.
& (D): Kπ=5–, α=1 band.
a (E): Kπ=5–, α=0 band.
b (F): Super band. Becomes yrast for J≥16.
c (G): Kπ=0– band.
d (H): Kπ=(2–) band.
e g–factor=–0.14 *4* (1983Na14), deduced from measured multipolarities and branching ratios of the interband transitions.
f Assigned by evaluator, consistent with Adopted Levels.
g The adopted band assignment is shown here. 1984Fi18 assigned level as J=13 member of 0– band instead.
h The adopted band assignment is shown here. 1984Fi18 assigned level as J=11 member of 0– band instead.
i From Adopted Levels.

γ(^{166}Yb)

γ(θ): A_2,A_4, extracted by 1967Ne02, 1972Li34 (or 1972Be39).

Eγ[‡]	E(level)	Iγ[§]	Mult.[†]	δ	α	Comments
102.26 *10*	102.26	33 *3*	(E2)		2.95	α(K)=0.970 *14*; α(L)=1.509 *23*; α(M)=0.372 *6*; α(N+..)=0.0946 *14*. α(N)=0.0848 *13*; α(O)=0.00975 *15*; α(P)=4.11×10^{-5} *6*. Eγ: from 1973Sa14. Other Eγ: 102.9 *3* (1984Fi18), 102.2 *3* (1972Li34). Mult.: A_2=+0.25 *3*, A_4=–0.11 *4* (1972Li34).

Continued on next page (footnotes at end of table)

From NNDC(BNL) program ENSDAT

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

γ(^{166}Yb) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[†]	δ	α	Comments
112.9 *3*	2071.7					Eγ: unresolved from unidentified contaminant transition (1984Fi18).
151.3 *3*	2360.6	1.00 *10*				
207.6 *3*	2071.7	4.1 *4*	(E2)		0.237	α(K)=0.1484 *22*; α(L)=0.0682 *11*; α(M)=0.0165 *3*; α(N+..)=0.00424 *7*. α(N)=0.00378 *6*; α(O)=0.000457 *7*; α(P)=7.00×10^{-6} *11*.
217.9 *3*	1834.71	<1				
228.05 *10*	330.28	163 *16*	(E2)		0.1744	α(K)=0.1137 *16*; α(L)=0.0467 *7*; α(M)=0.01122 *16*; α(N+..)=0.00290 *4*. α(N)=0.00258 *4*; α(O)=0.000315 *5*; α(P)=5.48×10^{-6} *8*. Eγ: from 1973Sa14. Other Eγ: 227.8 *3* (1984Fi18); 228.1 *3* (1972Li34). A_2=+0.30 *1*, A_4=−0.03 *2* (1972Li34).
247.8 *3*	1864.40	3.2 *3*				
274.0 *3*	2232.40	<1.0				
288.6 *3*	2360.6	1.70 *10*				
289.3 *3*	1327.27	1.00 *10*	[E2]		0.0825	α(K)=0.0583 *9*; α(L)=0.0186 *3*; α(M)=0.00443 *7*; α(N+..)=0.001153 *17*. α(N)=0.001022 *15*; α(O)=0.0001279 *19*; α(P)=2.96×10^{-6} *5*.
295.6 *3*	1864.40	8.1 *8*				
300.8 *3*	2136.6	4.6 *5*				
318.6[a] *3*	1481.60	1.80 *18*				
331.0[b] *3*	1811.7	1.90[b] *19*				
	2142.6	1.90[b] *19*				
337.2 *3*	667.75	100	E2		0.0523	α(K)=0.0384 *6*; α(L)=0.01070 *16*; α(M)=0.00252 *4*; α(N+..)=0.000659 *10*. α(N)=0.000583 *9*; α(O)=7.42×10^{-5} *11*; α(P)=2.00×10^{-6} *3*. Eγ: other Eγ: 337.7 *3* (1972Li34); 337.3 *2* (1973Sa14). Mult.: from α(K)exp=0.0455 *10* (1984Fi18) and A_2=+0.30 *1*, A_4=−0.03 *2* (1972Li34).
353.7 *3*	2490.7	1.20 *12*				
355.8 *3*	2531.7	1.30 *13*	M1		0.0998	α(N)=0.000655 *10*; α(O)=9.39×10^{-5} *14*; α(P)=5.04×10^{-6} *8*. α(N)=0.000655 *10*; α(O)=9.39×10^{-5} *14*; α(P)=5.04×10^{-6} *7*. Mult.: from α(K)exp=0.088 *7* (1983Na14). See 1983Na14 for 356γ(θ).
361.3 *3*	2214.3	<1.0				
367.5[b] *3*	2232.40	3.2[b] *3*				
	2728.1	3.2[b] *3*				
376.9 *3*	1704.1	1.50 *15*				
398.1 *3*	2232.40	<1.0				
400.2 *3*	2891.4	2.8 *3*	(E2)		0.0322	α(K)=0.0245 *4*; α(L)=0.00595 *9*; α(M)=0.001393 *20*; α(N+..)=0.000366 *6*. α(N)=0.000322 *5*; α(O)=4.18×10^{-5} *6*; α(P)=1.309×10^{-6} *19*. Mult.: from α(K)exp=0.0157 *6* (1984Fi18).
402.7 *3*	2214.3	<1.0				
420.6 *3*	2360.6	1.60 *16*				
[x]425.4 *3*		<1.0				1984Fi18 indicate that this γ deexcites the J=13 member of the Kπ=5− band but such a placement is inconsistent with the adopted ^{166}Yb level scheme.

Continued on next page (footnotes at end of table)

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

γ(^{166}Yb) (continued)

Eγ‡	E(level)	Iγ§	Mult.†	δ	α	Comments
429.9 *3*	1097.70	46 *5*	E2		0.0265	α(K)=0.0204 *3*; α(L)=0.00472 *7*; α(M)=0.001099 *16*; α(N+..)=0.000289 *4*. α(N)=0.000255 *4*; α(O)=3.33×10^{-5} *5*; α(P)=1.100×10^{-6} *16*. Mult.: from α(K)exp=0.0202 *5* (1984Fi18) and A_2=+0.33 *2*, A_4=−0.05 *3* (1972Li34). Eγ: from 1984Fi18. Other Eγ: 430.4 *2* (1973Sa14), 430.2 *3* (1972Li34).
433.2[b] *3*	2136.6	<1[b]				
	2609.3	<1.0[b]	(M1)		0.0594	α(K)=0.0499 *7*; α(L)=0.00740 *11*; α(M)=0.001652 *24*; α(N+..)=0.000447 *7*. α(N)=0.000388 *6*; α(O)=5.56×10^{-5} *8*; α(P)=3.00×10^{-6} *5*. Mult.: from α(K)exp>0.026 (1984Fi18).
443.1 *3*	2232.40	<1.0				
445.4[@b] *3*	2149.9	2.8[b] *3*				
	2862.7	2.8[b] *3*				
453.2 *3*	1616.16	1.20 *12*				Mult.: α(K)exp=0.014 *2* (1984Fi18); too high for E1 multipolarity implied by level scheme.
459.0 *3*	3350.4	<1.0				Placed by evaluator, consistent with Adopted Levels, Gammas. 1984Fi18 place it between the J=12 and J=10 members of the γ band but, in Adopted Levels, Gammas, Eγ=466.9 for that transition.
463.5 *3*	1502.1	<1.0				
466.9 *3*	2609.3	0.50 *5*				Eγ,Iγ: from 1983Fi12.
477.2 *3*	2417.7	<1.0				α(K)exp=0.012 *3* (1984Fi18).
494.5 *3*	3273.8		Q			Eγ: from 1972Li34. A_2=+0.41 *9*, A_4=−0.03 *14* (1972Li34).
496.4 *3*	2646.3	1.80 *18*	E2		0.0182	α(K)=0.01427 *20*; α(L)=0.00301 *5*; α(M)=0.000697 *10*; α(N+..)=0.000184 *3*. α(N)=0.0001618 *23*; α(O)=2.15×10^{-5} *3*; α(P)=7.82×10^{-7} *11*. Mult.: from α(K)exp=0.0108 *7* (1984Fi18).
507.4[#] *3*	1605.4	25.8 *26*	(E2)		0.01718	α(K)=0.01354 *19*; α(L)=0.00282 *4*; α(M)=0.000652 *10*; α(N+..)=0.0001722 *25*. α(N)=0.0001514 *22*; α(O)=2.01×10^{-5} *3*; α(P)=7.44×10^{-7} *11*. A_2=+0.35 *2*, A_4=−0.10 *4* (1972Li34).
	1834.71	25.8[b] *26*				
	2318.9	25.8[b] *26*				
509.1 *3*	3782.9					Eγ: from 1972Li34.
537.2[b] *3*	1864.40	1.90[b] *19*				
	2142.6	1.90[b] *19*	M1		0.0340	α(N)=0.000221 *4*; α(O)=3.17×10^{-5} *5*; α(P)=1.711×10^{-6} *24*. α(N)=0.000221 *3*; α(O)=3.17×10^{-5} *5*; α(P)=1.711×10^{-6} *24*. Mult.: from α(K)exp=0.040 *10* (1984Fi18).
547.5 *3*	2029.5	<1				α(K)exp=0.055 *53* (1984Fi18).
570.6[b] *3*	1502.1	1.80[b] *18*				
	2176.0	1.80[b] *18*	(E2)		0.01285	α(K)=0.01026 *15*; α(L)=0.00200 *3*; α(M)=0.000460 *7*; α(N+..)=0.0001220 *18*. α(N)=0.0001070 *15*; α(O)=1.439×10^{-5} *21*; α(P)=5.68×10^{-7} *8*. Eγ: other Eγ: 569.3 *4* (1973Sa14); 569.7 *3* (1972Li34). Mult.: α(K)exp=0.018 *5* (1984Fi18) (0.018 *2* in 1983Fi12) for doublet; A_2=+0.32 *3*, A_4=−0.05 *5* (1972Li34) for line contaminated by E2 γ in ^{207}Pb.

Continued on next page (footnotes at end of table)

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

γ(^{166}Yb) (continued)

Eγ‡	E(level)	Iγ§	Mult.†	δ	α	Comments
577.0 *3*	1616.16	2.20 *22*	[E1]		0.00445	α(K)=0.00377 *6*; α(L)=0.000532 *8*; α(M)=0.0001181 *17*; α(N+..)=3.17×10^{-5} *5*. α(N)=2.76×10^{-5} *4*; α(O)=3.89×10^{-6} *6*; α(P)=2.00×10^{-7} *3*. Mult.: α(K)exp=0.012 *3* (1984Fi18); too high for E1 multipolarity implied by level scheme.
588.8 *3*	4371.7		(E2)		0.01191	Eγ: from 1972Li34. A_2=+0.44 *15*, A_4=−0.04 *25* (1972Li34).
603.3 *3*	2779.3	<1.0	E2		0.01124	Mult.: A_2=+0.34 *5*, A_4=−0.05 *9* (1972Li34); α(K)exp=0.020 *13* (1984Fi18). Eγ: other Eγ: 603.8 *2* (1972Li34), 603.3 *4* (1973Sa14).
608.9 *3*	2214.3	1.70 *17*	E0+M1+E2		0.053 *26*	Mult.,α: from α(K)exp=0.040 *20* (1984Fi18) (0.035 *7* in 1983Fi12).
659.2 *3*	1327.27	3.8 *4*	(E2)		0.00913	α(K)=0.00740 *11*; α(L)=0.001347 *19*; α(M)=0.000307 *5*; α(N+..)=8.18×10^{-5} *12*. α(N)=7.16×10^{-5} *10*; α(O)=9.75×10^{-6} *14*; α(P)=4.13×10^{-7} *6*. Mult.: from α(K)exp=0.006 *4* (1984Fi18) (0.007 *1* in 1983Fi12).
686.3 *3*	2862.7	3.9 *4*	E1		0.00310	α(K)=0.00263 *4*; α(L)=0.000368 *6*; α(M)=8.16×10^{-5} *12*; α(N+..)=2.19×10^{-5} *3*. α(N)=1.91×10^{-5} *3*; α(O)=2.70×10^{-6} *4*; α(P)=1.405×10^{-7} *20*. Mult.: from α(K)exp=0.004 *2* (1984Fi18).
708.5 *3*	1038.56	6.5 *7*	(E2)		0.00775	α(K)=0.00631 *9*; α(L)=0.001115 *16*; α(M)=0.000254 *4*; α(N+..)=6.76×10^{-5} *10*. α(N)=5.91×10^{-5} *9*; α(O)=8.09×10^{-6} *12*; α(P)=3.53×10^{-7} *5*. Mult.: from α(K)exp=0.0035 *10* (1984Fi18) (0.0066 *7* in 1983Fi12).
713.3[&b] *3*	1811.7	<1[b]				
	2318.9	<1.0[b]				
715.8 *3*	2891.4	<1.0				
754.8 *3*	1852.5	3.0 *3*	E0+M1+E2		0.022 *4*	α(K)=0.009 *4*; α(L)=0.0014 *4*; α(M)=0.00030 *9*; α(N+..)=8.2×10^{-5} *25*. α(N)=7.1×10^{-5} *21*; α(O)=1.0×10^{-5} *4*; α(P)=5.1×10^{-7} *21*. Mult.,α: from α(K)exp=0.017 *3* (1984Fi18) (0.020 *1* in 1983Fi12).
811.0 *3*	2417.7	2.9 *3*				
813.7 *3*	1481.60	7.4 *7*	M1		0.01192	α(K)=0.01005 *14*; α(L)=0.001458 *21*; α(M)=0.000325 *5*; α(N+..)=8.78×10^{-5} *13*. α(N)=7.62×10^{-5} *11*; α(O)=1.095×10^{-5} *16*; α(P)=5.96×10^{-7} *9*. Mult.: from α(K)exp=0.010 *1* (1984Fi18).
829.4 *3*	931.6	3.4 *4*	M1		0.01136	α(K)=0.00958 *14*; α(L)=0.001389 *20*; α(M)=0.000309 *5*; α(N+..)=8.37×10^{-5} *12*. α(N)=7.26×10^{-5} *11*; α(O)=1.044×10^{-5} *15*; α(P)=5.68×10^{-7} *8*. Mult.: from α(K)exp=0.010 *1* (1984Fi18).
831.7 *3*	1162.5	7.2 *7*	M1		0.01129	α(K)=0.00952 *14*; α(L)=0.001380 *20*; α(M)=0.000307 *5*; α(N+..)=8.31×10^{-5} *12*. α(N)=7.21×10^{-5} *11*; α(O)=1.036×10^{-5} *15*; α(P)=5.64×10^{-7} *8*. Mult.: from α(K)exp=0.0103 *4* (1984Fi18).

Continued on next page (footnotes at end of table)

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

γ(^{166}Yb) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[†]	δ	α	Comments
837.0 *3*	1504.5	4.1 *4*	E1+M2	0.31 *+3−4*	0.0045 *6*	α(K)=0.0037 *5*; α(L)=0.00056 *8*; α(M)=0.000126 *17*; α(N+..)=3.4×10^{-5} *5*. α(N)=3.0×10^{-5} *4*; α(O)=4.2×10^{-6} *6*; α(P)=2.2×10^{-7} *3*. Mult.,δ: from α(K)exp=0.0037 *4* (1984Fi18). γ is unplaced in 1984Fi18; placed by evaluator, consistent with Adopted Levels, Gammas.
843.3 *3*	1940.5	4.0 *4*	E1		0.00207	α(N)=1.256×10^{-5} *18*; α(O)=1.78×10^{-6} *3*; α(P)=9.42×10^{-8} *14*. Mult.: from α(K)exp=0.0018 *10* (1984Fi18).
859.7 *3*	1958.1	3.9 *4*	E1+(M2)		0.014 *13*	α(K)=0.012 *11*; α(L)=0.0019 *17*; α(M)=0.0004 *4*; α(N+..)=0.00012 *11*. α(N)=0.00010 *9*; α(O)=1.4×10^{-5} *13*; α(P)=8.×10^{-7} *7*. Mult.: from α(K)exp=0.0037 *7* (1984Fi18).
924.7 *3*	2531.7	2.00 *20*				Mult.: α(K)exp<0.0010 (1984Fi18). 1984Fi18 indicate that this γ also deexcites the 1039 level, but Eγ does not fit that placement. See 1983Na14 for 925γ(θ).
932.1 *3*	2029.5	7.3 *7*	E0+M1		0.116 *12*	Mult.,α: from α(K)exp=0.0089 *9* (1984Fi18).
932.4[a] *3*	931.6					Eγ: from 1983Fi12. All or most of 932.4γ+932.1γ doublet Iγ belongs to the 932.1γ, based on γ assignment in 1984Fi18.
936.0 *3*	1038.56	12.0 *12*	E2		0.00425	α(K)=0.00352 *5*; α(L)=0.000565 *8*; α(M)=0.0001274 *18*; α(N+..)=3.41×10^{-5} *5*. α(N)=2.98×10^{-5} *5*; α(O)=4.15×10^{-6} *6*; α(P)=1.98×10^{-7} *3*. Eγ,Iγ: from 1983Fi12. Mult.: from α(K)exp=0.004 *1* (1983Fi12).
939.5 *3*	1607.0	1.70 *17*	E0+M1+E2		0.0063 *21*	α(K)=0.0053 *18*; α(L)=0.00079 *23*; α(M)=0.00018 *5*; α(N+..)=4.8×10^{-5} *14*. α(N)=4.1×10^{-5} *12*; α(O)=5.9×10^{-6} *18*; α(P)=3.1×10^{-7} *11*. Mult.: from α(K)exp=0.026 *5* (1984Fi18) (0.020 *4* in 1983Fi12).
996.8 *3*	1327.27	12.6 *13*	M1+E2		0.0055 *18*	α(K)=0.0046 *15*; α(L)=0.00068 *20*; α(M)=0.00015 *5*; α(N+..)=4.1×10^{-5} *12*. α(N)=3.6×10^{-5} *10*; α(O)=5.1×10^{-6} *15*; α(P)=2.7×10^{-7} *10*. Mult.: from α(K)exp=0.0036 *3* (1984Fi18).
1012.0 *3*	1342.3					Eγ,Mult.: α(K)exp<0.01 (1984Fi18) but γ is unresolved from unidentified contaminant transition.
1036.6 *3*	1704.1	3.6 *4*	M1+E2		0.0050 *16*	α(K)=0.0042 *14*; α(L)=0.00062 *18*; α(M)=0.00014 *4*; α(N+..)=3.7×10^{-5} *11*. α(N)=3.3×10^{-5} *9*; α(O)=4.6×10^{-6} *14*; α(P)=2.4×10^{-7} *9*. Mult.: from α(K)exp=0.0049 *6* (1984Fi18).
1042.0 *3*	1144.23					Eγ,Mult.: α(K)exp<0.05 (1984Fi18) but γ is unresolved from unidentified contaminant transition.
1052.5 *3*	2149.9	1.50 *15*	E2+M1		0.0048 *15*	α(K)=0.0041 *13*; α(L)=0.00060 *17*; α(M)=0.00013 *4*; α(N+..)=3.6×10^{-5} *10*. α(N)=3.1×10^{-5} *9*; α(O)=4.5×10^{-6} *13*; α(P)=2.4×10^{-7} *8*. Mult.: α(K)exp=0.0022 *4* (1984Fi18).
1111.4 *3*	2209.2	3.4 *3*	E1		1.24×10^{-3}	α(K)=0.001051 *15*; α(L)=0.0001434 *20*; α(M)=3.17×10^{-5} *5*; α(N+..)=1.063×10^{-5} *15*. α(N)=7.41×10^{-6} *11*; α(O)=1.058×10^{-6} *15*; α(P)=5.68×10^{-8} *8*; α(IPF)=2.10×10^{-6} *4*. Mult.: α(K)exp<0.001 (1984Fi18).

Continued on next page (footnotes at end of table)

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

γ(^{166}Yb) (continued)

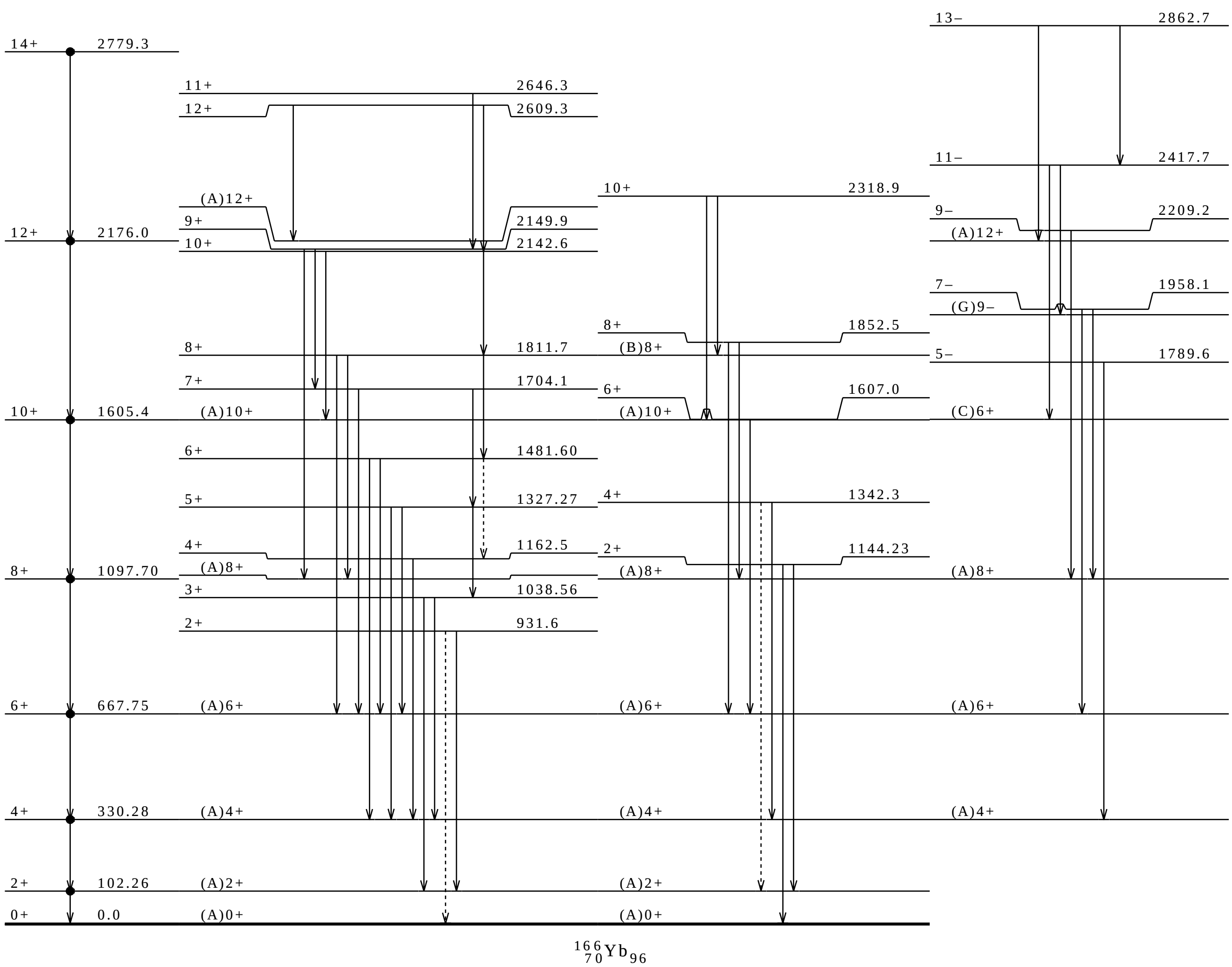
Eγ‡	E(level)	Iγ§	Mult.†	α	Comments
1117.1 *3*	2214.3	2.20 *22*			
1144.2[b] *3*	1144.23	1.70[b] *17*			
	1811.7	1.70[b] *17*			
1152.0 *3*	1481.60	<1.0			
1165.8 *3*	1833.6	<1.0	E1	1.14×10^{-3}	α(K)=0.000965 *14*; α(L)=0.0001313 *19*; α(M)=2.90×10^{-5} *4*; α(N+..)=1.83×10^{-5} *3*. α(N)=6.79×10^{-6} *10*; α(O)=9.70×10^{-7} *14*; α(P)=5.21×10^{-8} *8*; α(IPF)=1.053×10^{-5} *17*. Mult.: from α(K)exp<0.0019 (1984Fi18).
1173.9 *3*	1504.5	6 *1*			γ is unplaced in 1984Fi18; placed by evaluator, consistent with Adopted Levels, Gammas.
1184.1 *3*	1852.5	2.7 *3*			
[x]1201.6 *3*		3.4 *3*	E2	0.00257	α(K)=0.00215 *3*; α(L)=0.000325 *5*; α(M)=7.28×10^{-5} *11*; α(N+..)=2.46×10^{-5} *4*. α(N)=1.703×10^{-5} *24*; α(O)=2.40×10^{-6} *4*; α(P)=1.211×10^{-7} *17*; α(IPF)=5.10×10^{-6} *8*. Mult.: from α(K)exp=0.0022 *6* (1984Fi18).
1238.9[ab] *3*	1342.3	4.6[b] *5*			
	1569.0	4.6[b] *5*			
1290.2 *3*	1958.1	4.0 *4*	E1	1.01×10^{-3}	α(K)=0.000807 *12*; α(L)=0.0001094 *16*; α(M)=2.41×10^{-5} *4*; α(N+..)=6.68×10^{-5} *10*. α(N)=5.65×10^{-6} *8*; α(O)=8.08×10^{-7} *12*; α(P)=4.37×10^{-8} *7*; α(IPF)=6.03×10^{-5} *9*. Mult.: from α(K)exp=0.0007 *4* (1984Fi18).
1316.2 *3*	1418.5	<1.0			
1459.7 *3*	1789.6	5.8 *6*			

† From γ(θ), assigning Δπ=(no) for stretched Q intraband transitions, unless otherwise noted.
‡ From 1984Fi18, unless otherwise noted. 1984Fi18 report ΔE=0.1 keV; however, that uncertainty appears to have been underestimated based on the large number of energies that differ by at least 3σ from the value expected from a least–squares fit to Eγ. The evaluator has, therefore, increased the uncertainty to 0.3 keV to overcome this problem.
§ From ^{164}Er(α,2nγ), Eα=24 MeV (1984Fi18, except as noted). Iγ data are from 55° singles spectrum.
# 1984Fi18 report α(K)exp=0.0118 *6* for the 507.4 triplet.
@ 1984Fi18 report α(K)exp=0.014 *4* for the 445.4 doublet.
& 1984Fi18 report α(K)exp=0.016 *6* (cf. 0.018 *4* in 1983Fi12) for the 713.3 doublet.
a Placement of transition in the level scheme is uncertain.
b Multiply placed; undivided intensity given.
x γ ray not placed in level scheme.

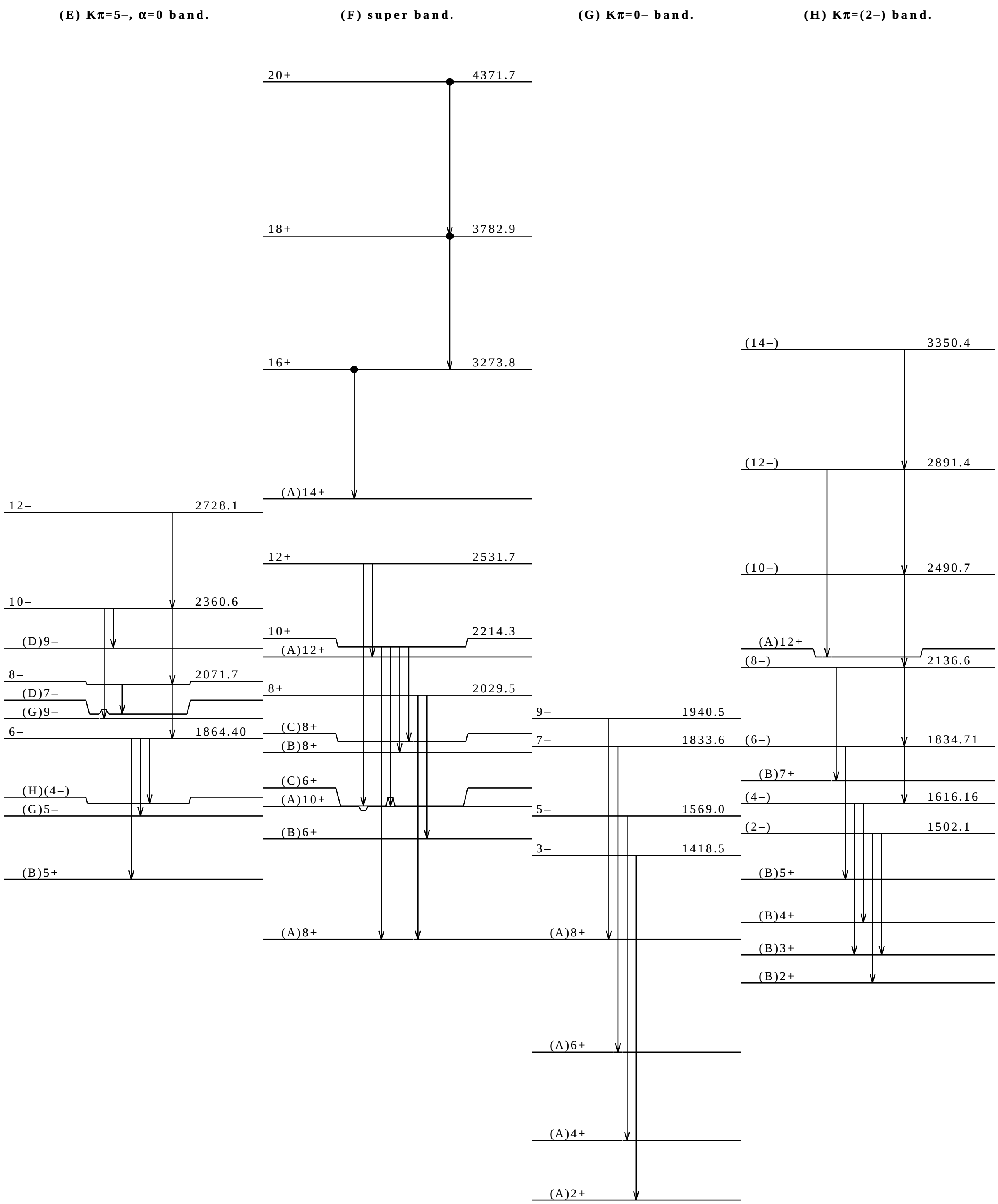
From NNDC(BNL)
program ENSDAT

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

(A) K=0+ g.s. band. **(B) K=2+ γ–vibrational band.** **(C) K=0+ β–vibrational band.** **(D) Kπ=5–, α=1 band.**



Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)



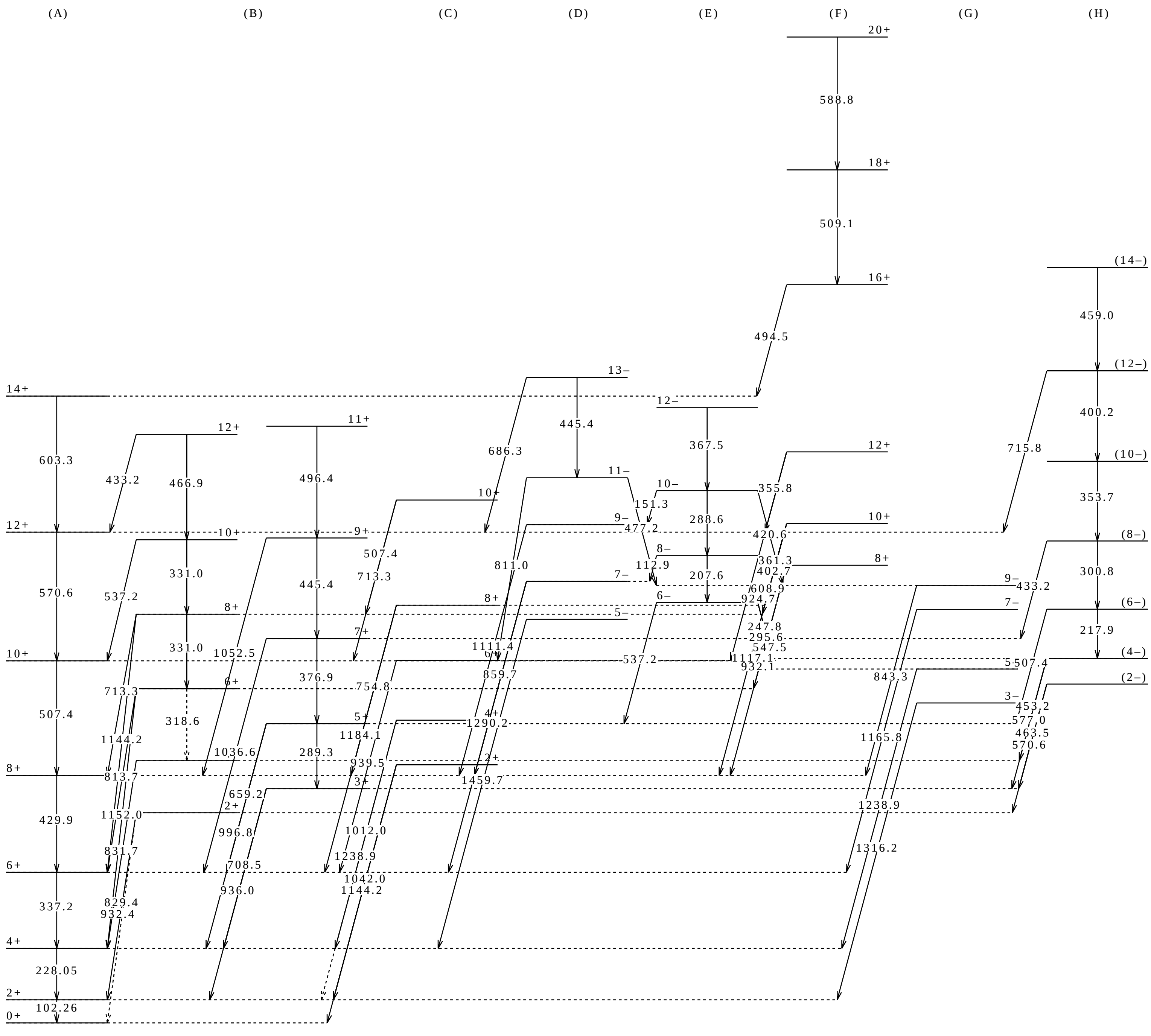
$^{166}_{70}Yb_{96}$

From NNDC(BNL)
program ENSDAT

$^{166}_{70}Yb_{96}$–60

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ)   1984Fi18,1972Li34 (continued)

Bands for ^{166}Yb



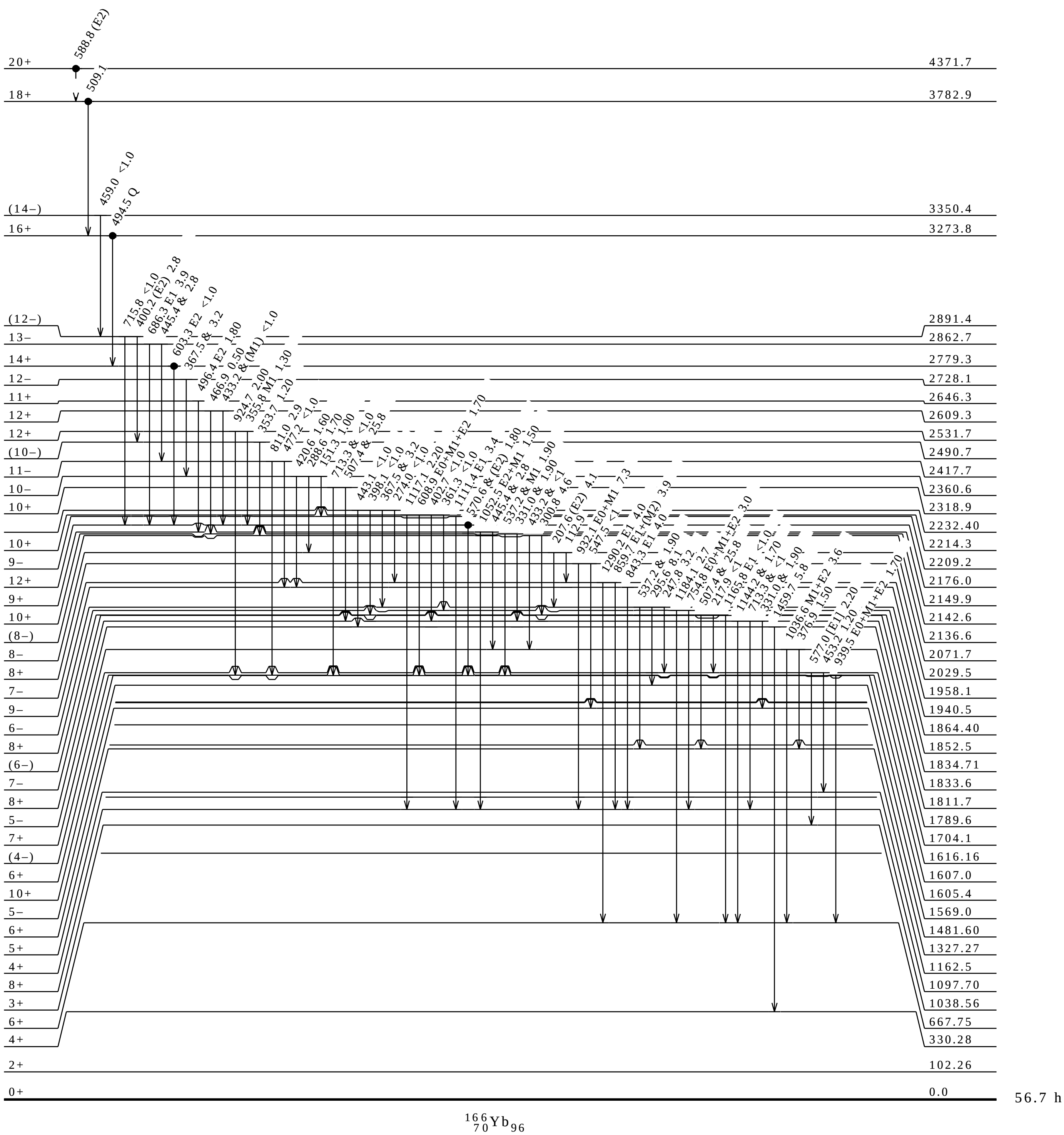
$^{166}_{70}Yb_{96}$

$^{166}_{70}Yb_{96}$–60

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

Level Scheme

Intensities: relative Iγ from (α,2nγ), E=24 MeV
& Multiply placed; undivided intensity given



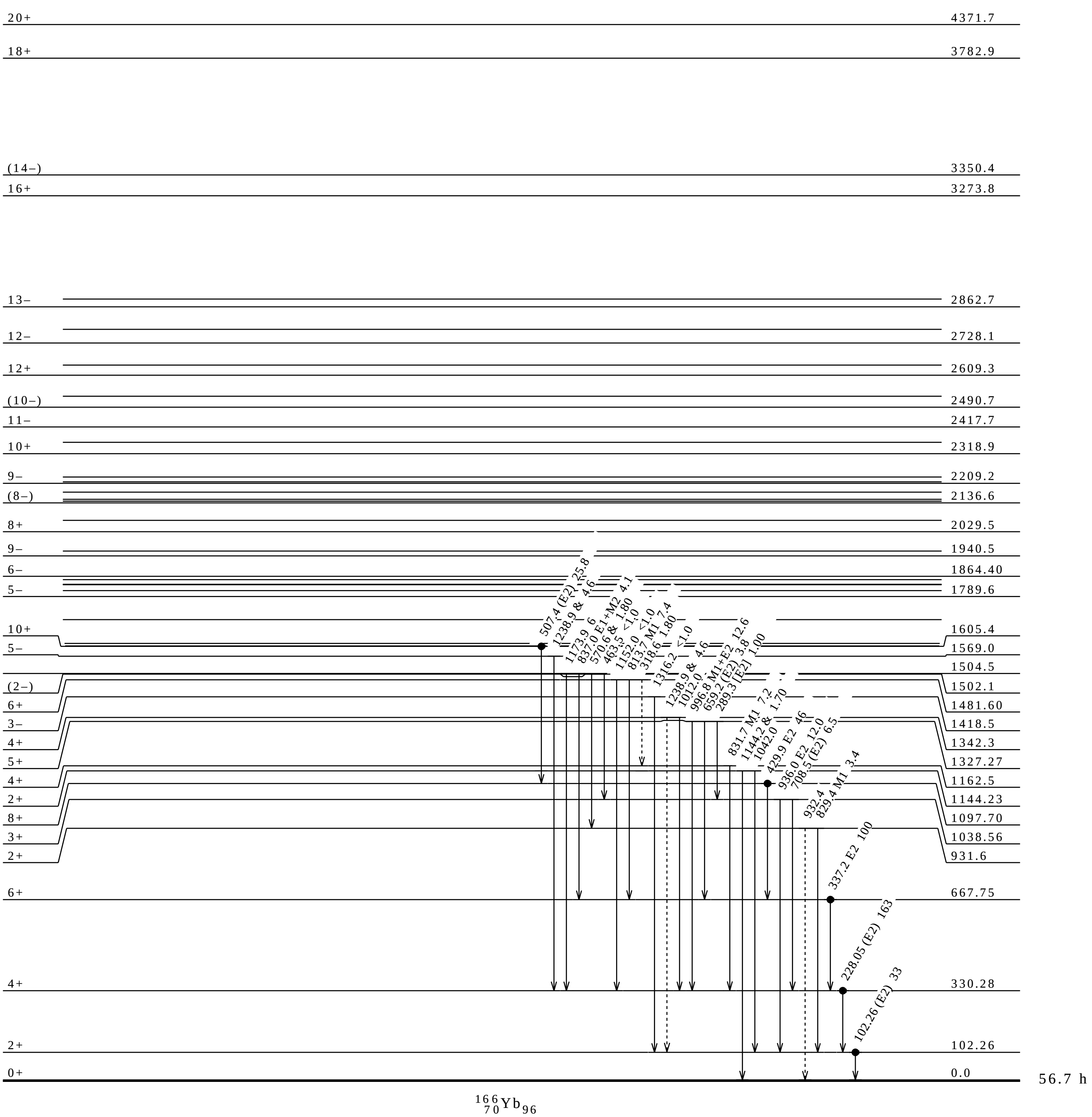
$^{166}_{70}Yb_{96}$

From NNDC(BNL)
program ENSDAT

Er(α,xnγ),^{166}Er(^{3}He,3nγ),^{169}Tm(d,5nγ),^{169}Tm(p,4nγ) 1984Fi18,1972Li34 (continued)

Level Scheme (continued)

Intensities: relative Iγ from (α,2nγ), E=24 MeV
& Multiply placed; undivided intensity given



From NNDC(BNL)
program ENSDAT

^{168}Yb(p,t) 1973Oo01

1973Oo01: E=19 MeV; 18.25% ^{168}Yb target; magnetic spectrometer with nuclear emulsions and position sensitive detectors in focal plane (FWHM=10–12 keV); measured Q(β⁻)value, dσ/dΩ(E(t),θ).(4 angles).

^{166}Yb Levels

E(level)†	Jπ‡	L	Σσ(c.m.) μb/sr§
0.0#	0+	0	647 *22*
101# *10*	2+		267 *16*
329# *10*	4+		55 *8*
931 *10*	(2+)		58 *8*
1043@ *10*	(0+)	(0)	76 *11*
1581 *10*			30 *16*

† A search at 27.5° (near the L=0 maximum) revealed no additional states stronger than 10% of the g.s. between 2200 and 3300 keV.
‡ Authors' assignments are based on comparison of the (p,t) angular distributions with those for levels with previously known Jπ.
§ Center of mass cross section summed over θ=12.5°, 27.5°, 42.5°, 55° (in μb/sr).
# (A): Kπ=0+ g.s. band.
@ (B): K=0+ β–vibrational band.

^{186}W(n,4p17nγ) 2000Ya22

E=250–600 MeV from LANSCE/WNR spallation neutron source; 4 HPGe detectors in close geometry; measured Eγ, γγ coin.

^{166}Yb Levels

E(level)†	Jπ‡
102§	2+
330§	4+
667§	6+
1097§	8+
1604§	10+
2173§	12+
2777§	14+

† From Eγ, assuming adopted value (rounded) for the 2+ level.
‡ From Adopted Levels.
§ (A): Kπ=0+ g.s. band.

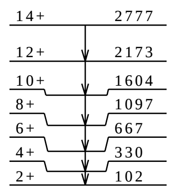
γ(^{166}Yb)

Eγ†	E(level)
228	330
337	667
430	1097
507	1604
569	2173
604	2777

† From fig. 2 of 2000Ya22.

^{186}W(n,4p17nγ) 2000Ya22 (continued)

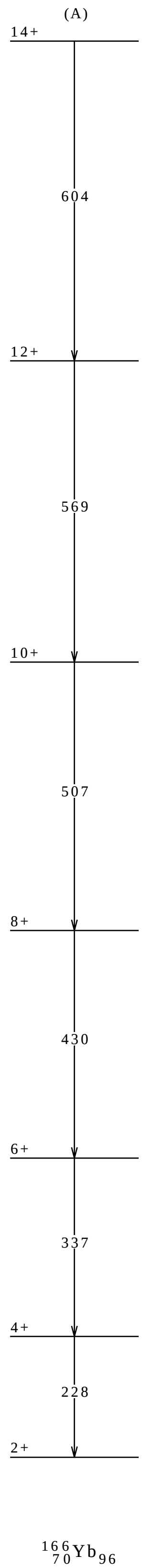
(A) Kπ=0+
g.s. band.



$^{166}_{70}Yb_{96}$

^{186}W(n,4p17nγ) 2000Ya22 (continued)

Bands for ^{166}Yb

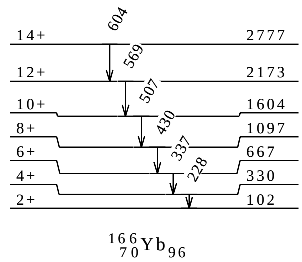


From NNDC(BNL)
program ENSDAT

$^{166}_{70}Yb_{96}$–66

$^{186}W(n,4p17n\gamma)$ 2000Ya22 (continued)

Level Scheme



Adopted Levels, Gammas

Q(β⁻)=–2160 *40*; S(n)=7650 *40*; S(p)=3020 *40*; Q(α)=3040 *40* 2003Au03.
Assignment: daughter ^{166}Hf, chem. γ(^{166}Yb) (1969Ar23); ^{169}Tm(^{3}He,6n), E(^{3}He)=45–80 MeV, excit, γ(^{166}Yb) (1974De09); ^{170}Yb(p,5n), E(p)=52 MeV, γ(^{166}Yb) (1974De09).
For hfs and isotope shift data, see 1998Ge13.
Other Reactions: ^{123}Sb(^{48}Ca,5nγ) (1990McZY): identified four rotational bands; details of results not given.

^{166}Lu Levels

Cross Reference (XREF) Flags

A ^{166}Lu IT Decay (1.41 min)
B ^{166}Hf ε Decay
C ^{139}La(^{30}Si,3nγ)
D ^{152}Sm(^{19}F,5nγ)
E ^{159}Tb(^{12}C,5nγ)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0	6–#	ABCDE	2.65 min *10*	%ε+%β⁺=100. μ=+2.912 *12* (1998Ge13); Q=+4.33 *4* (1998Ge13). Δ<r²>(^{170}Lu,^{166}Lu)=–0.412 (1998Ge13). μ,Q: from collinear fast–beam LASER spectroscopy. Sign from 2005St24. <r²>$^{1/2}$(charge)=5.298 *5* (2004An14). Jπ: J=6 from collinear fast–beam LASER spectroscopy (1998Ge13). π from allowed ε decay to π=– 2233 level of ^{166}Yb. Configuration: (π 7/2[411])+(ν 5/2[523]). Unhindered allowed ε decay to a ^{166}Yb level implies the presence of the (ν 5/2[523]) orbital in the g.s. configuration in this mass region, and the 7/2+ g.s. of ^{167}Lu has the configuration (π 7/2[404]). For a deformed odd–odd nucleus, the 6– coupling is expected to lie lower in energy than the 1–. $T_{1/2}$: from 1974De09. Other: 1969Ar23.
34.37 *22*	3(–)#	AB	1.41 min *10*	%IT=42 *5*; %ε=58 *5* (1974De09). μ=+0.189 *5* (1998Ge13); Q=+2.715 *21* (1998Ge13). Δ<r²>(^{170}Lu,^{166}Lu)=–0.444 (1998Ge13). μ,Q: from collinear fast–beam LASER spectroscopy. Sign from 2005St24. $T_{1/2}$: from 1974De09. Jπ: J=3 from collinear fast–beam LASER spectroscopy (1998Ge13). π from (M3) 34γ to 6– g.s. Configuration: (π 1/2[411])+(ν 5/2[523]). Assignment: ^{169}Tm(^{3}He,6n), E(^{3}He)=45–80 MeV, excit γ(^{166}Yb); ^{170}Yb(p,5n), E(p)=52 MeV, γ(^{166}Yb) (1974De09).
43.0 *4*	0–#	B	2.12 min *10*	%IT<20; %ε+%β⁺>80 (1974De09). Δ<r²>(^{170}Lu,^{166}Lu)=–0.448 (1998Ge13). Assignment: ^{169}Tm(^{3}He,6n), E(^{3}He)=45–80 MeV excit, γ(^{166}Yb); ^{170}Yb(p,5n), E(p)=52 MeV, γ(^{166}Yb) (1974De09). $T_{1/2}$: from 1974De09. Jπ: J=0 from collinear fast–beam LASER spectroscopy (1998Ge13). π from allowed ε decay to π=– 1359 level in ^{166}Yb. configuration: (π 5/2[402])–(ν 5/2[523]) (1974De09).
57.2 *3*	(1)–#	B		Jπ: E1 79γ from 1+ 136; 23γ to 3(–) 34; configuration assignment. configuration: (π 7/2[404])–(ν 5/2[523]) (1974De09).
60.5 *4*	(3+)#	B		Jπ: 483γ from 1+ 544; likely configuration. configuration: (π 1/2[541])+(ν 5/2[523]) (1974De09).
83.50 *10*	(5,6,7)+	C E	92 ns *7*	Jπ: E1 84γ to 6– g.s. $T_{1/2}$: from centroid shift between 83.5γ and 85.5γ in (^{12}C,5nγ).
135.9 *3*	1+	B		Jπ: ε decay from 0+ is unhindered allowed (log *ft*=4.5). configuration: (π 7/2[523])–(ν 5/2[523]) (1974De09).
144.79 *14*	(6,7,8)–	C E		Jπ: E1 61γ to (5,6,7)+ 84 level; ΔJ≤1 142γ from J≥7 *287*.
189.8& *10*	(7)+	CDE		Jπ: E1 45γ to (6,7,8)– 145 level; band assignment.
196.0c *10*	J	CDE		Jπ: γ to (5,6,7)+ 84 level.
287.21a *14*	(8)–	CDE		Jπ: Δπ=no 143γ to (6,7,8)– 145 level; possibly E1 204γ to (5,6,7)+ 84; band assignment.
290.5@ *11*	(8+)	CDE		
303.29? *24*	(+)	E		Existence of level is doubtful; it should have been seen in (^{19}F,5nγ) and in (^{30}Si,3nγ) also, but was not. Jπ: (E1) 159γ to (6,7,8)– 145.
336.0c *11*	J+2	CDE		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Lu Levels (continued)

E(level)†	Jπ‡	XREF	Comments
341.10[b] *16*	(9−)	CDE	
341.2 *4*	1	B	Jπ: allowed or first forbidden ε decay from 0+ (log *ft*=5.8).
358.2[§d] *11*	(8−)	CDE	
399.1 *3*	1(+)	B	Jπ: ε decay from 0+ is allowed or first–forbidden (log *ft*=5.4); 355γ to 0− 43; 339γ to (3+) 61.
425.5[&] *11*	(9+)	CDE	
426.58[a] *23*	(10−)	CDE	
434.7 *4*	1(+)	B	Jπ: ε decay from 0+ is allowed or first–forbidden (log *ft*=5.5). 378γ to 0− 43.
505.2[§e] *17*	(9−)	D	
539.10[b] *24*	(11−)	CDE	
543.7 *4*	1+	B	Jπ: log *ft*=5.2 for ε decay from 0+.
587.4[§d] *4*	(10−)	CDE	
591.2[@] *11*	(10+)	CDE	
591.8[c] *11*	J+4	CDE	
694.62[a] *25*	(12−)	CDE	
786.2[§e] *13*	(11−)	D	
786.9[&] *11*	(11+)	CDE	
867.9[b] *3*	(13−)	CDE	
907.0[§d] *11*	(12−)	CDE	
961.6[c] *11*	J+6	CDE	
1004.6[@] *11*	(12+)	CDE	
1083.5[a] *3*	(14−)	CDE	
1145.8[§e] *13*	(13−)	D	
1250.5[&] *11*	(13+)	CDE	
1312.9[b] *3*	(15−)	CDE	
1323.9[§d] *11*	(14−)	CDE	
1433.4[c] *11*	J+8	CDE	
1512.0[@] *11*	(14+)	CDE	
1574.8[a] *3*	(16−)	CDE	
1589.0[§e] *13*	(15−)	D	
1799.5[&] *11*	(15+)	CDE	
1834.4[§d] *11*	(16−)	CDE	
1856.9[b] *4*	(17−)	CDE	
1991.3[c] *12*	J+10	CDE	
2096.5[@] *11*	(16+)	CDE	
2111.9[§e] *13*	(17−)	D	
2152.2[a] *4*	(18−)	CDE	
2416.8[&] *11*	(17+)	CDE	
2430.6[§d] *11*	(18−)	CDE	
2482.6[b] *4*	(19−)	CDE	
2615.7[c] *12*	J+12	CDE	
2710.2[§e] *14*	(19−)	D	
2739.3[@] *11*	(18+)	CDE	
2800.0[a] *4*	(20−)	CDE	
3069.7[&] *12*	(19+)	CDE	
3098.5[§d] *12*	(20−)	CDE	
3173.0[b] *7*	(21−)	CD	
3285.7[c] *16*	J+14	D	
3375.9[§e] *17*	(21−)	D	
3430.9[@] *13*	(20+)	CDE	
3499.5[a] *5*	(22−)	CDE	
3773.9[&] *16*	(21+)	CD	
3819.3[§d] *12*	(22−)	CDE	
3892.5[b] *12*	(23−)	C	
3974.7?[c] *19*	(J+16)	D	
4104.4[§e] *20*	(23−)	D	
4167.0[@] *17*	(22+)	C	
4248.6[a] *11*	(24−)	C	
4520.9?[&] *19*	(23+)	D	
4591.8[§d] *16*	(24−)	D	
4673.3[b] *16*	(25−)	C	
0.0+x?[f]	(8+)	D	
130.4+x[g] *8*	(9+)	D	

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CITATION: Nuclear Data Sheets (1992) From NNDC(BNL) program ENSDAT

Adopted Levels, Gammas (continued)

^{166}Lu Levels (continued)

E(level)†	Jπ‡	XREF
286.9+x[f] 8	(10+)	D
470.2+x[g] 10	(11+)	D
690.6+x[f] 11	(12+)	D
928.8+x[g] 12	(13+)	D
1198.0+x[f] 13	(14+)	D
1486.2+x[g] 13	(15+)	D
1785.9+x[f] 14	(16+)	D
2114.2+x[g] 17	(17+)	D

† From least–squares fit to Eγ, assigning 1 keV uncertainty to data for which the authors gave no uncertainty.

‡ Values given without comment are based on deduced band structure. It should be noted, however, that different authors may disagree on the spin of a given level, even when they agree on the configuration assignment. See detailed comments on the individual bands.

§ Level energy is dependent on the validity of the 163γ and 251γ transitions linking the Kπ=2– and ΔJ=2 bands; these gammas were reported in (^{30}Si.3nγ) and (^{12}C,5nγ) but not in (^{19}F,5nγ).

\# Assignments for the lowest energy levels are consistent with systematics for neighboring nuclides (1974De09). Based on low–energy structure of odd–odd Lu isotopes, the 7/2[404], 1/2[411] and 5/2[402] proton orbitals are expected to lie lowest in energy (and at almost the same energy) for N=95, with the 1/2[541] and 9/2[514] orbitals at somewhat higher energy. Unhindered allowed ε decay from the g.s. to a ^{166}Yb level and a (ν 5/2[523]) g.s. for ^{165}Yb support the inclusion of the (ν 5/2[523]) orbital in the g.s. configuration in this mass region, so low–energy 6–, 3– and 0– levels are anticipated based on the Gallagher–Moszkowski rule, with 1– and 3+ states a little higher in energy.

@ (A): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band. J values are from (^{19}F,5nγ), based on level energy systematics for similar bands in neighboring odd–odd nuclei and checked by the alignment additivity rule; they are one unit higher than suggested in independent (^{12}C,5nγ) (1992Ho02) and (^{30}Si,3nγ) (2000Le25) studies.

& (B): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner band.

a (C): Kπ=7–, α=0 (π 9/2[514])+(ν 5/2[642]) band (2000Le25). J values are based on energy systematics, the alignment additivity rule and systematics of signature inversion for low–lying states for yrast bands in odd–odd Lu isotopes; these values are from (^{19}F,5nγ) and (^{30}Si,3nγ) and they are one unit higher than suggested in an earlier (^{12}C,5nγ) study (1992Ho02).

b (D): Kπ=7–, α=1 (π 9/2[514])+(ν 5/2[642]) band (2000Le25). See comment on signature partner band.

c (E): ΔJ=2 band (2000Zh51). Assigned as Kπ=2+, α=0 (π 1/2[411])–(ν 5/2[642]) band (with Jπ(196 level)=6+) in (^{19}F,5nγ) (2000Zh51), based on similarity of level structure to that for the α=0 band in ^{162}Tm with the same configuration assignment. However, assigned as signature partner of the Kπ=2– (π 1/2[541])–(ν 5/2[642]) band (with Jπ(196 level)=7–) in (^{30}Si,3nγ) (2000Le25). If the adopted Jπ values for the α=0 (π 1/2[541])–(ν 5/2[642]) band are correct, the former configuration would imply M2 multipolarity for the three transitions linking it to the ΔJ=2 band. The alternative scenario is problematic also because a different band has already been assigned as the signature partner of the Kπ=2– band.

d (F): Kπ=2–, α=0 (π 1/2[541])–(ν 5/2[642]) band (2000Zh51). Configuration assignment supported by similarity of band structure to that for bands in ^{162}Tm and ^{164}Tm with the same configuration assignment (large signature splitting, low–spin signature inversion, delayed BC crossing and small B(M1) to B(E2) in–band cascade to crossover transition probability ratios) (2000Zh51).

e (G): Kπ=2–, α=1 (π 1/2[541])–(ν 5/2[642]) band (2000Zh51). α=1 sequence is observed only in (^{19}F,5nγ). See comment on signature partner of this band.

f (H): Kπ=5+, α=0 (π 5/2[402])+(ν 5/2[642]) band (2000Zh51). Configuration assignment supported by similarity of band structure to that for a ^{162}Tm band with the same configuration assignment. Strongly coupled, weakly populated band reported in (^{19}F,5nγ) alone.

g (I): Kπ=5+, α=1 (π 5/2[402])+(ν 5/2[642]) band (2000Zh51). See comment on signature partner of this band.

γ(^{166}Lu)

E(level)	Eγ†	Iγ‡	Mult.§	α	Comments
34.37	34.37# 22	100#	(M3)	8.6×10^4 4	B(M3)(W.u.)=0.074 12. Mult.: from L/M in ε decay.
57.2	(14.3)		[M1]	191	Eγ: from level energy difference.
	22.85# 22	#	[E2]	3110 160	
60.5	(26.1)		[E1]	2.55	Eγ: from level energy difference.
83.50	83.5# 1	100#	E1	0.560	B(E1)(W.u.)=2.68×10^{-6} 21.
135.9	78.76# 10	100# 5	E1	0.651	Mult.: from α(L)exp in ε decay.
	93.05# 20	8# 1	(E1)	0.423 7	Mult.: from α(L)exp in ε decay.
144.79	61.3 1	100	E1	0.240	
189.8	45	100	E1	0.566	
196.0	112.5@				
287.21	142.5 2	100	M1(+E2)	1.12 23	

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Adopted Levels, Gammas (continued)

γ(^{166}Lu) (continued)

E(level)	Eγ[†]	Iγ[‡]	Mult.[§]	α	Comments
287.21	203.7 *1*	<158	(E1)		Mult.,Iγ: possibly unreliable; measurement was for a contaminated line.
290.5	100.8 *2*	100	M1(+E2)	3.43 *18*	
303.29?	158.5[a] *2*	100	(E1)	0.1046	
336.0	139.9 *2*	100	[E2]	0.959	
341.10	54.0 *3*		[M1(+E2)]	24 *21*	γ not observed but its existence is implied by γγ coin data and presence of 139γ crossover transition; possibly highly converted.
	196.3 *1*	100	(E2)	0.2956	Mult.: M1,E2 from intensity balance in (^{12}C,5nγ); ΔJ>1 from level scheme.
341.2	283.92[#] *20*	93[#] *36*			
	306.8[#] *4*	100[#] *23*			
358.2	162.4 *3*	100			
399.1	338.98[#] *15*	25[#] *12*			
	341.82[#] *10*	100[#] *9*			
	355.1[#] *5*	23[#] *11*			
425.5	135.0 *2*	100	[M1(+E2)]	1.33 *24*	
	235.7 *2*	72			
426.58	85.5 *2*	100	[M1(+E2)]	6.0 *3*	
	139.0[@]	<107	[E2]	0.982	
434.7	298.77[#] *20*	33[#] *10*			
	377.6[#] *5*	100[#] *29*			
505.2	148.0[&a]	100			
539.10	112.5 *1*	100	[M1(+E2)]	2.38 *25*	
	198.0 *3*	<30	[E2]	0.287	
543.7	407.91[#] *10*	100[#] *19*			
	483.05[#] *10*	91[#] *16*			
587.4	229.3 *2*	100			
	251.3 *3*				
591.2	165.6 *2*	92	[M1(+E2)]	0.7018	
	300.8 *2*	100			
591.8	255.8 *2*	100			
694.62	155.5 *1*	100	[M1(+E2)]	0.85 *20*	
	268.1 *2*	34			
786.2	198.2[&]				
	281.0[&]				
786.9	195.7 *2*	83	[M1(+E2)]	0.42 *13*	
	361.4 *2*	100			
867.9	173.3 *1*	100	[M1(+E2)]	0.61 *16*	
	328.8 *2*	48			
907.0	319.6 *2*	100			
961.6	369.8 *2*	100			
1004.6	217.7 *2*	62	[M1(+E2)]	0.31 *10*	
	413.4 *2*	100			
1083.5	215.6 *1*	100	[M1(+E2)]	0.32 *11*	
	388.7 *2*	84			
1145.8	238.6[&]				
	359.1[&]				
1250.5	245.9 *2*	99			
	463.5 *2*	100			
1312.9	229.5 *2*	81			
	445.3 *2*	100			
1323.9	416.9 *2*	100			
1433.4	471.8 *3*	100			
1512.0	261.5 *3*	100			
	507.4 *3*	70			
1574.8	261.9 *2*	100			
	491.0 *2*	75			
1589.0	265.4[&]				
	442.4[&]				
1799.5	287.7 *3*	78			
	549.1 *3*	100			
1834.4	510.5 *2*	100			

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Adopted Levels, Gammas (continued)

γ(^{166}Lu) (continued)

E(level)	Eγ†	Iγ‡	Mult.§	α
1856.9	281.9 *2*	100		
	544.1 *2*	81		
1991.3	557.9 *3*	100		
2096.5	297.1 *3*			
	584.3 *3*	100		
2111.9	277.5&			
	522.4&			
2152.2	295.3 *2*	100		
	577.4 *2*	84		
2416.8	617.3 *3*	100		
2430.6	596.3 *2*	100		
2482.6	330.2 *3*	73		
	625.7 *2*	100		
2615.7	624.4 *3*	100		
2710.2	280.1&			
	597.7&			
2739.3	642.8 *3*	100		
2800.0	317.2 *3*	71		
	647.9 *2*	100		
3069.7	652.9 *3*	100		
3098.5	667.9 *3*	100		
3173.0	373.2@			
	690.2@			
3285.7	670.0&	100		
3375.9	665.7&	100		
3430.9	361.4@			
	691.4@			
3499.5	326.3@			
	699.5 *3*			
3773.9	704.2@	100		
3819.3	720.8 *3*	100		
3892.5	719.5@	100		
3974.7?	689&a	100		
4104.4	728.5&	100		
4167.0	736.2@	100		
4248.6	749.1@	100		
4520.9?	747&a	100		
4591.8	772.5&	100		
4673.3	780.8@	100		
130.4+x	130.3&a	100	[M1]	1.727
286.9+x	156.3&			
	287.0&a			
470.2+x	183.2&			
	339.8&			
690.6+x	220.2&			
	403.8&			
928.8+x	238.1&			
	458.6&			
1198.0+x	269.1&			
	507.6&			
1486.2+x	288.0&			
	557.4&			
1785.9+x	299.5&			
	588.1&			
2114.2+x	328.0&a			
	628.0&			

† From ^{159}Tb(^{12}C,5nγ), except as noted. Eγ data from (^{30}Si,3nγ) are in excellent agreement; however, Eγ data from (^{19}F,5nγ) are consistently lower by as much as 1.5 keV.

‡ Relative photon intensity normalized to 100 for strongest photon deexciting each level. From ^{159}Tb(^{12}C,5nγ), except as noted.

§ From intensity balance in ^{159}Tb(^{12}C,5nγ), except as noted.

From ^{166}Hf ε decay.

@ From (^{30}Si,3nγ) (2000Le25).

Footnotes continued on next page

Adopted Levels, Gammas (continued)

γ(^{166}Lu) (continued)

& From (^{19}F,5nγ) (2000Zh51).

a Placement of transition in the level scheme is uncertain.

CITATION:
Nuclear Data Sheets (1992)

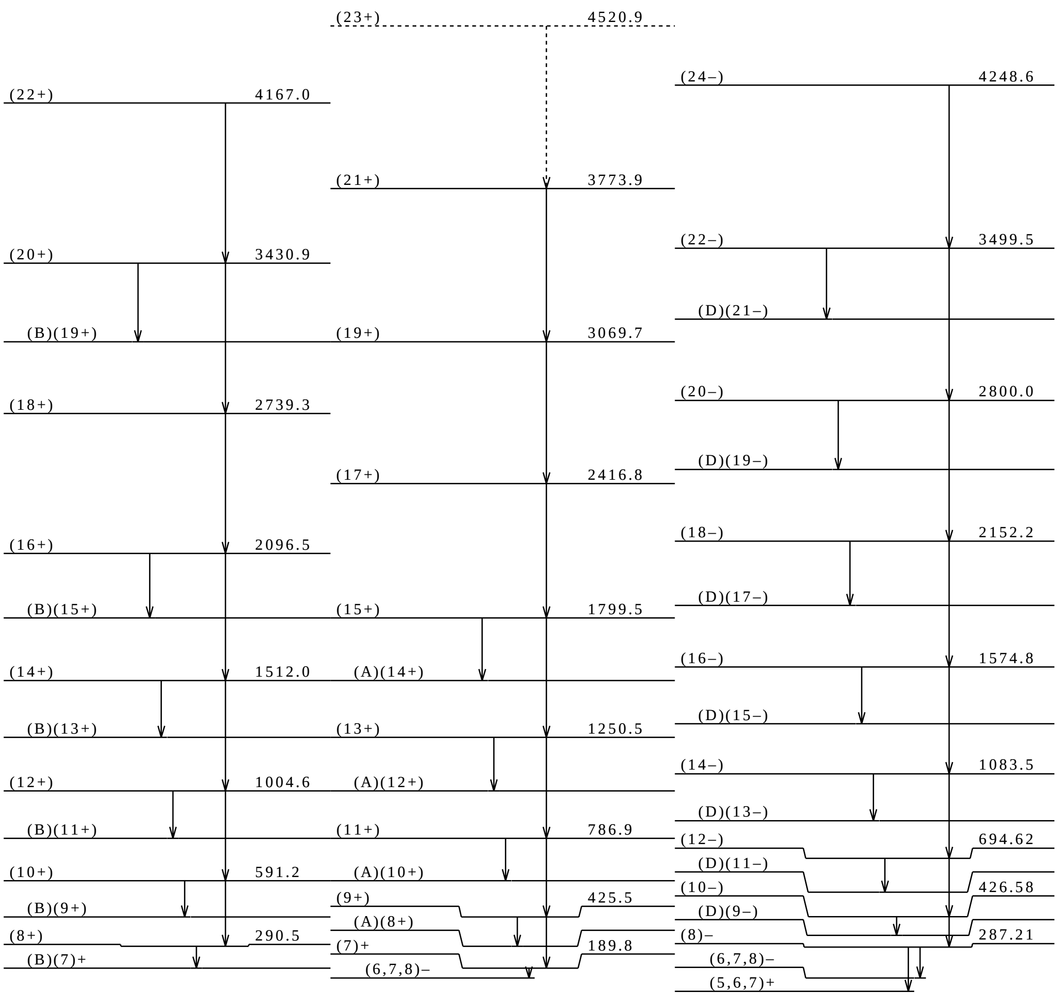
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(A) Kπ=6+, α=0 (π 7/2[404]) +(ν 5/2[642]) band.

(B) Kπ=6+, α=1 (π 7/2[404]) +(ν 5/2[642]) band.

(C) Kπ=7–, α=0 (π 9/2[514]) +(ν 5/2[642]) band (2000Le25).



$^{166}_{71}Lu_{95}$

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Nuclear Data Sheets (1992)

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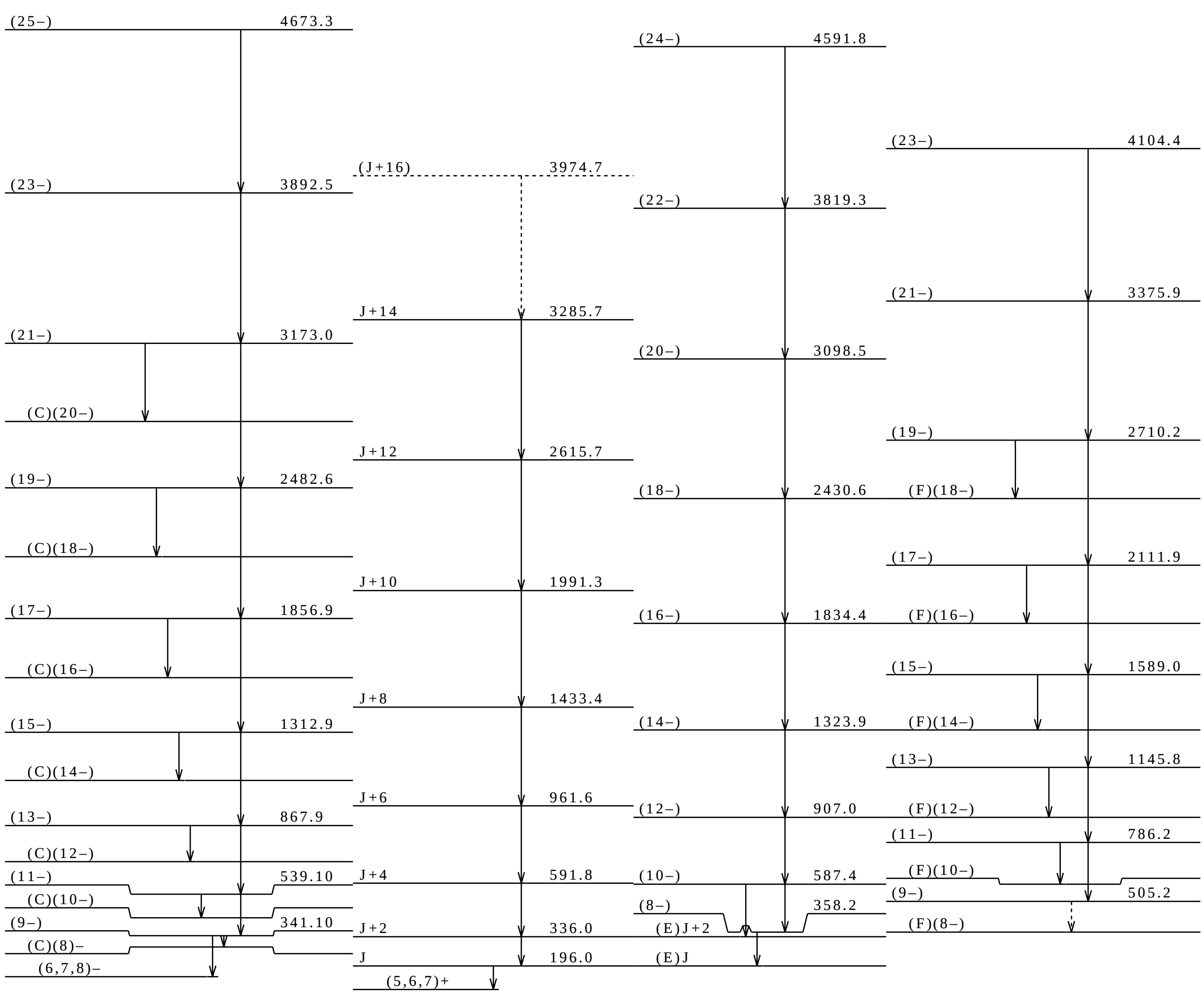
Adopted Levels, Gammas (continued)

(D) Kπ=7−, α=1 (π 9/2[514]) +(ν 5/2[642]) band (2000Le25).

(E) ΔJ=2 band (2000Zh51).

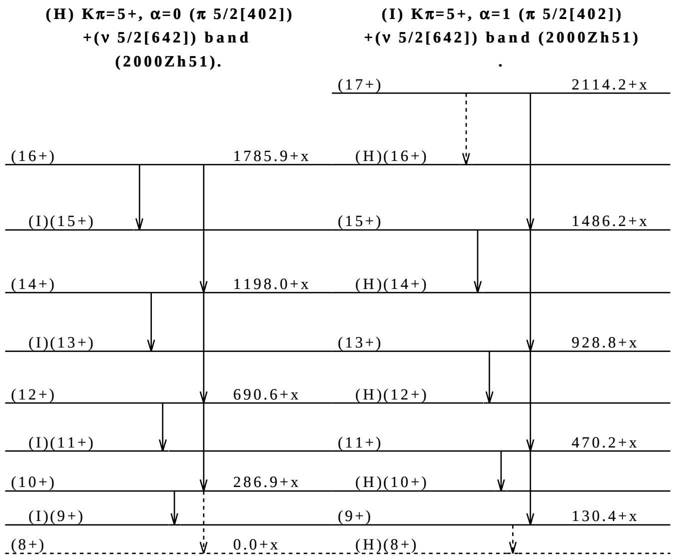
(F) Kπ=2−, α=0 (π 1/2[541]) −(ν 5/2[642]) band (2000Zh51).

(G) Kπ=2−, α=1 (π 1/2[541]) −(ν 5/2[642]) band (2000Zh51).



$^{166}_{71}Lu_{95}$

Adopted Levels, Gammas (continued)



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Nuclear Data Sheets (1992)

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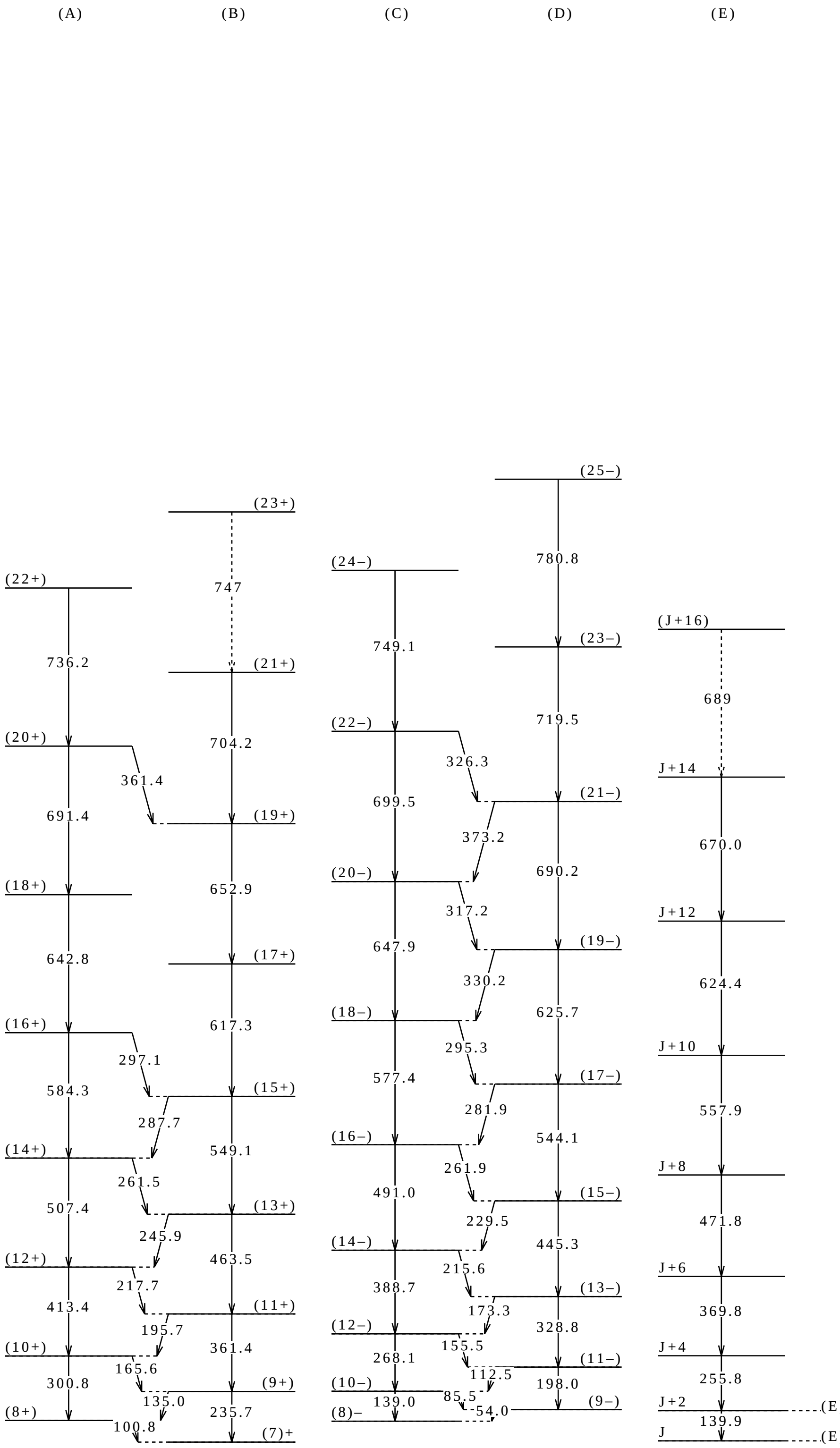
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Lu



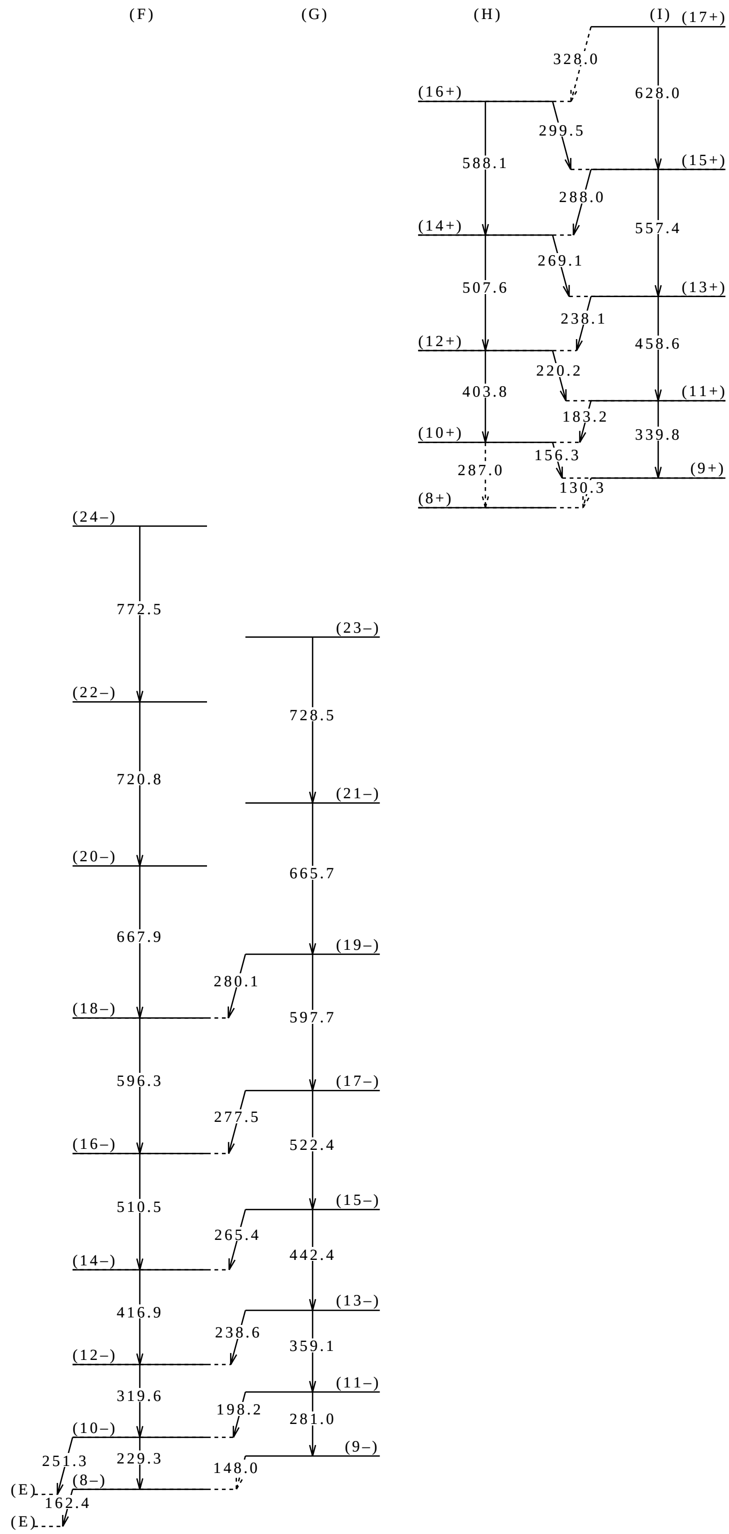
$^{166}_{71}Lu_{95}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Lu



$^{166}_{71}Lu_{95}$

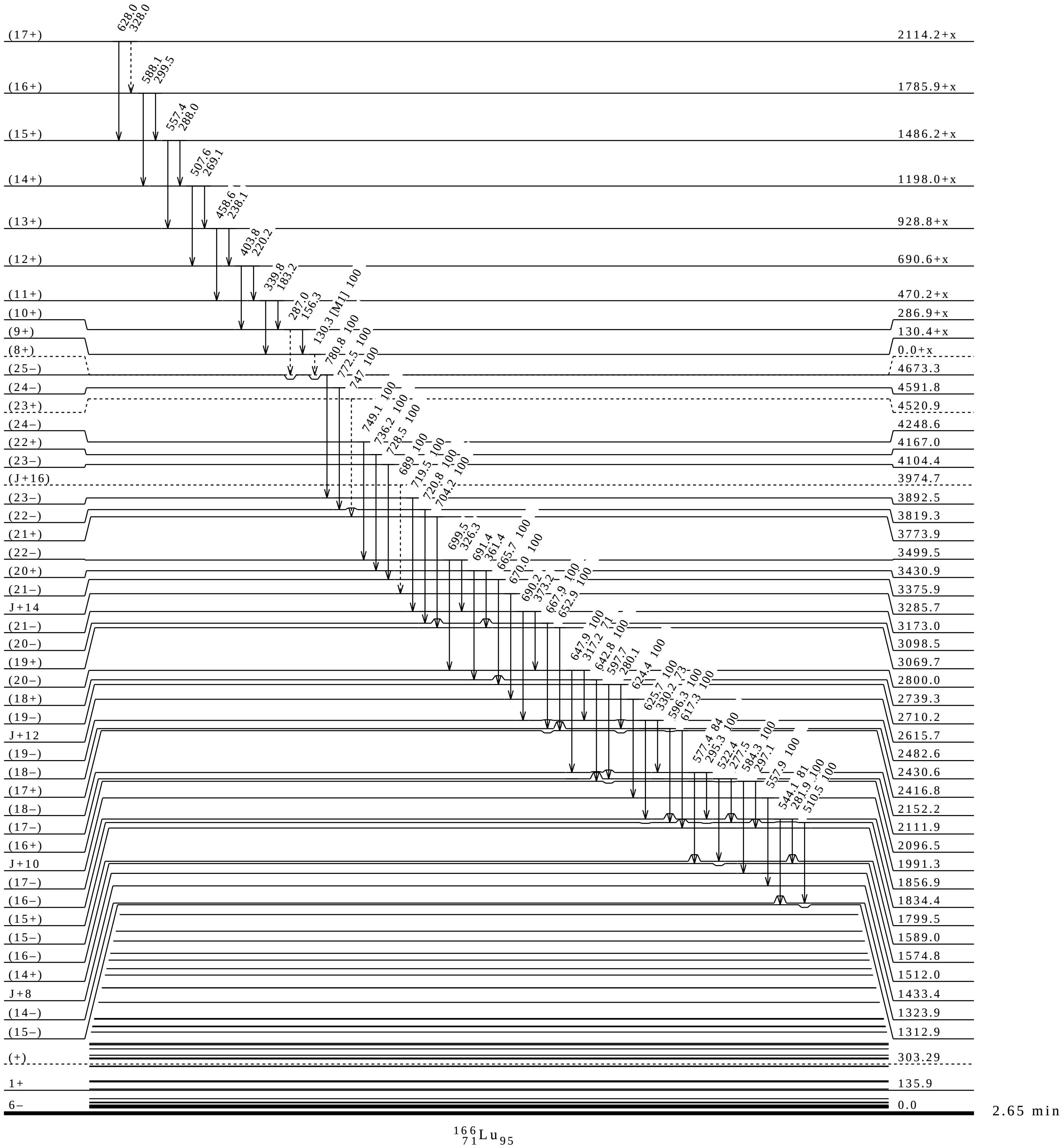
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

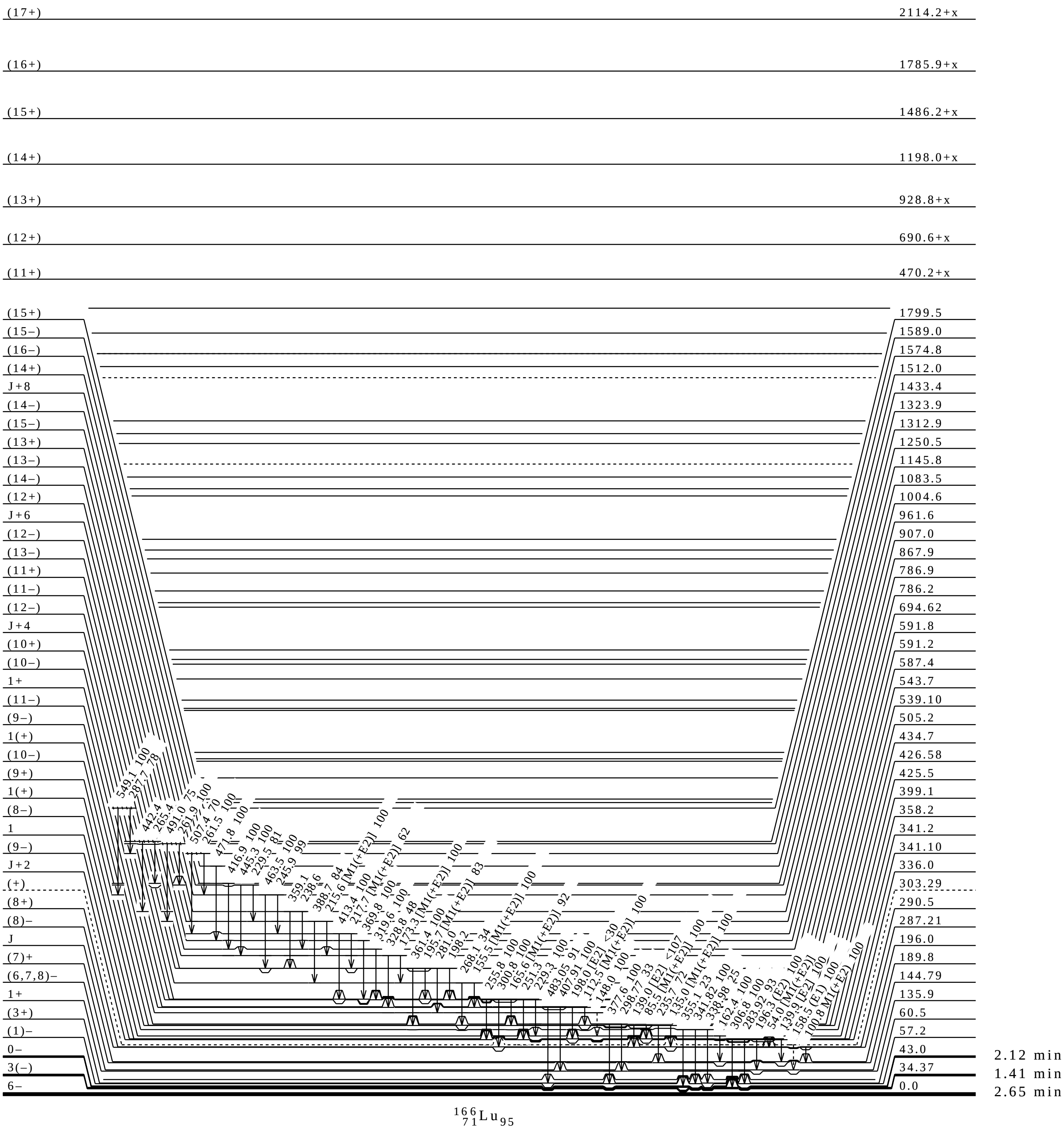


434

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



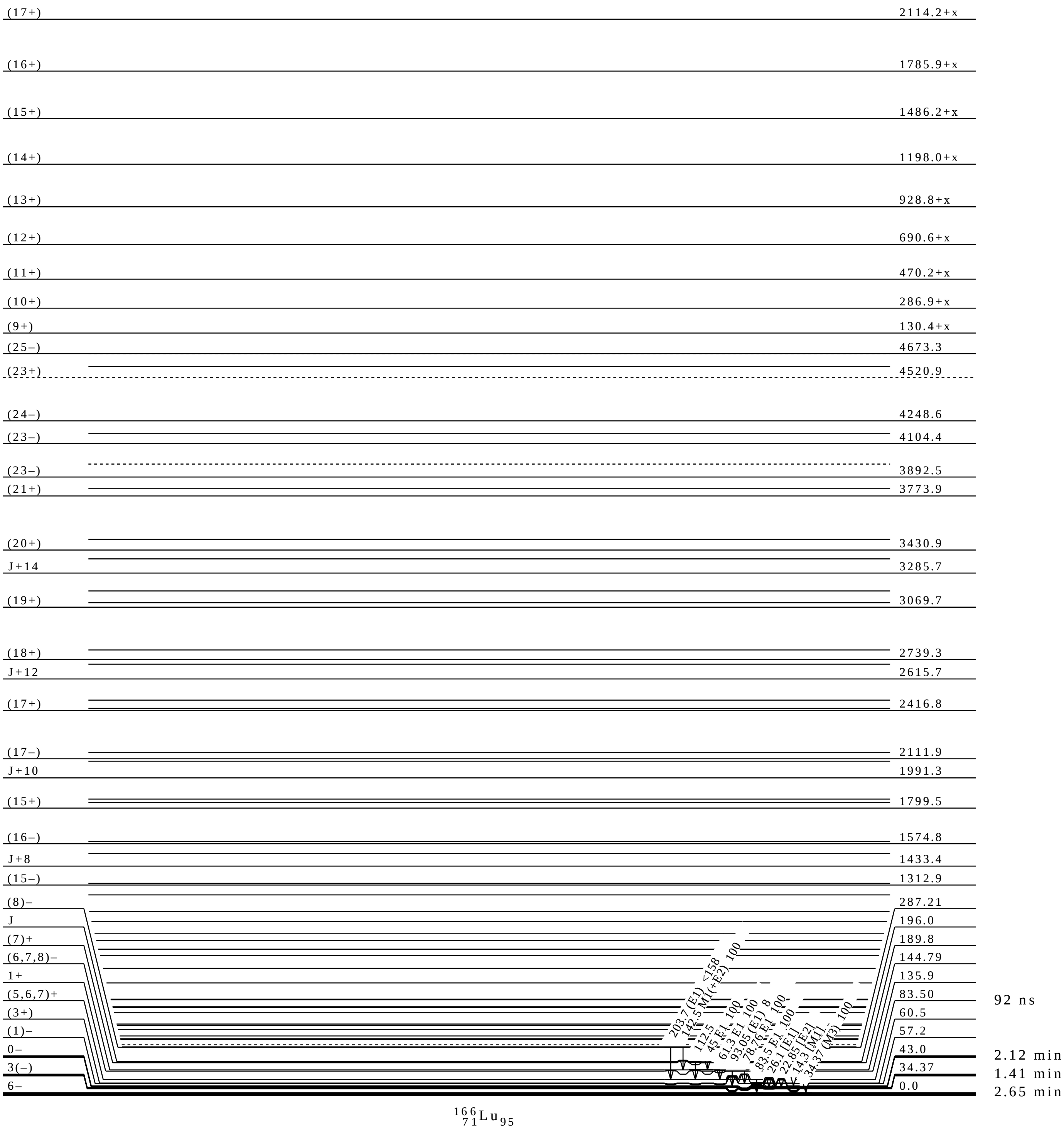
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



^{166}Lu IT Decay (1.41 min) 1974De09

Parent ^{166}Lu: E=34.37 *22*; Jπ=3(−); $T_{1/2}$=1.41 min *10*; %IT decay=42 *5*.
^{166}Lu−%IT decay: The 34.37−keV level decays 42% *5* by IT decay and 58% *5* by (ε+β^+).

^{166}Lu Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	6−	2.65 min *10*	
34.37 *22*	3(−)	1.41 min *10*	%IT=42 *5*; %ε=58 *5* (1974De09).

† From Eγ.
‡ From Adopted Levels.

γ(^{166}Lu)

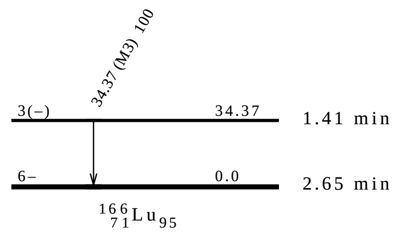
Eγ	E(level)	Mult.	α	I(γ+ce)†	Comments
34.37 *22*	34.37	(M3)	8.6×10^4 *4*	100	Eγ,Mult.: from Adopted Gammas. ce(L)/(γ+ce)=0.725 *24*; ce(M)/(γ+ce)=0.217 *12*; ce(N+)/(γ+ce)=0.058 *4*. ce(N)/(γ+ce)=0.052 *4*; ce(O)/(γ+ce)=0.0064 *4*; ce(P)/(γ+ce)=0.000118 *7*.

† For absolute intensity per 100 decays, multiply by 0.42 *5*.

^{166}Lu IT Decay (1.41 min) 1974De09 (continued)

Decay Scheme

Intensity: I(γ+ce)
per 100 decays by
this branch
%IT= 2 5



^{166}Hf ε Decay 1974De09

Parent ^{166}Hf: E=0.0; Jπ=0+; $T_{1/2}$=6.77 min *30*; Q(g.s.)=2160 *40*; %ε+%β^+ decay=100.

^{166}Lu Levels

E(level)†	Jπ‡	$T_{1/2}$‡
0.0	6−	2.65 min *10*
34.37 *22*	3(−)	1.41 min *10*
43.0 *4*	0−	2.12 min *10*
57.2 *3*	(1)−	
60.5 *4*	(3+)	
135.9 *3*	1+	
341.2 *4*	1	
399.1 *3*	1(+)	
434.7 *4*	1(+)	
543.7 *4*	1+	

† From least−squares fit to Eγ.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)	Iβ^+†	Iε†	Log *ft*	I(ε+β^+)†	Comments
(1620 *40*)	543.7	0.029 *9*	9.2 *13*	5.22 *7*	9.2 *13*	av Eβ=284 *18*; εK=0.8210 *5*; εL=0.1347 *3*; εM+=0.04113 *11*.
(1730 *40*)	434.7	0.034 *12*	5.7 *14*	5.49 *11*	5.7 *14*	av Eβ=332 *18*; εK=0.8192 *10*; εL=0.1339 *4*; εM+=0.04084 *12*.
(1760 *40*)	399.1	0.054 *14*	7.3 *11*	5.39 *7*	7.4 *11*	av Eβ=347 *18*; εK=0.8184 *11*; εL=0.1336 *4*; εM+=0.04074 *12*.
(1820 *40*)	341.2	0.034 *10*	3.5 *8*	5.75 *11*	3.5 *8*	av Eβ=373 *18*; εK=0.8168 *14*; εL=0.1330 *4*; εM+=0.04057 *13*.
(2020 *40*)	135.9	1.5 *3*	69 *6*	4.54 *5*	71 *6*	av Eβ=463 *18*; εK=0.8078 *24*; εL=0.1308 *6*; εM+=0.03984 *17*.
(2100‡ *40*)	57.2	<0.098	<3.4	>5.9	<3.5	av Eβ=497 *18*; εK=0.803 *3*; εL=0.1297 *6*; εM+=0.03951 *19*.
(2120‡ *40*)	43.0	<0.10	<3.4	>5.9	<3.5	av Eβ=504 *18*; εK=0.802 *3*; εL=0.1295 *6*; εM+=0.03944 *19*.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

^{166}Hf ε Decay 1974De09 (continued)

γ(^{166}Lu)

γγ coin: (78.8γ)(Lu x–ray, 298.8γ, 407.9γ) semi–semi (1974De09).
I(Lu K x–ray)=208 *128* if Iγ(78.76γ)=100.
Iγ normalization: Assuming<7% feeding to the five lowest–energy levels. Negligible feeding is expected to the 6– g.s., 3(–) 35 level and (3+) 61 level. Feeding to the 0– 43 level and (1)– 57 level would be first–forbidden and log *ft*>5.9 would imply %ε+%$β^+$<3.5 to each level.

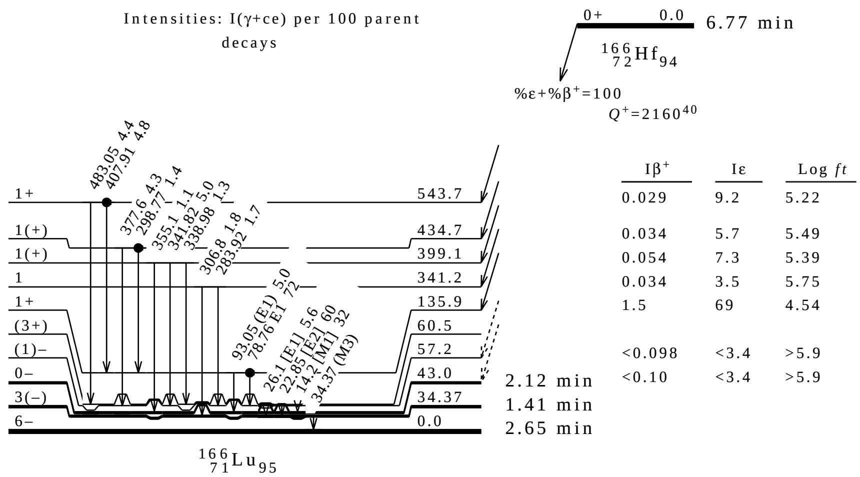
Eγ†	E(level)	Iγ‡§	Mult.	α	I(γ+ce)‡§	Comments
(14.2)	57.2		[M1]	191	74	ce(L)/(γ+ce)=0.772 *8*; ce(M)/(γ+ce)=0.175 *4*; ce(N+)/(γ+ce)=0.0477 *10*. ce(N)/(γ+ce)=0.0413 *8*; ce(O)/(γ+ce)=0.00610 *12*; ce(P)/(γ+ce)=0.000375 *8*. Eγ: from level–energy difference; transition not observed.
22.85 *22*	57.2		[E2]	3110 *160*	137	ce(L)/(γ+ce)=0.76 *3*; ce(M)/(γ+ce)=0.187 *13*; ce(N+)/(γ+ce)=0.048 *4*. ce(N)/(γ+ce)=0.043 *3*; ce(O)/(γ+ce)=0.0051 *4*; ce(P)/(γ+ce)=2.56×10^{-6} *19*. Eγ: the conversion line at E(ce)=20.74 *22* was interpreted as the M–conversion line of an E2 transition.
(26.1)	60.5		[E1]	2.55	12.9	ce(L)/(γ+ce)=0.557 *5*; ce(M)/(γ+ce)=0.1283 *21*; ce(N+)/(γ+ce)=0.0323 *6*. ce(N)/(γ+ce)=0.0288 *5*; ce(O)/(γ+ce)=0.00338 *6*; ce(P)/(γ+ce)=9.74×10^{-5} *17*. Eγ: from level–energy difference; transition not observed.
34.37 *22*	34.37		(M3)	8.6×10^4 *4*		α(L)=6.2E4 3; α(M)=1.86E4 9; α(N+..)=5.02E3 22. α(N)=4.46E3 20; α(O)=549 *24*; α(P)=10.1 *4*. Eγ: conversion lines at E(ce)=25.05 *22* and 32.44 *22* were interpreted as the L– and M–conversion lines of the isomeric M3 transition. L:M=36 *20*:20 *12*.
78.76 *10*	135.9	100 *5*	E1	0.651		α(K)=0.531 *8*; α(L)=0.0932 *14*; α(M)=0.0210 *3*; α(N+..)=0.00553 *8*. α(N)=0.00485 *7*; α(O)=0.000652 *10*; α(P)=2.77×10^{-5} *4*. Mult.: from α(L)exp=0.13 *4* (1974De09). %Iγ=43.6 *20* assuming recommended normalization.
93.05 *20*	135.9	8.0 *10*	(E1)	0.423 *7*		α(K)=0.347 *6*; α(L)=0.0588 *9*; α(M)=0.01323 *21*; α(N+..)=0.00349 *6*. α(N)=0.00306 *5*; α(O)=0.000416 *7*; α(P)=1.85×10^{-5} *3*. Mult.: from α(L)exp<1.3 (1974De09).
ˣ170.0 *6*		1.1 *4*				
ˣ244.6 *4*		3.8 *12*				
283.92 *20*	341.2	3.9 *15*				
298.77 *20*	434.7	3.2 *10*				
306.8 *4*	341.2	4.2 *10*				
338.98 *15*	399.1	2.9 *14*				
341.82 *10*	399.1	11.4 *10*				
355.1 *5*	399.1	2.6 *13*				
377.6 *5*	434.7	9.8 *28*				
407.91 *10*	543.7	11.0 *21*				
ˣ430.74 *10*		3.2 *7*				
483.05 *10*	543.7	10.0 *18*				

† From 1974De09, except as noted.
‡ From 1974De09.
§ For absolute intensity per 100 decays, multiply by 0.436 *24*.
ˣ γ ray not placed in level scheme.

^{166}Hf ε Decay 1974De09 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{139}La(^{30}Si,3nγ) 2000Le25

E=120 MeV; Tsukuba Ball consisting of 10 BGO Compton–suppressed HPGe detectors and one LEPS detector; measured Eγ, γγ coin, DCO ratios (unenumerated).

^{166}Lu Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†		Jπ‡
0.0	6–§	867.5[a]	(13–)	2430.8[c]		(18–)
83.5	(5,6,7)+§	907.2[c]	(12–)	2482.6[a]		(19–)
144.8	(6,7,8)–§	962.1[b]	(13–)	2616.0[b]		(19–)
189.8#	(6+)	1004.9@	(11+)	2739.7@		(17+)
196.0[b]	(7–)	1083.0&	(14–)	2799.6&		(20–)
287.0&	(8–)	1250.8#	(12+)	3069.7#		(18+)
290.3@	(7+)	1312.5[a]	(15–)	3098.9[c]		(20–)
336.1[b]	(9–)	1324.1[c]	(14–)	3172.8[a]	*7*	(21–)
340.8[a]	(9–)	1433.9[b]	(15–)	3431.1@	*7*	(19+)
358.4[c]	(8–)	1512.4@	(13+)	3499.1&	*7*	(22–)
425.6#	(8+)	1574.4&	(16–)	3773.9#	*8*	(20+)
426.2&	(10–)	1799.6#	(14+)	3820.6[c]	*9*	(22–)
538.8[a]	(11–)	1835.0[c]	(16–)	3892.3[a]	*7*	(23–)
587.6[c]	(10–)	1856.3[a]	(17–)	4167.3@	*8*	(21+)
591.3@	(9+)	1991.6[b]	(17–)	4248.2&	*7*	(24–)
592.1[b]	(11–)	2097.0@	(15+)	4673.1[a]	*8*	(25–)
694.3&	(12–)	2151.5&	(18–)			
786.8#	(10+)	2417.0#	(16+)			

† From least–squares fit to Eγ, assigning equal weight to all data.
‡ Authors' values.
§ From Adopted Levels.
# (A): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band.
@ (B): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band.
& (C): Kπ=7–, α=0 (π 9/2[514])+(ν 5/2[642]) band. J values are based on energy systematics, the alignment additivity rule, and systematics of signature inversion for low–lying states for yrast bands in odd–odd Lu isotopes; they are one unit higher than suggested in an earlier (^{12}C,5nγ) study (1992Ho02).
[a] (D): Kπ=7–, α=1 (π 9/2[514])+(ν 5/2[642]) band. See comment on signature partner band.
[b] (E): π=–, α=1 (π 1/2[541])(ν 5/2[642]) band. Note that this band assignment differs from that in Adopted Levels.
[c] (F): π=–, α=0 (π 1/2[541])(ν 5/2[642]) band.

^{139}La(^{30}Si,3nγ) 2000Le25 (continued)

γ(^{166}Lu)

Eγ	E(level)	Eγ	E(level)	Eγ	E(level)
45	189.8	256.0	592.1	471.8	1433.9
54.0	340.8	261.6	1512.4	491.4	1574.4
61.3	144.8	261.9	1574.4	507.5	1512.4
83.5	83.5	268.0	694.3	510.9	1835.0
85.6	426.2	281.9	1856.3	543.8	1856.3
100.5	290.3	287.2	1799.6	548.8	1799.6
112.5	196.0	295.2	2151.5	557.9	1991.6
	538.8	297.4	2097.0	577.1	2151.5
135.3	425.6	301.0	591.3	584.6	2097.0
139.0	426.2	315.5†‡	907.2	595.6	2430.8
139.9	336.1	317.0	2799.6	617.4	2417.0
142.2	287.0	319.6	907.2	624.4	2616.0
155.5	694.3	320.0	2417.0	626.3	2482.6
162.6	358.4	322.7	2739.7	642.7	2739.7
165.7	591.3	326.3	3499.1	648.1	2799.6
173.2	867.5	328.7	867.5	652.7	3069.7
195.5	786.8	330.0	3069.7	668.1	3098.9
196.1	340.8	331.1	2482.6	690.2	3172.8
198.0	538.8	361.2	786.8	691.4	3431.1
203.5	287.0	361.4	3431.1	699.5	3499.1
215.5	1083.0	370.0	962.1	704.2	3773.9
218.1	1004.9	373.2	3172.8	719.5	3892.3
229.3	587.6	388.7	1083.0	721.7	3820.6
229.5	1312.5	413.6	1004.9	736.2	4167.3
235.8	425.6	416.9	1324.1	749.1	4248.2
245.9	1250.8	445.0	1312.5	780.8	4673.1
251.3	587.6	464.0	1250.8		

† From level–energy difference; Eγ=281.1 in figure 2 of 2000Le25 appears to be erroneous. Consequently, transition is shown as tentative.

‡ Placement of transition in the level scheme is uncertain.

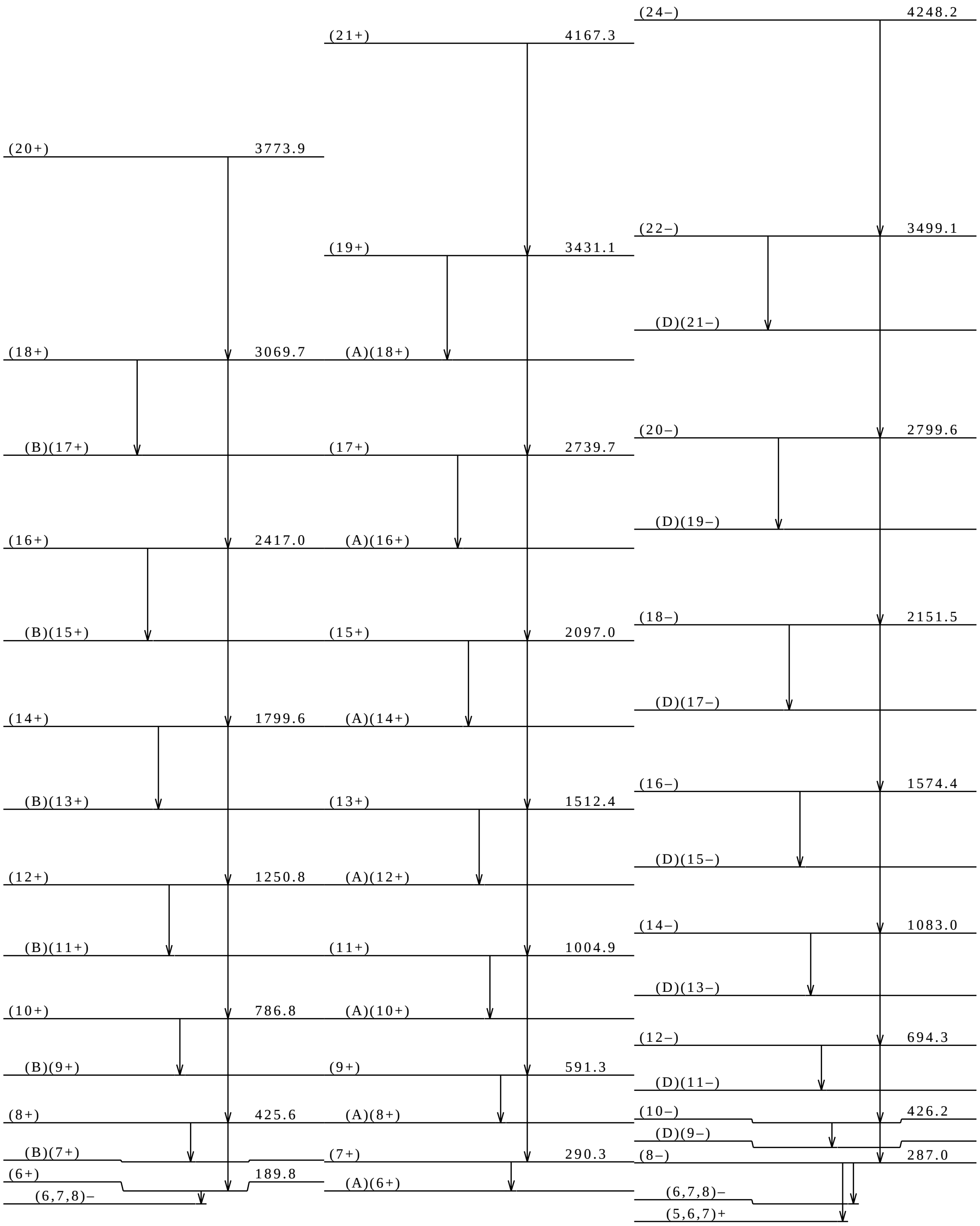
$^{166}_{71}Lu_{95}$–20

$^{139}La(^{30}Si,3n\gamma)$ 2000Le25 (continued)

(A) Kπ=6+, α=0 (π 7/2[404]) +(ν 5/2[642]) band.

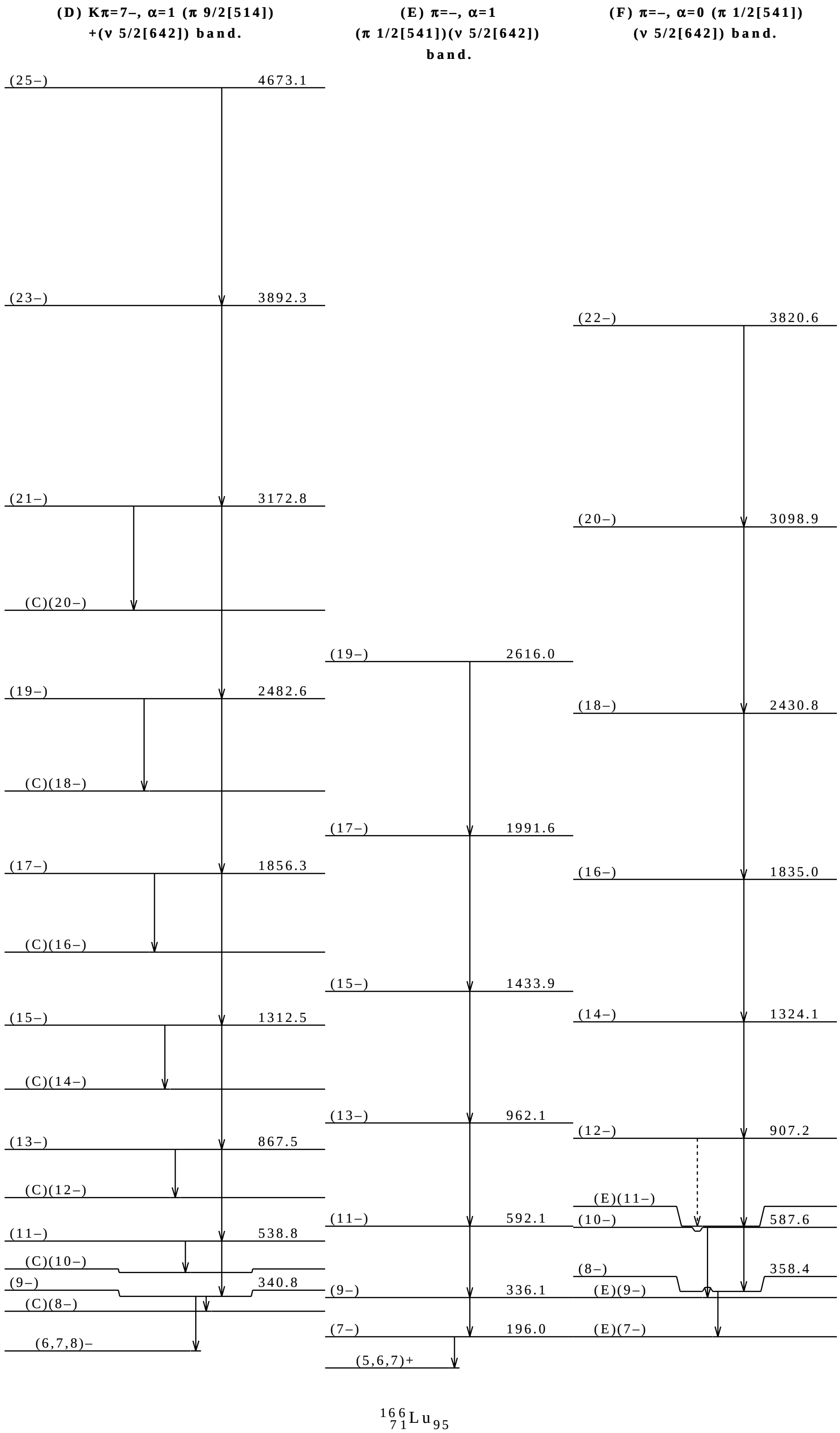
(B) Kπ=6+, α=1 (π 7/2[404]) +(ν 5/2[642]) band.

(C) Kπ=7−, α=0 (π 9/2[514]) +(ν 5/2[642]) band.



$^{166}_{71}Lu_{95}$

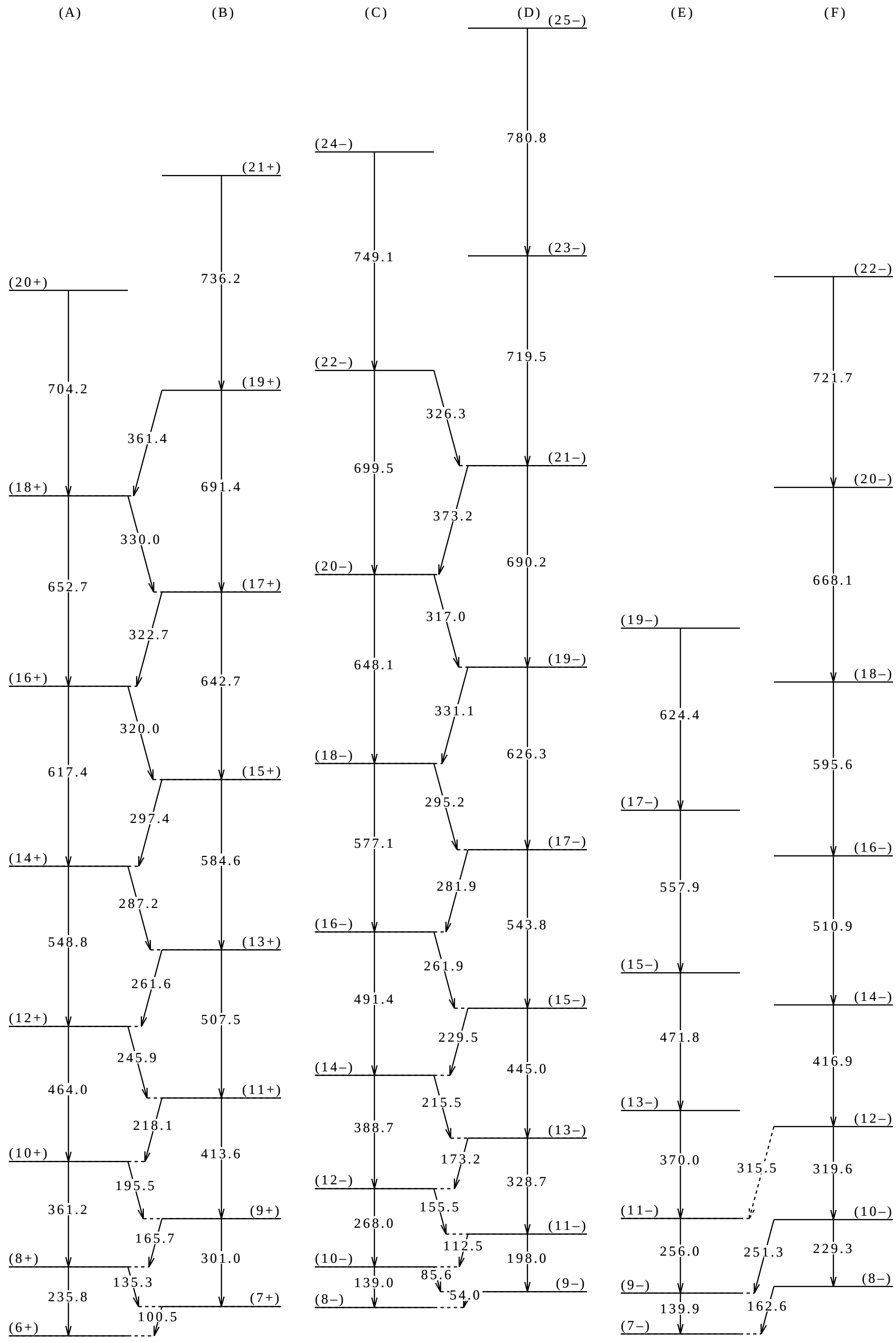
$^{139}La(^{30}Si,3n\gamma)$ 2000Le25 (continued)



From NNDC(BNL)
program ENSDAT

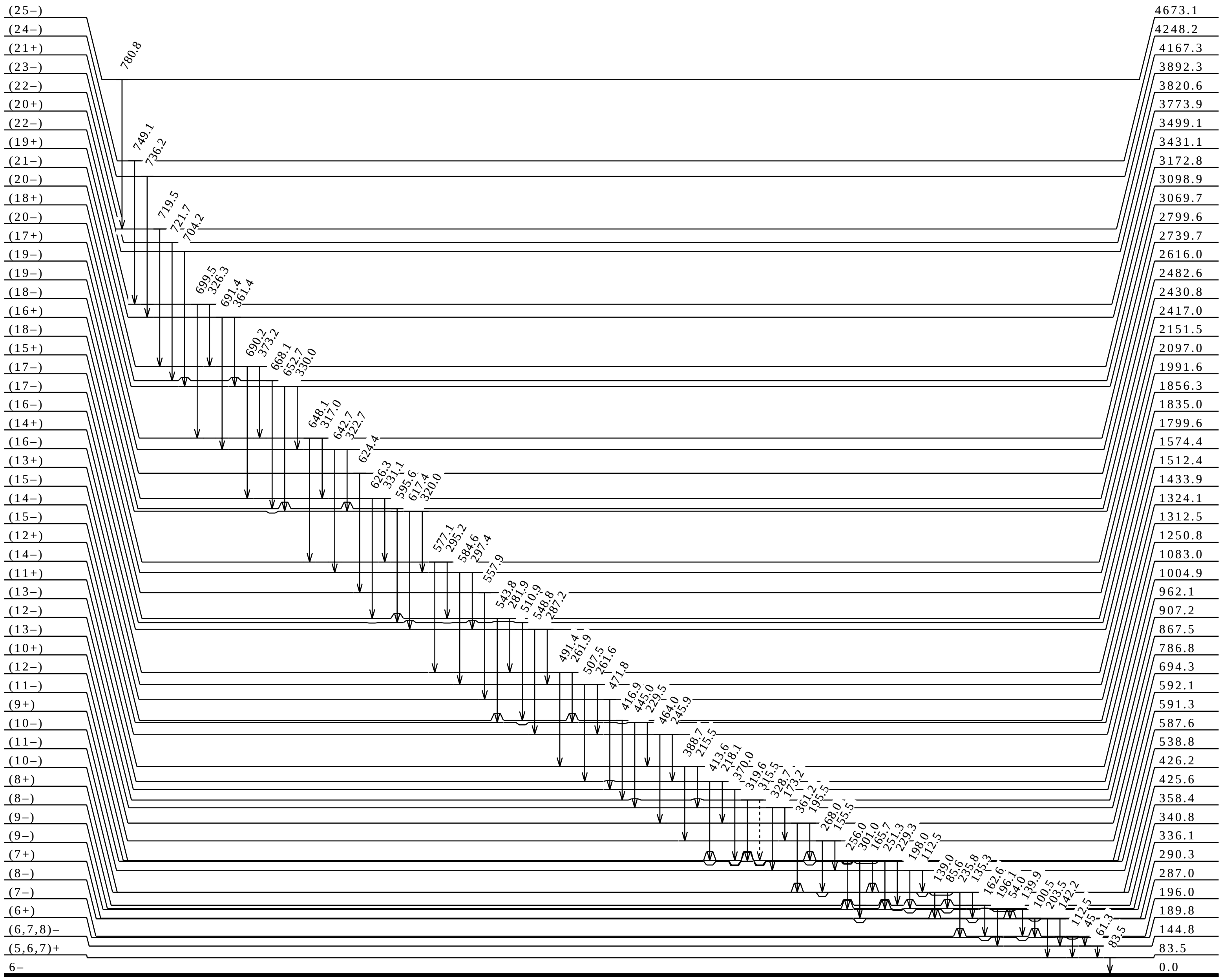
$^{139}La(^{30}Si,3n\gamma)$ 2000Le25 (continued)

Bands for ^{166}Lu



$^{166}_{71}Lu_{95}$

Level Scheme



$^{166}_{71}Lu_{95}$

$^{139}La(^{30}Si,3n\gamma)$ 2000Le25 (continued)

From NNDC(BNL) program ENSDAT

$^{166}_{71}Lu_{95}$–23

^{152}Sm(^{19}F,5nγ) 2000Zh51

E=97 MeV; array of ten HPGe detectors, each equipped with a BGO Compton–suppression shield; measured Eγ,γγ coin, unenumerated DCO ratios (θ=38°, 90°, 144°, for some transitions).

^{166}Lu Levels

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
0.0+x[#k]	(7)+	690.4+v[d]	12+	2070.1+u[b]	18−
0.0+y[@j]	(8−)	764.1+z[a]	12+	2114.0+v[e]	17+
0.0+z[a i]	(6+)	787.5+u[c]	13−	2189.6+y[&]	19−
0.0+u[b h]	(8)−	793.1+y[@]	14−	2222.2+x[#]	17+
0.0+v?[d]	(8+)	813.1+x[§]	12+	2350.2+u[c]	19−
53.8+y[&]	9−	928.6+v[e]	13+	2415.6+z[a]	18+
100.2+x[§]	8+	964.7+u[b]	14−	2506.6+y[@]	20−
130.3+v[e]	9+	1022.0+y[&]	15−	2544.7+x[§]	18+
138.4+y[@]	10−	1058.4+x[#]	13+	2737.7+u[b]	20−
139.3+z[a]	8+	1197.8+v[d]	14+	2873.6+x[#]	19+
147.6+u[c]	9−	1230.0+u[c]	15−	2877.9+y[&]	21−
229.7+u[b]	10−	1235.1+z[a]	14+	3015.9+u[c]	21−
235.0+x[#]	9+	1283.3+y[@]	16−	3085.6+z[a]	20+
250.0+y[&]	11−	1319.6+x[§]	14+	3204.9+y[@]	22−
286.7+v[d]	10+	1474.9+u[b]	16−	3234.4+x[§]	20+
394.7+z[a]	10+	1486.0+v[e]	15+	3458.2+u[b]	22−
400.4+x[§]	10+	1564.9+y[&]	17−	3576.6+x?[#]	21+
405.2+y[@]	12−	1606.4+x[#]	15+	3744.4+u[c]	23−
428.3+u[c]	11−	1752.4+u[c]	17−	3774.6+z?[a]	22+
470.4+v[e]	11+	1785.7+v[d]	16+	3923.7+y?[@]	24−[g]
548.8+u[b]	12−	1792.2+z[a]	16+	3953.4+x?[§]	22+[f]
578.1+y[&]	13−	1859.4+y[@]	18−	4230.7+u[b]	24−
595.4+x[#]	11+	1902.7+x[§]	16+	4323.6+x?[#]	23+

[†] From least–squares fit to Eγ, assigning equal weight to all Eγ data.

[‡] Authors' values.

[§] (A): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band. J values are based on level energy systematics for similar bands in neighboring odd–odd nuclei and checked by the alignment additivity rule; they are one unit higher than suggested in independent (^{12}C,5nγ) (1992Ho02) and (^{30}Si,3nγ) (2000Le25) studies.

[#] (B): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner band.

[@] (C): Kπ=7−, α=0 (π 9/2[514])+(ν 5/2[642]) band.

[&] (D): Kπ=7−, α=1 (π 9/2[514])+(ν 5/2[642]) band.

[a] (E): Kπ=2+, α=0 (π 1/2[411])−(ν 5/2[642]) band. Assigned as π=−, α=1 (π 1/2[541])(ν 5/2[642]) band (with J values one unit higher than here) in two independent (HI,xnγ) studies (1992Ho02 and 2000Le25). Present assignment supported by similarity of level structure to that for α=0 band in ^{162}Tm with same configuration assignment.

[b] (F): Kπ=2−, α=0 (π 1/2[541])−(ν 5/2[642]) band. Configuration assignment supported by similarity of band structure to that for bands in ^{162}Tm and ^{164}Tm with the same configuration assignment (large signature splitting, low–spin signature inversion, delayed BC crossing and small B(M1) to B(E2) in–band cascade to crossover transition probability ratios) (2000Zh51).

[c] (G): Kπ=2−, α=1 (π 1/2[541])−(ν 5/2[642]) band. See comment on signature partner of this band. α=1 sequence is reported in this reaction alone.

[d] (H): Kπ=5+, α=0 (π 5/2[402])+(ν 5/2[642]) band. Configuration assignment supported by similarity of band structure to that for a ^{162}Tm band with the same configuration assignment. Very weakly populated, strongly coupled band reported in this reaction alone.

[e] (I): Kπ=5+, α=1 (π 5/2[402])+(ν 5/2[642]) band. See comment on signature partner of this band.

[f] Not adopted; tentative deexciting 719γ differs from adopted 736.2γ deexciting the J=22 band member.

[g] Not adopted; tentative deexciting 718.8γ differs from adopted 749.1γ deexciting the J=24 band member.

[h] From Adopted Levels, u=358.2.

[i] From Adopted Levels, z=196.0.

[j] From Adopted Levels, y=287.2.

[k] From Adopted Levels, x=189.8.

γ(^{166}Lu)

Eγ	E(level)
53.6	53.8+y
84.7	138.4+y
100.1	100.2+x
111.7	250.0+y

Continued on next page (footnotes at end of table)

From NNDC(BNL)
program ENSDAT

^{152}Sm(^{19}F,5nγ) 2000Zh51 (continued)

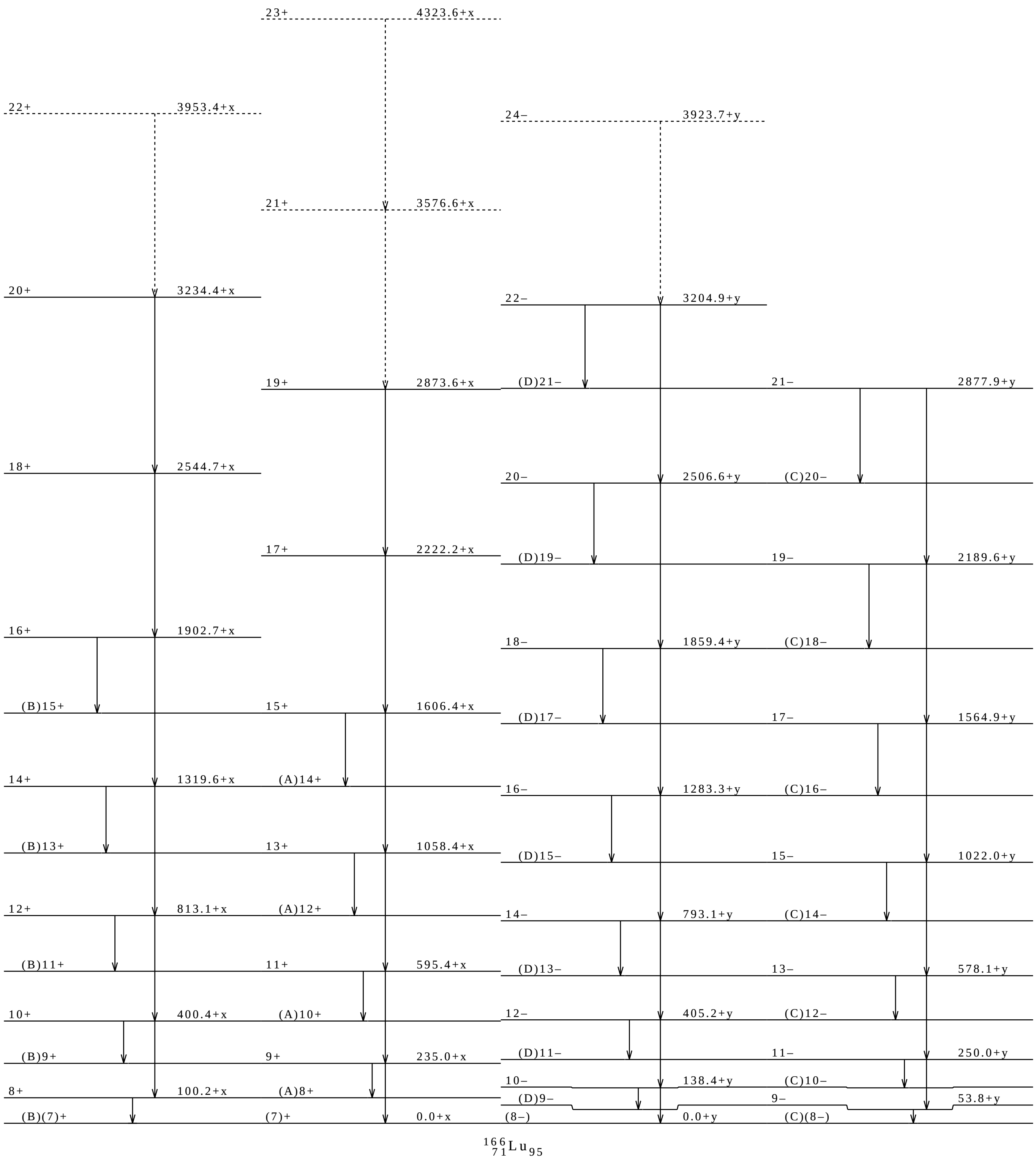
γ(^{166}Lu) (continued)

Eγ	E(level)	Eγ	E(level)	Eγ	E(level)
130.3[§]	130.3+v	286.7	1606.4+x	543.0	1564.9+y
134.8	235.0+x	287.0[§]	286.7+v	548.1	1606.4+x
138.5	138.4+y	288.0	1486.0+v	557.1	1792.2+z
139.3	139.3+z	294.5	1859.4+y	557.4	1486.0+v
148.0[§]	147.6+u	296.2	1902.7+x	576.0	1859.4+y
154.7	405.2+y	299.5	1785.7+v	583.2	1902.7+x
156.3	286.7+v	300.2	400.4+x	588.1	1785.7+v
165.3	400.4+x	317.1	2506.6+y	595.2	2070.1+u
172.8	578.1+y	319.2	548.8+u	597.7	2350.2+u
183.2	470.4+v	327.1	3204.9+y	615.8	2222.2+x
194.8	595.4+x	328.0	578.1+y	623.4	2415.6+z
196.4	250.0+y		2114.0+v	625.0	2189.6+y
198.2	428.3+u	330.1	2189.6+y	628.0	2114.0+v
214.7	793.1+y	339.8	470.4+v	642.0	2544.7+x
217.6	813.1+x	359.1	787.5+u	647.1	2506.6+y
220.2	690.4+v	360.5	595.4+x	651.4	2873.6+x
228.8	1022.0+y	369.4	764.1+z	665.7	3015.9+u
229.3	229.7+u	371.4	2877.9+y	667.6	2737.7+u
235.1	235.0+x	388.0	793.1+y	670.0	3085.6+z
238.1	928.6+v	403.8	690.4+v	688.3	2877.9+y
238.6	787.5+u	412.7	813.1+x	689[§]	3774.6+z?
245.2	1058.4+x	416.1	964.7+u	689.7	3234.4+x
255.4	394.7+z	442.4	1230.0+u	698.1	3204.9+y
261.1	1319.6+x	444.0	1022.0+y	703.0[§]	3576.6+x?
261.3	1283.3+y	458.6	928.6+v	718.8[†§]	3923.7+y?
265.4	1230.0+u	463.0	1058.4+x	719[‡§]	3953.4+x?
267.0	405.2+y	471.0	1235.1+z	720.5	3458.2+u
269.1	1197.8+v	490.1	1283.3+y	728.5	3744.4+u
277.5	1752.4+u	506.6	1319.6+x	747[§]	4323.6+x?
280.1	2350.2+u	507.6	1197.8+v	772.5	4230.7+u
281.0	428.3+u	510.2	1474.9+u		
281.4	1564.9+y	522.4	1752.4+u		

† Not adopted; see comment on 3924+y level.
‡ Not adopted; see comment on 3953+x level.
§ Placement of transition in the level scheme is uncertain.

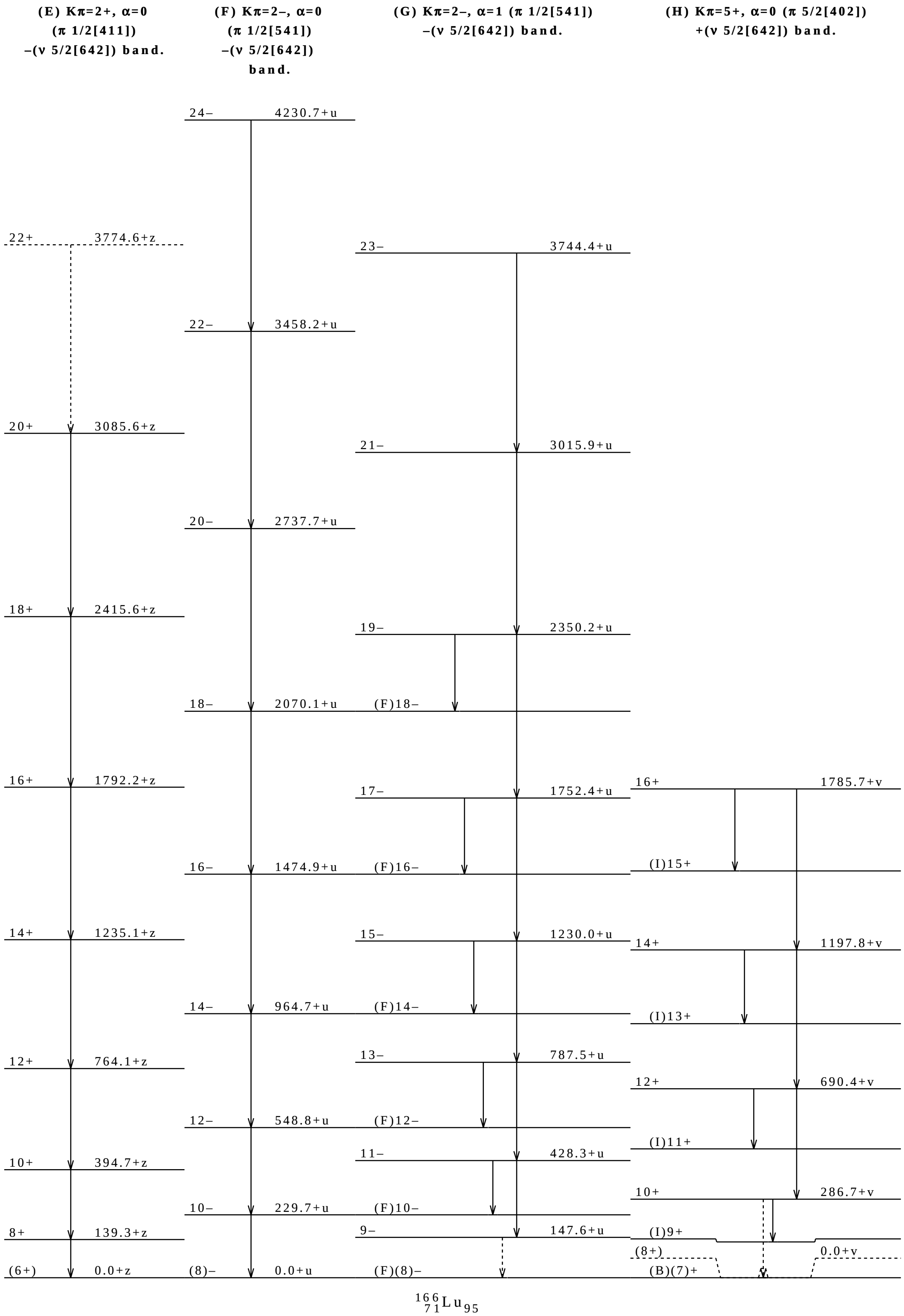
From NNDC(BNL)
program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)



From NNDC(BNL)
program ENSDAT

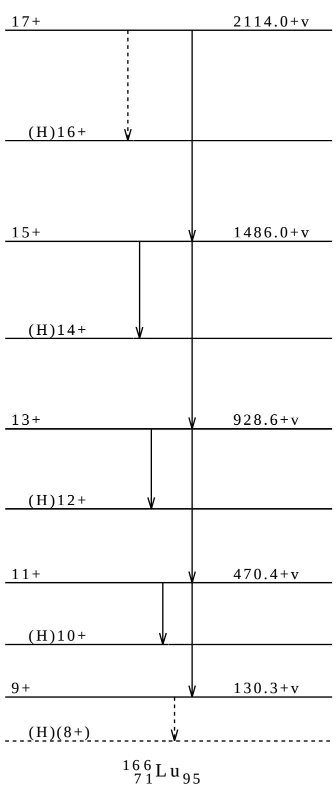
$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)



From NNDC(BNL)
program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)

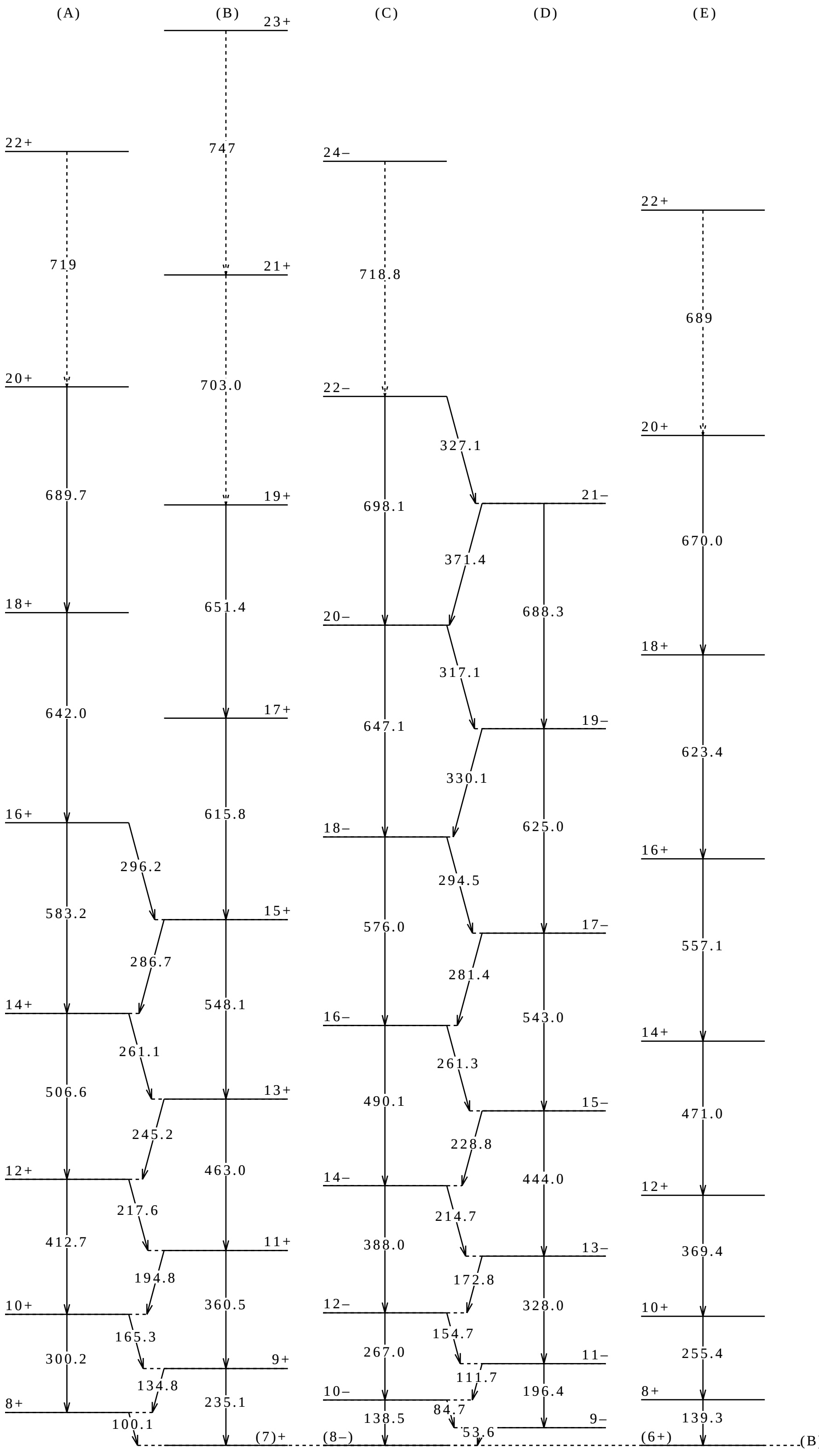
(I) Kπ=5+, α=1 (π 5/2[402]) +(ν 5/2[642]) band.



From NNDC(BNL) program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)

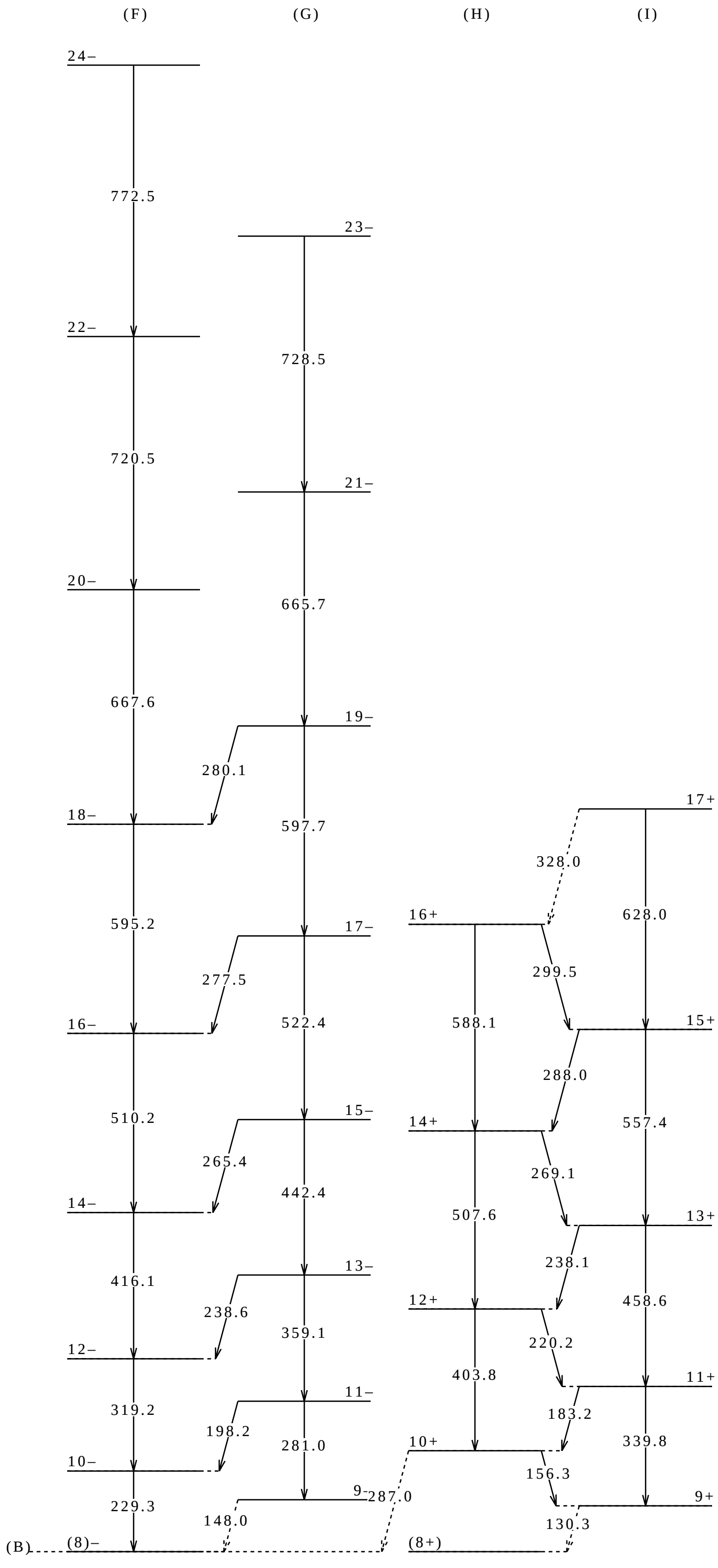
Bands for ^{166}Lu



From NNDC(BNL)
program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)

Bands for ^{166}Lu

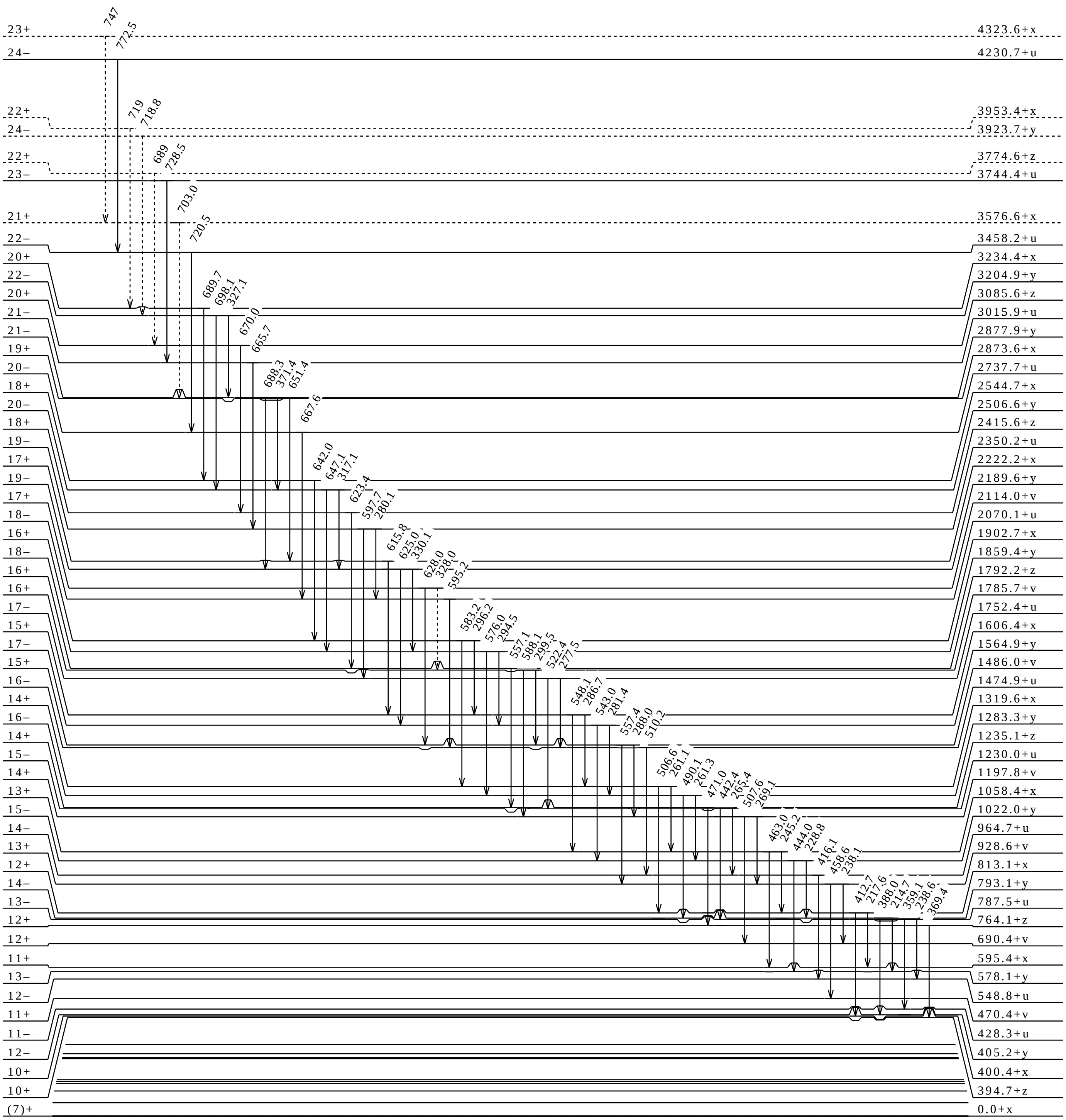


$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)

Level Scheme

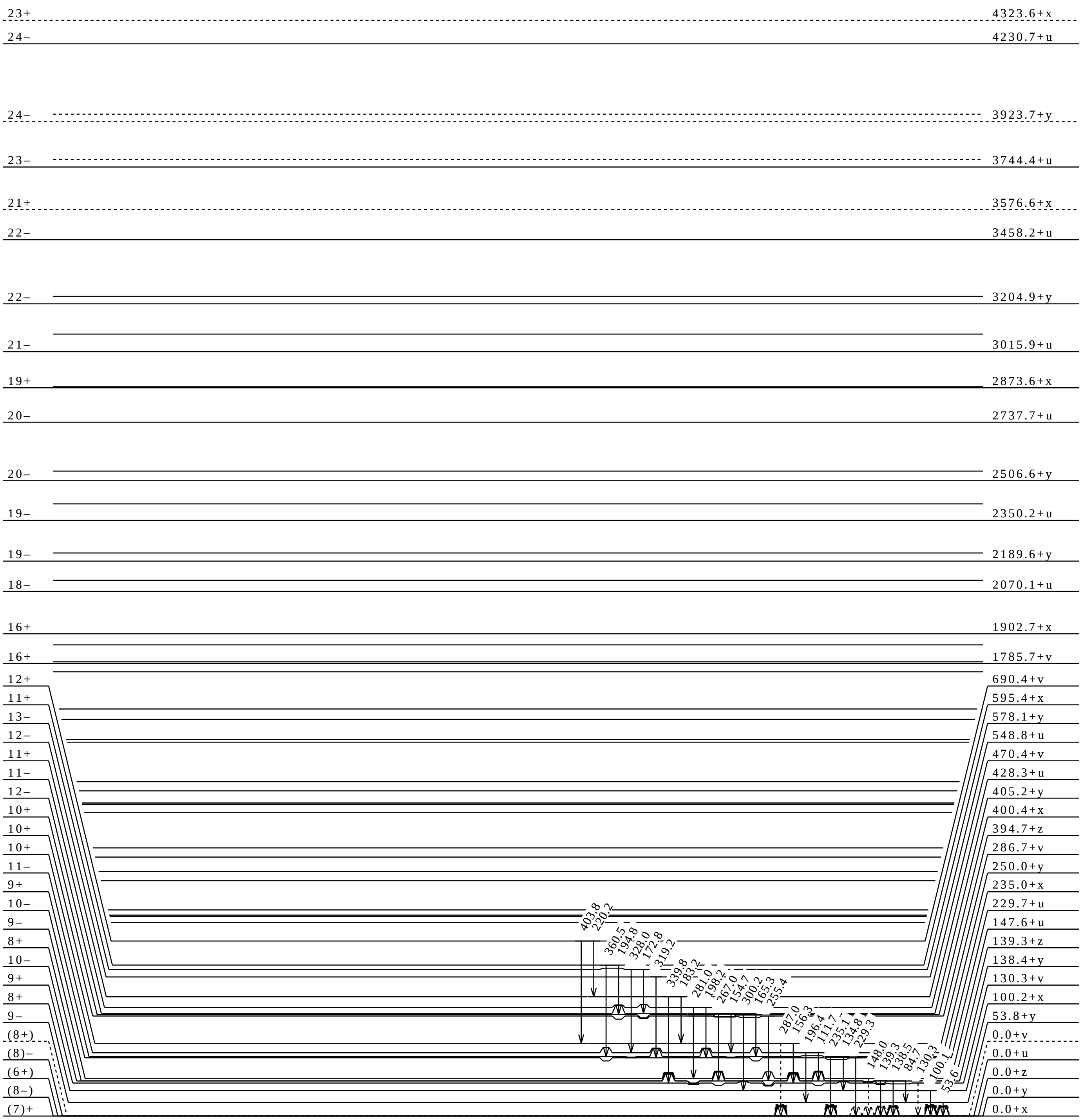


$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

$^{152}Sm(^{19}F,5n\gamma)$ 2000Zh51 (continued)

Level Scheme (continued)



$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

^{159}Tb(^{12}C,5nγ) 1992Ho02

E=75–90 MeV; two Ge detectors with BGO Compton suppression and a high–resolution planar detector; measured Eγ, Iγ and γγ coin; statistical precision was inadequate to enable extraction of γ(θ) information.

^{166}Lu Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	6−		Jπ: from Adopted Levels.
83.50 *10*	(6+)	92 ns *7*	$T_{1/2}$: from centroid shift between 83.5γ and the prompt 85.5γ. Other: 91 ns *8* from slope of 83.5γ time spectrum.
144.79 *14*	(6−,7−)		
189.8§ *10*	(6+)		
287.21@ *14*	(7−)		
290.5# *11*	(7+)		
303.29? *24*			
341.10& *16*	(8−)		
425.5§ *11*	(8+)		
426.59@ *24*	(9−)		
539.12& *24*	(10−)		
591.2# *11*	(9+)		
694.6@ *3*	(11−)		
786.9§ *11*	(10+)		
867.9& *3*	(12−)		
1004.6# *11*	(11+)		
1083.5@ *3*	(13−)		
1250.5§ *11*	(12+)		
1313.0& *3*	(14−)		
1512.0# *11*	(13+)		
1574.8@ *3*	(15−)		
1799.6§ *11*	(14+)		
1856.9& *4*	(16−)		
2096.3# *11*	(15+)		
2152.2@ *4*	(17−)		
2416.9§ *11*	(16+)		
2482.6& *4*	(18−)		
2739.1# *12*	(17+)		
2800.0@ *4*	(19−)		
3069.8§ *12*	(18+)		
3203.6& *11*	(20−)		E(level): not adopted; γ deexciting the J=20 member of this band was missed by 1992Ho02 and the 721γ placed from this level probably deexcites a higher–energy band member.
3430.1# *16*	(19+)		
3499.5@ *5*	(21−)		
0.0+x[b]	(7−)		E(level): x=196 from Adopted Levels, where this level is seen to decay to 83.5 level via a 112.5γ.
139.90+x[b] *20*	(9−)		
162.4+x[a] *3*	(8−)		
391.7+x[a] *4*	(10−)		
395.7+x[b] *3*	(11−)		
711.3+x[a] *3*	(12−)		
765.5+x[b] *4*	(13−)		
1128.2+x[a] *5*	(14−)		
1237.3+x[b] *5*	(15−)		
1638.7+x[a] *5*	(16−)		
1795.2+x[b] *6*	(17−)		
2235.0+x[a] *6*	(18−)		
2419.6+x[b] *7*	(19−)		
2902.9+x[a] *7*	(20−)		
3623.7+x[a] *7*	(22−)		

† From least–squares fit to Eγ.
‡ Authors' values.
§ (A): Kπ=6+, α=0 (π 7/2[404])+(ν 5/2[642]) band.
\# (B): Kπ=6+, α=1 (π 7/2[404])+(ν 5/2[642]) band.
@ (C): Kπ=7−, α=1 (π 9/2[514])+(ν 5/2[642]) band. Note that Jπ values assigned by 1992Ho02 for this configuration are one unit lower than those in Adopted Levels.
& (D): Kπ=7−, α=0 (π 9/2[514])+(ν 5/2[642]) band. See comment on signature partner band.
a (E): π=−, α=0 (π 1/2[541])(ν 5/2[642]) band.
b (F): π=−, α=1 (π 1/2[541])(ν 5/2[642]) band. Note that this band assignment differs from that in Adopted Levels.

$^{159}Tb(^{12}C,5n\gamma)$ 1992Ho02 (continued)

γ(^{166}Lu)

Eγ†	E(level)	Iγ‡	Mult.§	α	Comments
45	189.8		E1	0.566	
54.0 *3*	341.10		[M1(+E2)]	24 *21*	γ not observed but its existence is implied by γγ coin data and presence of 139γ crossover transition; possibly highly converted.
61.3 *1*	144.79	47.9	E1	0.240	
83.5 *1*	83.50	64.0	E1	0.560	
85.5 *2*	426.59	8.1	[M1(+E2)]	6.0 *3*	
100.8 *2*	290.5	8.9	[M1+E2]	3.43 *18*	
112.5 *1*	539.12	13.1	[M1(+E2)]	2.38 *25*	
x115#		4.6			
135.0 *2*	425.5	8.6	[M1(+E2)]	1.33 *24*	
139@	426.59	8.7	[E2]	0.982	Iγ: 8.7 for 139γ+139.9γ.
139.9 *2*	139.90+x	8.7	[E2]	0.950	Iγ: 8.7 for 139γ+139.9γ.
142.5 *2*	287.21	7.4	M1(+E2)	1.12 *23*	
155.5 *1*	694.6	16.9	[M1(+E2)]	0.85 *20*	
158.5@ *2*	303.29?	7.3	(E1)	0.1046	
x160.7# *3*		5.0			
162.4@ *3*	162.4+x	2.7	[M1(+E2)]	0.74 *19*	
165.6 *2*	591.2	6.6	[M1(+E2)]	0.70 *18*	
x172#		3.7			
173.3 *1*	867.9	13.9	[M1(+E2)]	0.61 *10*	
x181.3# *3*		4.5			
195.7 *2*	786.9	6.6	[M1(+E2)]	0.42 *13*	
196.3 *1*	341.10	10.0	M1,E2	0.42 *13*	
198.0 *3*	539.12	<3.9	[E2]	0.287	Iγ: 3.9 for multiplet.
203.7 *1*	287.21	<11.7	(E1)		Iγ,Mult.: Iγ=11.7 for multiplet; second component not identified by 1992Ho02. Authors assign mult=E1 based on intensity balance, but this may not be reliable because the 204γ is a multiplet.
215.6 *1*	1083.5	10.5	[M1(+E2)]	0.32 *11*	
217.7 *2*	1004.6	5.5	[M1(+E2)]	0.31 *10*	
229.3 *2*	391.7+x	5.6			
229.5 *2*	1313.0	7.9			
235.7 *2*	425.5	6.2			
245.9 *2*	1250.5	7.2			
251.3@ *3*	391.7+x				
255.8 *2*	395.7+x	8.2			
261.5 *3*	1512.0	4.0			
261.9 *2*	1574.8	7.5			
268.1 *2*	694.6	5.7			
281.9 *2*	1856.9	7.9			
287.7 *3*	1799.6	3.5			
295.3 *2*	2152.2	5.1			
297.1@ *3*	2096.3				
300.8 *2*	591.2	7.2			
317.2 *3*	2800.0	3.6			
319.6 *2*	711.3+x	6.9			
328.8 *2*	867.9	6.7			
330.2 *3*	2482.6	4.0			
361.4 *2*	786.9	8.0			
369.8 *2*	765.5+x	6.6			
388.7 *2*	1083.5	8.8			
413.4 *2*	1004.6	8.9			
416.9 *2*	1128.2+x	7.7			
445.3 *2*	1313.0	9.8			
463.5 *2*	1250.5	7.3			
471.8 *3*	1237.3+x	4.3			
491.0 *2*	1574.8	5.6			
507.4 *3*	1512.0	2.8			
510.5 *2*	1638.7+x	7.0			
544.1 *2*	1856.9	6.4			
549.1 *3*	1799.6	4.5			
557.9 *3*	1795.2+x	2.5			

Continued on next page (footnotes at end of table)

^{159}Tb(^{12}C,5nγ) 1992Ho02 (continued)

γ(^{166}Lu) (continued)

Eγ†	E(level)	Iγ‡	Eγ†	E(level)	Iγ‡	Eγ†	E(level)	Iγ‡
577.4 *2*	2152.2	4.3	625.7 *2*	2482.6	5.5	691@	3430.1	
584.3 *3*	2096.3	3.3	642.8 *3*	2739.1	3.1	699.5 *3*	3499.5	2.9
596.3 *2*	2235.0+x	5.6	647.9 *2*	2800.0	5.1	720.8@ *3*	3623.7+x	3.9
617.3 *3*	2416.9	3.1	652.9 *3*	3069.8	3.0	721@	3203.6	
624.4 *3*	2419.6+x	2.3	667.9 *3*	2902.9+x	3.9			

† ΔE=0.1 keV assigned by evaluator if Iγ>10, 0.2 keV if 5<Iγ<10, 0.3 keV if Iγ<5, based on the general comment that 0.1≤ΔE≤0.3 (1992Ho02).

‡ Relative photon intensity for E(^{12}C)=82 MeV; uncertainties range from 10% to 30% (1992Ho02).

§ Deduced by authors from intensity balance.

Depopulates (7−) 287.2 and/or (8−) 341.1 level (1992Ho02). However, existence of transition has not been confirmed in either of two subsequent (HI,xnγ) studies (2000Zh51, 2000Le25).

@ Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

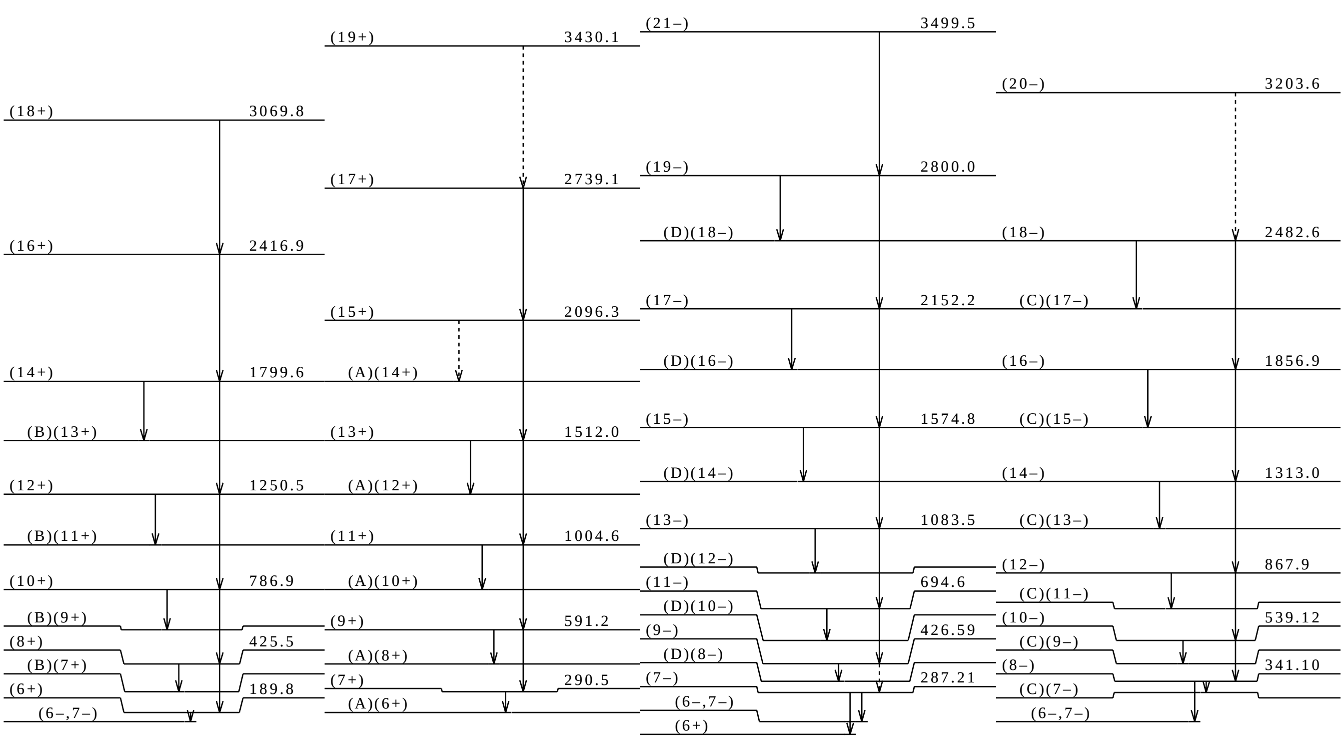
$^{159}Tb(^{12}C,5n\gamma)$ 1992Ho02 (continued)

(A) Kπ=6+, α=0 (π 7/2[404]) +(ν 5/2[642]) band.

(B) Kπ=6+, α=1 (π 7/2[404]) +(ν 5/2[642]) band.

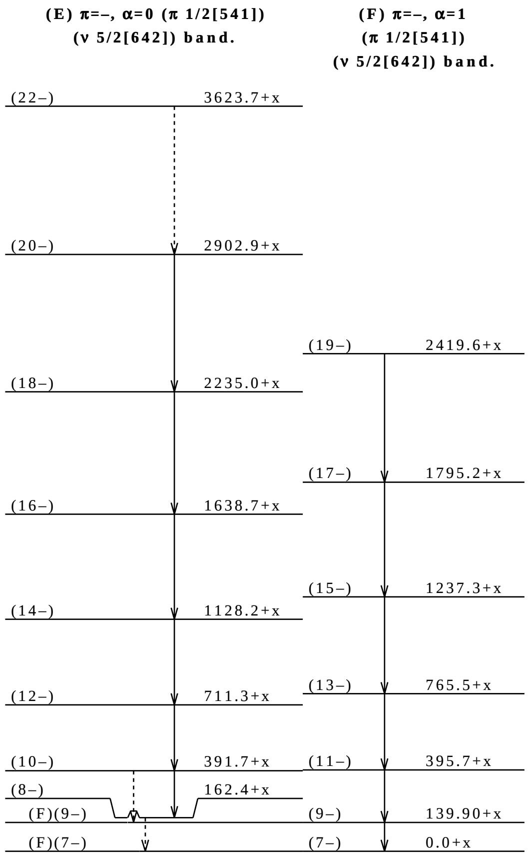
(C) Kπ=7–, α=1 (π 9/2[514]) +(ν 5/2[642]) band.

(D) Kπ=7–, α=0 (π 9/2[514]) +(ν 5/2[642]) band.



$^{166}_{71}Lu_{95}$

$^{159}Tb(^{12}C,5n\gamma)$ 1992Ho02 (continued)



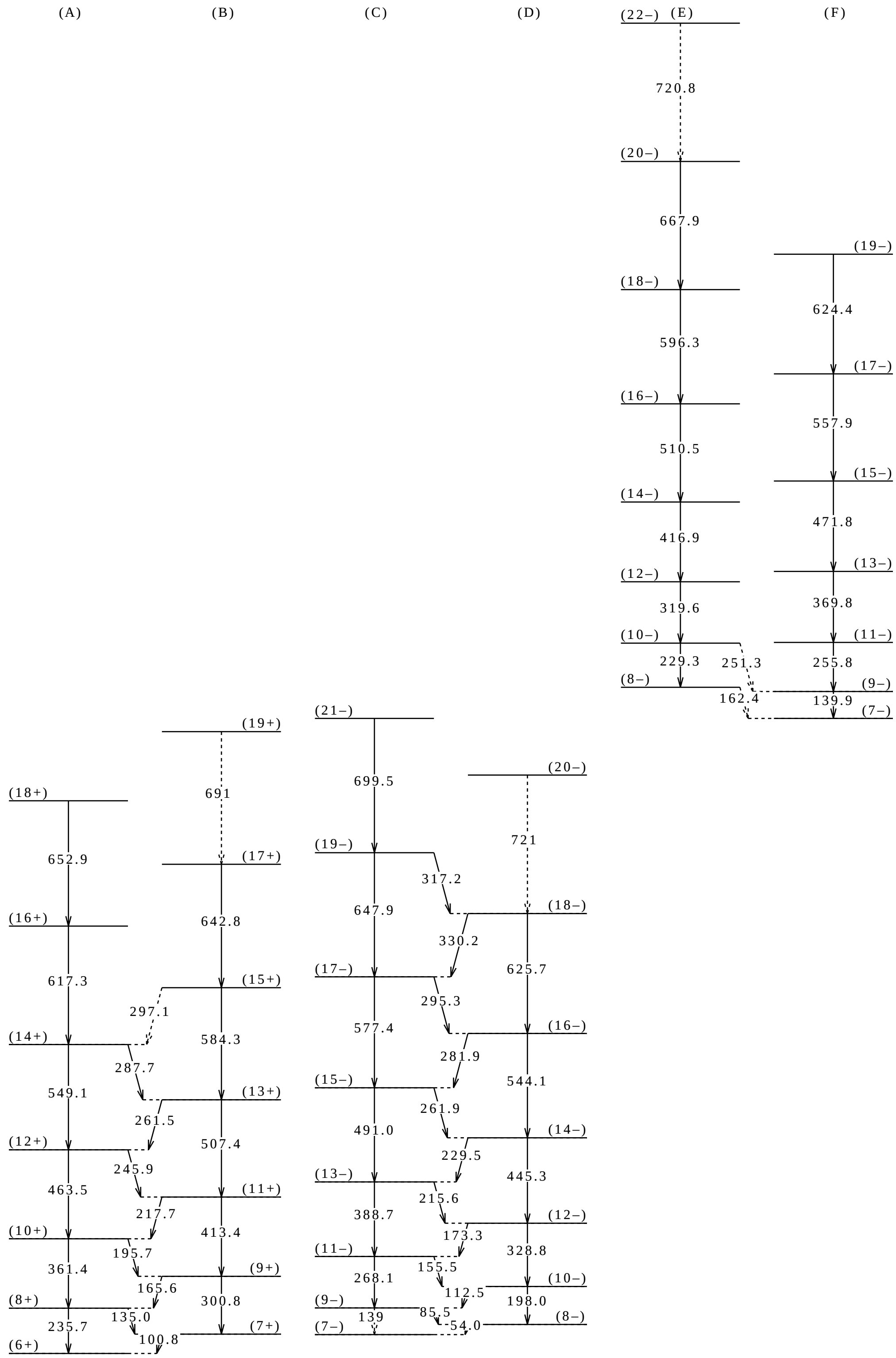
$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

$^{166}_{71}Lu_{95}$–38

^{159}Tb(^{12}C,5nγ) 1992Ho02 (continued)

Bands for ^{166}Lu



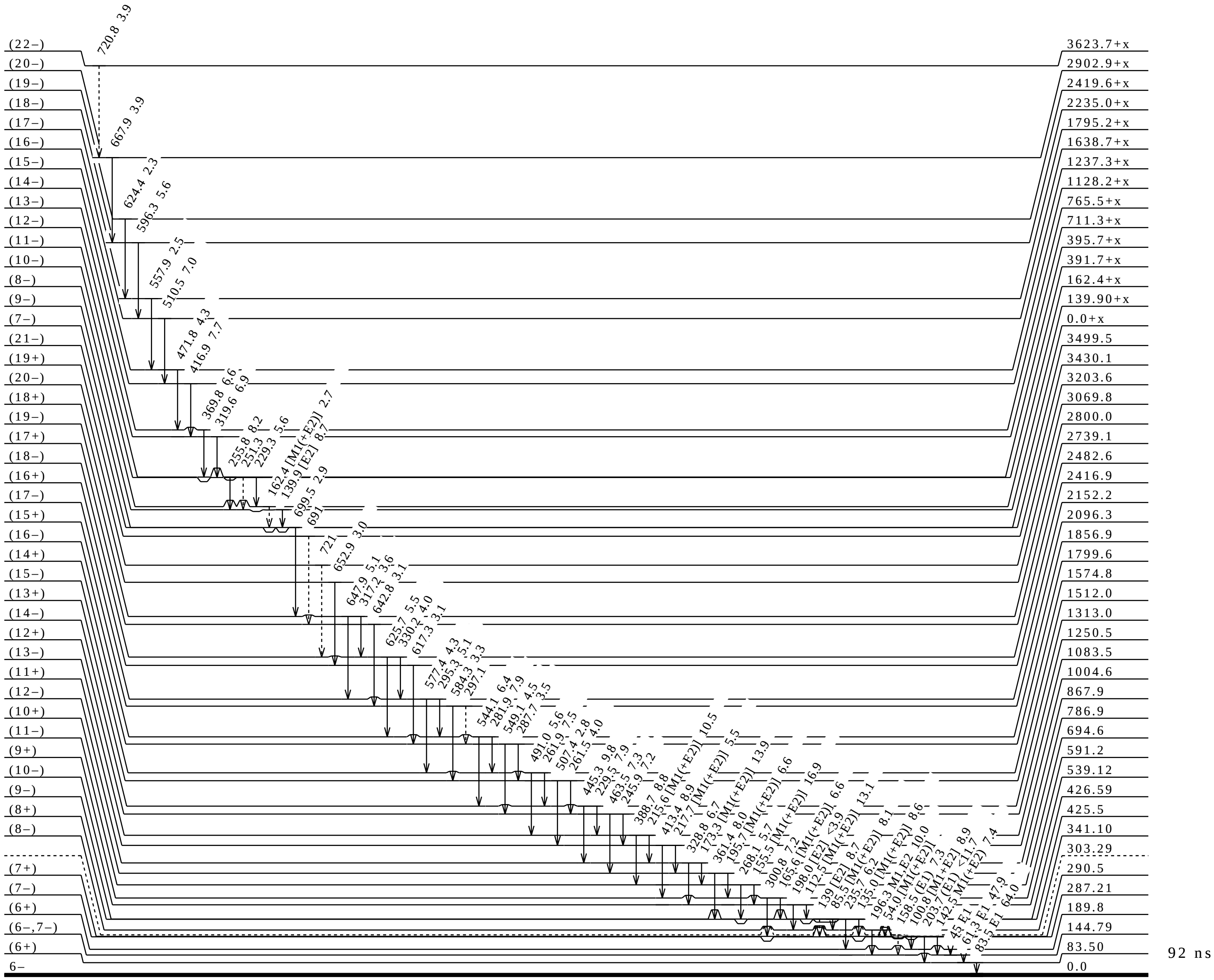
$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

$^{159}Tb(^{12}C,5n\gamma)$ 1992Ho02 (continued)

Level Scheme

Intensities: relative Iγ



$^{166}_{71}Lu_{95}$

From NNDC(BNL)
program ENSDAT

$^{166}_{71}Lu_{95}$–39

Adopted Levels, Gammas

Q(β⁻)=−7760 *40*; S(n)=10290 *40*; S(p)=4710 *40*; Q(α)=3550 *30* 2003Au03.
Assignment: ^{170}Yb(^{3}He,7n), E(^{3}He)=80 MeV chem, γ(^{166}Yb) (1974De09); ^{181}Ta(p,2p14n), E(p)=660 MeV, chem, γ(^{166}Er) (1969Ar23).
Other Reaction.
^{130}Te(^{40}Ca,4nγ), E=167.5–182.5 MeV: Te on Gd target, backed by Au; transient field technique used to determine g–factor at 5 beam energies for pre–yrast high–spin states in ^{166}Hf (1996We01). Individual values of 0.23 *3*, 0.21 *4*, 0.16 *2*, 0.21 *3* and 0.22 *3*, each with an additional systematic uncertainty of 0.02 lead to an average g–factor=+0.19 *4* (2005St24).

^{166}Hf Levels

Quasiparticle orbitals used in band labels are as follows:
A=(ν 5/2[642]), α=+1/2.
B=(ν 5/2[642]), α=−1/2.
C=(ν 3/2[651]), α=+1/2.
D=(ν 3/2[651]), α=−1/2.
E=(ν 5/2[523]), α=+1/2.
F=(ν 5/2[523]), α=−1/2.
G=(ν 3/2[521]), α=+1/2.
H=(ν 3/2[521]), α=−1/2.
a=(π 7/2[404]), α=+1/2.
b=(π 7/2[404]), α=−1/2.
k=(π 1/2[660]), α=+1/2.
e=(π 9/2[514]), α=+1/2.
f=(π 9/2[514]), α=−1/2.
g=(π 1/2[541]), α=+1/2.

Cross Reference (XREF) Flags

A ^{166}Ta ε Decay
B (HI,xnγ)
C ^{96}Zr(^{74}Ge,4nγ)
D ^{186}W(n,2p19nγ)

E(level)†	Jπ‡	XREF	T1/2§	Comments
0.0[a]	0+	ABCD	6.77 min *30*	%ε+%β⁺=100. T1/2: from 1974De09. Other: 1969Ar23. Jπ: g.s. of even–even nucleus.
158.64[a] *5*	2+	ABCD	497 ps *23*	Jπ: E2 159γ to 0+ g.s.
470.46[a] *6*	4+	ABCD	16.4 ps *5*	Jπ: stretched E2 312γ to 2+ 159 in (HI,xnγ).
809.96[s] *6*	(2+)[&]	A		Jπ: 651γ–159γ(θ) consistent with 2(810)–2+(159)–0+(g.s.) sequence in ε decay; γ to 0+.
897.17[a] *12*	6+	ABCD	3.24 ps *19*	Jπ: continuation of g.s. band.
1007.16[s] *6*	(3+)[&]	A C		Jπ: γ's to 2+ and 4+; band assignment.
1064.99 *10*	(0+)	A		Jπ: E consistent with X(5) prediction for second 0+ state; 906γ–159γ(θ) in ε decay is consistent with 0 – 2+ – 0+ cascade.
1162.70 *8*		A		Jπ: γ to 4+.
1218.76 *8*	2+	A		Jπ: strong γ branches to 0+, to 2+ and to 4+ levels.
1332.41 *7*	(2+,3,4+)	A		Jπ: γ's to 2+ and 4+.
1404.85 *7*		A		Jπ: 1247γ to 2+ 159 and 398γ to (3+) 1007, so Jπ=(1+,2,3,4+).
1406.4[a] *6*	8+	BCD	1.05 ps *10*	Jπ: continuation of g.s. band.
1418.9[s] *14*	(5+)[&]	C		Jπ: γ's to (3+) and 4+; band assignment.
1466.3[j] *6*	(5−)[#]	BC		Jπ: 259γ from (7−) 1726, D 996γ to 4+ 470; band assignment.
1551.39[k] *10*	(4−)[@]	ABC		Jπ: 289γ from (6−) 1841, 544γ to (3+) 1007; band assignment.
1603.05 *21*	(2+,3,4+)	A		Jπ: 1144γ to 2+ 159, 1133γ to 4+ 470.
1726.3[j] *6*	(7−)[#]	BC		Jπ: J=5,7 from stretched D 829γ to 6+ 897; not J=5 based on 320γ to 8+ 1406; band assignment.
1841.1[k] *6*	(6−)[@]	BC		Jπ: 421γ to (5+) 1419, D 944γ to 6+, γ from (8−); band assignment.
1971.9[a] *6*	10+	BCD	0.7 ps *5*	Jπ: continuation of g.s. band.
2078.5[j] *6*	(9−)[#]	BC	1.7 ps *4*	
2197.3[k] *6*	(8−)[@]	BC		
2376.5[n] *16*	(8−)	C		
2496.7[j] *6*	(11−)[#]	BC		Jπ: stretched D 525γ to 10+ 1972; band assignment.
2539.7[k] *6*	(10−)[@]	BC		
2565.8[a] *7*	12+	BC	0.9 ps *7*	Jπ: continuation of g.s. band.
2680.1[n] *16*	(10−)	C		Jπ: stretched Q 484γ to (8−) 2197; band assignment.
2734.6[c] *7*	12+[d]	BC		Jπ: stretched E2 275γ from 14+ 3009; stretched Q 763γ to 10+ 1972.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Hf Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$§	Comments
2793.1[o] 18	(11−)	C		
2910.9[k] 6	(12−)[@]	BC		
2962.2[j] 7	(13−)[#]	BC		
3009.2[c] 7	14+[d]	BC	6.9 ps 7	Jπ: stretched E2 443γ to 12+ 2566.
3023.9[e] 18	(12+)	C		Jπ: 460γ to 12+ 2566; 1054γ to 10+ 1972; band assignment.
3085.8[n] 17	(12−)	C		
3211.1[b] 7	14(+)	BC		Jπ: stretched Q 645γ to 12+ 2566.
3231.4[o] 18	(13−)	C		
3375.1[k] 7	(14−)[@]	BC		
3449.0[c] 8	16+[d]	BC		
3472.6[j] 7	(15−)[#]	BC		
3515.8[e] 18	(14+)	C		Jπ: 952γ to 12+ 2566; 492γ to (12+) 3024; band assignment.
3585.6[n] 18	(14−)	C		
3779.4[o] 18	(15−)	C		
3817.4[f] 20	(15−)	C		Jπ: 811γ to 14+ 3009; band assignment.
3835.2[b] 8	(16+)	BC		
3920.3[k] 8	(16−)[@]	BC		
3972.1[g] 20	(15−)	C		Jπ: 965γ to 14+ 3009; band assignment.
4009.2[c] 8	18+[d]	BC		
4030.1[j] 8	(17−)[#]	BC		
4064.7[e] 19	(16+)	C		
4163.5[n] 19	(16−)	C		
4228.5[m] 19	(16−)	C		
4374.0[f] 20	(17−)	C		Jπ: 927γ to 16+ 3449; intraband 557γ to (15−) 3817.
4400.4[o] 21	(17−)	C		
4443.4[g] 20	(17−)	C		Jπ: 997γ to 16+ 3449; intraband 471γ to (15−) 3972; band assignment.
4445.4[i] 20	(14−)	C		
4459.3[b] 9	(18+)	BC		
4516.0[k] 8	(18−)[@]	BC		
4582.0[h] 19	(15−)	C		Jπ: 1575γ to 14+ 3009; band assignment.
4625.2[j] 9	(19−)[#]	BC		
4641.4[m] 19	(18−)	C		Jπ: stretched Q 723γ to (16−) 3920.
4671.0[c] 9	20+[d]	BC		
4677.4[e] 20	(18+)	C		
4744.9[i] 19	(16−)	C		
4823.5[n] 22	(18−)	C		
4937.1[h] 19	(17−)	C		
5005.6[f] 20	(19−)	C		
5031.3[g] 20	(19−)	C		
5071.4[o] 23	(19−)	C		
5086.9[l] 22	(19−)	C		
5089.6[k] 9	(20−)[@]	BC		
5121.7[b] 9	(20+)	BC		
5157.5[r] 21	(19+)	C		Jπ: 1151γ to 18+ 4009; band assignment.
5160.0[i] 20	(18−)	C		
5214.3[m] 20	(20−)	C		
5253.3[j] 9	(21−)[#]	BC		
5313.0[e] 21	(20+)	C		
5409.9[c] 9	22+[d]	BC		
5410.0[h] 21	(19−)	C		
5510.5[n] 24	(20−)	C		
5665.9[l] 23	(21−)	C		
5672.7[f] 22	(21−)	C		
5678.8[k] 9	(22−)[@]	BC		
5687.1[i] 21	(20−)	C		
5720.4[g] 21	(21−)	C		
5784.4[o] 25	(21−)	C		
5798.5[r] 21	(21+)	C		Jπ: 1130γ to 20+ 4671; band assignment.
5851.7[b] 10	(22+)	BC		
5897.3[m] 22	(22−)	C		
5926.9[j] 10	(23−)[#]	BC		
5986.0[e] 23	(22+)	C		
5987.8[h] 22	(21−)	C		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Hf Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
6201.2[c] *10*	24+[d]	BC	
6243[n] *3*	(22−)	C	
6310.6[i] *22*	(22−)	C	
6331.0[l] *24*	(23−)	C	Jπ: stretched Q 1080γ to (21−) 5253; band assignment.
6356.4[k] *10*	(24−)[@]	BC	
6385.7[f] *25*	(23−)	C	
6441.4[g] *23*	(23−)	C	
6531[o] *3*	(23−)	C	
6536.5[r] *24*	(23+)	C	
6615.0[b] *22*	(24+)	C	
6641.3[m] *24*	(24−)	C	
6650.6[h] *23*	(23−)	C	
6665.5[j] *10*	(25−)[#]	BC	
6978[n] *3*	(24−)	C	
7006.6[i] *23*	(24−)	C	
7030.1[c] *10*	26+[d]	BC	
7078.2[l] *25*	(25−)	C	
7137.4[k] *10*	(26−)[@]	BC	
7145[f] *3*	(25−)	C	
7199.4[g] *25*	25−	C	
7314[o] *3*	(25−)	C	
7342[r] *3*	(25+)	C	
7363.6[h] *23*	(25−)	C	
7392.1[b] *23*	(26+)	C	
7444[m] *3*	(26−)	C	
7481.1[j] *11*	(27−)[#]	BC	
7713.6[i] *24*	(26−)	C	
7770[n] *3*	(26−)	C	
7894.7[c] *11*	28+[d]	BC	
7899[l] *3*	(27−)	C	
7954[f] *3*	(27−)	C	
8007[g] *3*	(27−)	C	
8017.3[k] *11*	(28−)[@]	BC	
8062.7[h] *24*	(27−)	C	
8222.0[b] *25*	(28+)	C	
8303[m] *3*	(28−)	C	
8375.4[j] *11*	(29−)[#]	BC	
8426.4[i] *25*	(28−)	C	
8767[l] *3*	(29−)	C	
8800.7[c] *15*	30+[d]	BC	
8808.1[h] *25*	(29−)	C	
8817[f] *3*	(29−)	C	
8871[g] *3*	(29−)	C	
8980.0[k] *15*	(30−)[@]	BC	
9116[b] *3*	(30+)	C	
9212[i] *3*	(30−)	C	
9216[m] *3*	(30−)	C	
9337.8[j] *15*	(31−)[#]	BC	
9635[h] *3*	(31−)	C	
9682[l] *3*	(31−)	C	
9734[f] *4*	(31−)	C	
9753.5[c] *18*	32+[d]	BC	
9771[g] *3*	(31−)	C	
9991.2[k] *18*	(32−)[@]	BC	
10009[b] *3*	(32+)	C	
10080?[i] *3*	(32−)	C	
10167[m] *4*	(32−)	C	
10330[j] *2*	(33−)[#]	BC	
10721[f] *4*	(33−)	C	
10747.5[c] *21*	34+[d]	BC	
10933[b] *3*	(34+)	C	
10994[k] *4*	(34−)[@]	C	
11298[j] *4*	(35−)[#]	C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{166}Hf Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	XREF
11751[c] 4	36+[d]	C	16006?[c] 4	(44+)[d]	C	3665.0+x[q] 16	C
11928[b] 4	(36+)	C	0.0+x[q]		C	4083.1+x[q] 17	C
12005[k] 4	(36−)[@]	C	236.0+x[q] 8		C	0.0+y[p]	C
12289[j] 4	(37−)[#]	C	486.0+x[q] 8		C	204.0+y[p] 8	C
12762[c] 4	38+[d]	C	759.0+x[q] 10		C	438.0+y[p] 8	C
13038[k] 4	(38−)[@]	C	1064.1+x[q] 11		C	697.0+y[p] 10	C
13328[j] 4	(39−)[#]	C	1387.7+x[q] 12		C	977.0+y[p] 11	C
13800[c] 4	40+[d]	C	1734.9+x[q] 13		C	1274.0+y[p] 12	C
14096[k] 4	(40−)[@]	C	2095.8+x[q] 13		C	1582.0+y[p] 13	C
14424[j] 4	(41−)[#]	C	2475.9+x[q] 14		C	1905.0+y[p] 13	C
14879[c] 4	42+[d]	C	2860.7+x[q] 15		C	2240.0+y[p] 14	C
15575?[j] 4	(43−)[#]	C	3256.1+x[q] 15		C		

† From least−squares fit to Eγ, assigning 1 keV uncertainty to data for which the authors did not state an uncertainty.
‡ Values given without comment are from (^{74}Ge,4nγ) and based on deduced band structure, alignment gains, B(M1)/B(E2) ratios and comparison with structures in neighboring nuclides.
§ The half−lives of excited states are from recoil Doppler measurements in (HI,nγ), except as noted.
\# The interband transition between side band 1 and the ground−state band show angular distributions of pure stretched dipole type, most likely E1.
@ Transitions connecting the two side bands have positive anisotropies and are interpreted as mixed M1,E2 transitions (1987Bl06) in (HI,xnγ).
& Proposed by 1977Le08 in ε decay.
a (A): Kπ=0+ g.s. band. A=26.5 if B=0.
b (B): BC band (2000Ri11).
c (C): AB band (2000Ri11). Yrast above J=14. Alignment gain 10ħ at ħω≈0.25 MeV. Becomes ABCDfg band at high spin with possible admixture of ABEFfg.
d Jπ established for J=12 through J=42 band members based on smooth progression of Eγ for intraband cascade, Jπ=14+ for 3007 level and E2 intraband 275γ to 2566.
e (D): EFBC band (2000Ri11).
f (E): AGEF band (2000Ri11).
g (F): AGEH band (2000Ri11).
h (G): Kπ=10−, α=0 gfAE band (2000Ri11). Likely configuration: ν (5/2[642]+5/2[523])+ π (1/2[541]+9/2[514]); strongly supported by measured B(M1)/B(E2) ratios.
i (H): Kπ=10−, α=1 geAE band (2000Ri11). See comment on Kπ=10− signature partner band.
j (I): Kπ=5− AE band (2000Ri11). A=13.7 if B=0.
k (J): AF band (2000Ri11).
l (K): AGBC band (2000Ri11). Large alignment, consistent with four−quasineutron structure.
m (L): AHBC band (2000Ri11).
n (M): BE band (2000Ri11). Low alignment at low J.
o (N): BF band (2000Ri11).
p (O): Band 1 (2000Ri11).
q (P): Band 2 (2000Ri11).
r (Q): Band 3 (2000Ri11).
s (R): Kπ=2+ γ−vibrational band.

γ(^{166}Hf)

E(level)	Eγ†	Iγ†§	Mult.‡	α	Comments
158.64	158.64[#] 4	100[#]	E2	0.636	B(E2)(W.u.)=128 7. Mult.: stretched Q from γ(θ) in (HI,xnγ); not M2 from RUL.
470.46	311.87[#] 5	100[#]	E2	0.0706	B(E2)(W.u.)=202 7.
809.96	651.26[#] 5	93.6[#] 20			
	810.0[#] 3	100[#] 9			
897.17	426.7[#] 1	100[#]	E2	0.0292	B(E2)(W.u.)=221 13.
1007.16	536.81[#] 7	15.7[#] 16			
	848.41[#] 6	100[#] 7			
1064.99	906.35[#] 9	100[#]	(E2)	0.00500	Mult.: Q from 906γ−159γ(θ) in ε decay.
1162.70	692.23[#] 6	100[#]			
1218.76	748.25[#] 7	100[#] 7			
	1060.2[#] 1	77[#] 10			
	1218.8[#] 3	33[#] 13			

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Adopted Levels, Gammas (continued)

γ(^{166}Hf) (continued)

E(level)	Eγ[†]	Iγ[†§]	Mult.[‡]	α	Comments
1332.41	861.97[#] *7*	92[#] *5*			
	1173.74[#] *7*	100[#] *7*			
1404.85	397.6[#] *1*	51[#] *5*			
	594.65[#] *10*	100[#] *16*			
	1246.37[#] *7*	95[#] *5*			
1406.4	509.5 *3*	100	E2	0.0185	B(E2)(W.u.)=280 *30*.
1418.9	413[&]				
	949[&]				
1466.3	995.8 *10*	100	D		
1551.39	544.27[#] *10*	59[#] *11*			
	1080.86[#] *12*	100[#] *13*	D		
1603.05	1132.75[#] *11*	100[#] *12*			
	1444.4[#] *2*	92[#] *4*			
1726.3	259[&]				
	320[&]				
	829.3 *3*	100	D		
1841.1	289.2 *3*	34 *7*			
	374.7 *3*	100 *10*			
	421[&]				
	944.3 *3*	90 *10*	D		
1971.9	565.5 *3*	100	E2	0.0129	B(E2)(W.u.)=250 *+640–110*.
2078.5	352.2 *3*	28 *3*	E2	0.0495	B(E2)(W.u.)=250 *60*.
	672.2 *3*	100 *5*	D		
2197.3	356.3 *3*	100 *10*			
	471.0 *3*	80 *8*			
2376.5	537[&]				
2496.7	418.1 *3*	100 *10*	(E2)	0.0308	
	524.7 *3*	62 *6*	D		
2539.7	342.5 *3*	100 *10*			
	461.2 *3*	87 *9*			
2565.8	594.0 *3*	100	E2	0.01271	B(E2)(W.u.)=155 *+550–70*.
2680.1	304[&]				
	484[&]		Q[@]		
2734.6	168[&]				
	762.7 *3*	100	(E2)	0.00721	
2793.1	716[&]	100			
2910.9	371.3 *3*	100 *10*	(E2)	0.0427	
	414.0 *3*	47 *4*			
2962.2	396.4 *3*	8.2 *16*			
	465.4 *3*	100 *5*	(E2)	0.0232	
3009.2	274.6 *3*	22.3 *24*	E2	0.1037	B(E2)(W.u.)=168 *17*.
	443.4 *3*	100 *5*	E2	0.0264	B(E2)(W.u.)=70 *7*.
3023.9	460[&]				
	1054[&]				
3085.8	406[&]				
	547[&]				
3211.1	645.3 *3*	100	(E2)	0.01048	
3231.4	438[&]				
	737[&]		Q[@]		
3375.1	413[&]				
	464.2 *3*	100	(E2)	0.0234	
3449.0	439.8 *3*	100	(E2)	0.0269	
3472.6	261[&]				
	510.4 *3*	100	(E2)	0.0184	
3515.8	492[&]				
	952[&]				
3585.6	500[&]	100			
3779.4	548[&]				
	819[&]		Q[@]		
3817.4	811[&]				
3835.2	624[&]	100			
3920.3	448[&]				
	545.2 *3*	100	(E2)	0.01561	

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Adopted Levels, Gammas (continued)

γ(^{166}Hf) (continued)

E(level)	Eγ†	Iγ†§	Mult.‡	α
3972.1	965&	100		
4009.2	560.2 3	100	(E2)	0.01462
4030.1	557.5 3	100	(E2)	0.01479
4064.7	549&			
	856&			
4163.5	578&	100		
4228.5	643&	100		
4374.0	557			
	927			
4400.4	621&	100		
4443.4	471&			
	997&			
4459.3	623&	100		
4516.0	595.7 3	100		
4582.0	137&			
	1373&			
	1575&			
4625.2	595.1 3	100		
4641.4	413&			
	478&			
	723&		Q@	
4671.0	661.8 3	100		
4677.4	613&			
	844&			
4744.9	163&			
	299&			
	1298&		D@	
4823.5	660&	100		
4937.1	192&			
	355&			
	1491&			
5005.6	562&			
	632&			
	999&			
5031.3	588&			
	657&			
	1025&		D@	
5071.4	671&	100		
5086.9	1059&	100	(Q)@	
5089.6	573.6 3	100		
5121.7	662.3 3	100		
5157.5	1151&	100		
5160.0	223&			
	415&			
	1153&			
5214.3	573&			
	700&		Q@	
5253.3	628.1 3	100	(E2)	0.01115
5313.0	636&			
	856&			
5409.9	738.9 3	100	[E2]	0.00779
5410.0	250&			
	473&			
5510.5	687&	100		
5665.9	579&			
	1043			
5672.7	667&	100		
5678.8	589.2 3	100		
5687.1	277&			
	527&			
5720.4	689&			
	1052&			
5784.4	713&	100		

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Adopted Levels, Gammas (continued)

γ(^{166}Hf) (continued)

E(level)	Eγ[†]	Iγ[†§]	Mult.[‡]
5798.5	641[&]		
	1130[&]		
5851.7	730.0 *3*	100	
	1180[&]		
5897.3	683[&]		
5926.9	673.6 *3*	100	
5986.0	673[&]		
	867[&a]		
5987.8	301[&]		
	578[&]		
6201.2	791.3 *3*	100	
6243	733[&]	100	
6310.6	323[&]		
	623[&]		
6331.0	665		
	1080		Q[@]
6356.4	677.6 *3*	100	
6385.7	713[&]	100	
6441.4	721[&]	100	
6531	747[&]	100	
6536.5	738[&]	100	
6615.0	766[&]		
	1208[&]		
6641.3	744[&]	100	
6650.6	340[&]		
	663[&]		
6665.5	738.6 *3*	100	
6978	735[&]	100	
7006.6	356[&]		
	696[&]		
7030.1	828.9 *3*	100	
7078.2	747[&]		
	1155[&]		
7137.4	781.0 *3*	100	
7145	759[&]	100	
7199.4	758[&]	100	
7314	783[&]	100	
7342	806[&]	100	
7363.6	357[&]		
	713[&]		
7392.1	777[&]		
	1195[&]		
7444	803[&]	100	
7481.1	815.6 *3*	100	
7713.6	350[&]		
	707[&]		
7770	792[&]	100	
7894.7	864.6 *3*	100	
7899	821[&]	100	
7954	809[&]	100	
8007	808[&]	100	
8017.3	879.9 *3*	100	
8062.7	349[&]		
	699[&]		
8222.0	830[&]	100	
8303	859[&]	100	
8375.4	894.3 *3*	100	
8426.4	364[&]		
	713[&]		
8767	868[&]	100	
8800.7	906 *1*	100	
8808.1	382[&]		
	745[&]		

E(level)	Eγ[†]	Iγ[†§]
8817	863[&]	100
8871	864[&]	100
8980.0	962.7 *10*	100
9116	894[&]	100
9212	404[&]	
	786[&]	
9216	913[&]	100
9337.8	962.4 *10*	100
9635	423[&]	
	827[&]	
9682	915[&]	100
9734	917[&]	100
9753.5	952.7 *10*	100
9771	900[&]	100
9991.2	1011.2 *10*	100
10009	893[&]	100
10080?	445[&a]	
	867[&a]	
10167	951[&]	100
10330	992.5 *10*	100
10721	987[&]	100
10747.5	994 *1*	100
10933	924[&]	100
10994	1007[&]	100
11298	972[&]	100
11751	1009[&]	100
11928	995[&]	100
12005	1011[&]	100
12289	991[&]	100
12762	1011[&]	100
13038	1033[&]	100
13328	1039[&]	100
13800	1038[&]	100
14096	1058[&]	100
14424	1096[&]	100
14879	1079[&]	100
15575?	1151[&a]	100
16006?	1127[&a]	100
236.0+x	236[&]	100
486.0+x	250[&]	
	486[&]	
759.0+x	273[&]	
	523[&]	
1064.1+x	305[&]	
	578[&]	
1387.7+x	323[&]	
	629[&]	
1734.9+x	347[&]	
	671[&]	
2095.8+x	361[&]	
	708[&]	
2475.9+x	380[&]	
	741[&]	
2860.7+x	385[&]	
	765[&]	
3256.1+x	396[&]	
	780[&]	
3665.0+x	409[&]	
	804[&]	
4083.1+x	418[&]	
	827[&]	
204.0+y	204[&]	100
438.0+y	234[&]	

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Adopted Levels, Gammas (continued)

$\gamma(^{166}Hf)$ (continued)

E(level)	Eγ†	E(level)	Eγ†	E(level)	Eγ†
438.0+y	438&	1274.0+y	297&	1905.0+y	631&
697.0+y	259&		577&	2240.0+y	335&
	493&	1582.0+y	308&		658&
977.0+y	280&		605&		
	539&	1905.0+y	323&		

† From (HI,xnγ), unless otherwise noted.

‡ From γ(θ) and/or DCO ratio in (HI,xnγ), except as noted. Q transitions are not M2 from RUL if value is shown without parentheses; Δπ=(no) has been assigned to all other intraband stretched Q transitions.

§ Relative photon intensity normalized to 100 for strongest photon deexciting each level; from (HI,xnγ), except as noted.

From ^{166}Ta ε decay.

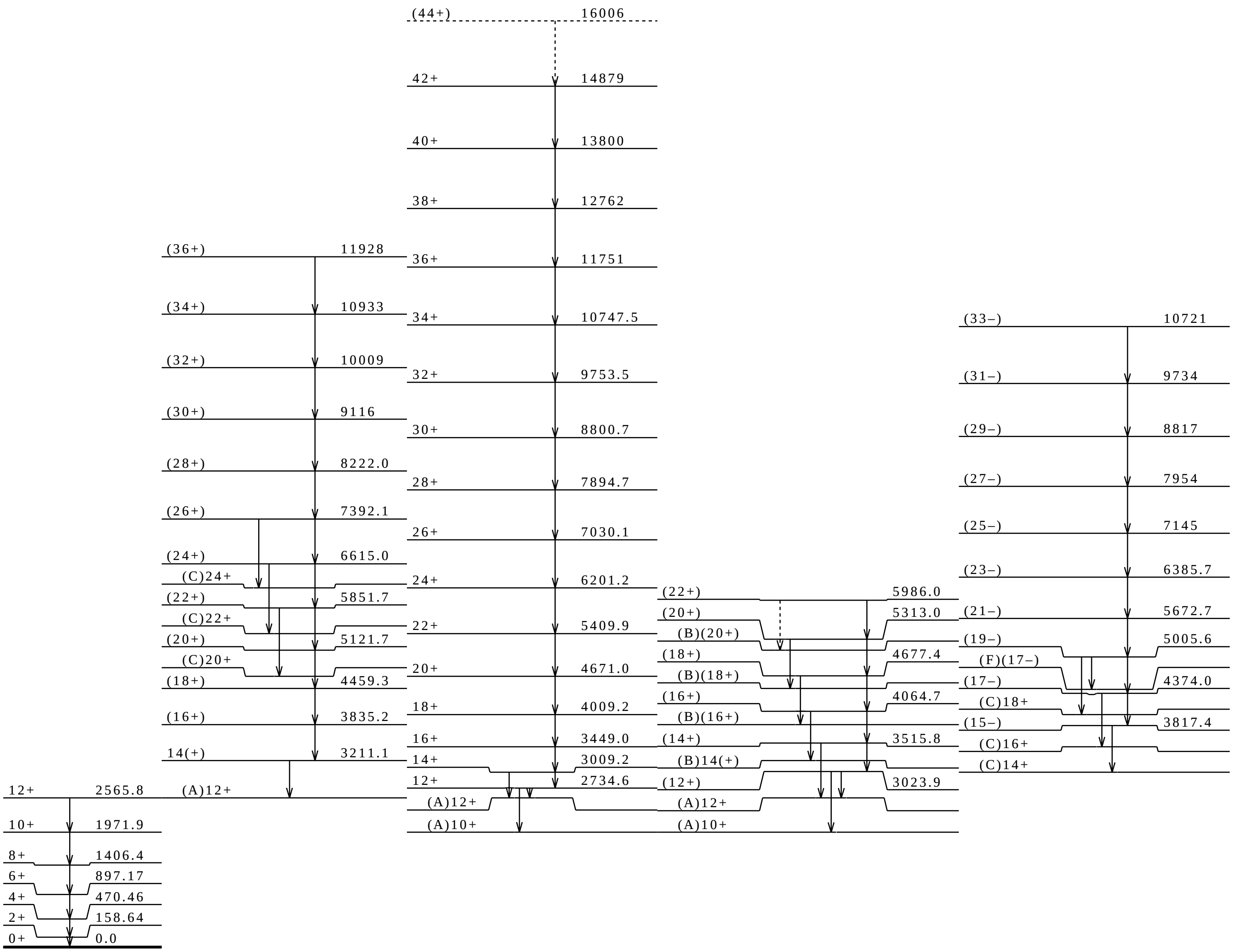
@ From DCO ratios in ^{96}Zr(^{74}Ge,4nγ), assigning intraband stretched Q transitions as (E2).

& From ^{96}Zr(^{74}Ge,4nγ).

a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

(A) Kπ=0+ g.s. band. (B) BC band (2000Ri11). (C) AB band (2000Ri11). (D) EFBC band (2000Ri11). (E) AGEF band (2000Ri11).



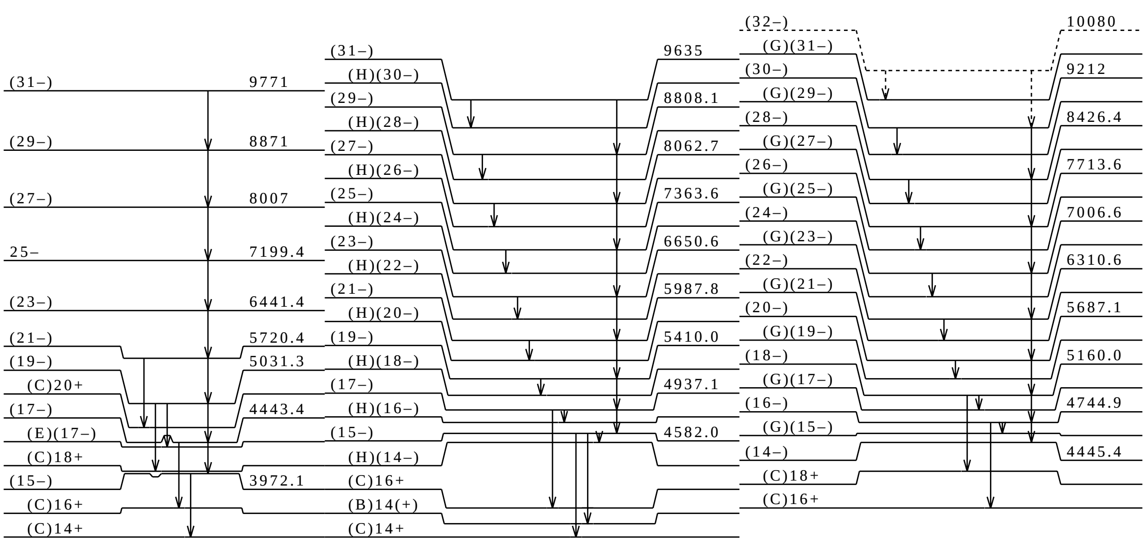
$^{166}_{72}Hf_{94}$

Adopted Levels, Gammas (continued)

(F) AGEH band (2000Ri11).

(G) Kπ=10−, α=0 gfAE band (2000Ri11).

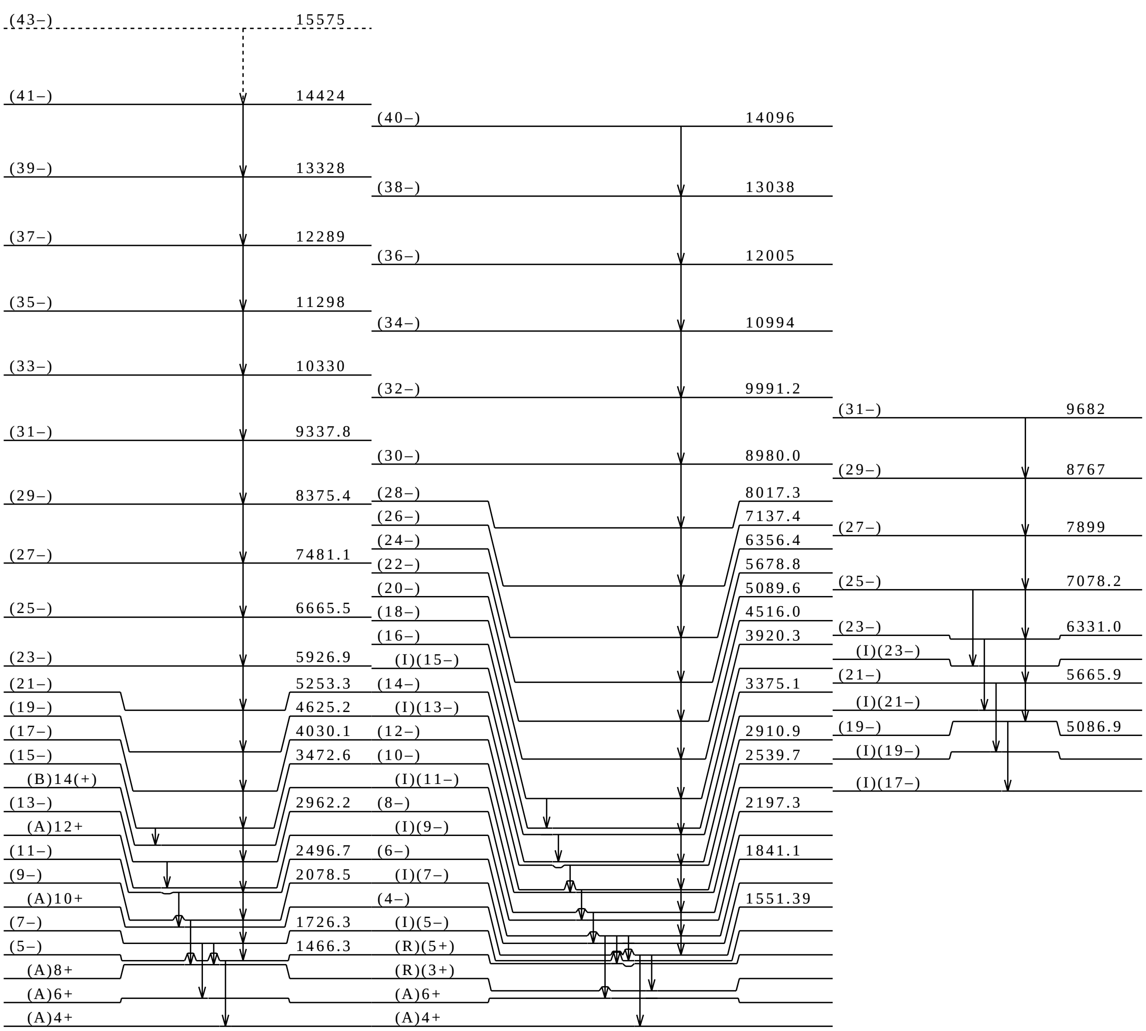
(H) Kπ=10−, α=1 geAE band (2000Ri11).



$^{166}_{72}Hf_{94}$

Adopted Levels, Gammas (continued)

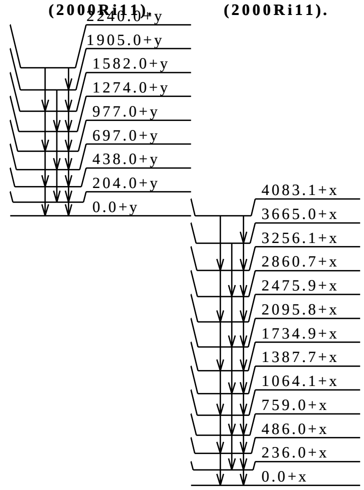
(I) Kπ=5– AE band (2000Ri11). **(J) AF band (2000Ri11).** **(K) AGBC band (2000Ri11).**

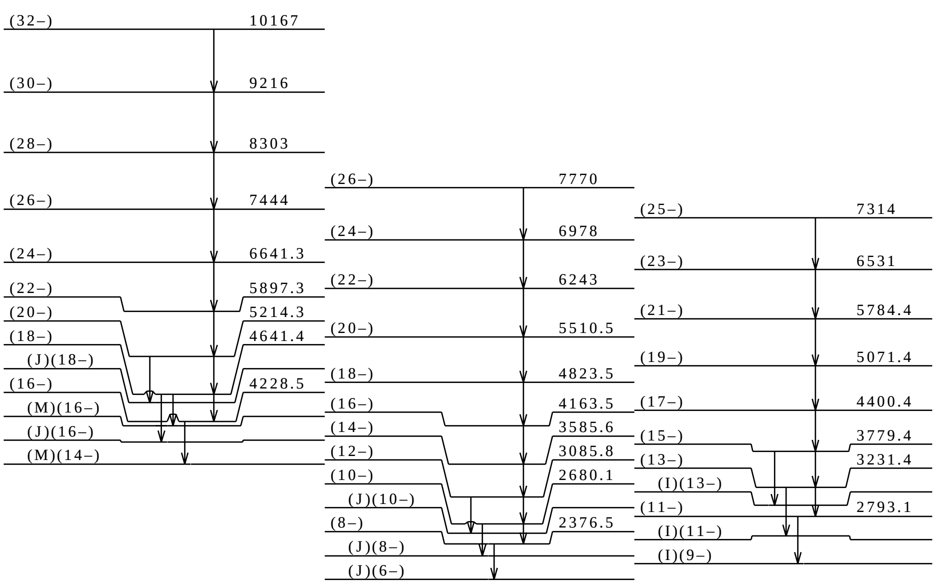


$^{166}_{72}Hf_{94}$

Adopted Levels, Gammas (continued)

(L) AHBC band (2000Ri11). **(M) BE band (2000Ri11).** **(N) BF band (2000Ri11).** **(O) Band 1 (2000Ri11).** **(P) Band 2 (2000Ri11).**





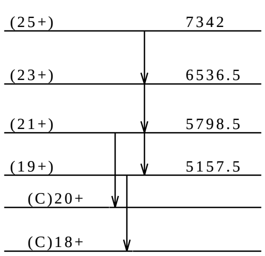
$^{166}_{72}Hf_{94}$

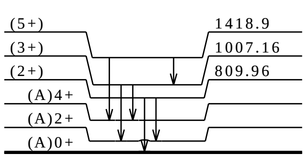
$^{166}_{72}Hf_{94}$–13

Adopted Levels, Gammas (continued)

(Q) Band 3 (2000Ri11).

(R) Kπ=2+ γ–vibrational band.

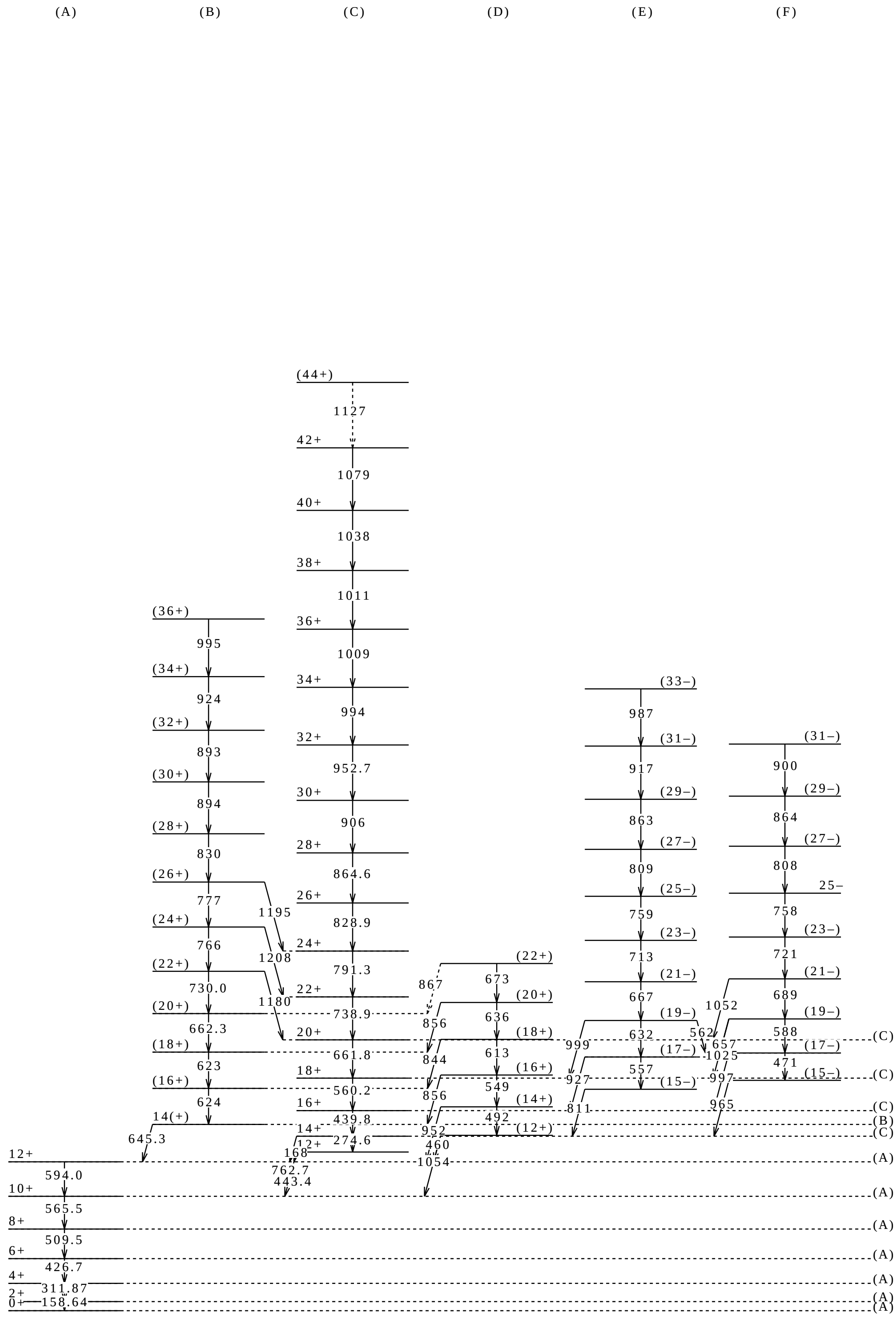




$^{166}_{72}Hf_{94}$

Adopted Levels, Gammas (continued)

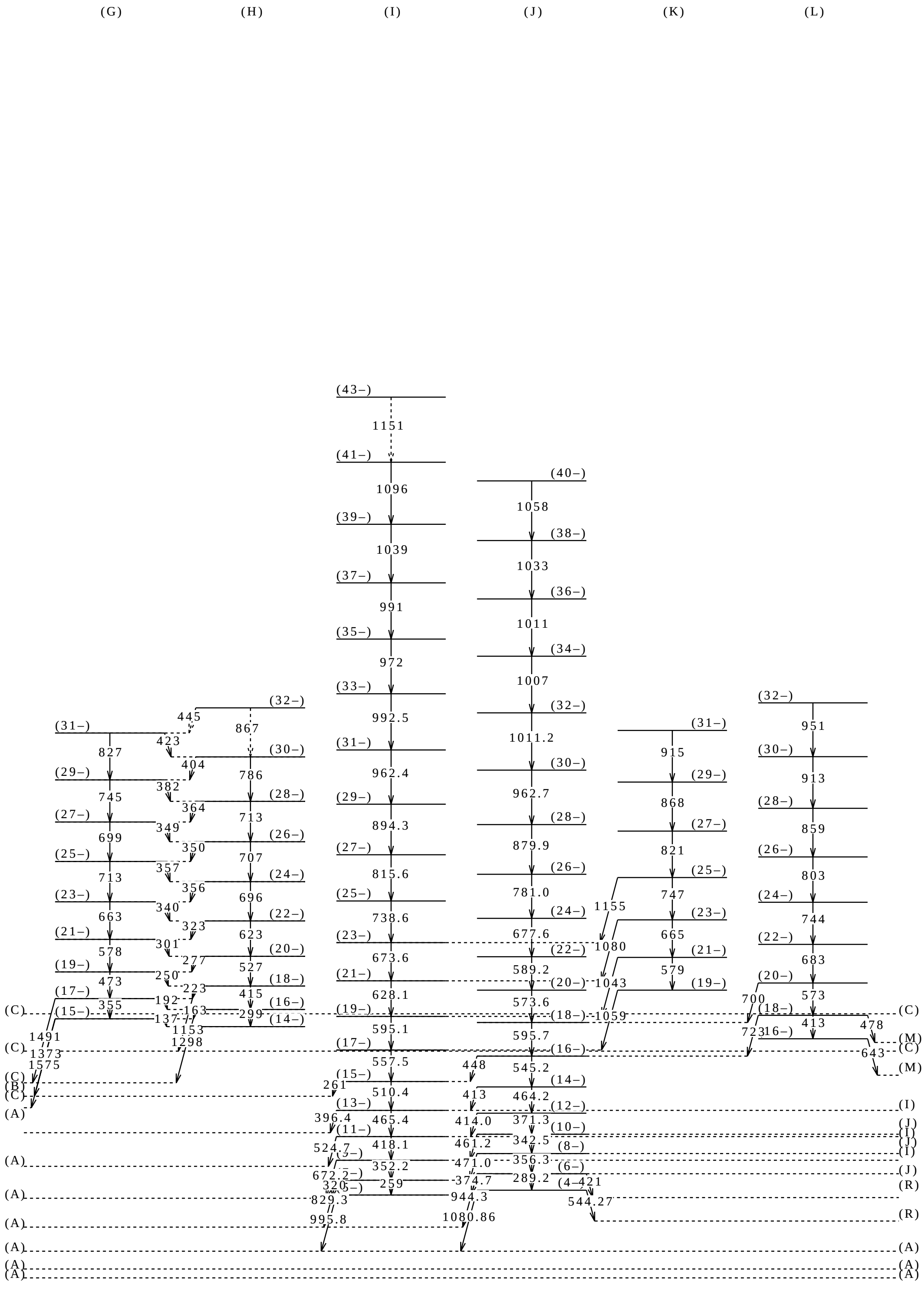
Bands for ^{166}Hf



$^{166}_{72}Hf_{94}$

Adopted Levels, Gammas (continued)

Bands for ^{166}Hf



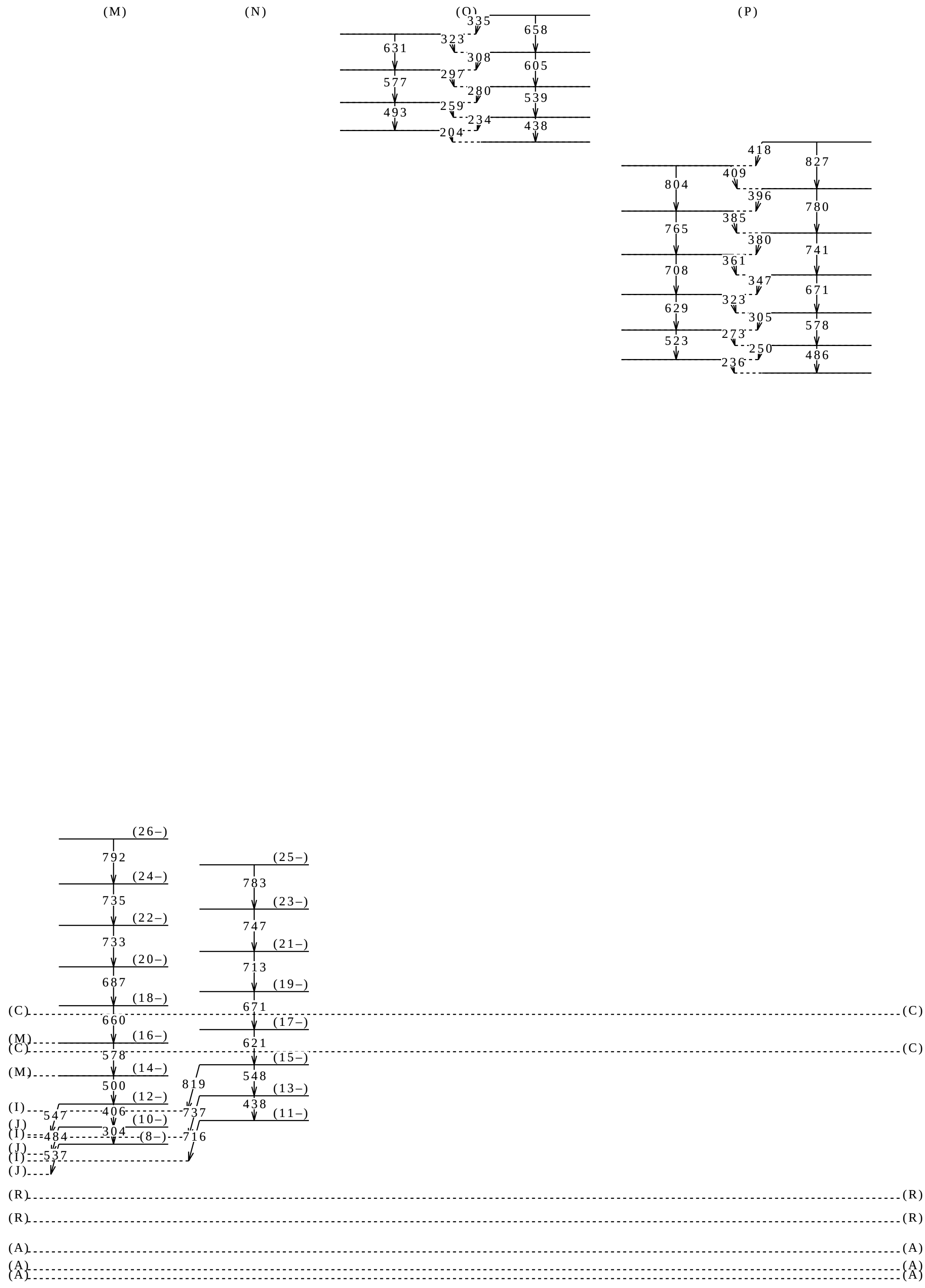
$^{166}_{72}Hf_{94}$

CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}Hf



$^{166}_{72}Hf_{94}$

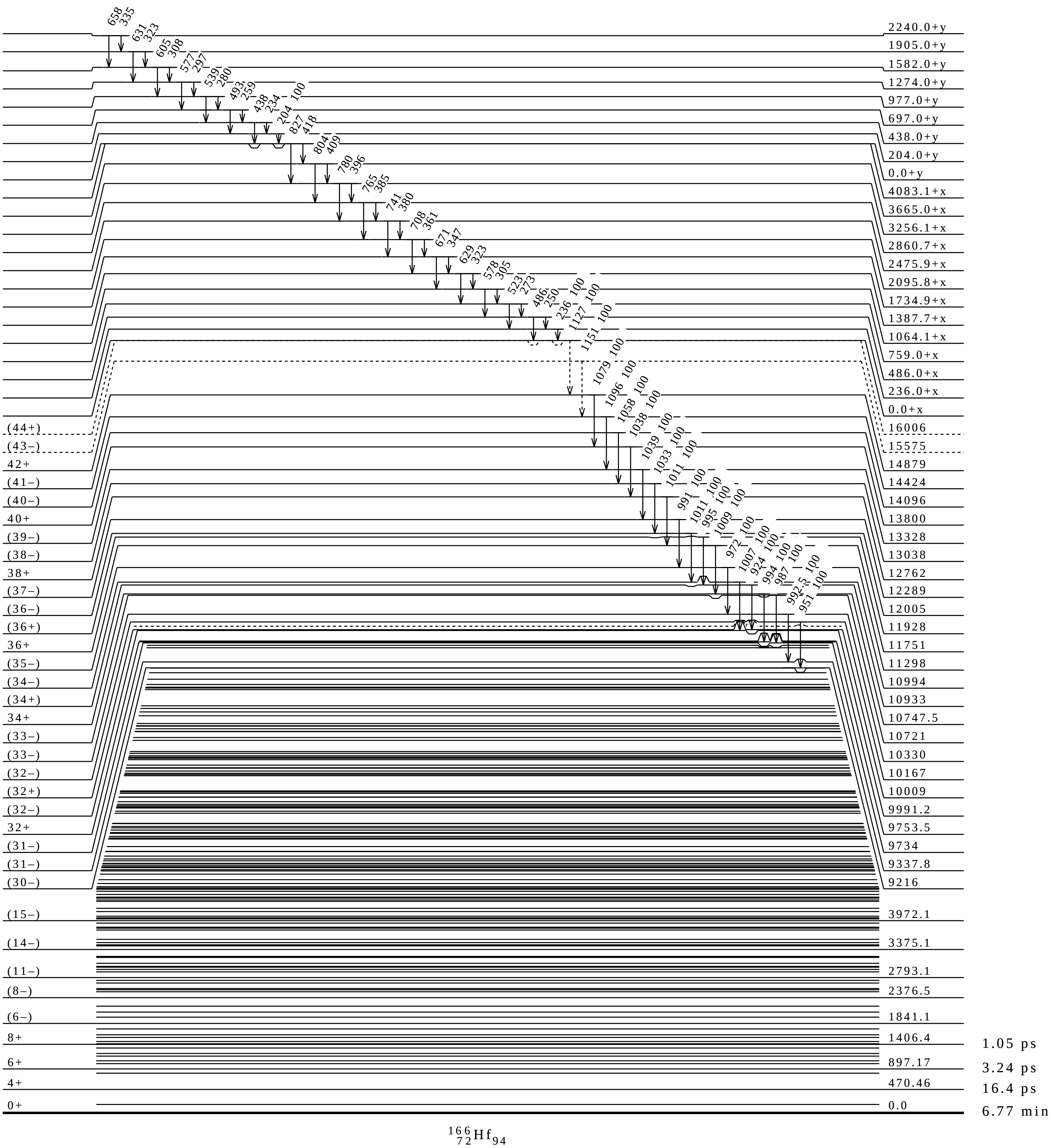
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



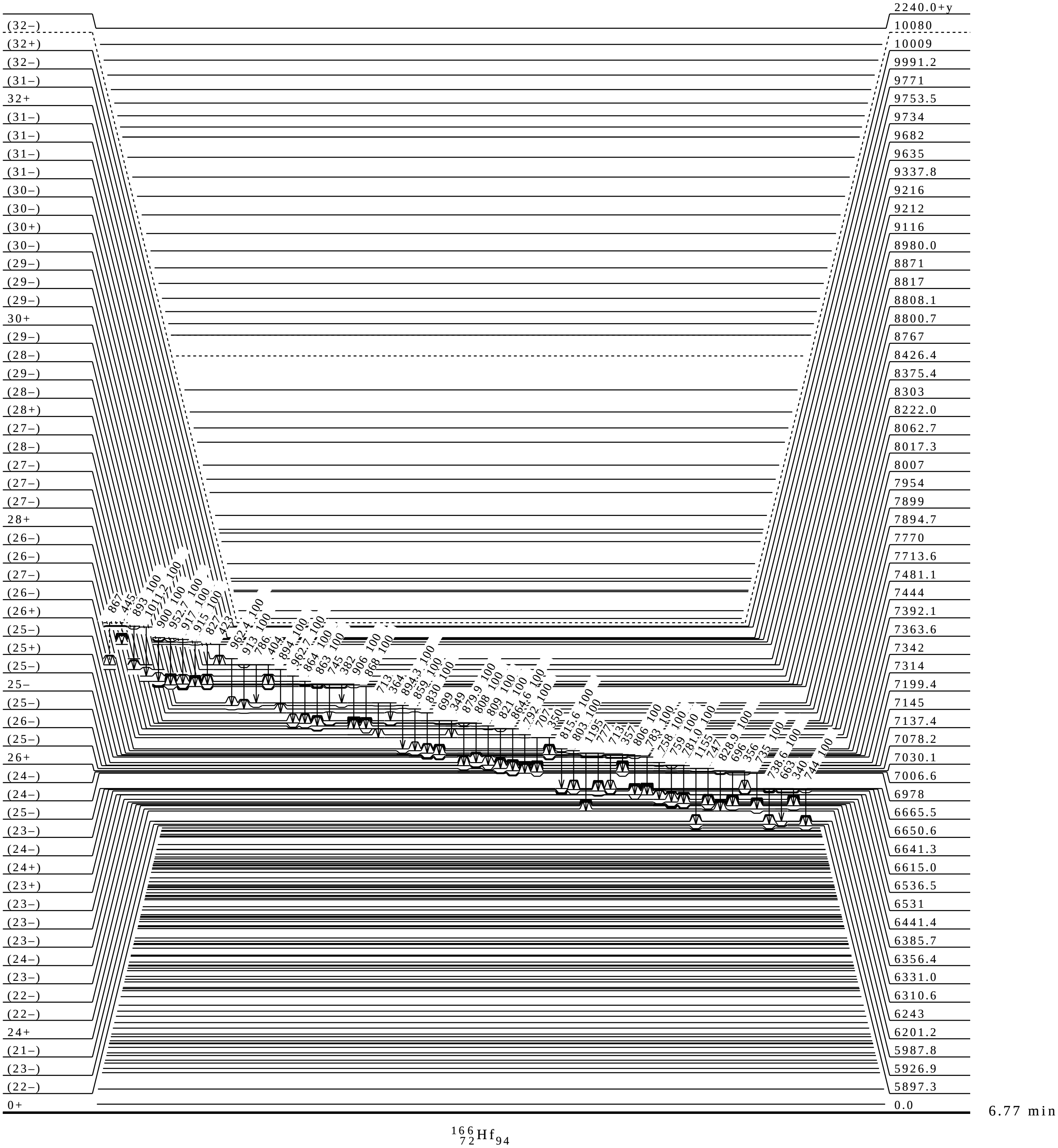
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



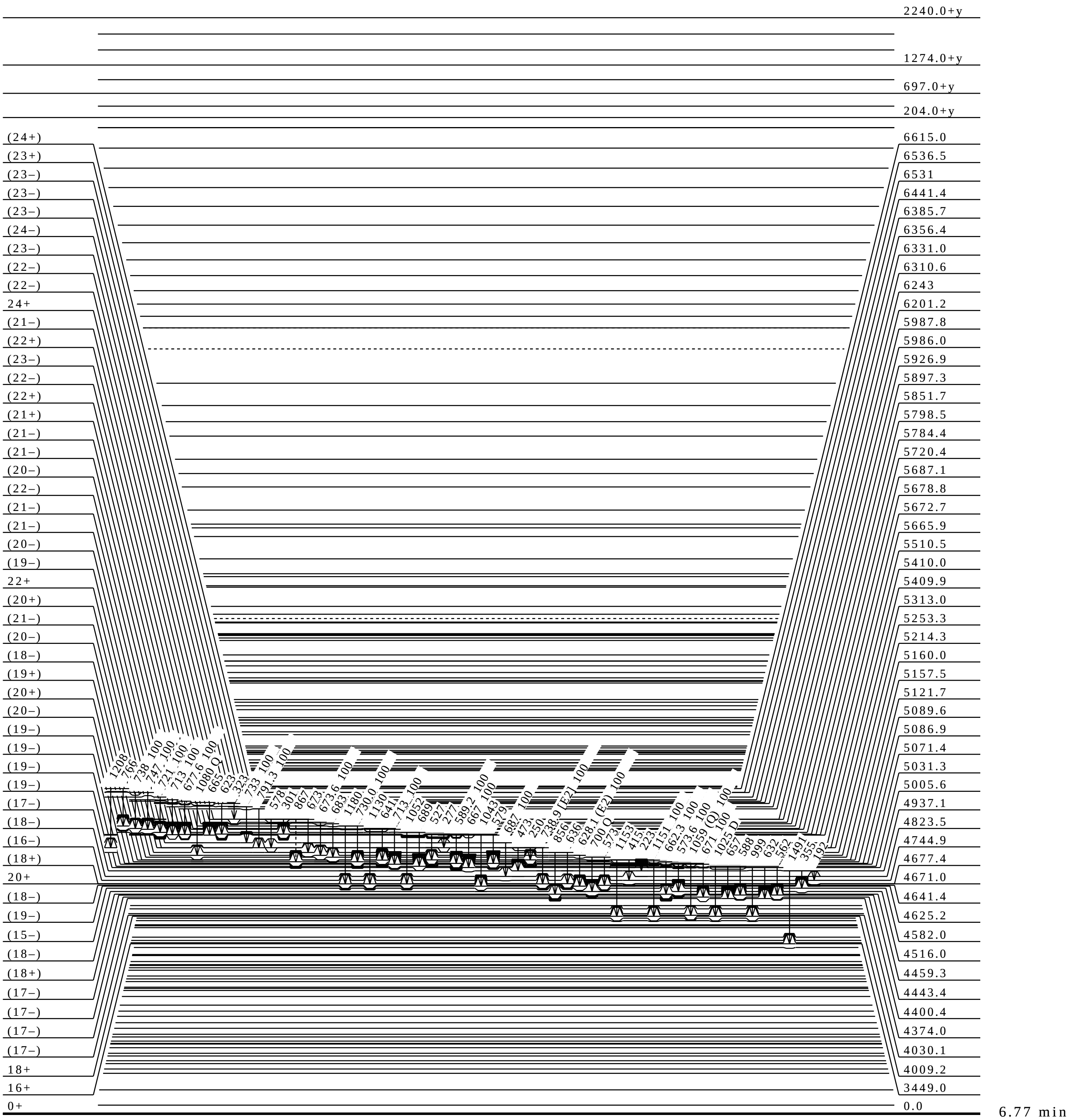
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



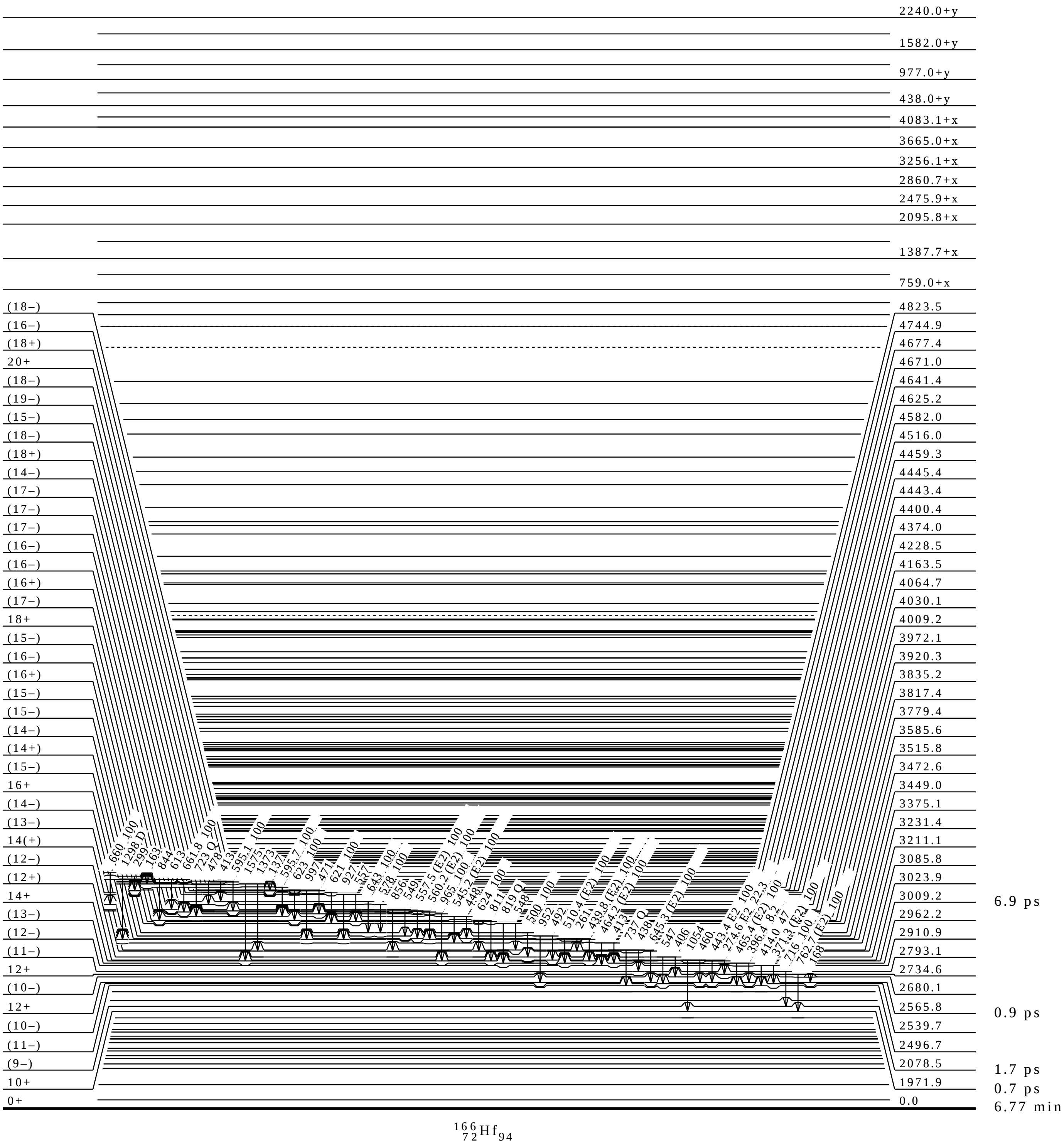
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



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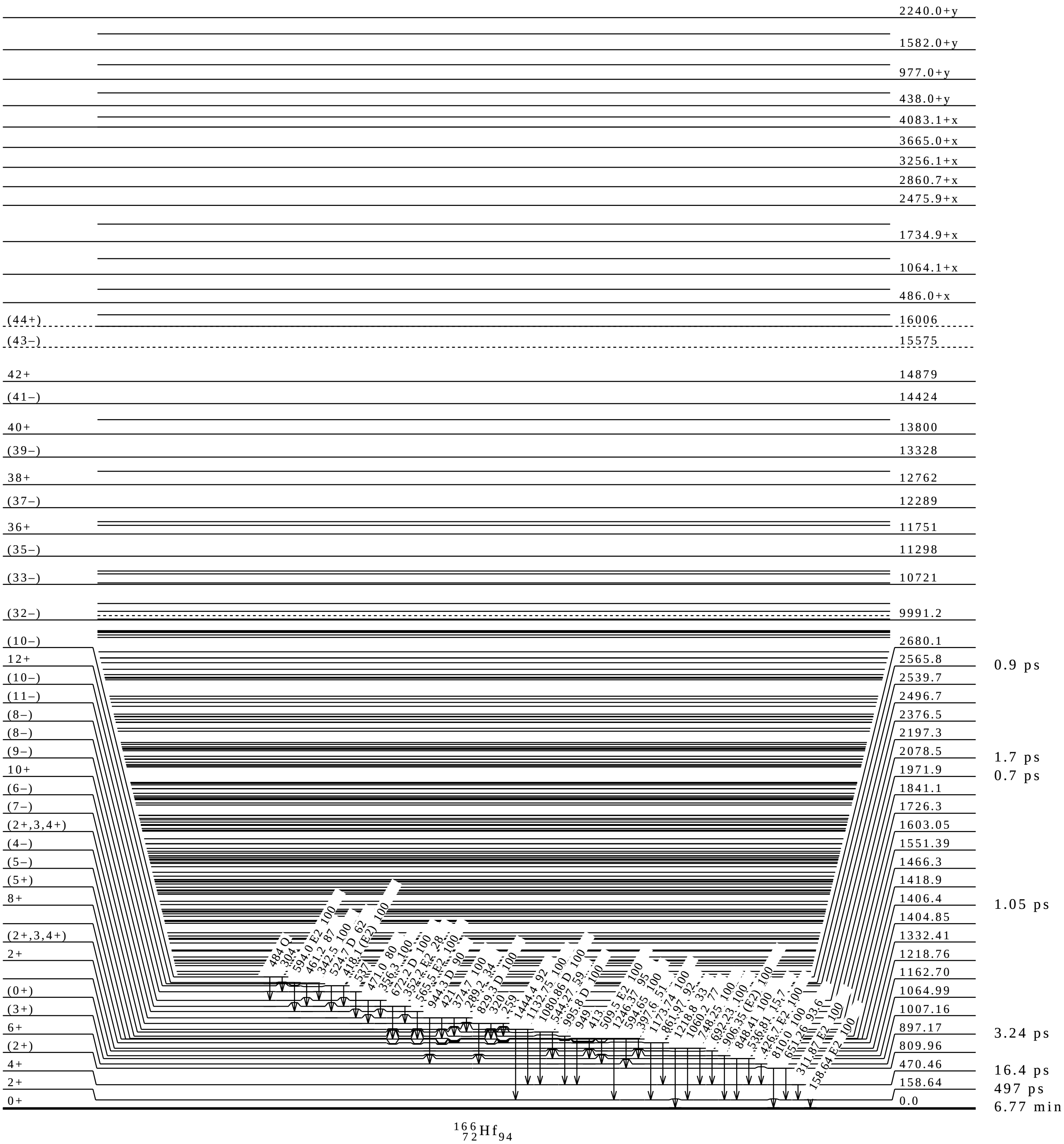
Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Ta ε Decay 2005Mc01,1977Le08

Parent ^{166}Ta: E=0; Jπ=(2)+; $T_{1/2}$=34.4 s *5*; Q(g.s.)=7760 *40*; %ε+%β^+ decay=100.
^{166}Ta produced using ^{159}Tb(^{16}O,9n) reaction at E=147 *5* MeV (1977Le08) or E=155 MeV (2005Mc01).
1977Le08: measured Eγ, Iγ, γγ coin, parent $T_{1/2}$.
2005Mc01: aluminized Kapton tape transport of reaction recoils to low background area; three Compton–suppressed Clover HPGe detectors and one low–energy photon spectrometer; measured Eγ (E<2400), Iγ, γγ coin, γγ(θ) (two cascades).

^{166}Hf Levels

The decay scheme is adopted from 2005Mc01; it differs significantly from that proposed in 1977Le08 on the basis of limited coincidence information. The authors of 2005Mc01 introduce new levels at 897, 1405, 1551 and 1603; they also reject those at 695, 852, 909, 1023, 1213 and 1447 proposed in 1977Le08. However, the deduced ε+β^+ feeding and the Jπ of the levels fed still fail to present an entirely consistent picture, suggesting that the scheme is incomplete, as might be expected given that Q=7760 and no Eγ>2400 transitions have been measured.

E(level)†	Jπ‡	$T_{1/2}$‡
0.0	0+	6.77 min *30*
158.64 *4*	2+	
470.47 *6*	4+	
809.96 *6*	(2+)	
897.16 *12*	6+	
1007.16 *6*	(3+)	
1064.99 *10*	(0+)	
1162.70 *8*		
1218.76 *8*	2+	
1332.41 *7*	(2+,3,4+)	
1404.85 *7*		
1551.39 *10*	(4−)	
1603.18 *11*	(2+,3,4+)	

† From least–squares fit to Eγ, omitting the 1133γ from the 1603 level because that Eγ may contain a typographical error.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)	Iβ^+†	Iε†	Log *ft*	I(ε+β^+)†	Comments
(6160 *40*)	1603.18	1.99 *15*	0.61 *5*	6.54 *4*	2.60 *19*	av Eβ=2344 *19*; εK=0.194 *4*; εL=0.0306 *6*; εM+=0.00933 *17*.
(6210 *40*)	1551.39	0.81 *9*	0.56 *7*	8.75^{1u} *6*	1.37 *16*	av Eβ=2315 *19*; εK=0.341 *5*; εL=0.0548 *8*; εM+=0.01674 *24*.
(6360 *40*)	1404.85	6.0 *5*	1.6 *1*	6.14 *4*	7.6 *6*	av Eβ=2437 *19*; εK=0.178 *3*; εL=0.0282 *5*; εM+=0.00857 *15*.
(6430 *40*)	1332.41	4.8 *3*	1.3 *1*	6.26 *4*	6.1 *4*	av Eβ=2471 *19*; εK=0.173 *3*; εL=0.0273 *5*; εM+=0.00832 *15*.
(6540 *40*)	1218.76	2.7 *3*	0.68 *8*	6.55 *6*	3.4 *4*	av Eβ=2525 *19*; εK=0.165 *3*; εL=0.0261 *5*; εM+=0.00793 *14*.
(6600 *40*)	1162.70	1.92 *15*	0.46 *4*	6.72 *4*	2.38 *18*	av Eβ=2551 *19*; εK=0.161 *3*; εL=0.0255 *5*; εM+=0.00775 *13*.
(6700 *40*)	1064.99	0.93 *14*	0.21 *3*	7.07 *7*	1.14 *17*	av Eβ=2597 *19*; εK=0.155 *3*; εL=0.0244 *4*; εM+=0.00744 *13*. Log *ft*: much too low for a ΔJ=2, Δπ=no transition.
(6750 *40*)	1007.16	4.8 *5*	1.1 *1*	6.38 *5*	5.9 *6*	av Eβ=2625 *19*; εK=0.1512 *25*; εL=0.0239 *4*; εM+=0.00727 *12*.
(6860 *40*)	897.16	0.55 *8*	0.12 *2*	7.36 *7*	0.67 *10*	av Eβ=2677 *19*; εK=0.1447 *24*; εL=0.0228 *4*; εM+=0.00695 *12*. Iε,Log *ft*: apparent feeding inconsistent with Jπ of level fed.
(6950 *40*)	809.96	15.1 *11*	3.05 *23*	5.95 *4*	18.1 *13*	av Eβ=2718 *19*; εK=0.1397 *23*; εL=0.0220 *4*; εM+=0.00671 *11*.
(7290 *40*)	470.47	12.8 *7*	2.21 *12*	6.13 *3*	15.0 *8*	av Eβ=2878 *19*; εK=0.1223 *19*; εL=0.0193 *3*; εM+=0.00587 *10*. Log *ft*: much too low for a ΔJ=2, Δπ=no transition.
(7600 *40*)	158.64	31 *3*	4.7 *4*	5.84 *4*	36 *3*	av Eβ=3026 *19*; εK=0.1086 *17*; εL=0.0171 *3*; εM+=0.00521 *8*.

† Absolute intensity per 100 decays.

^{166}Ta ε Decay 2005Mc01,1977Le08 (continued)

γ(^{166}Hf)

Iγ normalization: The normalization assumes that there is no ε+β^+ feeding to the ground state (ΔJ=(2), Δπ=no); then, Σ(I(γ+ce) to g.s.)=100%.

Eγ[†]	E(level)	Iγ[†&]	Mult.[‡]	α	Comments
158.64 *4*	158.64	100.0 *30*	E2	0.636	α(K)=0.315 *5*; α(L)=0.245 *4*; α(M)=0.0606 *9*; α(N+..)=0.01593 *23*. α(N)=0.01409 *20*; α(O)=0.00182 *3*; α(P)=1.97×10^{-5} *3*. Iγ=100.0 *35* in 1977Le08. Iγ=54.1% *8*, assuming recommended decay scheme normalization.
197.5[@a]	1007.16				Iγ: <0.40 (2005Mc01).
211.6[@a]	1218.76				Iγ: <0.13 (2005Mc01).
255.0[@a]	1064.99				Iγ: <0.19 (2005Mc01).
311.87 *5*	470.47	44.7 *9*	E2	0.0706	α(K)=0.0495 *7*; α(L)=0.01616 *23*; α(M)=0.00388 *6*; α(N+..)=0.001036 *15*. α(N)=0.000908 *13*; α(O)=0.0001240 *18*; α(P)=3.56×10^{-6} *5*. Iγ=53.6 *21* in 1977Le08.
325.3[@a]	1332.41				Iγ: <0.33 (2005Mc01).
339.5[@a]	809.96				Iγ: <0.27 (2005Mc01).
352.8[@a]	1162.70				Iγ: <0.51 (2005Mc01).
397.6[#] *1*	1404.85	2.9[#] *3*			
408.8[@a]	1218.76				Iγ: <0.69 (2005Mc01).
426.7[#] *1*	897.16	1.21[#] *17*	E2	0.0292	α(K)=0.0220 *3*; α(L)=0.00549 *8*; α(M)=0.001297 *19*; α(N+..)=0.000349 *5*. α(N)=0.000304 *5*; α(O)=4.28×10^{-5} *6*; α(P)=1.660×10^{-6} *24*.
522.5[@a]	1332.41				Iγ: <0.65 (2005Mc01).
536.81 *7*	1007.16	2.0 *2*			Eγ=536.0 *4*, Iγ=7.5 *10* in 1977Le08; probably included large contribution from 537.6γ in ^{166}Yb (2005Mc01).
544.27[#] *10*	1551.39	0.94[#] *18*			
[x]552.4[§] *4*		5.6[§] *18*			Attributed in 2005Mc01 to 552.0γ from ^{164}Lu ε decay.
594.65 *10*	1404.85	5.7 *9*			Placement from 1065 level in 1977Le08 rejected in 2005Mc01 based on γγ coin data.
651.26 *5*	809.96	18.9 *4*			Iγ=16.1 *11* in 1977Le08. Mult.: 651γ–159γ(θ) consistent with 2+(810)–2+(159)–0+(g.s.) sequence (W(Δθ=75°)/W(Δθ=15°)=0.99 *12*) (2005Mc01).
692.23 *6*	1162.70	4.4 *3*			Eγ=693.2 *5*, Iγ=1.2 *5* in 1977Le08.
[x]742.8[§] *4*		13.3[§] *12*			Attributed to ^{164}Yb in 2005Mc01.
748.25 *7*	1218.76	3.0 *2*			An Eγ=750.0 *5*, Iγ=10.4 *18* transition was placed, instead, from a 909 level in 1977Le08.
[x]750.0[§] *5*		10.4[§] *18*			May include the 748.25γ from 2005Mc01 and a large contribution from the 747.8γ in ^{164}Yb.
793.2[@a]	1603.18				Iγ: <0.33 (2005Mc01).
810.0 *3*	809.96	20.2 *18*			Iγ=18.6 *16* in 1977Le08.
848.41 *6*	1007.16	12.7 *9*			Eγ=847.4 *4*, Iγ=13.6 *27* in 1977Le08.
[x]851.7[§] *6*		3.4[§] *14*			Absent in 2005Mc01 (Iγ<0.3).
861.97 *7*	1332.41	5.4 *3*			Iγ=7.1 *20* in 1977Le08.
[x]864.1[§] *5*		9.2[§] *23*			Attributed in 2005Mc01 to 863.9γ from ^{164}Lu ε decay.
906.35 *9*	1064.99	2.1 *3*	(E2)	0.00500	α(K)=0.00411 *6*; α(L)=0.000689 *10*; α(M)=0.0001570 *22*; α(N+..)=4.30×10^{-5} *6*. α(N)=3.71×10^{-5} *6*; α(O)=5.54×10^{-6} *8*; α(P)=3.21×10^{-7} *5*. Iγ: 11.5 *15* in 1977Le08. Mult.: from 906γ–159γ(θ) consistent with 0(1065)–2+(159)–0+(g.s.) sequence (W(Δθ=75°)/W(Δθ=15°)=0.50 *10*) (2005Mc01).
934.4[@a]	1404.85				Iγ: <0.17 (2005Mc01).
[x]977.0[§] *8*		4.7[§] *11*			Absent in 2005Mc01 (Iγ<0.15).
1004.1[@a]	1162.70				Iγ: <0.15 (2005Mc01).
[x]1054.4[§] *10*		8.3[§] *13*			Attributed to ^{166}Yb in 2005Mc01.
1060.2[#] *1*	1218.76	2.3[#] *3*			
1080.86[#] *12*	1551.39	1.6[#] *2*			
1132.75[#] *11*	1603.18	2.5[#] *3*			Eγ: from table I of 2005Mc01; Eγ=1133.75 *11* in table II and 1134 in fig. 3. *1132*.75 fits placement well, 1133.75 does not.
1173.74 *7*	1332.41	5.9 *4*			
1218.8[#] *3*	1218.76	1.0[#] *4*			
1246.37[#] *7*	1404.85	5.4[#] *3*			
[x]1288.3[§] *12*		5.8[§] *21*			Absent in 2005Mc01 (Iγ<0.12).

Continued on next page (footnotes at end of table)

^{166}Ta ε Decay 2005Mc01,1977Le08 (continued)

γ(^{166}Hf) (continued)

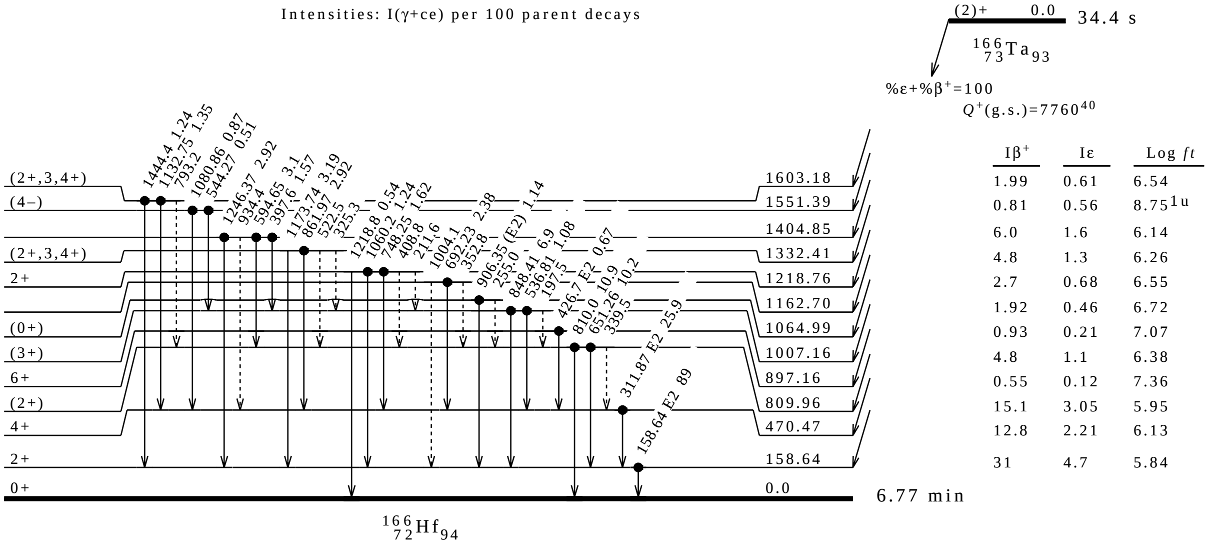
Eγ†	E(level)	Iγ†&	Comments
1444.4# *2*	1603.18	2.3# *1*	
x1447.0§ *20*		6.3§ *16*	2005Mc01 report no evidence in singles for this γ.

† From 2005Mc01, except as noted.
‡ From Adopted Gammas, except as noted.
§ From 1977Le08.
# Not reported previously in ^{166}Ta ε decay.
@ Approximate energy from level–energy difference for unobserved but spin–allowed transition; upper limit for intensity is given in comments and transition is omitted from Adopted Levels, Gammas.
& For absolute intensity per 100 decays, multiply by 0.541 *17*.
a Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{166}Ta ε Decay 2005Mc01,1977Le08 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{96}Zr(^{74}Ge,4nγ) 2000Ri11

2000Ri11: E=310 MeV; 85.25% ^{96}Zr target; EUROBALL III array equipped with 30 Tapered and 15 Cluster Ge−detectors, all Compton−suppressed; measured Eγ, γγ coin, γγ(θ) (DCO, θ≈90° and ≈154°).

^{166}Hf Levels

Quasiparticle orbitals used in band labels:

A=(ν 5/2[642]), α=+1/2.
B=(ν 5/2[642]), α=−1/2.
C=(ν 3/2[651]), α=+1/2.
D=(ν 3/2[651]), α=−1/2.
E=(ν 5/2[523]), α=+1/2.
F=(ν 5/2[523]), α=−1/2.
G=(ν 3/2[521]), α=+1/2.
H=(ν 3/2[521]), α=−1/2.
a=(π 7/2[404]), α=+1/2.
b=(π 7/2[404]), α=−1/2.
k=(π 1/2[660]), α=+1/2.
e=(π 9/2[514]), α=+1/2.
f=(π 9/2[514]), α=−1/2.
g=(π 1/2[541]), α=+1/2.

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
0.0[§]	0+	2494.6[e] *17*	11−	3469.9[e] *18*	15−
158.0[§] *10*	2+	2538.5[f] *16*	10−	3515.8[&] *18*	14+
470.0[§] *13*	4+	2563.8[§] *17*	12+	3585.6[i] *18*	14−
895.9[§] *15*	6+	2680.1[i] *16*	10−	3779.4[j] *18*	15−
1005.9[n] *13*	(3+)	2731.9[@] *18*	12+	3817.4[a] *20*	15−
1405.0[§] *16*	8+	2793.1[j] *18*	11−	3833.3[#] *19*	16+
1418.9[n] *14*	(5+)	2909.5[f] *17*	12−	3918.2[f] *18*	16−
1465.9[e] *15*	5−	2960.4[e] *17*	13−	3972.1[b] *20*	15−
1550.6[f] *14*	4−	3006.8[@] *18*	14+	4006.5[@] *20*	18+
1725.0[e] *15*	7−	3023.9[&] *18*	12+	4027.9[e] *21*	17−
1839.8[f] *14*	6−	3085.8[i] *17*	12−	4064.7[&] *19*	16+
1970.0[§] *17*	10+	3209.0[#] *18*	14+	4163.5[i] *19*	16−
2076.8[e] *16*	9−	3231.4[j] *18*	13−	4228.5[h] *19*	16−
2196.1[f] *15*	8−	3373.4[f] *18*	14−	4374.0[a] *20*	17−
2376.5[i] *16*	8−	3446.6[@] *19*	16+	4400.4[j] *21*	17−

Continued on next page (footnotes at end of table)

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

^{166}Hf Levels (continued)

E(level)†	Jπ‡
4443.4[b] 20	17−
4445.4[d] 20	14−
4456.7[#] 20	18+
4514.3[f] 20	18−
4582.0[c] 19	15−
4622.9[e] 22	19−
4641.4[h] 19	18−
4668.5[@] 20	20+
4677.4[&] 20	18+
4744.9[d] 19	16−
4823.5[i] 22	18−
4937.1[c] 19	17−
5005.6[a] 20	19−
5031.3[b] 20	19−
5071.4[j] 23	19−
5086.9[g] 22	19−
5088.3[f] 22	20−
5118.7[#] 21	20+
5157.5[m] 21	(19+)
5160.0[d] 20	18−
5214.3[h] 20	20−
5250.8[e] 24	21−
5313.0[&] 21	20+
5407.2[@] 22	22+
5410.0[c] 21	19−
5510.5[i] 24	20−
5665.9[g] 23	21−
5672.7[a] 22	21−
5677.3[f] 24	22−
5687.1[d] 21	20−
5720.4[b] 21	21−
5784.4[j] 25	21−
5798.5[m] 21	(21+)
5848.7[#] 21	22+
5897.3[h] 22	22−
5923.5[e] 25	23−
5986.0[&] 23	22+
5987.8[c] 22	21−
6197.1[@] 23	24+
6243[i] 3	22−
6310.6[d] 22	22−
6331.0[g] 24	23−
6355[f] 3	24−
6385.7[a] 25	23−
6441.4[b] 23	23−
6531[j] 3	23−
6536.5[m] 24	(23+)
6615.0[#] 22	24+
6641.3[h] 24	24−
6650.6[c] 23	23−
6662[e] 3	25−
6978[i] 3	24−
7006.6[d] 23	24−
7026.1[@] 25	26+
7078.2[g] 25	25−
7136[f] 3	26−
7145[a] 3	25−
7199.4[b] 25	25−
7314[j] 3	25−
7342[m] 3	(25+)
7363.6[c] 23	25−
7392.1[#] 23	26+
7444[h] 3	26−
7478[e] 3	27−
7713.6[d] 24	26−
7770[i] 3	26−
7891[@] 3	28+
7899[g] 3	27−
7954[a] 3	27−
8007[b] 3	27−
8015[f] 3	28−
8062.7[c] 24	27−
8222.0[#] 25	28+
8303[h] 3	28−
8373[e] 3	29−
8426.4[d] 25	28−
8767[g] 3	29−
8797[@] 3	30+
8808.1[c] 25	29−
8817[a] 3	29−
8871[b] 3	29−
8976[f] 4	30−
9116[#] 3	30+
9212[d] 3	30−
9216[h] 3	30−
9335[e] 4	31−
9635[c] 3	31−
9682[g] 3	31−
9734[a] 4	31−
9749[@] 3	32+
9771[b] 3	31−
9987[f] 4	32−
10009[#] 3	32+
10080[d] 3	32−
10167[h] 4	32−
10326[e] 4	33−
10721[a] 4	33−
10742[@] 4	34+
10933[#] 3	34+
10994[f] 4	34−
11298[e] 4	35−
11751[@] 4	36+
11928[#] 4	36+
12005[f] 4	36−
12289[e] 4	37−
12762[@] 4	38+
13038[f] 4	38−
13328[e] 4	39−
13800[@] 4	40+
14096[f] 4	40−
14424[e] 4	41−
14879[@] 4	42+
15575?[e] 4	43−
16006?[@] 4	44+
0.0+x[l]	
236.0+x[l] 8	
486.0+x[l] 8	
759.0+x[l] 10	
1064.1+x[l] 11	
1387.7+x[l] 12	
1734.9+x[l] 13	
2095.8+x[l] 13	
2475.9+x[l] 14	
2860.7+x[l] 15	
3256.1+x[l] 15	
3665.0+x[l] 16	
4083.1+x[l] 17	
0.0+y[k]	
204.0+y[k] 8	
438.0+y[k] 8	
697.0+y[k] 10	
977.0+y[k] 11	
1274.0+y[k] 12	
1582.0+y[k] 13	
1905.0+y[k] 13	
2240.0+y[k] 14	

† From least−squares fit to Eγ, assigning 1 keV uncertainty to each datum.

‡ Authors' values, based on band structure, alignment gains, B(M1)/B(E2) ratios and comparison with structures in neighboring nuclides.

§ (A): Kπ=0+ g.s. band.

\# (B): BC band.

@ (C): AB band. Yrast above J=14. Alignment gain 10ħ at ħω≈0.25 MeV. Becomes ABCDfg band at high spin with possible admixture of ABEFfg.

& (D): EFBC band.

a (E): AGEF band.

b (F): AGEH band.

c (G): Kπ=10−, α=0 gfAE band (2000Ri11). Likely configuration: ν (5/2[642]+5/2[523])+ π (1/2[541]+9/2[514]); strongly supported by measured B(M1)/B(E2) ratios.

d (H): Kπ=10−, α=1 geAE band (2000Ri11). See comment on Kπ=10− signature partner band.

e (I): Kπ=5− AE band.

f (J): AF band.

g (K): AGBC band. Large alignment, consistent with four−quasineutron structure.

Footnotes continued on next page

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

^{166}Hf Levels (continued)

h (L): AHBC band.
i (M): BE band. Low alignment at low J.
j (N): BF band.
k (O): Band 1.
l (P): Band 2.
m (Q): Band 3.
n (R): π=(+) band fragment.

γ(^{166}Hf)

Eγ‡	E(level)	Mult.†	Comments
137	4582.0		
158	158.0		
163	4744.9		
168	2731.9		DCO=1.50 *15*.
192	4937.1		
204	204.0+y		
223	5160.0		
234	438.0+y		
236	236.0+x		
250	5410.0		
	486.0+x		
259	1725.0		
	697.0+y		
261	3469.9		
273	759.0+x		
275	3006.8		
277	5687.1		
280	977.0+y		
289	1839.8		
297	1274.0+y		
299	4744.9		
301	5987.8		
304	2680.1		
305	1064.1+x		
308	1582.0+y		
312	470.0		
320	1725.0		
323	6310.6		
	1387.7+x		
	1905.0+y		
335	2240.0+y		
340	6650.6		
342	2538.5		
347	1734.9+x		
349	8062.7		
350	7713.6		
352	2076.8		
355	4937.1		
356	2196.1		
	7006.6		
357	7363.6		
361	2095.8+x		
364	8426.4		
371	2909.5		
374	1839.8		
380	2475.9+x		
382	8808.1		
385	2860.7+x		
396	3256.1+x		
397	2960.4		
404	9212		
406	3085.8		
409	3665.0+x		

Continued on next page (footnotes at end of table)

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

$\gamma(^{166}Hf)$ (continued)

Eγ‡	E(level)	Mult.†	Comments
413	1418.9		
	3373.4		
	4641.4		
415	2909.5		
	5160.0		
418	2494.6		
	4083.1+x		
421	1839.8		
423	9635		
426	895.9		
438	3231.4		
	438.0+y		
440	3446.6		
443	3006.8	Q	DCO=0.96 *2*.
445§	10080		
448	3918.2		
460	3023.9		
462	2538.5		
464	3373.4		
465	2960.4		
471	2196.1		
	4443.4		
473	5410.0		
478	4641.4		
484	2680.1	Q	DCO=0.98 *8*.
486	486.0+x		
492	3515.8		
493	697.0+y		
500	3585.6		
509	1405.0		
	3469.9		
523	759.0+x		
524	2494.6	D	DCO=1.68 *22*.
527	5687.1		
536	1005.9		
537	2376.5		
539	977.0+y		
545	1550.6		
	3918.2		
547	3085.8		
548	3779.4		
549	4064.7		
557	4374.0		
558	4027.9		
560	4006.5		
562	5005.6		
565	1970.0		
573	5214.3		
574	5088.3		
577	1274.0+y		
578	4163.5		
	5987.8		
	1064.1+x		
579	5665.9		
588	5031.3		
589	5677.3		
594	2563.8		
595	4622.9		
596	4514.3		
605	1582.0+y		
613	4677.4		
621	4400.4		
623	4456.7		

Continued on next page (footnotes at end of table)

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

$\gamma(^{166}Hf)$ (continued)

Eγ‡	E(level)	Mult.†	Comments
623	6310.6		
624	3833.3		
628	5250.8		
629	1387.7+x		
631	1905.0+y		
632	5005.6		
636	5313.0		
641	5798.5		
643	4228.5		
645	3209.0		
657	5031.3		
658	2240.0+y		
660	4823.5		
662	4668.5		
	5118.7		
663	6650.6		
665	6331.0		
667	5672.7		
671	5071.4		
	1734.9+x		
672	2076.8		
673	5923.5		
	5986.0		
678	6355		
683	5897.3		
687	5510.5		
689	5720.4		
696	7006.6		
699	8062.7		
700	5214.3	Q	DCO=0.99 *10*.
707	7713.6		
708	2095.8+x		
713	5784.4		
	6385.7		
	7363.6		
	8426.4		
716	2793.1		
721	6441.4		
723	4641.4	Q	DCO=1.04 *17*.
730	5848.7		
733	6243		
735	6978		
737	3231.4	Q	DCO=0.96 *8*.
738	6536.5		
739	5407.2		
	6662		
741	2475.9+x		
744	6641.3		
745	8808.1		
747	6531		
	7078.2		
758	7199.4		
759	7145		
762	2731.9		
765	2860.7+x		
766	6615.0		
777	7392.1		
780	3256.1+x		
781	7136		
783	7314		
786	9212		
790	6197.1		
792	7770		

Continued on next page (footnotes at end of table)

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

$\gamma(^{166}Hf)$ (continued)

Eγ‡	E(level)	Mult.†	Comments
803	7444		
804	3665.0+x		
806	7342		
808	8007		
809	7954		
811	3817.4		
816	7478		
819	3779.4	Q	DCO=1.10 *20*.
821	7899		
827	9635		
	4083.1+x		
829	1725.0	D	DCO=1.77 *23*.
	7026.1		
830	8222.0		
844	4677.4		DCO=0.89 *25*.
848	1005.9		
856	4064.7		DCO=0.8 *3*.
	5313.0		
859	8303		
863	8817		
864	8871		
865	7891		
867§	5986.0		
	10080		
868	8767		
879	8015		
893	10009		
894	8373		
	9116		
900	9771		
906	8797		
913	9216		
915	9682		
917	9734		
924	10933		
927	4374.0		
944	1839.8		
949	1418.9		
951	10167		
952	3515.8		
	9749		
961	8976		
962	9335		
965	3972.1		
972	11298		
987	10721		
991	10326		
	12289		
993	10742		
995	11928		
996	1465.9		
997	4443.4		
999	5005.6		
1007	10994		
1009	11751		
1011	9987		
	12005		
	12762		
1025	5031.3	D	DCO=1.4 *3*, 1.6 *4*.
1033	13038		
1038	13800		
1039	13328		
1043	5665.9		DCO=1.1 *3*.

Continued on next page (footnotes at end of table)

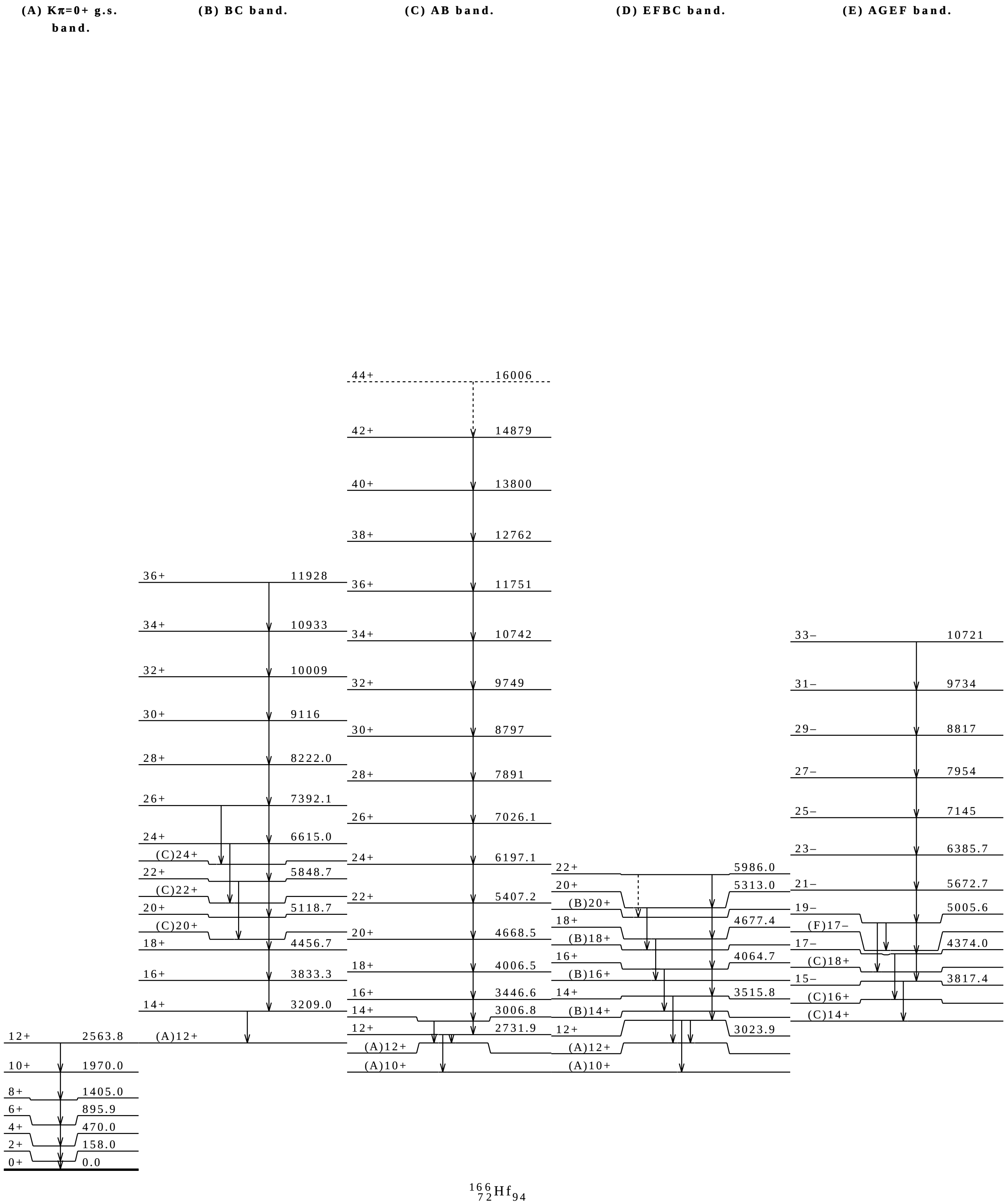
$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

$\gamma(^{166}Hf)$ (continued)

Eγ‡	E(level)	Mult.†	Comments
1052	5720.4		
1054	3023.9		
1058	14096		
1059	5086.9	(Q)	DCO=1.08 *26*.
1079	14879		
1080	1550.6		
	6331.0	Q	DCO=1.03 *21*.
1096	14424		
1127§	16006?		
1130	5798.5		
1151	5157.5		
	15575?		
1153§	5160.0		
1155	7078.2		
1180	5848.7		
1195	7392.1		
1208	6615.0		
1298	4744.9	D	DCO=0.47 *17* (ΔJ=1, D gate); DCO=1.01 *22* (ΔJ=2 gate). Interpreted by authors as D, ΔJ=0 transition.
1373	4582.0		
1491	4937.1		DCO=0.86 *22* (ΔJ=1, D gate).
1575	4582.0		

† From DCO ratios measured using gates on ΔJ=2 transitions, (quadrupole gated), unless otherwise noted.
‡ Uncertainties unstated by authors.
§ Placement of transition in the level scheme is uncertain.

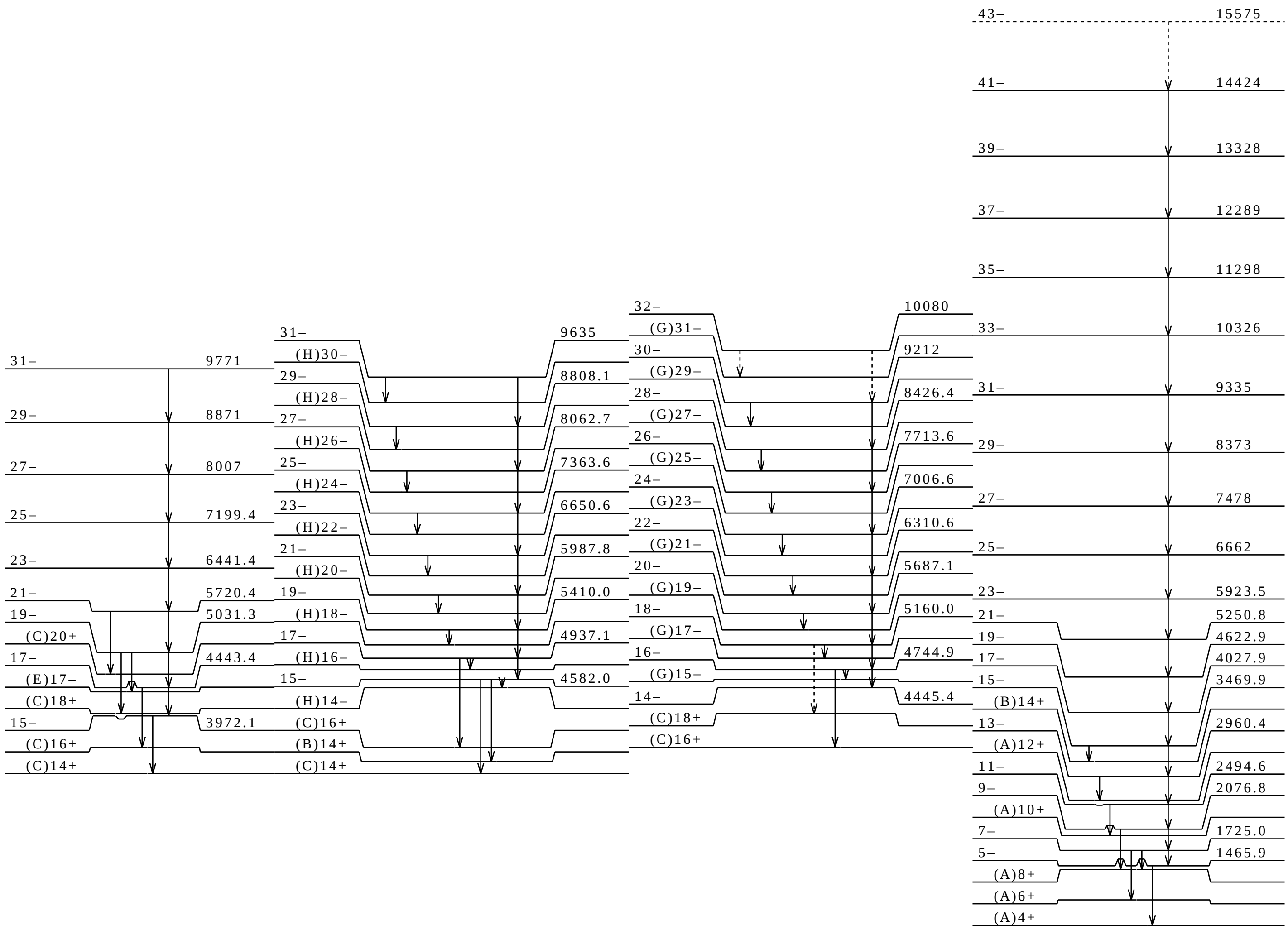
$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)



From NNDC(BNL)
program ENSDAT

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

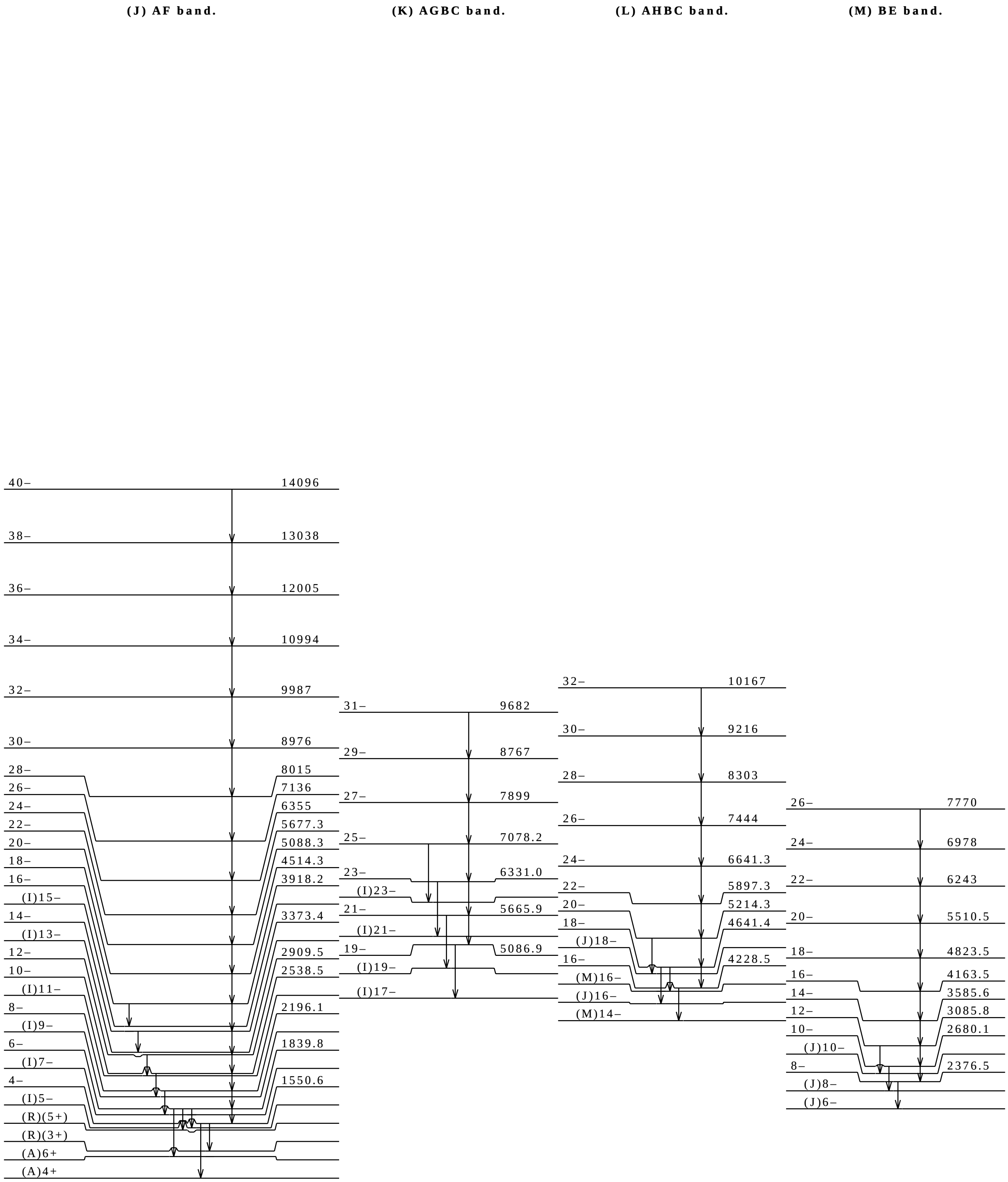
(F) AGEH band. **(G) Kπ=10–, α=0 gfAE band (2000Ri11).** **(H) Kπ=10–, α=1 geAE band (2000Ri11).** **(I) Kπ=5– AE band.**



$^{166}_{72}Hf_{94}$

From NNDC(BNL) program ENSDAT

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

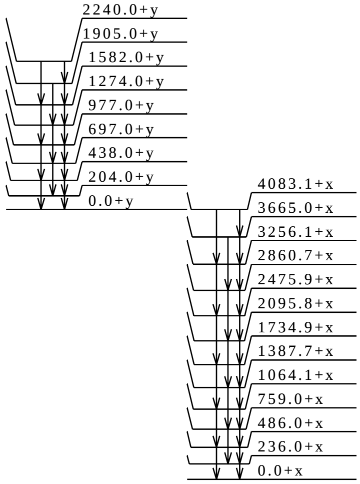


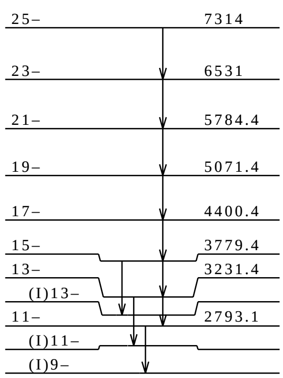
$^{166}_{72}Hf_{94}$

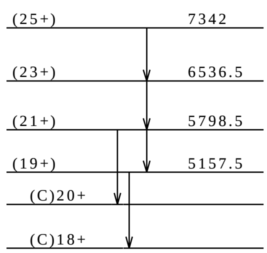
From NNDC(BNL)
program ENSDAT

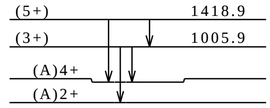
$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

(N) BF band. **(O) Band 1.** **(P) Band 2.** **(Q) Band 3.** **(R) π=(+) band fragment.**





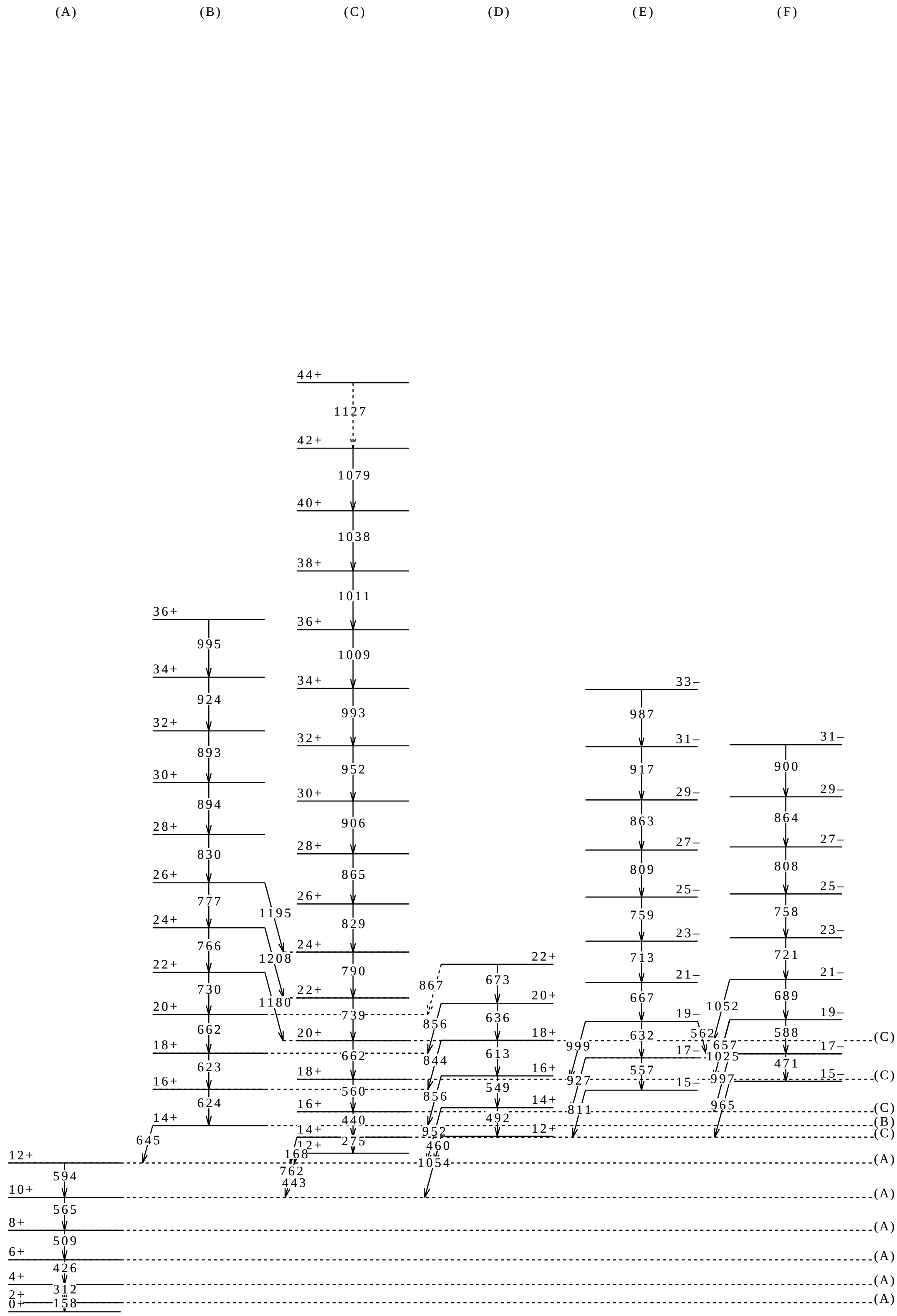




$^{166}_{72}Hf_{94}$

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

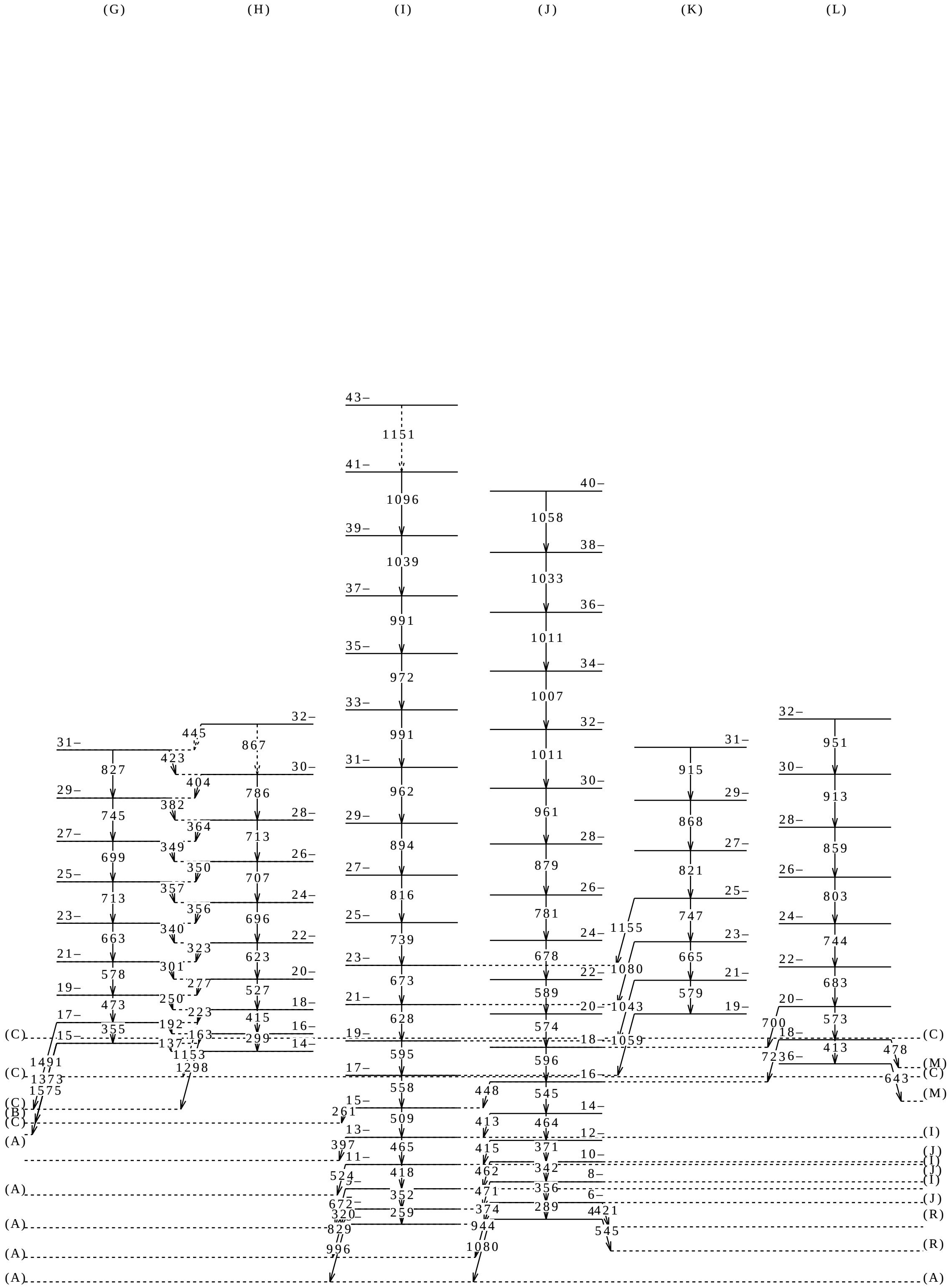
Bands for ^{166}Hf



$^{166}_{72}Hf_{94}$

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

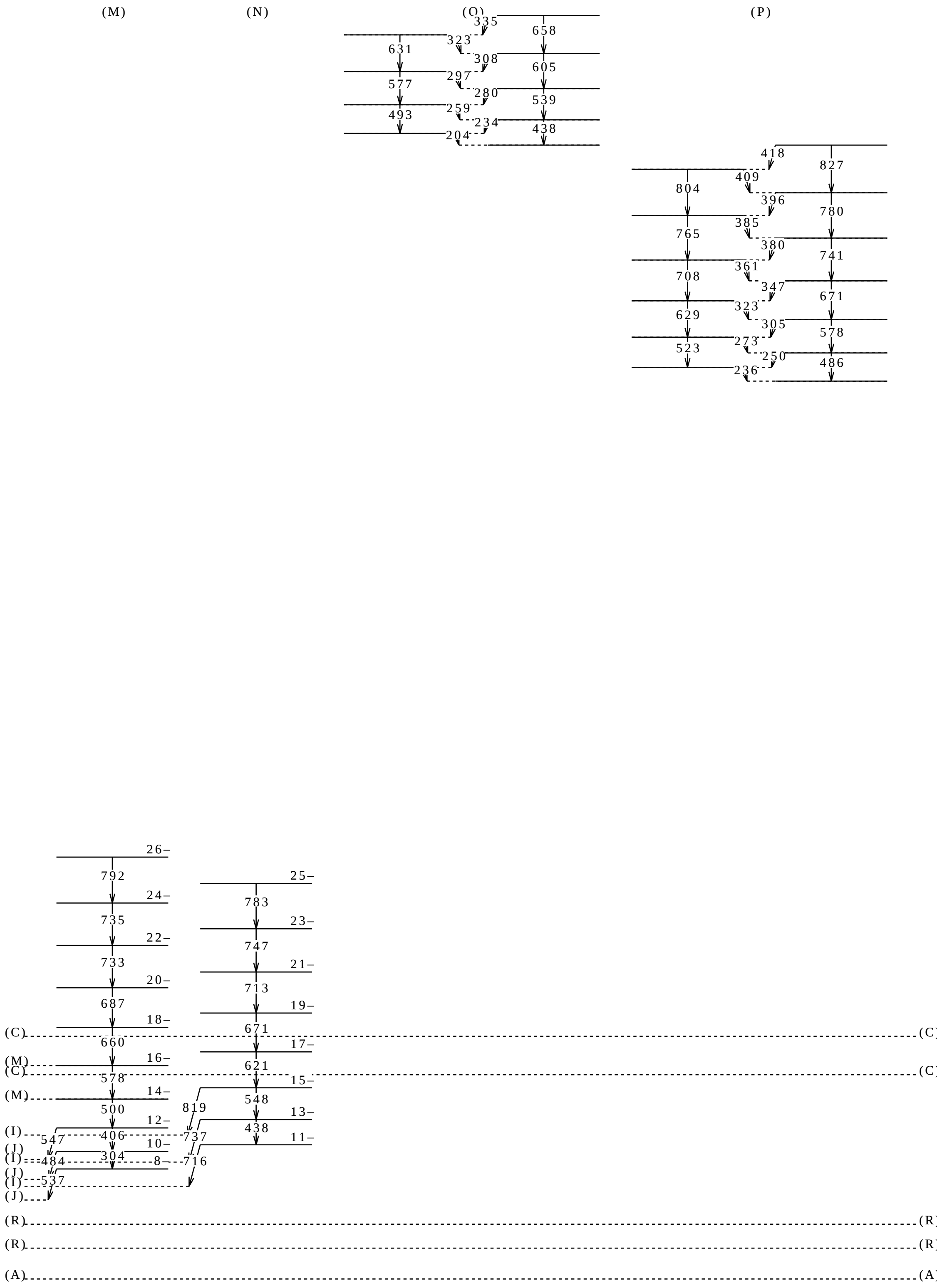
Bands for ^{166}Hf



$^{166}_{72}Hf_{94}$

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

Bands for ^{166}Hf

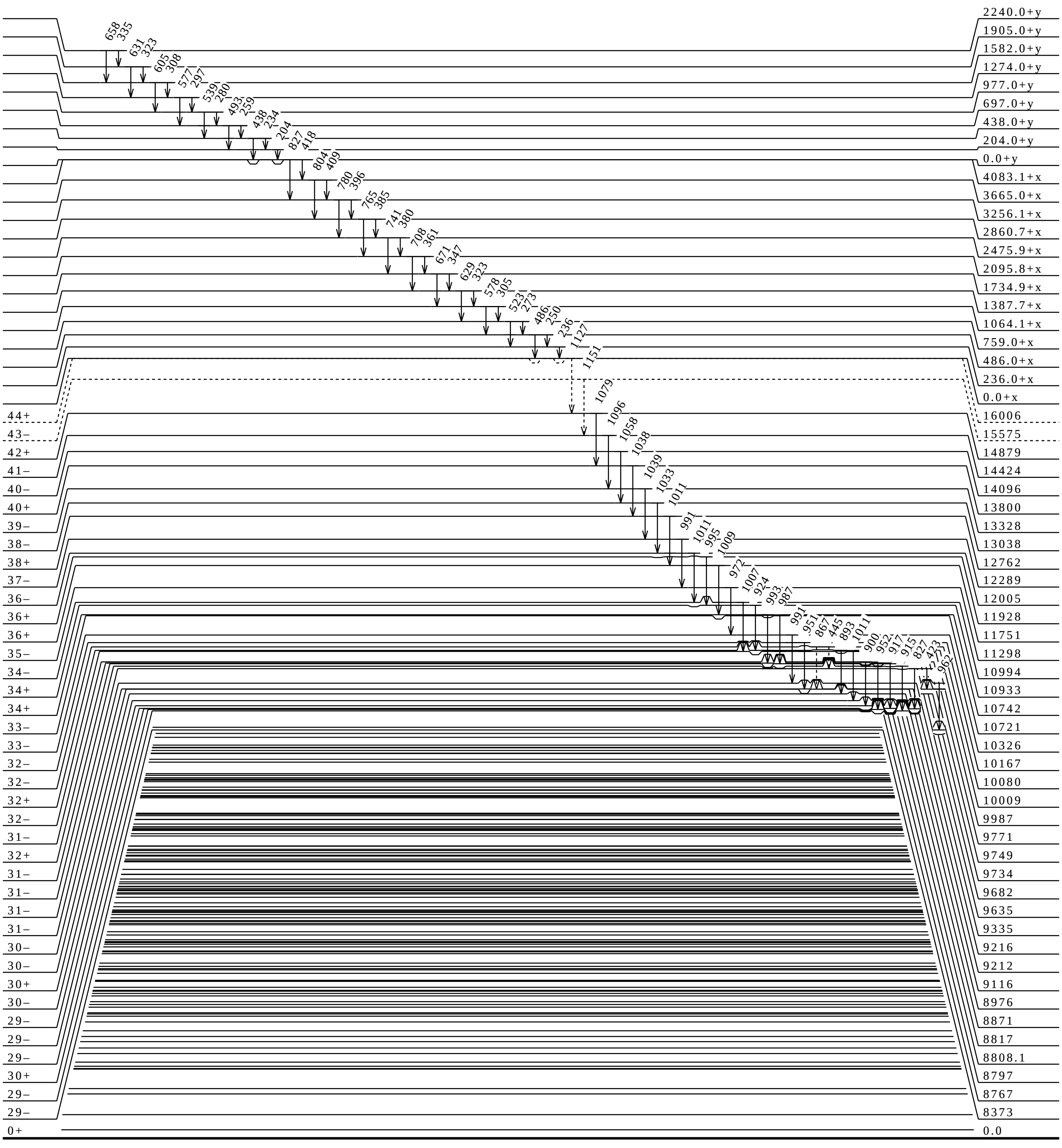


$^{166}_{72}Hf_{94}$

From NNDC(BNL)
program ENSDAT

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

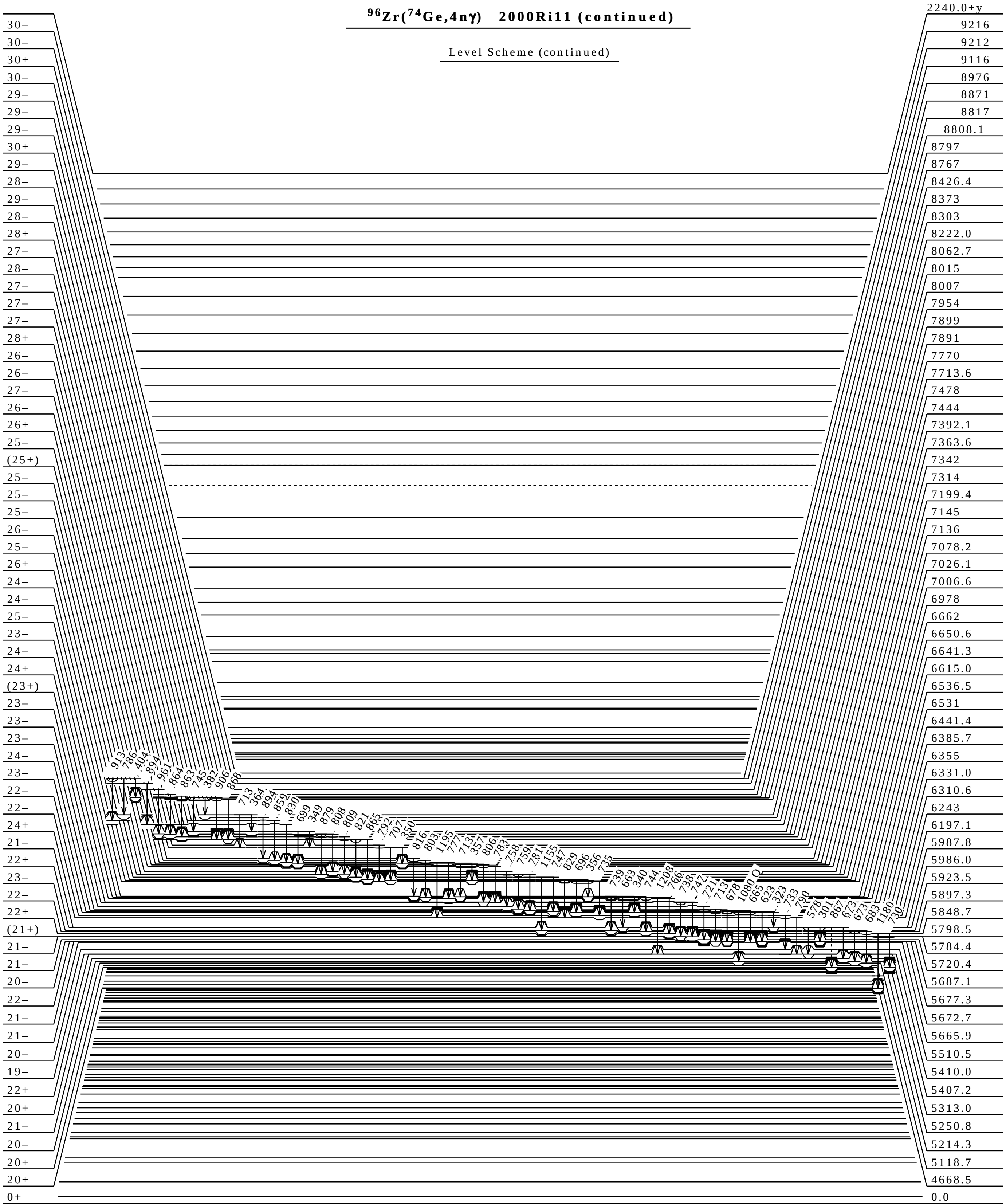
Level Scheme



$^{166}_{72}Hf_{94}$

From NNDC(BNL)
program ENSDAT

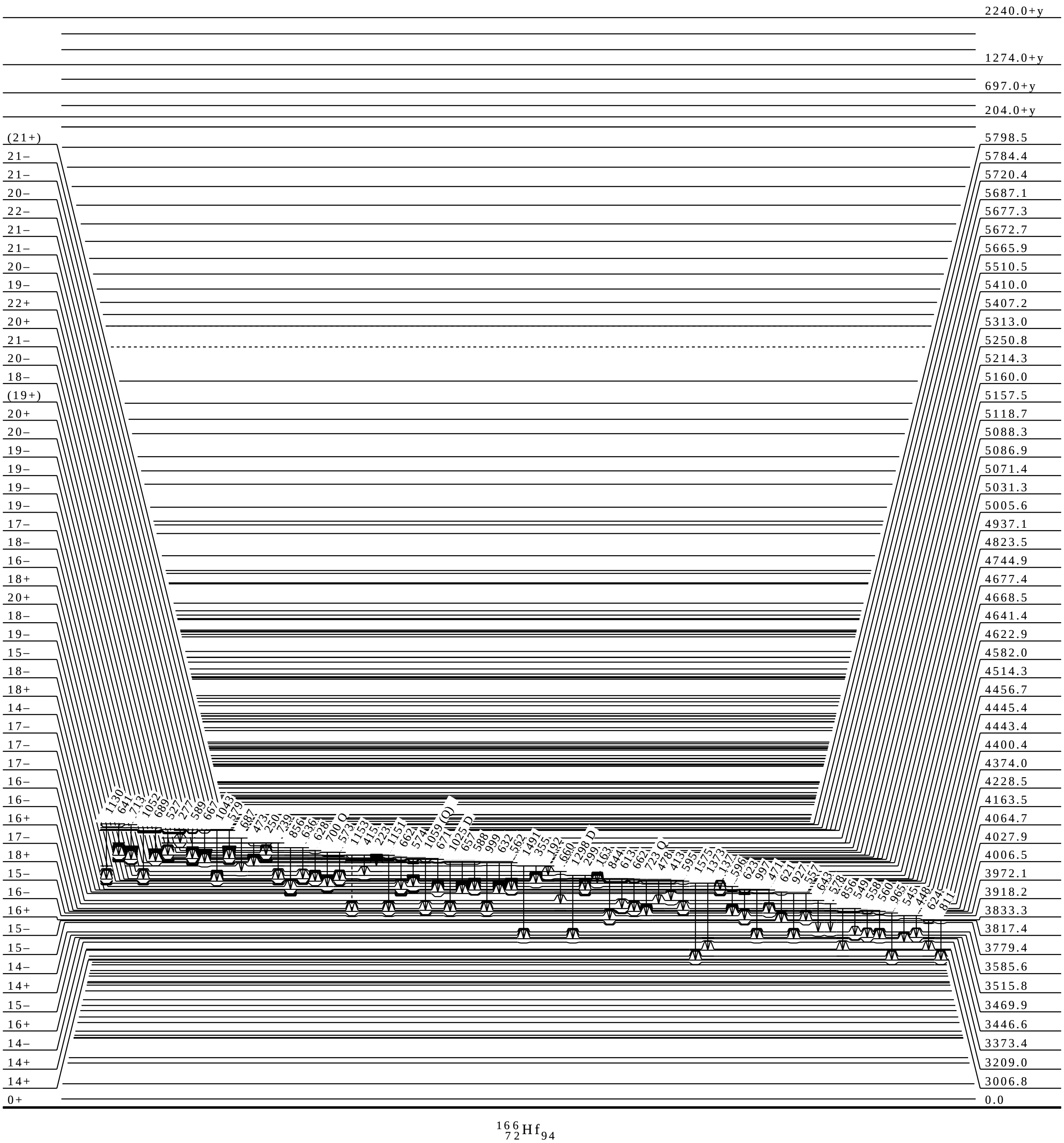
$^{166}_{72}Hf_{94}$–40



$^{166}_{72}Hf_{94}$

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

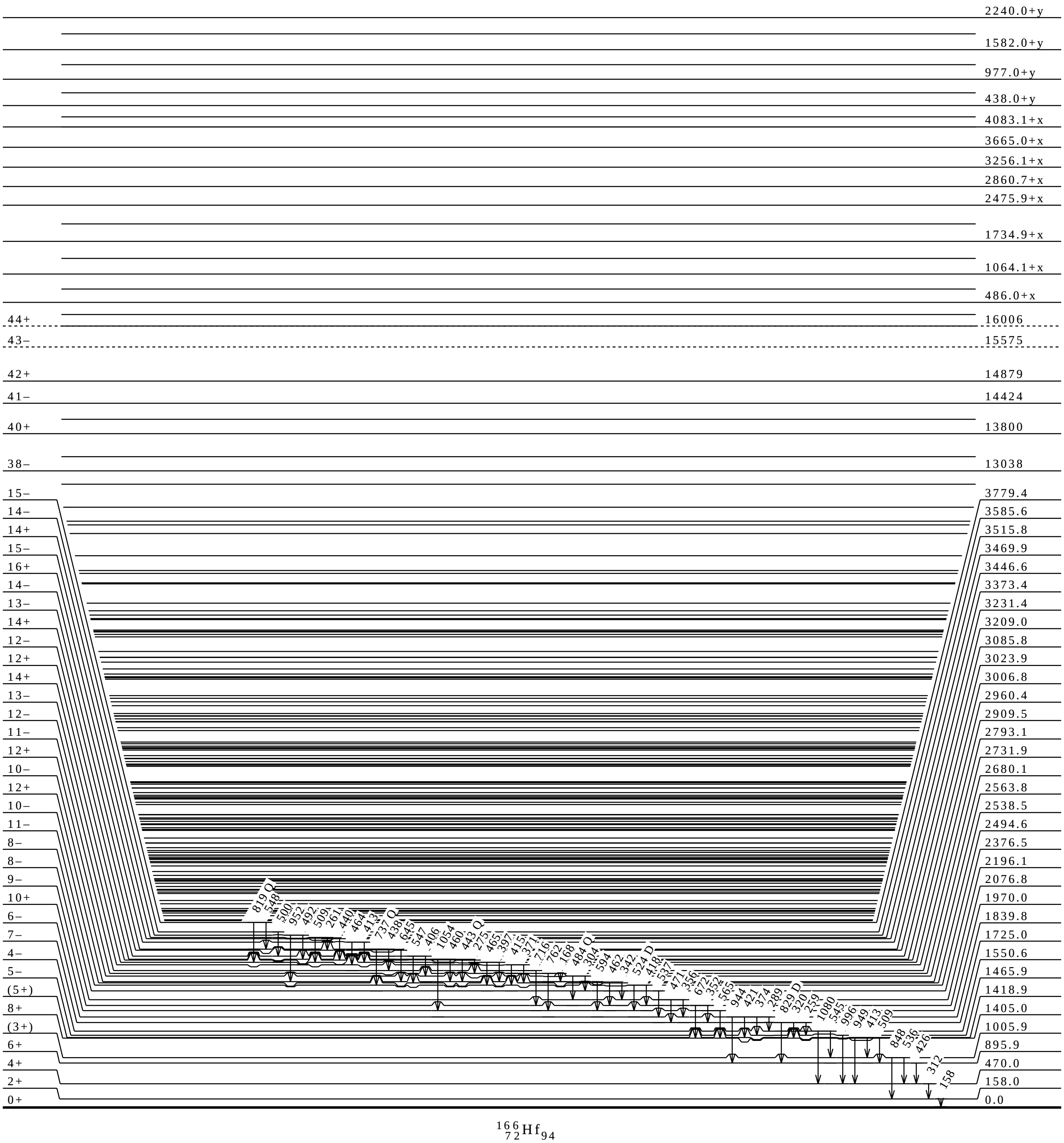
Level Scheme (continued)



From NNDC(BNL)
program ENSDAT

$^{96}Zr(^{74}Ge,4n\gamma)$ 2000Ri11 (continued)

Level Scheme (continued)



^{186}W(n,2p19nγ) 2000Ya22

E=250–600 MeV from LANSCE/WNR spallation neutron source; 4 HPGe detectors in close geometry; measured Eγ, γγ coin.

^{166}Hf Levels

E(level)†	Jπ‡
0.0§	0+
158§	2+
470§	4+
898§	6+
1408§	8+
1973§	10+

† From Eγ.
‡ From Adopted Levels.
§ (A): Kπ=0+ g.s. band.

γ(^{166}Hf)

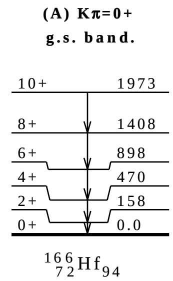
Eγ†	E(level)
158	158
312	470
426	898
510	1408
565	1973

† From fig. 2 of 2000Ya22.

From NNDC(BNL)
program ENSDAT

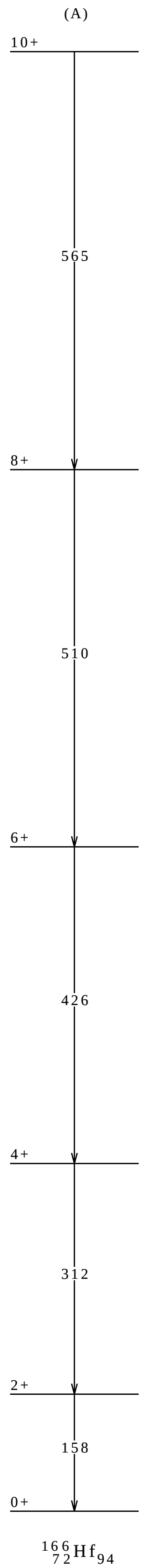
$^{166}_{72}Hf_{94}$–44

$^{186}W(n,2p19n\gamma)$ 2000Ya22 (continued)



$^{186}W(n,2p19n\gamma)$ 2000Ya22 (continued)

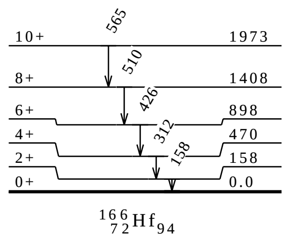
Bands for ^{166}Hf



From NNDC(BNL)
program ENSDAT

^{186}W(n,2p19nγ) 2000Ya22 (continued)

Level Scheme



(HI,xnγ) 1987Bl06,1983Ag01,1977Bo14

See separate data set for information from ^{96}Zr(^{74}Ge,4nγ).
Other: 1990JaZR (^{142}Ce(^{29}Si,5nγ), E=160 MeV; searched for large–deformation triaxiality in ^{166}Hf).
2006Mc02: ^{122}Sn(^{48}Ti,4n) E(^{48}Ti)=200 MeV; SPEEDY detector array (8 Compton–suppressed HPGe clover detectors, θ=41.5° and 138.5°); measured $T_{1/2}$ using recoil distance Doppler shift and differential decay curve method applied in coincidence mode (gate on shifted component of a feeding γ).
1987Bl06: ^{148}Sm(^{22}Ne,4n) E(^{22}Ne)=106–117 MeV; measured Eγ, Iγ, DCO ratios (30°, 90°, Q γ in gate), γγ–coin.
1983Ag01: ^{150}Sm(^{20}Ne,4n) E(^{20}Ne)=105 MeV, measured Eγ, Iγ, γγ(θ), γγ–coin. γ–ray angular correlations were measured with two Ge(Li) detectors at 10 angles between 90° and 360° with respect to the beam direction.
1977Bo14: ^{122}Sn(^{48}Ti,4n) E(^{48}Ti)=195 MeV, measured recoil distance Doppler shift, Iγ. Other measurements: 1973Ne08, 1965St03.

^{166}Hf Levels

E(level)[†]	Jπ[§]	$T_{1/2}$[‡]	Comments
0.0[@]	0+	6.77 min *30*	$T_{1/2}$: from Adopted Levels.
158.5[@] *3*	2+	497 ps *23*	$T_{1/2}$: from 1977Bo14.
470.3[@] *5*	4+	16.4 ps *5*	$T_{1/2}$: weighted average of 16.8 ps *10* (1977Bo14) and 16.3 ps *6* (2006Mc02).
896.9[@] *5*	6+	3.24 ps *19*	$T_{1/2}$: weighted average of 3.5 ps *5* (1977Bo14) and 3.19 ps *21* (2006Mc02).
1406.4[@] *6*	8+	1.05 ps *10*	$T_{1/2}$: weighted average of 1.2 ps *5* (1977Bo14) and 1.04 ps *10* (2006Mc02).
1466.3 *6*	(5−)		
1551.8 *6*	(5−)		Jπ: adopted value is (4−).
1726.3[&] *6*	7−		
1841.1 *6*	(6−,7−)		Jπ: adopted value is (6−).
1971.9[@] *6*	10+	0.7 ps *5*	$T_{1/2}$: from 1977Bo14.
2078.5[&] *6*	9−	1.73 ps *35*	$T_{1/2}$: from 2006Mc02.
2197.3[a] *6*	8−[#]		
2496.7[&] *6*	11−		
2539.7[a] *6*	10−[#]		
2565.8[@] *7*	12+	0.9 ps *7*	$T_{1/2}$: from 1977Bo14.
2734.6[c] *7*	12+		
2910.9[a] *6*	12−[#]		
2962.2[&] *7*	13−		
3009.2[c] *7*	14+	6.9 ps *7*	$T_{1/2}$: from 2006Mc02.
3211.1[b] *7*	14+		
3375.1[a] *7*	14−[#]		
3449.0[c] *8*	16+		
3472.6[&] *7*	15−		
3835.2[b] *8*	16+		
3920.3[a] *8*	16−[#]		
4009.2[c] *8*	18+		
4030.1[&] *8*	17−		
4459.3[b] *9*	18+		
4516.0[a] *8*	18−[#]		
4625.2[&] *9*	19−		
4671.0[c] *9*	20+		

Continued on next page (footnotes at end of table)

From NNDC(BNL)
program ENSDAT

(HI,xnγ) 1987Bl06,1983Ag01,1977Bo14 (continued)

^{166}Hf Levels (continued)

E(level)[†]	Jπ[§]	E(level)[†]	Jπ[§]	E(level)[†]	Jπ[§]
5089.6[a] *9*	20−[#]	6356.4[a] *10*	24−[#]	8800.7[c] *15*	30+
5121.7[b] *9*	20+	6665.5[&] *10*	25−	8980.0[a] *15*	(30−)[#]
5253.3[&] *9*	21−	7030.1[c] *10*	26+	9337.8[&] *15*	(31−)
5409.9[c] *9*	22+	7137.4[a] *10*	26−[#]	9753.5[c] *18*	32+
5678.8[a] *9*	22−[#]	7481.1[&] *11*	27−	9991.2[a] *18*	(32−)[#]
5851.7[b] *10*	22+	7894.7[c] *11*	28+	10330.3?[&] *18*	(33−)
5926.9[&] *10*	23−	8017.3[a] *11*	28−[#]	10747.5[c] *21*	(34+)
6201.2[c] *10*	24+	8375.4[&] *11*	29−		

† From least−squares fit to Eγ.
‡ From recoil distance Doppler shift measurements by 1977Bo14 and/or 2006Mc02, as indicated in comment on each level.
§ Authors' values (1987Bl06). See Adopted Levels for evaluator's assignments.
\# Transitions connecting the two side bands have positive anisotropies and are interpreted as mixed M1/E2 transitions (1987Bl06).
@ (A): K=0+ g.s. band. The assignment is based on γ−angular distributions and supported by the intensity balance.
& (B): Side band 1. The interband transition between side band 1 and the ground−state band show angular distributions of pure stretched dipole type, most likely E1.
a (C): Side band 2.
b (D): π=+, α=0 band.
c (E): Super band. The assignment is based on γ(θ) and supported by intensity balance.

γ(^{166}Hf)

A_2 and A_4 normalized to the 565.8γ 10+ to 8+ E2 transition.

Eγ[†]	E(level)	Iγ[‡]	Mult.[§]	α	Comments
158.5 *3*	158.5	272 *14*	E2[e]	0.638 *10*	A_2=+0.33 *3*; A_4=−0.12 *5* (1983Ag01). DCO=0.52 *1* (1987Bl06).
274.6 *3*	3009.2	75 *8*	E2[e]	0.1037	A_2=+0.32 *7*; A_4=−0.11 *8* (1983Ag01). DCO=0.9060 (1987Bl06).
289.2 *3*	1841.1	10 *2*			DCO=0.95 *25* (1987Bl06).
311.8 *3*	470.3	929 *47*	E2[e]	0.0706	A_2=+0.32 *2*; A_4=−0.10 *3* (1983Ag01). DCO=0.81 *2* (1987Bl06).
342.5 *3*	2539.7	67 *7*			DCO=0.87 *8* (1987Bl06).
352.2 *3*	2078.5	57 *6*	E2[e]	0.0495	A_2=+0.29 *7*; A_4=−0.15 *8* (1983Ag01). DCO=1.08 *14* (1987Bl06).
356.3 *3*	2197.3	59 *6*			DCO=1.00 *13* (1987Bl06).
371.3 *3*	2910.9	114 *11*	(E2)	0.0427	A_2=+0.28 *7*; A_4=−0.09 *8* (1983Ag01). DCO=0.98 *8* (1987Bl06).
374.7 *3*	1841.1	29 *3*			DCO=0.87 *21* (1987Bl06).
396.4 *3*	2962.2	21 *4*			DCO=0.56 *19* (1987Bl06).
414.0 *3*	2910.9	54 *5*			DCO=0.84 *19* (1987Bl06).
418.1 *3*	2496.7	193 *10*	(E2)	0.0308	A_2=+0.28 *5*; A_4=−0.09 *6* (1983Ag01). DCO=1.01 *4* (1987Bl06).
426.6 *3*	896.9	1000	E2[e]	0.0292	A_2=+0.34 *2*; A_4=−0.10 *3* (1983Ag01). DCO=0.98 *2* (1987Bl06).
439.8 *3*	3449.0	354 *17*	(E2)	0.0269	A_2=+0.27 *4*; A_4=−0.06 *5* (1983Ag01). DCO=1.07 *3* (1987Bl06).
443.4 *3*	3009.2	336 *17*	E2[e]	0.0264	A_2=+0.32 *4*; A_4=−0.02 *5* (1983Ag01). DCO=1.01 *2* (1987Bl06).
461.2 *3*	2539.7	58 *6*			DCO=0.98 *18* (1987Bl06).
464.2 *3*	3375.1	190 *10*	(E2)	0.0234	A_2=+0.30 *5*; A_4=−0.10 *6* (1983Ag01). DCO=0.97 *4* (1987Bl06).
465.4 *3*	2962.2	255 *13*	(E2)	0.0232	A_2=+0.31 *4*; A_4=−0.09 *5* (1983Ag01). DCO=1.09 *4* (1987Bl06).
471.0 *3*	2197.3	47 *5*			DCO=1.15 *25* (1987Bl06).
509.5 *3*	1406.4	@	E2[e]	0.0185	A_2=+0.29 *3*; A_4=−0.09 *5* (1983Ag01). DCO=1.03 *2* (1987Bl06).
510.4 *3*	3472.6	@	(E2)	0.0184	A_2=+0.31 *4*; A_4=−0.07 *5* (1983Ag01). DCO=0.97 *3* (1987Bl06).
524.7 *3*	2496.7	120 *12*	D[#]		A_2=−0.25 *7*; A_4=−0.08 *9* (1983Ag01). DCO=0.68 *8* (1987Bl06).
545.2 *3*	3920.3	167 *17*	(E2)	0.01561	A_2=+0.25 *6*; A_4=−0.14 *6* (1983Ag01). DCO=0.89 *8* (1987Bl06).
557.5 *3*	4030.1	191 *19*	(E2)	0.01479	A_2=+0.35 *4*; A_4=−0.02 *6* (1983Ag01). DCO=1.07 *6* (1987Bl06).
560.2 *3*	4009.2	340 *17*	(E2)	0.01462	A_2=+0.29 *6*; A_4=−0.16 *8* (1983Ag01). DCO=1.11 *2* (1987Bl06).
565.5 *3*	1971.9	699 *35*	E2[e]	0.01429	A_2=+0.35; A_4=−0.07 (1983Ag01). DCO=1.04 *3* (1987Bl06).
573.6 *3*	5089.6	110 *11*			DCO=0.90 *11* (1987Bl06).
589.2 *3*	5678.8	103 *10*			DCO=1.28 *16* (1987Bl06).
594.0 *3*	2565.8	&	E2[e]	0.01271	A_2=+0.35 *3*; A_4=−0.09 *4* (1983Ag01). DCO=1.02 *4* (1987Bl06).
595.1 *3*	4625.2	&			DCO=1.06 *5* (1987Bl06).
595.7 *3*	4516.0	&			DCO=1.13 *9* (1987Bl06).
624.1[f] *3*	3835.2	176[f] *18*			DCO=0.96 *11* (1987Bl06) for doublet.
	4459.3	176[f] *18*			DCO=0.96 *11* (1987Bl06).
628.1 *3*	5253.3	168 *17*	(E2)	0.01115	A_2=+0.27 *8*; A_4=0.00 *9* (1983Ag01). DCO=1.03 *5* (1987Bl06).
645.3 *3*	3211.1	123 *12*	(E2)	0.01048	A_2=+0.25 *6*; A_4=−0.03 *7* (1983Ag01). DCO=0.90 *13* (1987Bl06).
661.8 *3*	4671.0	310 *16*			DCO=0.98 *3* (1987Bl06).
662.3 *3*	5121.7	70 *7*			DCO=1.1 *3* (1987Bl06).

Continued on next page (footnotes at end of table)

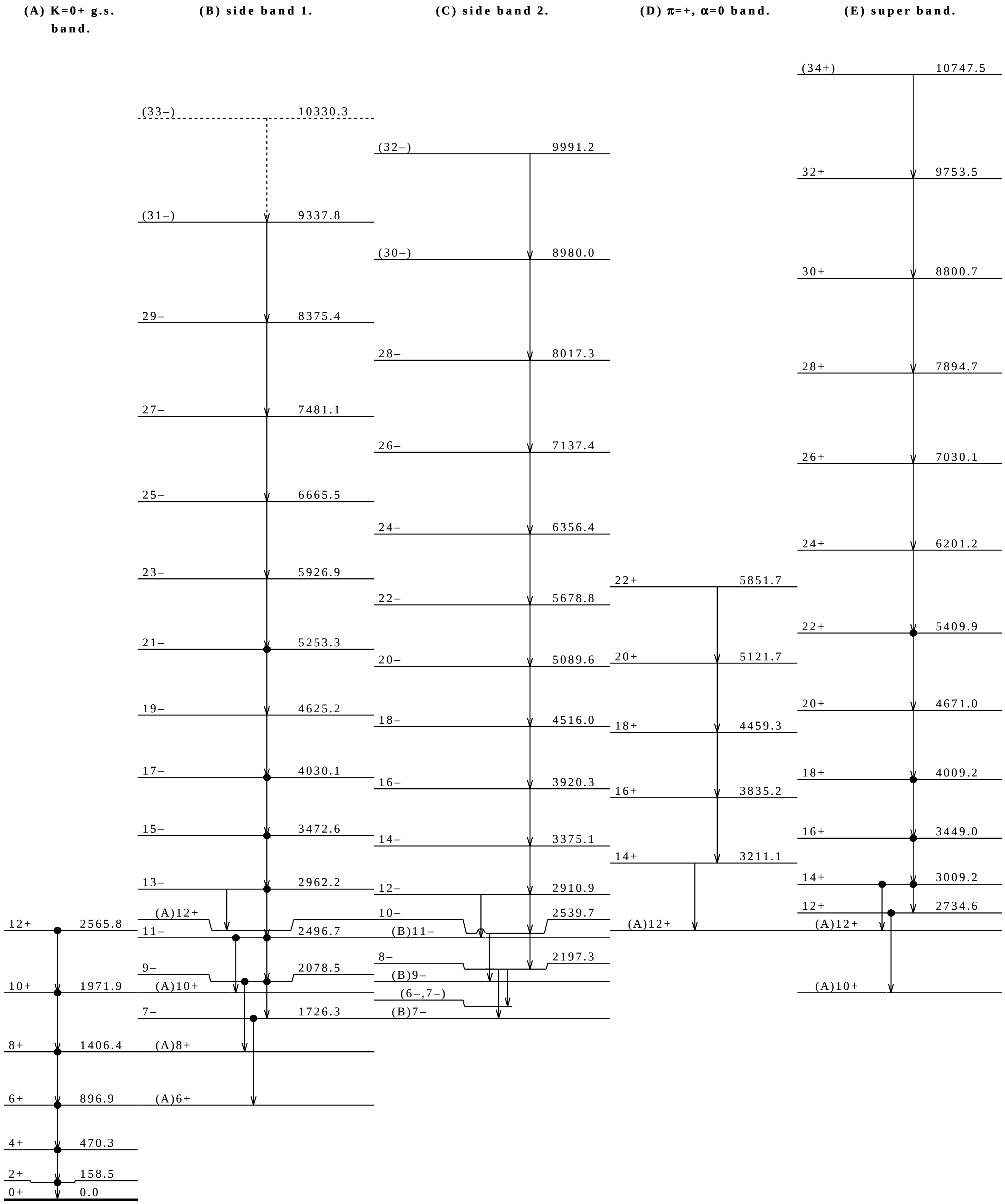
(HI,xnγ) 1987Bl06,1983Ag01,1977Bo14 (continued)

γ(^{166}Hf) (continued)

Eγ[†]	E(level)	Iγ[‡]	Mult.[§]	α	Comments
672.2 *3*	2078.5	204 *10*	D[#]		A_2=−0.25 *5*; A_4=+0.03 *6* (1983Ag01). DCO=0.80 *10* (1987Bl06).
673.6 *3*	5926.9	122 *12*			DCO=1.03 *7* (1987Bl06).
677.6 *3*	6356.4	72 *7*			DCO=1.38 *16* (1987Bl06).
730.0 *3*	5851.7	42 *4*			DCO=1.1 *3* (1987Bl06).
738.6 *3*	6665.5	[a]			DCO=1.12 *9* (1987Bl06).
738.9 *3*	5409.9	[a]			A_2=+0.16 *10*; A_4=−0.06 *13* (1983Ag01). DCO=1.12 *5* (1987Bl06).
762.7 *3*	2734.6	90 *9*	(E2)	0.00721	A_2=+0.45 *10*; A_4=−0.06 *12* (1983Ag01). DCO=1.06 *15* (1987Bl06).
781.0 *3*	7137.4	61 *6*			DCO=1.04 *23* (1987Bl06).
791.3 *3*	6201.2	170 *17*			DCO=1.19 *8* (1987Bl06).
815.6 *3*	7481.1	70 *7*			DCO=0.92 *18* (1987Bl06).
828.9 *3*	7030.1	[b]			DCO=1.15 *10* (1987Bl06).
829.3 *3*	1726.3	[b]	D[#]		A_2=−0.29 *8*; A_4=−0.07 *9* (1983Ag01). DCO=0.65 *19* (1987Bl06).
864.6 *3*	7894.7	69 *7*			DCO=0.84 *14* (1987Bl06).
879.9 *3*	8017.3	28 *6*			DCO=1.4 *7* (1987Bl06).
894.3 *3*	8375.4	51 *5*			DCO=1.3 *4* (1987Bl06).
906.0 *10*	8800.7	42 *8*			DCO=0.91 *22* (1987Bl06).
944.3 *3*	1841.1	26 *3*	D		DCO=0.45 *31* (1987Bl06).
952.7 *10*	9753.5	44 *8*			DCO=1.4 *4* (1987Bl06).
962.4 *10*	9337.8	38[c]			DCO=0.7 *4* (1987Bl06).
962.7 *10*	8980.0	[c]			DCO=0.5 *4* (1987Bl06).
992.5[g] *10*	10330.3?	21 *4*			
994.0 *10*	10747.5	[d]			DCO=1.9 *9* (1987Bl06).
995.8 *10*	1466.3	[d]	D		DCO<0.3 (1987Bl06).
1011.2 *10*	9991.2	19 *4*			DCO<0.5 (1987Bl06).
[x]1057		<13			
1081.4 *10*	1551.8	16 *3*	D		DCO<0.5 (1987Bl06).

† From 1987Bl06. Others: 1965St03, 1983Ag01.
‡ From 1987Bl06 determined from spectra coincident with 158.5γ and 311.8γ and normalized so Iγ(426.6γ)=1000.
§ Q from γ(θ) (1983Ag01), except as noted. Not M2 from RUL if value is shown without parentheses; Δπ=(no) assigned for all other intraband stretched Q transitions.
\# From DCO ratio (1987Bl06).
@ Iγ=1132 *57* for 509.5γ+510.4γ.
& Iγ=836 *42* for 594.0γ+595.1γ+595.7γ.
a Iγ=265 *13* for 738.6γ+738.9γ.
b Iγ=203 *10* for 828.9γ+829.3γ.
c Iγ=38 *4* for 962.4γ+962.7γ.
d Iγ=45 *5* for 994.0γ+995.8γ.
e Stretched Q from γ(θ); not M2 from RUL.
f Multiply placed; undivided intensity given.
g Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

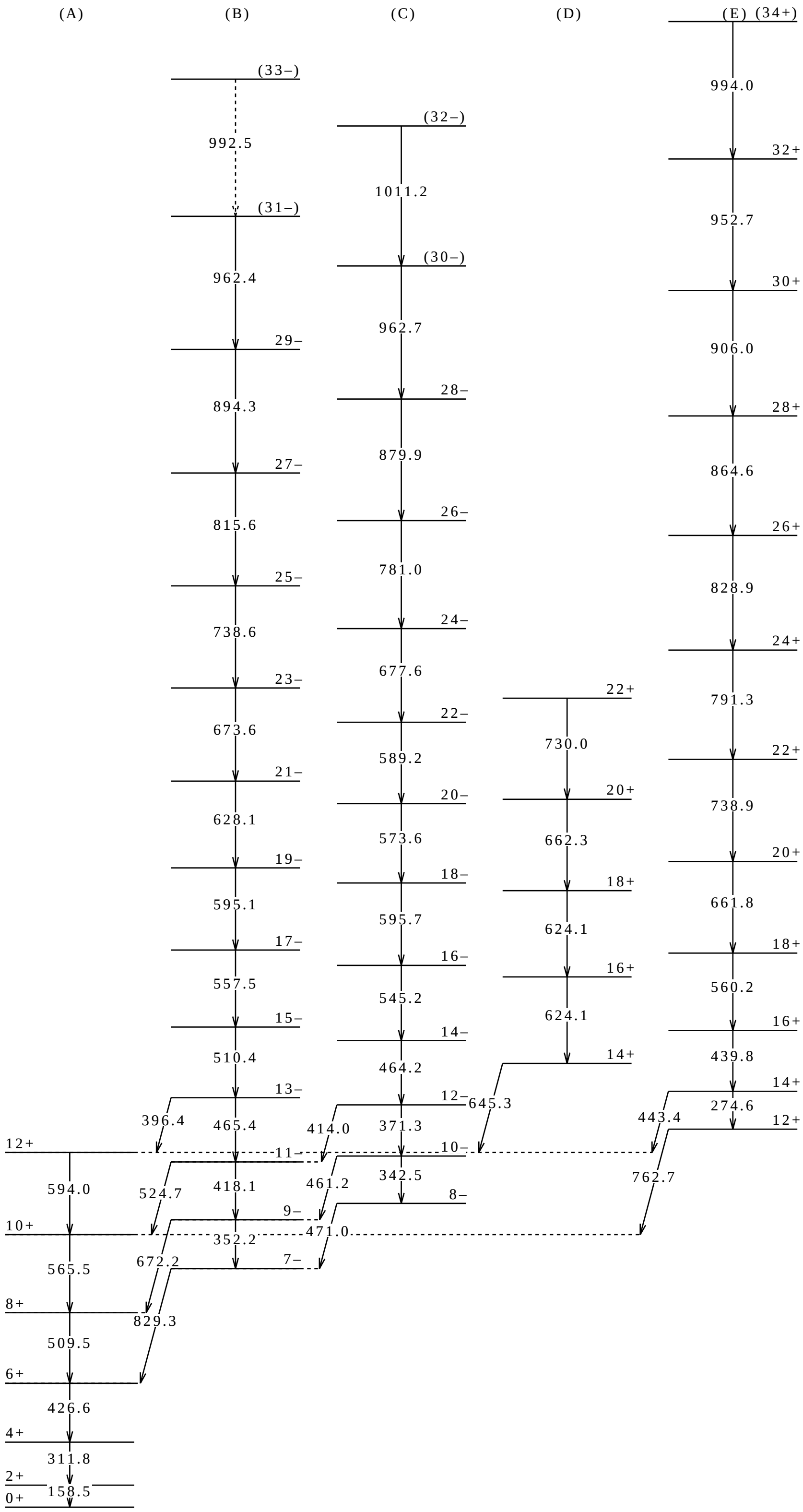
(HI,xnγ) 1987Bl06,1983Ag01,1977Bo14 (continued)



$^{166}_{72}Hf_{94}$

(HI,xnγ) 1987Bl06,1983Ag01,1977Bo14 (continued)

Bands for ^{166}Hf

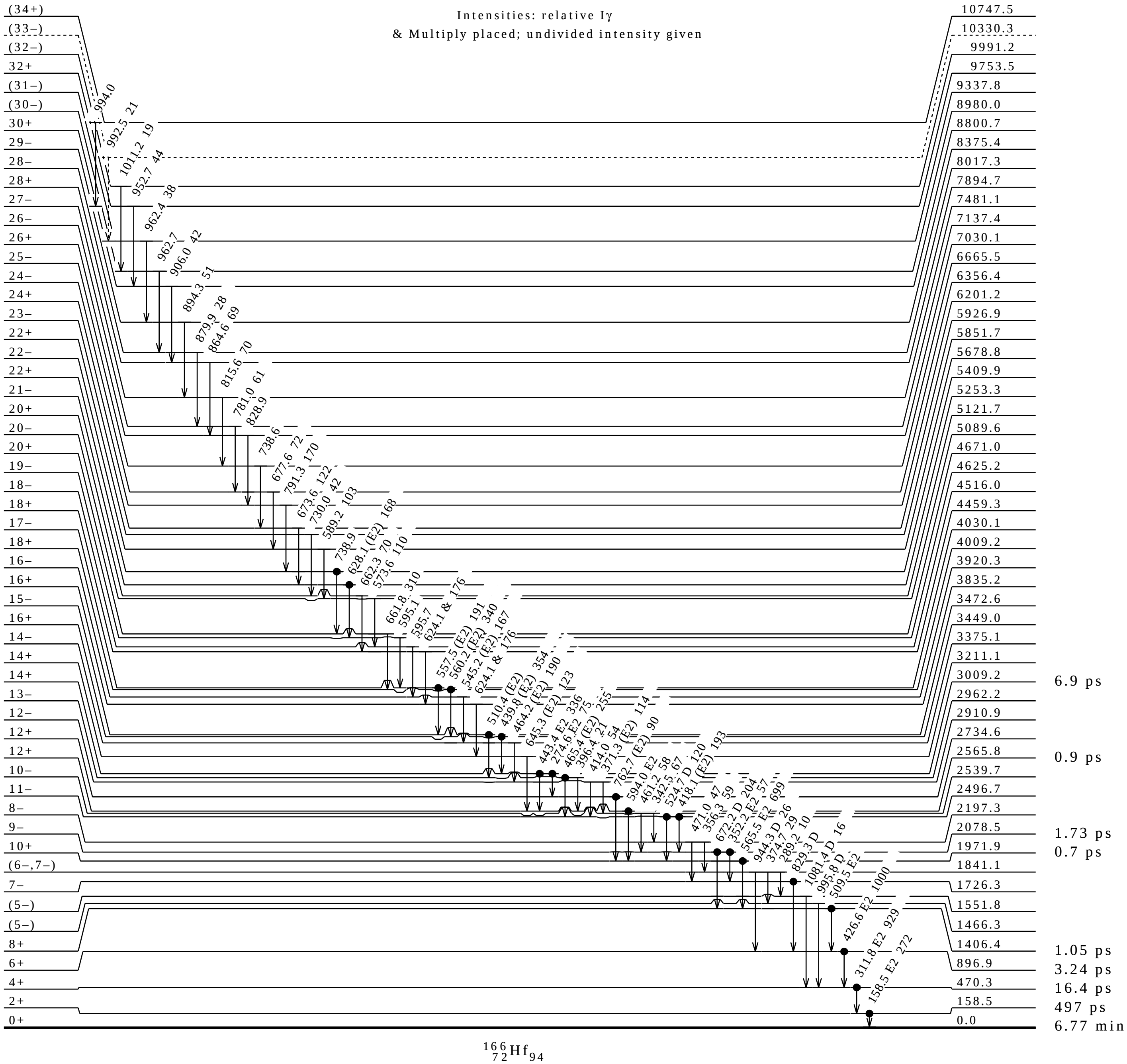


$^{166}_{72}Hf_{94}$

Level Scheme

Intensities: relative Iγ

& Multiply placed; undivided intensity given



$^{166}_{72}Hf_{94}$–51

Adopted Levels, Gammas

Q(β⁻)=–4206 *30*; S(n)=8310 *30*; S(p)=1750 *40*; Q(α)=4310 *80* 2003Au03.

^{166}Ta Levels

Cross Reference (XREF) Flags

A ^{166}W ε Decay
B ^{141}Pr(^{28}Si,3nγ)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0	(2)+	A	34.4 s *5*	%ε+%β⁺=100. Assignment: ^{159}Tb(^{16}O,9n), E(^{16}O)=147 MeV, excit (1977Le08). $T_{1/2}$: from 1982Li17. Other: 32 s *3* (1977Le08). Jπ: M1+E2 126γ from 1+ 126; allowed ε decay to 2+ 159 in ^{166}Hf. The adopted Jπ=(2)+ is in conflict with a previous assignment of (2–) based, in part, on apparent ε+β⁺ feeding to 4+ and (0+) levels. The ^{166}Ta ε+β⁺ decay scheme is probably incomplete (large Q value), so the above feedings might be accounted for by as yet unobserved transitions; the strongest ε+β⁺ branches feed 2+ levels.
0.0+x#	(9–)	B		
53.6+x§ *8*	(10–)	B		
125.79 *18*	1+	A		Jπ: allowed (log *ft*=4.0) ε decay from 0+. The apparently unhindered allowed ε decay to this state and the probable (ν 5/2[523]) g.s. for ^{165}W suggest that the configuration for the ^{166}Ta(126 level) includes the (π 7/2[523]) orbital.
147.6+x# *8*	(11–)	B		
298.3 *3*		A		Jπ: γ to 1+ 126.
320.1+x§ *10*	(12–)	B		
350.34 *25*		A		E(level): relative order of the 45.8 and 224.6 transitions is not established. The reverse order would define a level at 171.6. Jπ: γ to 1+ 126.
395.93 *20*	1+	A		Jπ: allowed (log *ft*=4.9) ε decay from 0+.
495.0+x# *11*	(13–)	B		
754.6+x§ *12*	(14–)	B		
992.2+x# *13*	(15–)	B		
1309.2+x§ *13*	(16–)	B		
1597.8+x# *14*	(17–)	B		
1946.3+x§ *15*	(18–)	B		
2273.2+x# *15*	(19–)	B		
2626.7+x§ *16*	(20–)	B		
2972.1+x# *17*	(21–)	B		
3304.9+x§ *17*	(22–)	B		
3653.9+x# *18*	(23–)	B		
3972.1+x§ *19*	(24–)	B		

† From least–squares fit to Eγ.
‡ Values given without comment are from ^{141}Pr(^{28}Si,3nγ). Bandhead J assumes smooth energy variation with Z for levels with assigned configuration in neighboring isotones. J for higher–energy levels is based on observed band structure.
§ (A): (ν $i_{13/2}$)⊗(π $h_{11/2}$), α=0 band. Configuration assignment is based on yrast band configurations of (ν $i_{13/2}$) and (π $h_{11/2}$), respectively, for yrast bands in ^{165}Hf and ^{165}Ta (1997Zh11).
# (B): (ν $i_{13/2}$)⊗(π $h_{11/2}$), α=1 band. See comment on signature–partner band.

γ(^{166}Ta)

E(level)	Eγ†	Iγ‡	Mult.	δ	α	Comments
53.6+x	53.6	100				
125.79	125.8§ *2*	100	M1+E2	0.8 *+8–5*	1.98 *24*	Mult.,δ: from α(K)exp in ε decay.
147.6+x	94.0					
	147.6					
298.3	172.5§ *3*	100	[M1,E2]		0.71 *22*	
320.1+x	172.5					
	266.5					
350.34	224.6§ *2*	100	[M1,E2]		0.32 *13*	
395.93	45.8§ *4*	26 *8*	[M1]		7.21 *22*	
	97.6§ *4*	35 *4*	[M1,E2]		4.4 *4*	
	270.1§ *2*	43 *4*	[M1,E2]		0.19 *8*	

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Adopted Levels, Gammas (continued)

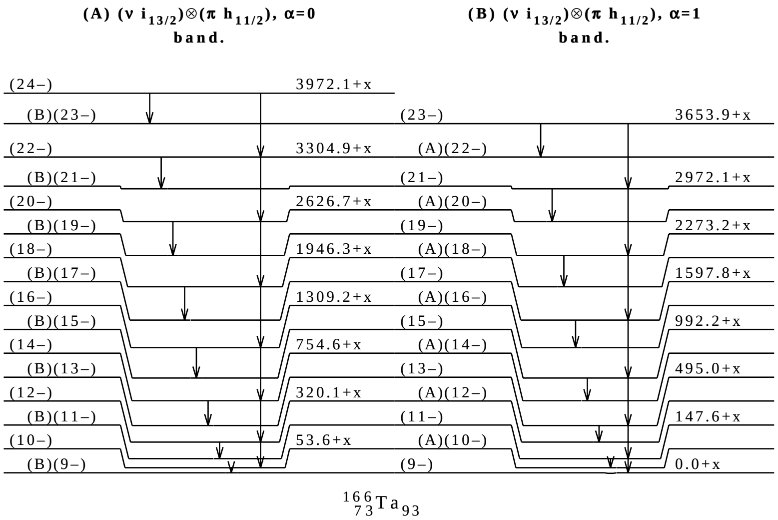
γ(^{166}Ta) (continued)

E(level)	Eγ†	Iγ‡	Mult.	α
395.93	395.9§ 3	100 2	[M1,E2]	0.07 3
495.0+x	174.9			
	347.4			
754.6+x	259.6			
	434.5			
992.2+x	237.6			
	497.3			
1309.2+x	317.0			
	554.6			
1597.8+x	288.6			
	605.6			
1946.3+x	348.5			
	637.1			

E(level)	Eγ†
2273.2+x	326.9
	675.4
2626.7+x	353.5
	680.4
2972.1+x	345.3
	698.8
3304.9+x	332.8
	678.2
3653.9+x	349.0
	681.8
3972.1+x	318.2
	667.2

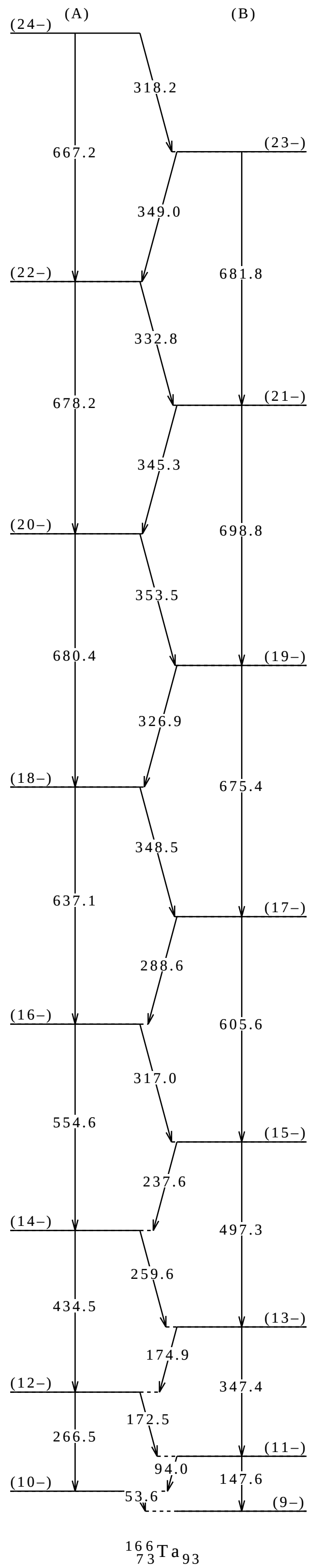
† From ^{141}Pr(^{28}Si,3nγ), except as noted. Authors did not state uncertainty.
‡ Relative photon intensity normalized to 100 at strongest photon deexciting each level. From ^{166}W ε decay.
§ From ^{166}W ε decay.

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)

Bands for ^{166}Ta



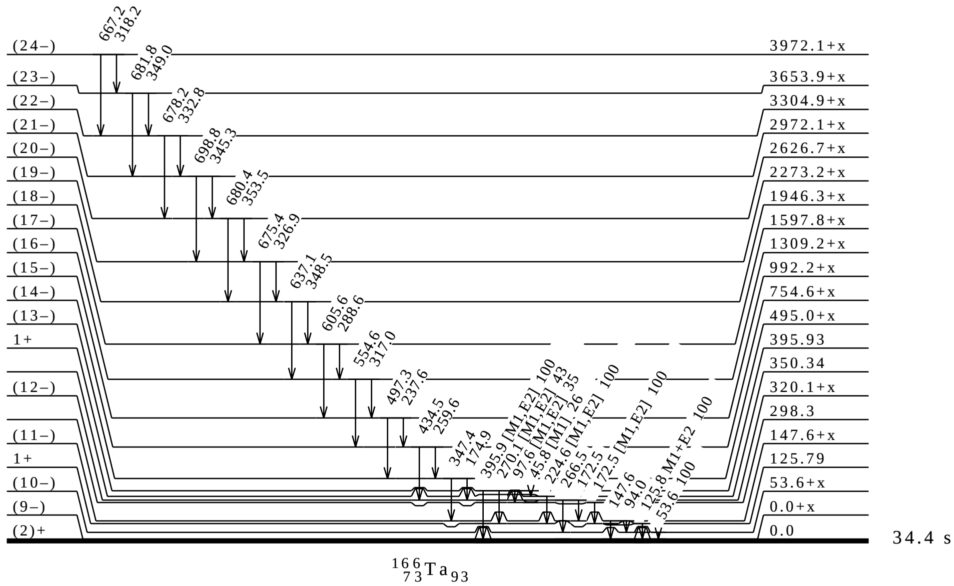
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



^{166}W ε Decay 1989Hi04

Parent ^{166}W: E=0.0; Jπ=0+; $T_{1/2}$=19.2 s *6*; Q(g.s.)=4206 *30*; %ε+%β^+ decay=99.965 *12*.

^{166}Ta Levels

E(level)	Jπ†	Comments
0.0	(2)+	
125.79 *18*	1+	
298.3 *3*		
350.34 *25*		E(level): relative order of the 45.8 and 224.6 transitions is not established. The reverse order would define a level at 171.6.
395.93 *20*	1+	Jπ: log *ft*<5.9 from 0+ independent of multipolarities assumed for transitions deexciting the 396 level.

† From Adopted Levels.

β^+,ε Data

Eε	E(level)	$I\beta^+$†	Iε†	Log *ft*	I(ε+β^+)†	Comments
(3810 *30*)	395.93	3.4 *5*	6.6 *10*	4.87 *7*	10.0 *15*	av Eβ=1259 *14*; εK=0.546 *6*; εL=0.0883 *10*; εM+=0.0271 *3*.
(3860‡ *30*)	350.34	<0.3	<0.5	>6.0	<0.8	av Eβ=1280 *14*; εK=0.537 *6*; εL=0.0868 *10*; εM+=0.0267 *3*.
(3910‡ *30*)	298.3	<0.3	<0.4	>6.1	<0.7	av Eβ=1304 *14*; εK=0.527 *6*; εL=0.0851 *10*; εM+=0.0262 *3*.
(4080 *30*)	125.79	36 *4*	54 *7*	4.02 *6*	90 *11*	av Eβ=1382 *14*; εK=0.493 *6*; εL=0.0796 *10*; εM+=0.0245 *3*.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

^{166}W ε Decay 1989Hi04 (continued)

γ(^{166}Ta)

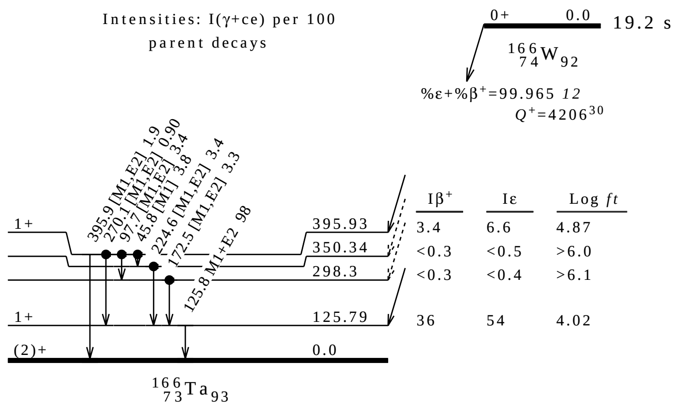
γγ coin (Ta K x ray)(125.8γ, 395.9γ).
Iγ normalization: The basis of the intensity normalization is that negligible ε+β^{+} feeding to the ground state is expected (ΔJ=(2), Δπ=no), so Σ(I(γ+ce) to g.s.)=100.

Eγ	E(level)	Iγ‡	Mult.	δ	α	Comments
45.8 *4*	395.93	1.4 *4*	[M1]		7.21 *22*	α(L)=5.59 *17*; α(M)=1.27 *4*; α(N+..)=0.355 *11*. α(N)=0.303 *9*; α(O)=0.0480 *15*; α(P)=0.00331 *10*. Mult.: if placement of 46γ is correct, E2 is ruled out because it would imply negative ε+β^{+} feeding of the 350 level; M1 would imply no ε+β^{+} branch to 350 level.
97.7 *4*	395.93	1.9 *2*	[M1,E2]†		4.4 *4*	α(K)=2.4 *15*; α(L)=1.5 *9*; α(M)=0.37 *23*; α(N+..)=0.10 *6*. α(N)=0.09 *6*; α(O)=0.012 *7*; α(P)=0.00022 *15*. Eγ: 97.7 from fig. 3 of 1989Hi04, consistent with E(level) difference. Eγ=97.1 from table 4 appears to be a misprint.
125.8 *2*	125.79	100	M1+E2	0.8 *+8−5*	1.98 *24*	α(K)=1.4 *5*; α(L)=0.47 *15*; α(M)=0.11 *4*; α(N+..)=0.031 *10*. α(N)=0.027 *9*; α(O)=0.0038 *11*; α(P)=0.00012 *5*. Mult.,δ: from α(K)exp=1.4 *4*.
172.5 *3*	298.3	5.8 *7*	[M1,E2]†		0.71 *22*	α(K)=0.5 *3*; α(L)=0.15 *4*; α(M)=0.037 *10*; α(N+..)=0.0099 *23*. α(N)=0.0086 *21*; α(O)=0.00124 *21*; α(P)=4.×10^{-5} *3*.
224.6 *2*	350.34	7.8 *5*	[M1,E2]		0.32 *13*	α(K)=0.25 *13*; α(L)=0.0595 *20*; α(M)=0.0141 *11*; α(N+..)=0.00384 *20*. α(N)=0.00333 *22*; α(O)=0.000491 *9*; α(P)=2.2×10^{-5} *13*.
270.1 *2*	395.93	2.3 *2*	[M1,E2]		0.19 *8*	α(K)=0.15 *8*; α(L)=0.032 *3*; α(M)=0.0075 *4*; α(N+..)=0.00207 *13*. α(N)=0.00179 *10*; α(O)=0.00027 *3*; α(P)=1.3×10^{-5} *8*.
395.9 *3*	395.93	5.4 *14*	[M1,E2]		0.07 *3*	α(K)=0.05 *3*; α(L)=0.0099 *25*; α(M)=0.0023 *5*; α(N+..)=0.00063 *15*. α(N)=0.00054 *13*; α(O)=8.3×10^{-5} *23*; α(P)=5.×10^{-6} *3*. Coincident with K x ray(Ta) only.

† From intensity balance assuming no ε+β^{+} feeding to 298.3 level.
‡ For absolute intensity per 100 decays, multiply by 0.33 *3*.

^{166}W ε Decay 1989Hi04 (continued)

Decay Scheme



^{141}Pr(^{28}Si,3nγ) 1997Zh11

E=127 MeV; 98.0% ^{141}Pr metallic stacked–foil target; γ detector array (seven Compton–suppressed HPGe detectors and one planar HPGe detector); measured Eγ, excit (E=123, 127, 131 MeV), x–γ coin, γγ coin (127 MeV).

^{166}Ta Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0+x#	(9–)	992.3+x# *12*	(15–)	2972.1+x# *17*	(21–)
53.6+x§ *8*	(10–)	1309.2+x§ *13*	(16–)	3304.9+x§ *17*	(22–)
147.6+x# *8*	(11–)	1597.8+x# *14*	(17–)	3653.9+x# *18*	(23–)
320.1+x§ *10*	(12–)	1946.3+x§ *15*	(18–)	3972.1+x§ *19*	(24–)
495.0+x# *11*	(13–)	2273.2+x# *15*	(19–)		
754.6+x§ *11*	(14–)	2626.7+x§ *16*	(20–)		

† From least–squares fit to Eγ, assigning 1 keV uncertainty to each datum.

‡ Authors' values. Bandhead J assumes smooth energy variation with Z for levels with assigned configuration in neighboring isotones. J for higher–energy levels is based on observed band structure.

§ (A): (ν $i_{13/2}$)⊗(π $h_{11/2}$), α=0 band. Configuration assignment is based on yrast band configurations of (ν $i_{13/2}$) and (π $h_{11/2}$), respectively, for yrast bands in ^{165}Hf and ^{165}Ta (1997Zh11).

(B): (ν $i_{13/2}$)⊗(π $h_{11/2}$), α=1 band. See comment on signature–partner band.

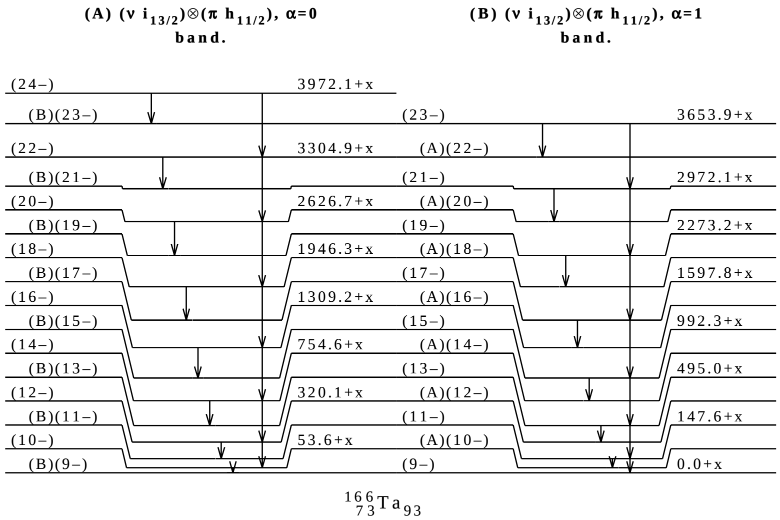
γ(^{166}Ta)

Eγ†	E(level)	Eγ†	E(level)	Eγ†	E(level)
53.6	53.6+x	318.2	3972.1+x	554.6	1309.2+x
94.0	147.6+x	326.9	2273.2+x	605.6	1597.8+x
147.6	147.6+x	332.8	3304.9+x	637.1	1946.3+x
172.5	320.1+x	345.3	2972.1+x	667.2	3972.1+x
174.9	495.0+x	347.4	495.0+x	675.4	2273.2+x
237.6	992.3+x	348.5	1946.3+x	678.2	3304.9+x
259.6	754.6+x	349.0	3653.9+x	680.4	2626.7+x
266.5	320.1+x	353.5	2626.7+x	681.8	3653.9+x
288.6	1597.8+x	434.5	754.6+x	698.8	2972.1+x
317.0	1309.2+x	497.3	992.3+x		

† Uncertainty unstated by authors.

CITATION:
Nuclear Data Sheets (1992)

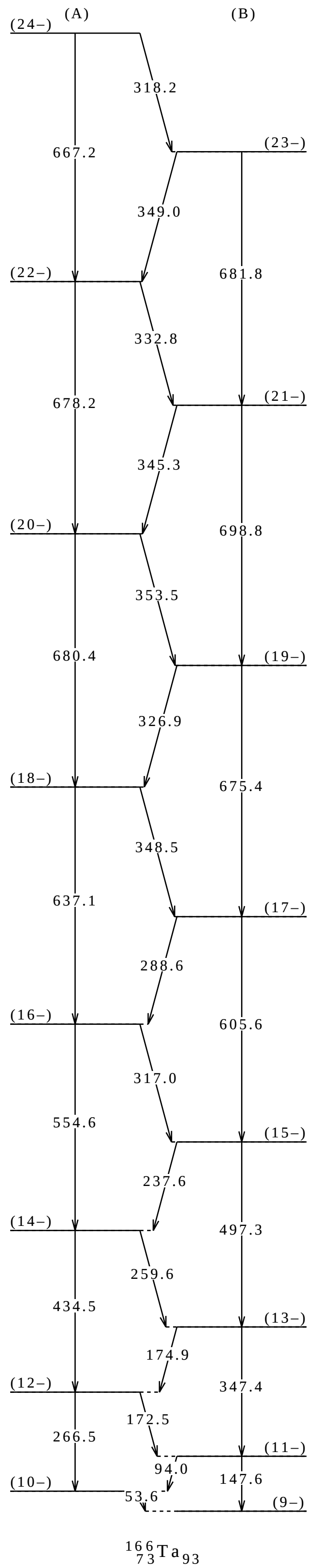
$^{141}Pr(^{28}Si,3n\gamma)$ 1997Zh11 (continued)



From NNDC(BNL)
program ENSDAT

$^{141}Pr(^{28}Si,3n\gamma)$ 1997Zh11 (continued)

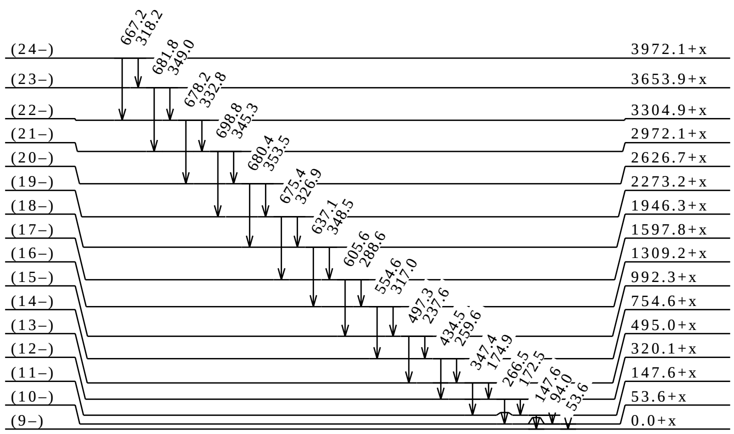
Bands for ^{166}Ta



From NNDC(BNL)
program ENSDAT

$^{141}Pr(^{28}Si,3n\gamma)$ 1997Zh11 (continued)

Level Scheme



From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas

Q(β⁻)=−10040 *SY*; S(n)=11101 *27*; S(p)=3326 *20*; Q(α)=4856 *4* 2003Au03.
ΔQ(β−)=90 (2003Au03).
Assignment: ^{156}Dy(^{16}O,6n), E(^{16}O)=124.6 MeV excit (1975To05).

^{166}W Levels

Cross Reference (XREF) Flags

A ^{142}Nd(^{28}Si,4nγ)
B ^{106}Pd(^{63}Cu,p2nγ)
C ^{170}Os α Decay
D ^{166}Re ε Decay

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0#	0+§	ABCD	19.2 s *6*	%α=0.035 *12*; %ε+%β⁺=99.965 *12*. %α: 0.035 *12* is the 0.03 *1* datum of 1989Hi04 after adjustment by the evaluator assuming adopted α(126γ, ^{166}Ta)=1.98 *24* (the authors used α=2.51 *+10−17*). Others: 0.6 *2* (1981HoZM,1979Ho10; from Iα(from ^{166}W)/Iα(from ^{162}Hf)); this implies r_0(^{162}Hf) much larger than expected from r_0 systematics (which suggest %α≈0.075 (1998Ak04)). %α<30 (1984ScZQ). Jπ: g.s. of even−even nucleus. $T_{1/2}$: weighted average of 22.0 s *10* (1992HeZV), 18.8 s *4* (1989Hi04, from ^{166}W ε decay), 19.6 s *12* (1989Hi04, from ^{166}W α decay), 16 s *3* (1975To05 and 1984ScZQ, from ^{166}W α decay).
252.0# *3*	2+§	AB D		Jπ: E2 252γ to 0+ g.s.
675.7# *4*	4+§	AB D		
1225.9# *4*	6+§	AB D		
1587.3@ *6*	(5−)	AB		
1864.8# *5*	8+§	AB		
1928.5@ *6*	(7−)	AB		
2020.2& *10*	(6−)	B		
2337.3@ *7*	(9−)	AB		XREF: A(2333.4).
2349.5& *9*	(8−)	B		
2551.6# *5*	10+§	AB		
2573.2& *10*	(10−)	B		
2742.5@ *9*	(11−)	AB		
2946.6& *14*	(12−)	B		
3031.2# *6*	(12+)§	AB		
3173.0@ *10*	(13−)	AB		
3356.2# *6*	(14+)§	AB		
3474.3& *18*	(14−)	B		
3722.1@ *11*	(15−)	AB		
3821.3# *8*	(16+)§	AB		
4127.0& *20*	(16−)	B		
4378.1@ *12*	(17−)	AB		
4388.4# *9*	(18+)§	AB		
4870.7& *23*	(18−)	B		
5027.3# *11*	(20+)§	AB		
5114.3@ *13*	(19−)	AB		
5579.5& *25*	(20−)	B		
5729.1# *12*	(22+)§	AB		
5853.6@ *17*	(21−)	B		
6169& *3*	(22−)	B		
6492.4# *13*	(24+)§	AB		
6496.3@ *20*	(23−)	B		
6811?& *3*	(24−)	B		
7170.5?@ *22*	(25−)	B		
7312.7# *14*	(26+)§	AB		
7520?& *3*	(26−)	B		
7917.0?@ *24*	(27−)	B		
8184.3# *17*	(28+)§	B		
8290?& *4*	(28−)	B		
8725?@ *3*	(29−)	B		
9106.9# *20*	(30+)§	B		
10075.7?# *22*	(32+)§	B		

Footnotes continued on next page

Adopted Levels, Gammas (continued)

^{166}W Levels (continued)

† From least–squares adjustment of Eγ, assigning ΔE_{γ}=1 keV to Eγ values to which the authors did not assign an uncertainty.
‡ Based on measured transition multipolarities and band structure deduced in (HI,xnγ) studies, supported by cranked shell model calculations of 1992Si12 and systematics of band properties in neighboring nuclides.
§ A cascade of stretched Q intraband transitions exists between the J=18 and the J=0 band members; the 0+ g.s. is the band head, and an E2 353γ links the J=2 and 0 members. Definite Jπ values have, therefore, been assigned below the first band crossing (i.e., to J=0 through 10 band members).
# (A): Kπ=0+ yrast band (1992Si12). Becomes (ν 3/2[651])^2 band at ħω=262 *4* keV.
@ (B): (ν 3/2[651])(ν 3/2[521]), α=+1/2 band (1992Si12). Crossed by 4 quasineutron (3/2[651])^2(3/2[521])(1/2[660]) band at ħω=348 keV *4*. (AE band crossed by AEBC band). Stretched dipole interband transitions link this band to the 0+ g.s. band. Many of the intraband cascade transitions are stretched Q. π=– consistent with systematics of the odd–parity sidebands in heavier W nuclei.
& (C): (ν 3/2[651])(ν 3/2[521]), α=–1/2 band (1992Si12). Crossed by 4 quasineutron (3/2[651])^2(3/2[521])(1/2[660]) band at ħω=336 keV *4*. (AF band crossed by AFBC band).

γ(^{166}W)

E(level)	Eγ†	Iγ‡	Mult.§	α	Comments
252.0	252.0 *3*	100	E2@	0.1452	Weighted average of 251.7 *2* in (^{28}Si,4nγ) and 252.3 *2* in ε decay. Mult.: Q from γ(θ), not M2 from intensity balance in (^{28}Si,4nγ).
675.7	423.7 *2*	100	(E2)@	0.0321	Other Eγ: 423.9 *2* in ε decay.
1225.9	550.2 *2*	100	(E2)@	0.01661	
1587.3	911.5 *5*	100	D		
1864.8	638.9& *2*	100	(E2)	0.01171	Mult.: stretched Q, based on DCO ratios for doublet dominated by this intraband transition.
1928.5	341.0 *5*	42 *3*	(E2)	0.0584	Other Iγ: 39 *4* from (^{28}Si,4nγ).
	702.7 *5*	100 *8*	D		
2020.2	432.8#	100			
2337.3	408.8 *5*	100 *5*	(E2)	0.0353	Placement is from (^{63}Cu,p2nγ); order of 405γ and 409γ was reversed in (^{28}Si,4nγ).
	472.7#	26.6 *22*	D		
2349.5	329.3#	100 *21*	(E2)	0.0646	
	421.1#	91 *15*			
2551.6	686.8 *2*	100	(E2)	0.00995	
2573.2	223.8#	100 *10*			
	235.7#	74 *7*	D		
2742.5	405.2 *5*		(E2)	0.0362	Other Eγ: 406.2 in (^{63}Cu,p2nγ). Placement is from (^{63}Cu,p2nγ); order of 405γ and 409γ was reversed in (^{28}Si,4nγ).
2946.6	373.4#	100	(E2)	0.0452	
3031.2	479.6 *2*	100	(E2)	0.0233	
3173.0	430.5 *5*	100	(E2)	0.0308	
3356.2	325.0 *2*	100	(E2)	0.0671	
3474.3	527.7#	100	(E2)	0.0184	
3722.1	549.1 *5*	100	(E2)	0.01669	Eγ: 546.2 in (^{63}Cu, p2nγ).
3821.3	465.1 *5*	100	(E2)	0.0252	
4127.0	652.7#	100	(E2)	0.01115	
4378.1	656.0 *5*	100	(E2)	0.01103	
4388.4	567.1 *5*	100	(E2)	0.01545	Eγ: 568.0 in (^{63}Cu,p2nγ).
4870.7	743.7#	100	(E2)	0.00835	
5027.3	638.9& *5*	100			
5114.3	736.2 *5*	100	(E2)	0.00854	
5579.5	708.8#	100			
5729.1	701.8 *5*	100	(E2)	0.00948	Eγ: 701.1 in (^{63}Cu,p2nγ).
5853.6	739.3#	100			
6169	589.7#	100	(E2)	0.01409	
6492.4	763.3 *5*	100	(E2)	0.00789	Eγ: 765.1 in (^{63}Cu,p2nγ).
6496.3	642.6#	100			
6811?	641.7#a	100			
7170.5?	674.2#a	100	(E2)	0.01037	
7312.7	820.3 *5*	100	(E2)	0.00677	
7520?	708.8#a	100			
7917.0?	746.5#a	100			
8184.3	871.6#	100	(E2)	0.00596	
8290?	770.5#a	100			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{166}W)$ (continued)

E(level)	Eγ†	Iγ‡
8725?	808.2[#a]	100
9106.9	922.6[#]	100
10075.7?	968.8[#a]	100

† From (^{28}Si,4nγ), except as noted.

‡ Relative–photon intensity, normalized to 100 for the strongest γ deexciting each level; from (^{63}Cu,p2nγ), except as noted.

§ Based on measured DCO ratios in (^{63}Cu,p2nγ), assigning $\Delta\pi$=(no) for intraband transitions, except as noted.

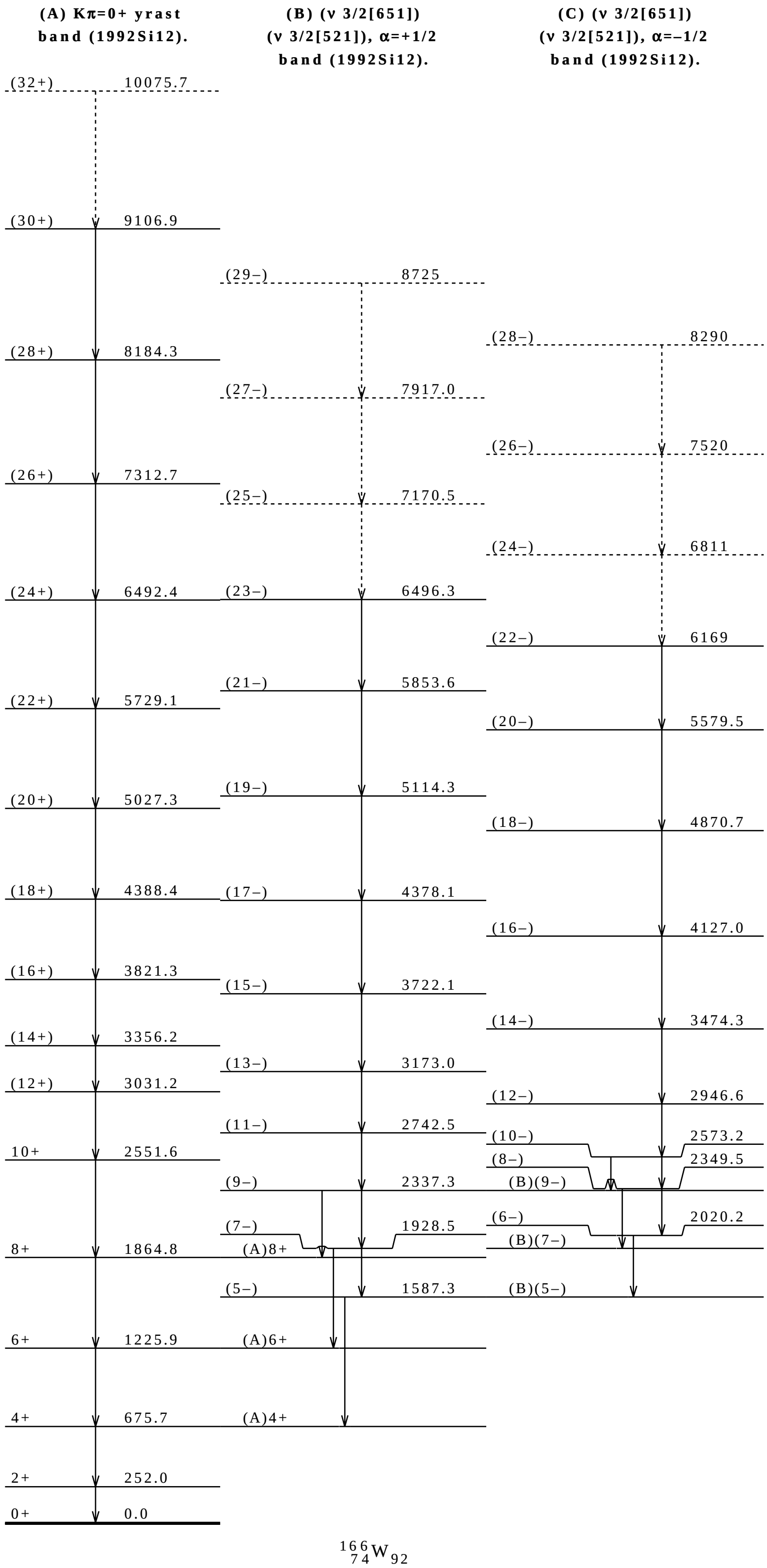
From (^{63}Cu,p2nγ); uncertainty unstated by authors.

@ Transition is member of stretched E2 cascade to 0+ g.s.

& Multiply placed.

a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

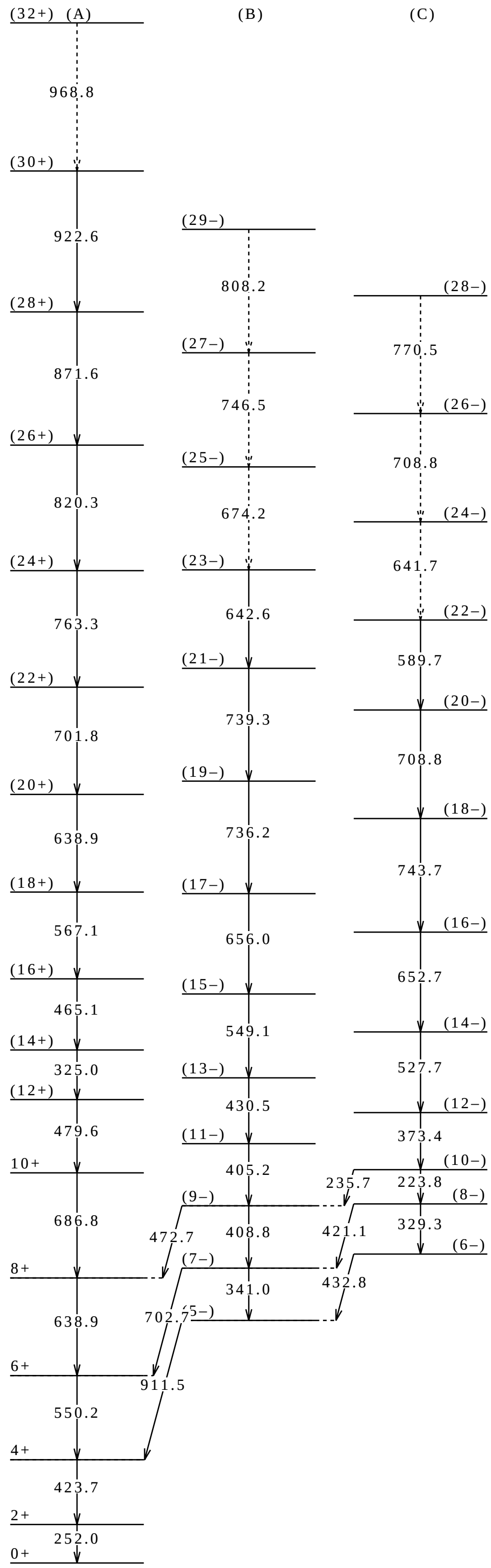


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Bands for ^{166}W



CITATION:
Nuclear Data Sheets (1992)

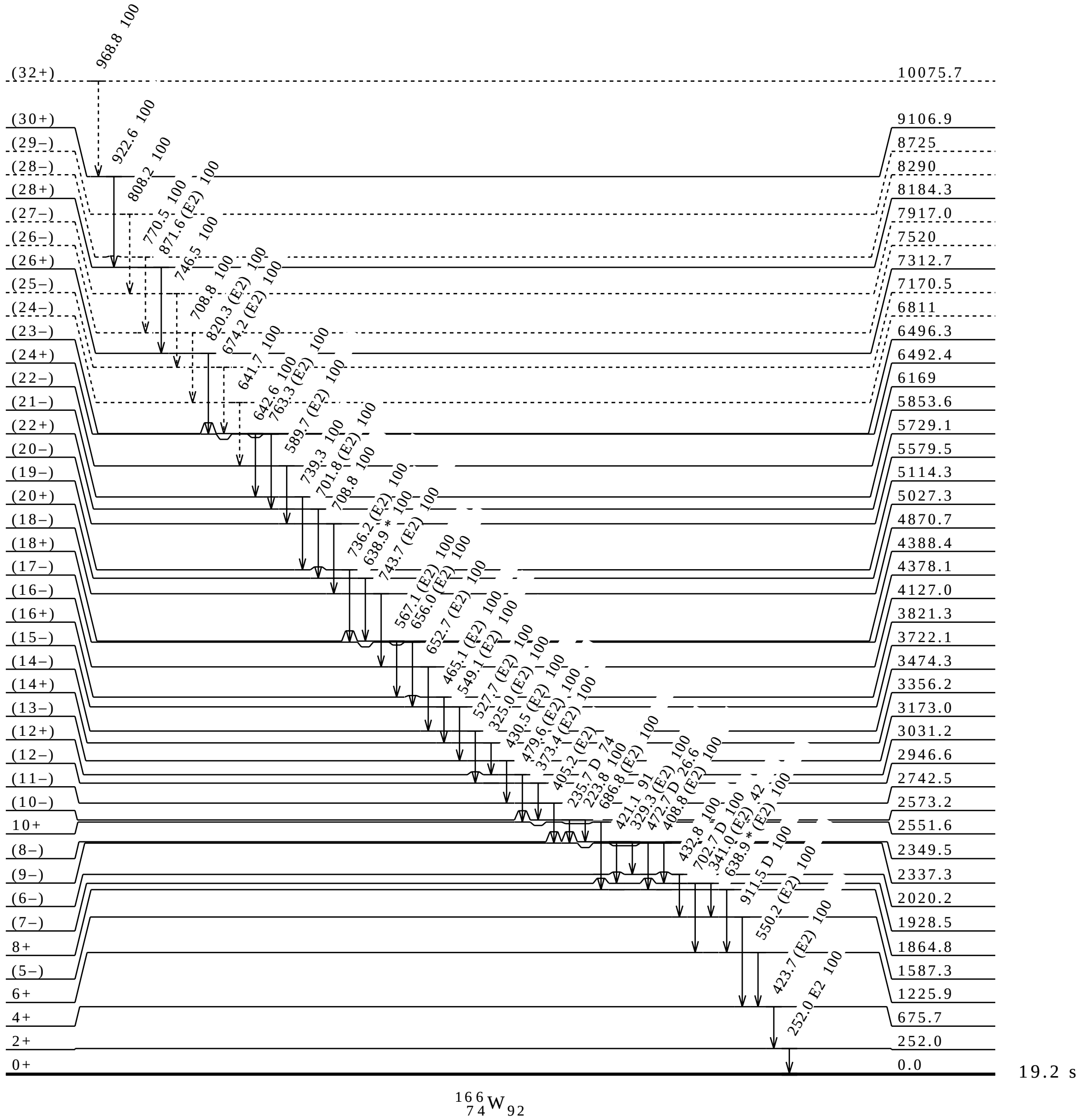
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

* Multiply placed



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{166}Re ε Decay 1992Me10

Parent ^{166}Re: E=0.0; Jπ=?; $T_{1/2}$=2.25 s *21*; Q(g.s.)=10040 syst; %ε+%β^+ decay>76.0.

^{166}Re–%ε+%β^+ decay: %(ε+β^+)>76 based on %α<24 estimated assuming a g.s. to g.s. transition and HF>1 for ^{166}Re α decay. See comment on %α for ^{166}Re g.s. In ^{166}Re Adopted Levels.

1992Me10: sources from ^{141}Pr(^{32}S,pxn), E=204 MeV; measured Eγ, Iγ, K x ray–γ coin, γγ coin, Eα (^{166}Re), γ excitation functions, γ(t), α(t). Isotopic identification from excit and cross bombardments.

The partial decay scheme is taken from 1992Me10. It has not been normalized because Q(ε) is large (≈10 MeV) and the scheme is almost certainly very incomplete.

^{166}W Levels

E(level)†	Jπ‡
0.0	0+
252.3 *2*	2+
676.2 *3*	4+
1226.4 *3*	6+

† From Eγ.
‡ From Adopted Levels.

β^+,ε Data

Eε	E(level)
(8814†)	1226.4
(9364†)	676.2
(9788†)	252.3

† Existence of this branch is questionable.

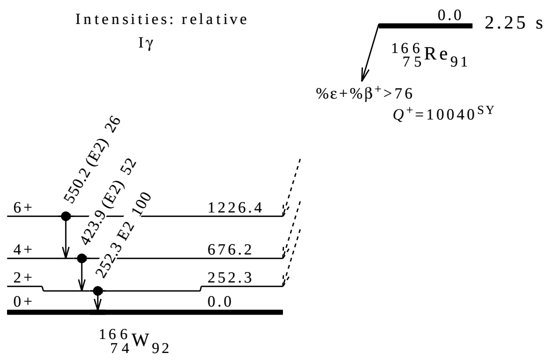
γ(^{166}W)

Eγ†	E(level)	Iγ†	Mult.‡	α	Comments
252.3 *2*	252.3	100	E2	0.1447	α(K)=0.0903 *13*; α(L)=0.0414 *6*; α(M)=0.01020 *15*; α(N+..)=0.00277 *4*. α(N)=0.00242 *4*; α(O)=0.000346 *5*; α(P)=7.49×10^{-6} *11*. Coincident with K x ray(W).
423.9 *2*	676.2	52 *6*	(E2)	0.0321	α(K)=0.0237 *4*; α(L)=0.00639 *9*; α(M)=0.001529 *22*; α(N+..)=0.000421 *6*. α(N)=0.000364 *6*; α(O)=5.46×10^{-5} *8*; α(P)=2.14×10^{-6} *3*. Coincident with K x ray(W) and $\gamma^{\pm}$.
550.2 *2*	1226.4	26 *4*	(E2)	0.01661	α(K)=0.01289 *18*; α(L)=0.00286 *4*; α(M)=0.000675 *10*; α(N+..)=0.000187 *3*. α(N)=0.0001611 *23*; α(O)=2.47×10^{-5} *4*; α(P)=1.184×10^{-6} *17*.

† From 1992Me10.
‡ From Adopted Gammas.

^{166}Re ε Decay 1992Me10 (continued)

Decay Scheme



^{170}Os α Decay 1996Pa01,1995Hi02,1982En03

Parent ^{170}Os: E=0; Jπ=0+; $T_{1/2}$=7.37 s *18*; Q(g.s.)=5539 *3*; %α decay=9.5 *10*.
^{170}Os–%α decay: from weighted average of %α(to ^{166}W g.s.)=12 *1* (1982En03), 8.6 *6* (1996Pa01), 10 *3* (2004GoZZ). The unweighted average is 10.2 *10*. Others: %α=3 estimated by 1978Sc26 based on comparison of measured α intensities and calculated excitation function for reaction producing ^{170}Os; %α=5 *1* (1995Hi02, assuming 162γ and 216γ in ^{170}Re are M1), or %α=9 *2* (1995Hi02, neglecting internal conversion of 162γ and 216γ).
Parent $T_{1/2}$=7.37 s *18* from weighted average of 7.2 s *2* (2004GoZZ, α(t)) 9.0 s *10* (1996Pa01), 7.9 s *3* (1995Hi02, from α(t)), 8.5 s *5* (1995Hi02, from 216γ(t)), 9.3 s *16* (1995Hi02, from 162γ(t)), 6.9 s *8* (1984Sc06), 7.1 s *2* (1982En03), 7.1 s *5* (1972To06). Other: 4.0 s *2* (1978Sc26). The unweighted average is 7.9 s *3*.

^{166}W Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	0+	19.2 s *6*	Jπ,$T_{1/2}$: from Adopted Levels.

α radiations

Eα	E(level)	Iα†§	HF‡	Comments
5407.1 *24*	0.0	97 *3*	1.0	Eα: weighted average of 5410 *5* (2004GoZZ), 5407 *10* (2002Ro17), 5408 *15* (2002Ro17), 5403 *7* (1995Hi02), 5393 *8* (1984Sc06), 5411 *4* (1982De11), 5405 *10* (1982En03), 5403 *10* (the 5400 *10* datum of 1972To06, after adjustment by 1991Ry01). Other Eα: 5400 *10* (1978Sc26) for line with discrepant $T_{1/2}$. Eα=5406 *3* implies Q(α)=5537.4 *24* cf. 5539 *3* in 2003Au03.

† This is the only α observed. Were there a 5161α to the 2+ 252 level of ^{166}W, the requirement that HF exceed 1 implies that its intensity must be <6% of all ^{170}Os α decays. Consequently, the evaluator adopts 97 *3* for I(g.s.)/Iα(total).
‡ r_0=1.560 *6* from HF=1 for α to ^{166}W g.s., consistent with r_0 systematics for W.
§ For α intensity per 100 decays, multiply by 0.095 *10*.

^{106}Pd(^{63}Cu,p2nγ) 1992Si12

1992Si12 (supersedes 1990HaZP): E(^{63}Cu)=285, 290 MeV; self–supporting foil targets. POLYTESSA array (20 Ge detectors with BGO suppression shields), θ=101°, 117°, 143°, recoil separator; measured Eγ, Iγ, γγ coin, recoil–γ coin, DCO ratios (Iγ(40°,40°)/Iγ(40°,79°) and, from recoil–gated spectrum, Iγ(40°)/Iγ(79°)). TESSA3 array (16 Ge detectors with 50–element inner ball of BGO detectors), θ=30°, 60°, 90°, 120°, 150°; measured Eγ, Iγ, γγ coin, feeding transition DCO ratios Iγ(30°,30°)/Iγ(30°,90°). Cranked shell model calculations.

^{106}Pd(^{63}Cu,p2nγ) 1992Si12 (continued)

^{166}W Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0§	0+	3030.6§ *23*	12+	5851# *3*	21−
252.0§ *10*	2+	3174.1# *23*	13−	6169@ *3*	22−
675.9§ *15*	4+	3356.1§ *25*	14+	6494# *4*	(23−)
1225.9§ *17*	6+	3474.1@ *24*	14−	6494.1§ *40*	24+
1587.0# *17*	5−	3720.3# *25*	15−	6811?@ *4*	(24−)
1864.6§ *18*	8+	3821§ *3*	16+	7168?# *4*	(25−)
1928.1# *17*	7−	4127@ *3*	16−	7314§ *4*	26+
2019.9@ *18*	6−	4376# *3*	17−	7519?@ *4*	(26−)
2337.3# *18*	9−	4389§ *3*	18+	7915?# *4*	(27−)
2349.2@ *18*	8−	4870@ *3*	18−	8186§ *4*	28+
2550.9§ *21*	10+	5028§ *3*	20+	8290?@ *4*	(28−)
2573.0@ *19*	10−	5112# *3*	19−	8723?# *4*	(29−)
2743.5# *21*	11−	5579@ *3*	20−	9108§ *4*	30+
2946.4@ *22*	12−	5729§ *4*	22+	10077?§ *4*	(32+)

† From least–squares fit to Eγ, assigning an uncertainty of 1 keV to all data.
‡ Authors' values, based on measured DCO ratios and deduced band structure.
§ (A): Yrast 0+ g.s. band. Becomes (ν 3/2[651])^2 band at ħω=262 keV *4*.
# (B): (ν 3/2[651])(ν 3/2[521]), α=+1/2 band. Crossed by 4 quasineutron (3/2[651])^2(3/2[521])(1/2[660]) band at ħω=348 keV *4*. (AE band crossed by AEBC band).
@ (C): (ν 3/2[651])(ν 3/2[521]), α=−1/2 band. Crossed by 4 quasineutron (3/2[651])^2(3/2[521])(1/2[660]) band at ħω=336 keV *4*. (AF band crossed by AFBC band).

γ(^{166}W)

Eγ†	E(level)	Iγ‡	Mult.§	Comments
223.8	2573.0	11.1 *11*		DCO1=0.87 *10*, DCO2=0.89 *14*, DCO3=0.74 *5*.
235.7	2573.0	8.2 *8*	D	DCO1=0.50 *4*, DCO2=0.69 *7*, DCO3=0.80 *5*.
252.0	252.0	100.0 *16*		DCO1=0.76 *3*, DCO2=0.82 *4*, DCO3=0.83 *2*.
325.5	3356.1	41.3 *16*	Q	DCO1=1.01 *4*, DCO2=1.01 *8*, DCO3=0.99 *3*.
329.3	2349.2	6.8 *14*	Q	DCO1=0.90 *13*, DCO2=0.95 *16*, DCO3=1.04 *9*.
341.1	1928.1	9.7 *6*	Q	DCO1=0.96 *10*, DCO2=0.92 *12*, DCO3=0.97 *6*.
373.4	2946.4	10.9 *6*	Q	DCO1=0.89 *8*, DCO2=1.09 *8*, DCO3=0.90 *5*.
406.2	2743.5	21.7 *12*	Q	DCO1=1.05 *8*, DCO2=0.93 *6*, DCO3=0.99 *4*.
409.1	2337.3	26.7 *14*	Q	DCO1=0.86 *9*, DCO2=0.92 *5*, DCO3=0.91 *3*.
421.1	2349.2	6.2 *10*		
423.9	675.9	100.0	Q	DCO1=0.89 *4*, DCO2=0.89 *4*, DCO3=0.89 *2*.
430.6	3174.1	19.5 *11*	Q	DCO1=0.99 *7*, DCO2=0.93 *7*, DCO3=1.17 *6*.
432.8	2019.9	3.9 *10*		
465.2	3821	37.4 *15*	Q	DCO1=1.02 *4*, DCO2=1.08 *5*, DCO3=1.10 *3*.
472.7	2337.3	7.1 *6*	D	DCO1=0.51 *6*, DCO2=0.52 *5*, DCO3=0.57 *5*.
479.7	3030.6	41.6 *16*	Q	DCO1=0.90 *4*, DCO2=0.97 *4*, DCO3=1.05 *3*.
527.7	3474.1	10.7 *10*	Q	DCO2=1.09 *14*, DCO3=1.07 *6*.
546.2	3720.3	17.6 *18*	Q	DCO1=0.97 *9*, DCO2=0.94 *16*, DCO3=0.94 *5*.
550.0	1225.9	89.3 *20*	Q	DCO1=1.03 *4*, DCO2=1.00 *5*, DCO3=0.94 *2*.
568.0	4389	32.0 *16*	Q	DCO1=0.90 *5*, DCO2=1.08 *5*, DCO3=0.99 *4*.
589.7	6169	5.4 *16*	Q	DCO2=1.08 *14*, DCO3=1.24 *11*.
638.8	1864.6	53 *3*		DCO1=1.06 *4*, DCO2=1.05 *6*, DCO3=0.95 *3*; for doublet.
	5028	24.4 *18*		DCO1=1.06 *4*, DCO2=1.05 *6*, DCO3=0.95 *3*; for doublet.
641.7#	6811?	3.8 *16*		
642.6	6494	8.4 *12*		
652.7	4127	10.4 *14*	Q	DCO1=0.95 *13*, DCO2=1.07 *17*, DCO3=1.04 *9*.
655.8	4376	14.2 *16*	Q	DCO1=0.99 *14*, DCO2=1.09 *19*, DCO3=1.12 *9*.
674.2#	7168?	5.1 *8*	Q	DCO2=1.02 *14*, DCO3=1.18 *18*.
686.3	2550.9	43.3 *16*	Q	DCO1=1.07 *6*, DCO2=1.02 *5*, DCO3=1.08 *3*.
701.1	5729	14.6 *8*	Q	DCO1=0.90 *8*, DCO2=1.06 *9*.
702.2	1928.1	22.9 *18*	D	DCO1=0.56 *7*, DCO2=0.60 *13*.
708.8	5579	9.3 *16*		DCO1=0.90 *8*, DCO2=1.16 *20*, DCO3=0.92 *15*; for doublet.
	7519?	9.3 *16*		DCO1=0.90 *8*, DCO2=1.16 *20*, DCO3=0.92 *15*; for doublet.
736.0	5112	10.5 *20*	Q	DCO2=1.02 *20*.
739.3	5851	8.6 *20*		DCO2=1.2 *3*.

Continued on next page (footnotes at end of table)

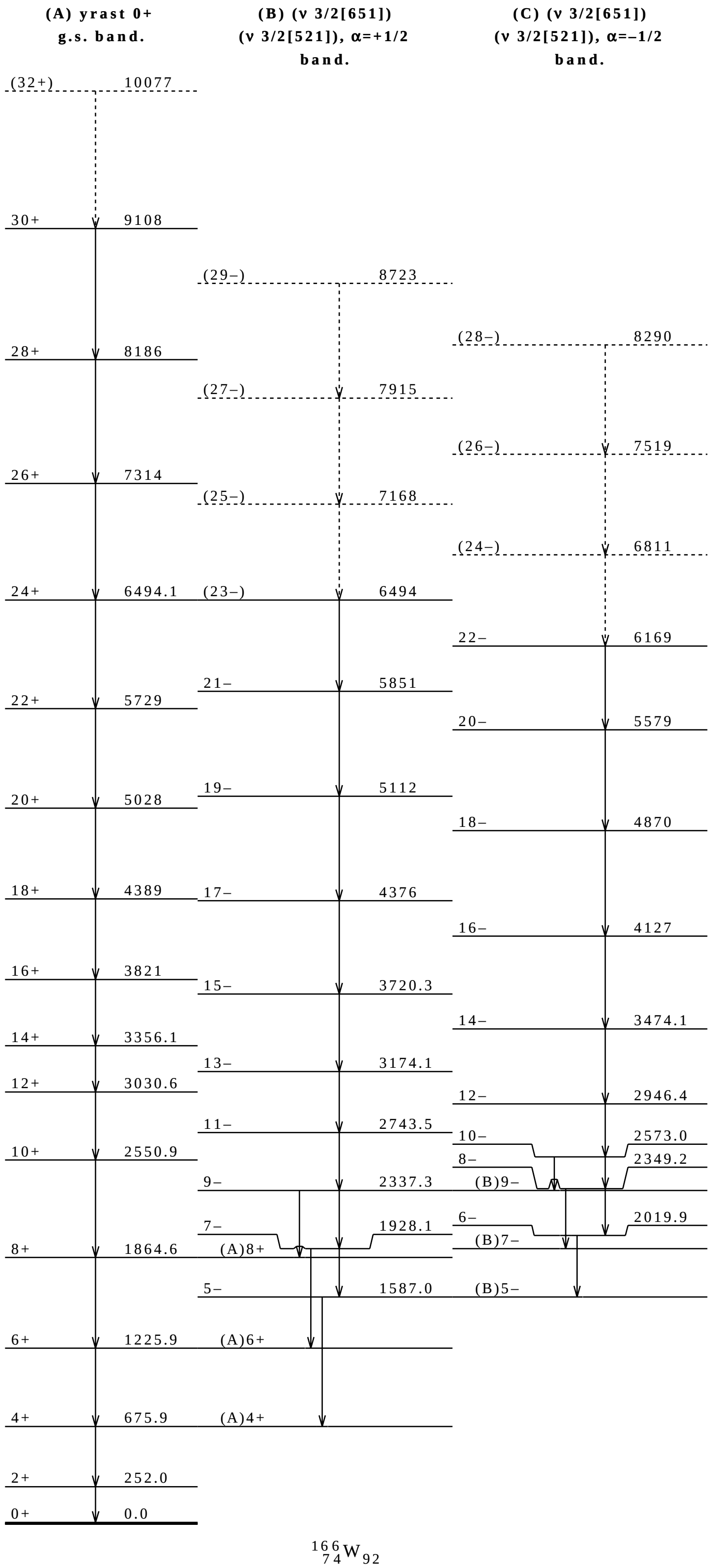
^{106}Pd(^{63}Cu,p2nγ) 1992Si12 (continued)

γ(^{166}W) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	Comments
743.7	4870	8.9 *18*	Q	DCO2=1.2 *3*, DCO3=1.01 *11*.
746.5#	7915?	4.4 *12*		
765.1	6494.1	10.3 *10*	Q	DCO1=0.92 *8*, DCO2=0.98 *8*, DCO3=1.04 *7*.
770.5#	8290?	1.9 *10*		
808.2#	8723?	3.0 *12*		
819.8	7314	7.4 *8*	Q	DCO2=0.98 *13*.
871.6	8186	3.9 *6*	Q	DCO1=1.10 *20*, DCO2=1.08 *13*.
911.1	1587.0	10.2 *6*	D	DCCO=0.55 *7*, DCO2=0.61 *13*, DCO3=0.64 *6*.
922.6	9108	2.5 *5*		DCO2=0.97 *22*.
968.8#	10077?	1.8 *5*		

† Uncertainties unstated by 1992Si12.
‡ Relative photon intensity for E(^{63}Cu)=285 MeV, normalized so Iγ(423.9)=100.
§ Based on measured DCO1=Iγ(30°,30°)/Iγ(30°,90°), DCO2=Iγ(40°,40°)/Iγ(40°,79°) and/or DCO3=Iγ(40°)/Iγ(79°) recoil gated. For all three ratios, values of 0.5 and 1.0 are expected for stretched D and stretched Q (or D, ΔJ=0) transitions, respectively.
# Placement of transition in the level scheme is uncertain.

$^{106}Pd(^{63}Cu,p2n\gamma)$ 1992Si12 (continued)

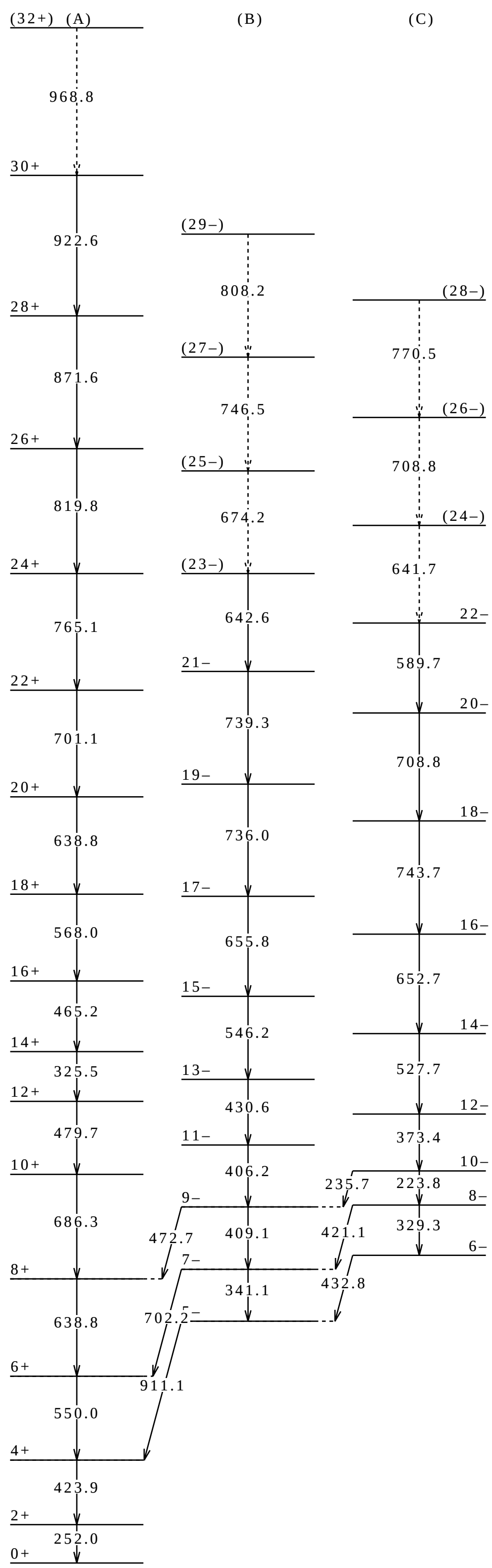


CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

^{106}Pd(^{63}Cu,p2nγ) 1992Si12 (continued)

Bands for ^{166}W

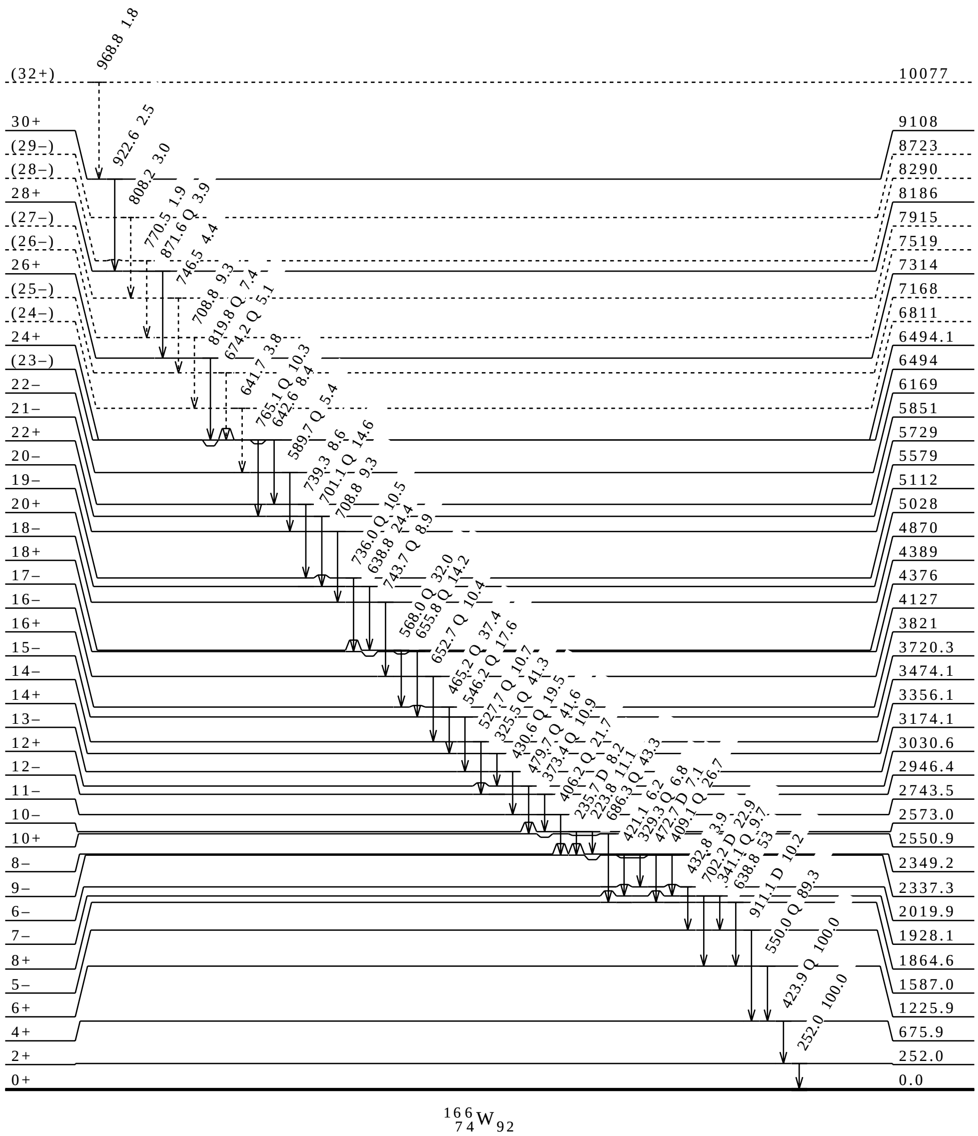


$^{166}_{74}W_{92}$

^{106}Pd(^{63}Cu,p2nγ) 1992Si12 (continued)

Level Scheme

Intensities: relative Iγ



CITATION:
Nuclear Data Sheets (1992)

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program ENSDAT

^{142}Nd(^{28}Si,4nγ) 1985Ge05

^{142}Nd(^{28}Si,4nγ), E=150 MeV; stacked foil target, chopped beam; measured Eγ, Iγ(θ) (6 angles, θ=0°–90°), γγ coin, γX–ray coin. Compton–suppressed detectors.

^{166}W Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0§	0+	2551.3§ *5*	10+	4388.1§ *9*	18+
251.7§ *2*	2+	2742.2# *9*	11(−)	5027.0§ *11*	20+
675.4§ *3*	4+	3030.9§ *5*	12+	5114.0# *14*	(19)
1225.6§ *4*	6+	3172.7# *10*	13(−)	5728.8§ *12*	(22)
1587.0# *5*	5(−)	3355.9§ *6*	14+	6492.1§ *13*	(24)
1864.5§ *4*	8+	3721.8# *12*	(15)	7312.4§ *14*	(26)
1928.2# *6*	7(−)	3821.0§ *8*	16+		
2333.4# *8*	9(−)	4377.8# *13*	(17)		

† From least–squares fit to Eγ.
‡ Authors' values, based on measured γ(θ) and deduced band structure.
§ (A): Yrast π=+ band.
\# (B): π=– sideband.

γ(^{166}W)

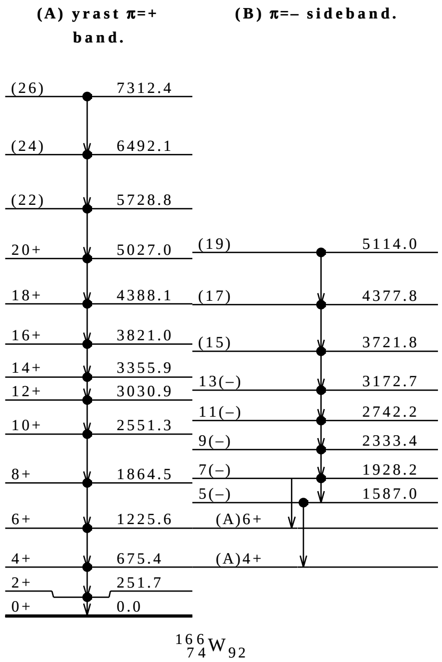
Eγ†	E(level)	Iγ	Mult.‡	Comments
251.7 *2*	251.7	100	E2	Mult.: Q from A_2=+0.17 *3*, A_4=−0.09 *2*; not M2 from intensity balance at the 252 level.
325.0 *2*	3355.9	33 *1*	Q	A_2=+0.17 *5*, A_4=−0.10 *5*.
341.0 *5*	1928.2	8.2 *8*		A_2=+0.7 *2*, A_4=−0.3 *2*.
405.2§ *5*	2333.4	23§ *4*		A_2=+0.21 *5*, A_4=−0.15 *5* for contaminated γ.
408.8 *5*	2742.2	28 *3*		A_2=+0.3 *1*, A_4=−0.1 *1*.
423.7 *2*	675.4	86 *4*	Q	A_2=+0.19 *4*, A_4=−0.08 *5*.
430.5 *5*	3172.7	13 *1*		A_2=+0.20 *9*, A_4=−0.1 *1*.
465.1 *5*	3821.0	22 *2*		A_2=+0.27 *8*.
479.6 *2*	3030.9	38 *2*		A_2=+0.20 *6*, A_4=−0.7 *6*.
549.1@ *5*	3721.8	11@ *1*		A_2=+0.19 *2*, A_4=−0.06 *3* for doublet.
550.2@ *2*	1225.6	68@ *1*		A_2=+0.19 *2*, A_4=−0.06 *3* for doublet.
567.1# *5*	4388.1	16# *4*		A_2=+0.26 *9*.
638.9@ *2*	1864.5	52@ *2*		A_2=+0.14 *4*, A_4=−0.07 *4* for doublet.
638.9@ *5*	5027.0	11@ *4*		A_2=+0.14 *4*, A_4=−0.07 *4* for doublet.
656.0 *5*	4377.8	9 *2*		A_2=+0.4 *1*.
686.8 *2*	2551.3	48 *2*	Q	A_2=+0.18 *5*, A_4=−0.11 *5*.
701.8§ *5*	5728.8	8§ *3*		
702.7 *5*	1928.2	21 *4*	D	A_2=−0.3 *2*.
736.2# *5*	5114.0	5# *2*		
763.3 *5*	6492.1	4 *1*		
820.3 *5*	7312.4	3 *1*		
911.5 *5*	1587.0	14 *1*	D	A_2=−0.20 *7*, A_4=−0.17 *8*.

† 1985Ge05 report ΔE_γ=0.2 keV for strong lines (interpreted by the evaluator as those with Iγ>30) and 0.5 keV for weak lines.
‡ Based on γ(θ), except as noted.
§ From coincidence data; contaminated by ^{167}W γ in singles spectrum.
\# From coincidence data; contaminated by impurity line in singles spectrum.
@ From coincidence data. Unresolved doublet in singles data.

CITATION:
Nuclear Data Sheets (1992)

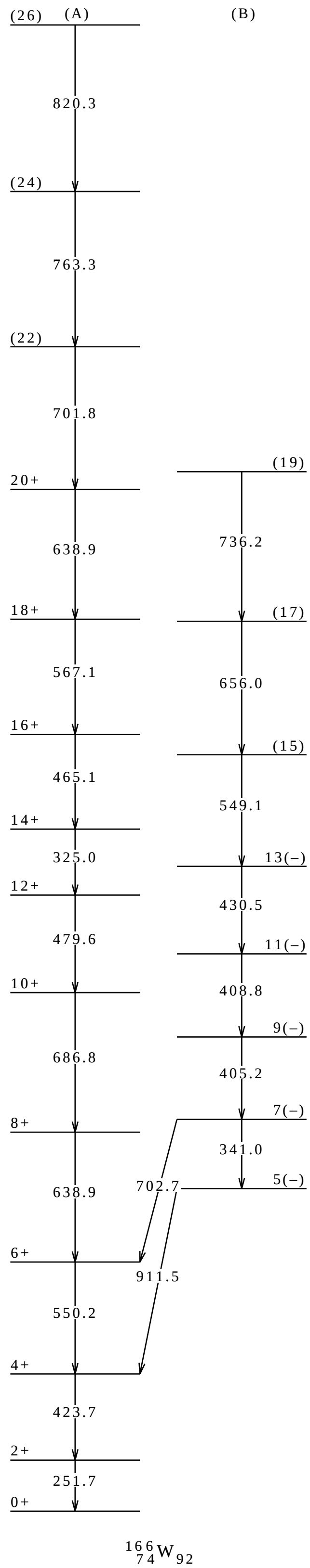
From NNDC(BNL)
program ENSDAT

$^{142}Nd(^{28}Si,4n\gamma)$ 1985Ge05 (continued)



^{142}Nd(^{28}Si,4nγ) 1985Ge05 (continued)

Bands for ^{166}W



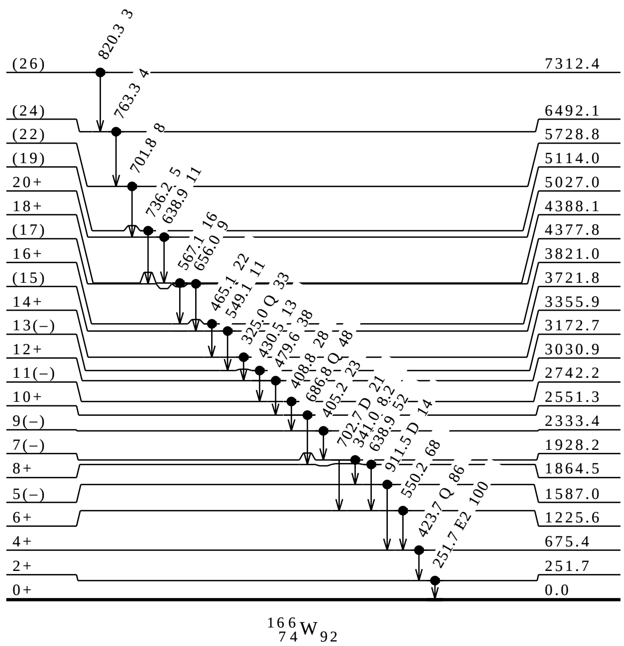
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{142}Nd(^{28}Si,4n\gamma)$ 1985Ge05 (continued)

Level Scheme

Intensities: relative Iγ



CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas

Q(β⁻)=–6410 *SY*; S(n)=9260 *SY*; S(p)=280 *SY*; Q(α)=5510 *SY* 2003Au03.
Uncertainty in Q(β⁻), S(n), S(p) and Q(α) is 90, 90, 90 and 70, respectively (2003Au03).
Q(α): 2003Au03 deduce Q(α) from Eα in ^{166}Re α–decay (1992Me10 and 1996Pa01) assuming an E(level)=150 *50* to g.s. transition. If, instead, it were a g.s. to g.s. transition, those two measurements would imply Q(α)=5657 *16*.
Assignment: ^{93}Nb(^{84}Kr,α7n), ^{89}Y(^{84}Kr,7n), E=5.1 to 5.5 MeV/u and 5.8 to 6.4 MeV/u, excit (1978Sc26); ^{141}Pr(^{32}S,pxn), E=204 MeV, excit (1992Me10).

^{166}Re Levels

Cross Reference (XREF) Flags

A ^{170}Ir α Decay (0.87 s)
B ^{170}Ir α Decay (811 ms)

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
0.0	‡	A	2.25 s§ *21*	%α<24; %ε+%β⁺>76. %α: both α decay and ε decay have been observed, but the branching has not been measured. Based on a comparison of excitation function data for the various nuclides they studied, 1978Sc26 estimate 30≤%α(^{166}Re)≤100. However, based on $T_{1/2}$ and assuming r_0(^{162}Ta)=1.562 *3* (unweighted average of r_0=1.567 *24* (^{160}Hf), 1.556 *16* (^{162}W), 1.563 *11* (^{164}W) from 1998Ak04), %α<24 for HF>1 if a g.s. to g.s. transition is assumed and %α<6 if Q(α)=5510 *70* from 2003Au03; further, if this is an unhindered decay, HF<4 would imply %α>6 or >1.35 respectively, for these two Q(α) possibilities. The evaluator adopts an upper limit of 24 for %α, implying %ε+%β⁺>76 since p decay is not expected (S(p)>0 from 2003Au03). The much higher estimate of %α in 1978Sc26 might be unreliable due to the similarity of both Eα and $T_{1/2}$ for the ^{166}Re and ^{165}Re decays.
0.0+x		B		E(level): it is not known whether this is the g.s. or an excited state.
0.0+y	(3–)	A		E(level): this may or may not be the g.s.; if it is, y=0. However, a comparison of Eα from low–spin ^{170}Ir α decay with Q(α) from systematics (2003Au03) suggests that it is not. Jπ: α decay is possibly unhindered (HF=4.4 *18*) from (3–) low–spin isomer in ^{170}Ir.
53+x		B		E(level): an alternative value of 69+x is possible because the order of the 53γ and the 69γ has not been established. π probably opposite to π(0+x) level based on (E1) 53γ to 0.0+x level.
65+x		B		π probably same as π(0+x) level based on (E1) 110γ from 175+x level.
75+x		B		E(level): 70+x 14 from energy difference between possible α group feeding this level and the 6121α feeding the 0+x level. π probably same as π(0+x) level based on (M1) 75γ to 0.0+x level.
122+x		B		E(level): 117+x 12 from energy difference between possible α group feeding this level and the 6121α feeding the 0+x level. π probably opposite to π(0+x) level based on (E1) 122γ to 0.0+x level.
175+x		B		E(level): 174+x 14 from energy difference between possible α group feeding this level and the 6121α feeding the 0+x level. π probably opposite to π(0+x) level based on (E1) 175γ to 0.0+x level.

† From Eγ, except as noted.
‡ The lowest–energy orbitals available for the 75th proton are probably 1/2[411] ($d_{3/2}$) and 9/2[514] ($h_{11/2}$) based on possible Jπ=(1/2+) and (9/2–) for the g.s. of ^{165}Re and ^{167}Re, respectively; the lowest–energy neutron orbital available to the 91st neutron is probably 5/2[523] ($f_{7/2}$) based on Jπ=(5/2–) for the g.s. of the isotone ^{165}W (1995Hi02). If the deformation is large enough for the Gallagher–Moszkowski rule to be valid, low–lying 3– and 7+ states might be expected, but no low–lying isomeric excited state has been identified in ^{166}Re as yet. ε decay to ^{166}W indicates an intensity imbalance at each of the 2+, 4+ and 6+ levels observed so far; this is probably the result of a very incomplete decay scheme, so this provides no useful indication of Jπ(g.s.) for ^{166}Re. The possibility that the 0+x or the 0+y level is, in fact, the g.s. cannot be ruled out.
§ Weighted average of 2.23 s *27* from 252γ(t) and 2.28 s *34* from 424γ(t) in ε decay (1992Me10). Other data: 2.2 s *4* (1978Sc26, for Eα=5495 *10*); 1.9 s *11* (1992Me10, for Eα=5501 *13*; however, A=165 contribution cannot be ruled out); the Eα=5506 *10*, 2.4 s *6* line assigned by 1981Ho10 to ^{165}Re has $T_{1/2}$ and Eα consistent with those for ^{166}Re (to which 1978Sc26 assign their 5495 *10* line and 1982De11 assign their 5527 *4* line) but 1996Pa01 confirm its assignment to ^{165}Re. $T_{1/2}$=2.8 s *3* (1984Sc06, for Eα=5372 *10*) was assigned by those authors to ^{166}Re, but neither 1992Me10 nor 1996Pa01 see this line so the evaluator presumes it to have been misassigned. Note that the assignment of this $T_{1/2}$ to the ^{166}Re g.s. here is at variance with the assumption in 2003Wa32 that the observed ^{166}Re α decay takes place from an excited state, unless both states have comparable $T_{1/2}$.

Adopted Levels, Gammas (continued)

γ(^{166}Re)

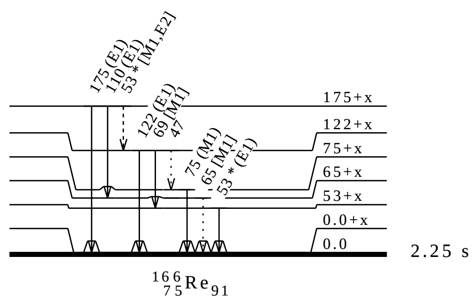
E(level)	Eγ[†]	Mult.[‡]	α	Comments
53+x	53[§]	(E1)	0.410	See comments on 53γ from 175+x level.
65+x	(65)	[M1]	3.12	Eγ,Mult.: γ expected to form a cascade with 110γ to 0+x level in ^{170}Ir α decay (811 ms); may be a highly–converted transition because transition is not evident in relevant α–γ coin spectrum, so 2007Ha45 suggest M1 multipolarity, consistent with level scheme.
75+x	75	(M1)	11.75	Mult.: suggested in ^{170}Ir α decay (811 ms) based on 6053α–γ coin spectrum which includes significant I(K x ray) attributed to internal conversion of the 75γ; analogous to authors' observations for known M1 92γ from ^{171}Re α decay.
122+x	(47)			Eγ: highly tentative; however, observation of 2007α–75γ coin (2007Ha45) suggests the existence of a transition connecting the 122+x and 75+x levels and such a transition may be too highly converted to be seen in α–γ coincidence spectrum. Level scheme implies Δπ=(yes), suggesting a multipolarity of M2 or higher.
	69	[M1]	2.62	
	122	(E1)	0.229	Mult.: since I(75γ)/I(Kα x ray) in ^{170}Ir α decay (811 ms) is approximately the same in spectra gated by the 6053α and by the 6007α, 2007Ha45 conclude that the 122γ is probably E1 since it provides no significant contribution to K x ray peak's intensity via internal conversion.
175+x	53[§#]	[M1,E2]	40 *40*	This second placement of 53γ is suggested by energy difference between 175γ and 122γ that deexcite the same level. Mult.: assumed, based on level scheme; however, I(53γ)/I(122γ) in ^{170}Ir α decay (811 ms) is approximately the same in the spectra gated by 5951α or by the 6007α (2007Ha45). Authors favor M1 multipolarity for this component and E1 for the other.
	110	(E1)	0.300	Mult.: based on an argument similar to that used by 2007Ha45 to assign multipolarity to 122γ.
	175	(E1)	0.0906	Mult.: based on an argument similar to that used by 2007Ha45 to assign multipolarity to 122γ.

† From ^{170}Ir α decay (811 ms); uncertainties unstated by authors.
‡ Very tentative values from arguments based on γ and K x ray intensities in α–γ coin spectra in ^{170}Ir α decay (811 ms), except as noted.
§ Multiply placed.
# Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Level Scheme

* Multiply placed



^{170}Ir α Decay (0.87 s) 2004GoZZ,2002Ro17,1996Pa01

Parent ^{170}Ir: E=0.0; Jπ=(3–); $T_{1/2}$=0.87 s *+18–12*; Q(g.s.)=6110 syst; %α decay=5.2 *17*.

^{170}Ir–%α decay: from %α=5.2 *17* for 5815α in 2002Ro17.

1996Pa01: ^{170}Ir produced in 354 MeV ^{70}Ge bombardment of ^{106}Cd; measured Eα, α(t), parent–daughter α correlations.

2002Ro17: ^{170}Ir produced by α decay of ^{174}Au; Si strip detector; measured Eα, parent–daughter α correlations, $T_{1/2}$ for ^{170}Ir.

2004GoZZ: ^{170}Ir from α decay of ^{174}Au produced by ^{92}Mo(^{84}Sr,pn) at E=390, 395 MeV; fragment mass analyzer and double–sided Si strip detector (for recoils and decay α particles) surrounded by 4 Ge detectors and a low–energy photon spectrometer; recoil decay tagging technique; measured Eα, Iα, recoil–α–γ coin, α(t), parent–daughter α correlations.

^{170}Ir α decay: please see summary tabulation of data from the two known ^{170}Ir isomer decays at the beginning of the ^{170}Ir α decay (811 ms) data set.

Adopted low–spin parent $T_{1/2}$: 0.87 s *+18–12* from 5815α(t) (2002Ro17). It is unclear whether any other observed α from ^{170}Ir also originates from the low–spin isomer. Eα=6045 *10* and Eα=6030 *10* (1978Sc26) each has a compatible $T_{1/2}$, but the 5815α, the only α from low–spin ^{170}Ir reported by 2002Ro17 or 2004GoZZ, was absent in the study by 1978Sc26. Eα=6027 *5* (1982De11) may be the same line that 1978Sc26 reported, but $T_{1/2}$ was not measured. The evaluator considers the 6045α, 6030α and 6027α to be of uncertain parentage.

^{166}Re Levels

E(level)	Jπ	Comments
0+x	(3–)	E(level): this may or may not be the g.s.; comparison of Eα with Q(α) from systematics (2003Au03) suggests that it is not. Jπ: α decay possibly unhindered from low–spin (3–) ^{170}Ir.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
5815 *4*	0+x	100	4.4 *18*	Eα: weighted average of 5815 *10* (2002Ro17) and 5815 *5* (2004GoZZ). This Eα would imply Q(α)=5955 *4* were this a g.s. to g.s. transition; this is 150 keV lower than 6110 *50* from systematics in 2003Au03. Correlated with α from low–spin isomer of ^{174}Au (2002Ro17, 2004GoZZ).

† r_0=1.5602 *23*, the unweighted average of r_0(^{166}W)=1.555 *9* and r_0(^{166}Os)=1.565 *3* (from this evaluation), and r_0(^{164}W)=1.563 *11* and r_0(^{168}Os)=1.558 *8* from 1998Ak04.

‡ For α intensity per 100 decays, multiply by 0.052 *17*.

^{170}Ir α Decay (811 ms) 2007Ha45,2004GoZZ,1996Pa01

Parent ^{170}Ir: E=0.0+x; Jπ=(8+); $T_{1/2}$=811 ms *18*; Q(g.s.)=6110 syst; %α decay=38 *5*.
^{170}Ir–%α decay: from weighted average of %α=36 *10* (1996Pa01) and %α=39 *6* (2004GoZZ). Note, however, that Eα values reported by 1996Pa01 and 2004GoZZ for one strong α differ from values from 2007Ha45.
Others: 1977Ca23, 1978Ca11, 1978Sc26, 1982De11, 2002Ro17.
1996Pa01: ^{170}Ir produced in 354 MeV ^{70}Ge bombardment of ^{106}Cd; measured Eα, parent–daughter α correlations.
2002Ro17: ^{170}Ir produced by α decay of ^{174}Au; Si strip detector; measured Eα, parent–daughter α correlations, $T_{1/2}$ for ^{170}Ir.
2004GoZZ: ^{170}Ir from α decay of ^{174}Au produced by ^{92}Mo(^{84}Sr,pn) at E=390, 395 MeV; fragment mass analyzer and double–sided Si strip detector (for recoils and decay α particles) surrounded by 4 Ge detectors and a low–energy photon spectrometer; recoil decay tagging technique; measured Eα, Iα, recoil–α–γ coin, α(t), parent–daughter α correlations.
2007Ha45: ^{170}Ir source from ^{112}Sn(^{60}Ni,pn), E(^{60}Ni)=266 MeV; 93% enriched, self–supporting target; JUROGAM spectrometer (43 EUROGAM type Compton–suppressed HPGe detectors) for prompt–γ detection; fusion–evaporation products selected using RITU gas–filled recoil separator and GREAT spectrometer (2 double–sided Si strip detectors, a multiwire proportional avalanche counter and an array of 28 Si PIN diode detectors); Ge detector near RITU focal plane to detect isomeric γ decay; measured Eγ, Eα, α–γ coin, γγ coin, α–recoil correlated γγ coin; Iγ and Iα not enumerated.

Summary of ^{170}Ir α decay data (for both isomers):

Eα	%α(Ir)	Half–life		Reference(s)	Correlation(s)
5815 *10*	5.2 *17*	0.87 s *+18–12*	L	2002Ro17	^{174}Au(6538α)
5815 *5*	–	–	L	2004GoZZ	^{174}Au(6547α)
5951 *10*	–	0.83 s *+6–5*	H	2007Ha45	–
6045 *10*	–	0.8 s *2*	?	1977ScYH	–
6030 *10*	–	1.05 s *15*	?	1978Sc26	–
6027 *5*	–	–	?	1982De11	–
6010 *10*	–	1.1 s *2*	H?	1977Ca23,1978Ca11	–
6003 *10*	–	–	H	1996Pa01	^{166}Re(5515α)
6007 *10*	–	0.802 s *+30–28*	H	2007Ha45	–
6053 *10*	–	0.826 s *+30–28*	H	2007Ha45	–
6083 *11*	36 *10*	0.83 s *30*	H?	1996Pa01	–
6082	–	0.43 s *5*	?	2002Ro17	^{174}Au(6544α#)
6088 *5*	39 *6*	0.82 s *3*	H?	2004GoZZ	^{174}Au(6433α, 6471α, 6618α)
6121? 10	–	0.80 s *6*	H	2007Ha45	–

\# consistent with 2004GoZZ if this is assumed to be the sum peak from 6471α(^{174}Au)–153ce(^{170}Ir) coin.
L – associated with low–spin ^{170}Ir decay.
H – associated with high–spin ^{170}Ir decay.

Parent $T_{1/2}$: 811 ms *18* is the authors' recommended value from 2007Ha45, based on the following α(t) data: 802 ms *+30–28* (6007α), 826 ms *+30–28* (6053α), 830 ms *+58–53* (5951α), 801 ms *+63–57* (6121α). Others: 0.43 s *5* (2002Ro17, 6082α), 0.83 s *30* (1996Pa01, 6083α), 0.82 s *3* from 6088α(t) (2004GoZZ; from table 5.1, but note that fig. 6.7 shows 0.82 s *2*). The result from 2002Ro17 is inconsistent and the reason for this is not understood. 0.8 s *2* (1977ScYH, 6045α), 1.05 s *15* (1978Sc26, 6030α) and 1.1 s *2* (1977Ca23 and 1978Ca11, 6010α) are reported for lines whose parentage the evaluator considers to be unclear.

^{166}Re Levels

E(level)†	Comments
0.0+x	
53+x	E(level): an alternative value of 69+x is possible because the order of the 53γ and the 69γ could not be established (2007Ha45).
65+x	
75+x	Other E: 70+x 14 from energy difference between α group feeding this level and the possible 6121α feeding the 0+x level.

Continued on next page (footnotes at end of table)

^{170}Ir α Decay (811 ms) 2007Ha45,2004GoZZ,1996Pa01 (continued)

^{166}Re Levels (continued)

E(level)†	Comments
122+x	Other E: 119+x 12 from energy difference between α group feeding this level and the possible 6121α feeding the 0+x level.
175+x	Other E: 174+x 14 from energy difference between α group feeding this level and the possible 6121α feeding the 0+x level.

† From least–squares fit to Eγ.

α radiations

Eα	E(level)	Comments
5951 *10*	175+x	Eα: reported by 2007Ha45 only. Coincident with 110γ and 175γ as well as 53γ, 75γ and 122γ.
6005 *7*	122+x	Eα: weighted average of 6003 *10* (1996Pa01) and 6007 *10* (2007Ha45). Other: 6010 *10* (1977Ca23, 1978Ca11); however, this α has $T_{1/2}$=1.1 s *2*, somewhat longer than value adopted for ^{170}Ir high spin isomer. 6003α correlated with 5533α from ^{166}Re (1996Pa01). Strong coincidence with 122γ as well as 53γ, 69γ, 75γ (2007Ha45).
6053 *10*	75+x	Eα: from 2007Ha45. Other Eα: 6088 *5* (2004GoZZ), 6083 *11* (1996Pa01), 6082 (2002Ro17); the inconsistency between these data and the adopted Eα=6053 *10* is troubling and unexplained. Correlated with 6544α from ^{174}Au (1996Pa01); correlated with 6433α, 6471α and 6618α from high–spin ^{174}Au (2004GoZZ). No correlation with α decay from ^{166}Re was observed (1996Pa01). Coincident with 75γ and Re K x ray.
6121# *10*	0.0+x	Eα: from 2007Ha45 only; shown as tentative because authors cannot rule out the possibility that this is a sum peak arising from 6053α+ce(L)(75γ) and/or 6007α+ce(L)(122γ). No coincidence with γ or Re(K x ray) observed by 2007Ha45.

Existence of this branch is questionable.

γ(^{166}Re)

Eγ†	E(level)	Mult.	α	Comments
(47)	122+x			Eγ,Mult.: highly tentative γ; however, observation of 6005α–75γ coin (2007Ha45) suggests the existence of a transition connecting the 122+x and 75+x levels and such a transition may be too highly converted to be seen in the α–γ coincidence spectrum. However, level scheme suggests Δπ=(yes) so multipolarity of M2 or higher may be implied.
53‡	53+x	(E1)	0.410	α(L)=0.317 *5*; α(M)=0.0732 *11*; α(N+..)=0.0199 *3*. α(N)=0.01723 *25*; α(O)=0.00258 *4*; α(P)=0.0001057 *15*. See comments on 53γ from 175+x level.
	175+x	[M1,E2]	40 *40*	α(L)=28 *24*; α(M)=7 *6*; α(N+..)=1.9 *17*. Mult.: assumed, based on level scheme; however, I(53γ)/I(122γ) is approximately the same in the spectra gated by the 5951α and by the 6007α (2007Ha45). Authors favor M1 multipolarity for this component and E1 for the other. This second placement of 53γ is suggested by energy difference between 175γ and 122γ (2007Ha45).
(65)	65+x	[M1]	3.12	α(L)=2.41 *4*; α(M)=0.551 *8*; α(N+..)=0.1578 *22*. α(N)=0.1337 *19*; α(O)=0.0225 *4*; α(P)=0.001638 *23*. Mult.: expected by 2007Ha45 to form a cascade with 110γ to 0+x level. γ is absent in 5951α–γ spectrum; this may indicate significant conversion, and authors suggest M1 multipolarity, consistent with level scheme.
69	122+x	[M1]	2.62	α(L)=2.02 *3*; α(M)=0.463 *7*; α(N+..)=0.1325 *19*. α(N)=0.1123 *16*; α(O)=0.0189 *3*; α(P)=0.001376 *20*. Eγ,Mult.: Eγ coincides with energy of Kβ x ray(Re) but peak is too strong relative to Kα x ray in 6007α–γ coin spectrum to be attributed entirely to Re Kβ x ray. Authors tentatively suggest M1 multipolarity based on the level scheme.
75	75+x	(M1)	11.75	α(K)=9.70 *14*; α(L)=1.588 *23*; α(M)=0.363 *5*; α(N+..)=0.1039 *15*. α(N)=0.0880 *13*; α(O)=0.01479 *21*; α(P)=0.001079 *16*. Mult.: suggested by 2007Ha45 based on 6053α–γ coin spectrum which includes significant I(K x ray) attributed to internal conversion of the 75γ; analogous to authors' observations for known M1 92γ from ^{171}Re α decay.

Continued on next page (footnotes at end of table)

^{170}Ir α Decay (811 ms) 2007Ha45,2004GoZZ,1996Pa01 (continued)

γ(^{166}Re) (continued)

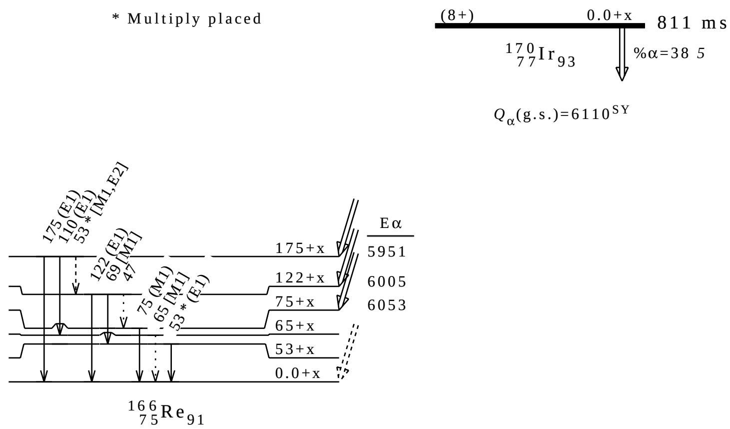
Eγ†	E(level)	Mult.	α	Comments
110	175+x	(E1)	0.300	α(K)=0.245 *4*; α(L)=0.0427 *6*; α(M)=0.00978 *14*; α(N+..)=0.00271 *4*. α(N)=0.00233 *4*; α(O)=0.000366 *6*; α(P)=1.90×10^{-5} *3*. Mult.: based on an argument similar to that used by 2007Ha45 to assign multipolarity to 122γ.
122	122+x	(E1)	0.229	α(K)=0.188 *3*; α(L)=0.0322 *5*; α(M)=0.00738 *11*; α(N+..)=0.00205 *3*. α(N)=0.001758 *25*; α(O)=0.000278 *4*; α(P)=1.479×10^{-5} *21*. Mult.: since I(75γ)/I(Kα x ray) is approximately the same in spectra gated by the 6053α and by the 6007α, 2007Ha45 conclude that the 122γ is probably E1 since it provides no significant contribution to K x ray peak's intensity via internal conversion.
175	175+x	(E1)	0.0906	α(K)=0.0748 *11*; α(L)=0.01223 *18*; α(M)=0.00279 *4*; α(N+..)=0.000782 *11*. α(N)=0.000668 *10*; α(O)=0.0001073 *15*; α(P)=6.19×10^{-6} *9*. Mult.: based on an argument similar to that used by 2007Ha45 to assign multipolarity to 122γ.

† From 2007Ha45; uncertainty unstated by authors.
‡ Multiply placed.
§ Placement of transition in the level scheme is uncertain.

^{170}Ir α Decay (811 ms) 2007Ha45,2004GoZZ,1996Pa01 (continued)

Decay Scheme

* Multiply placed



Adopted Levels, Gammas

Q(β^-)=−12230 *SY*; S(n)=11860 *SY*; S(p)=2070 *30*; Q(α)=6139 *4* 2003Au03.
Uncertainty in Q(β^-) and S(n) is 200 and 200, respectively (2003Au03).
Assignment: ^{106}Cd(^{63}Cu,p2n), ^{107}Ag(^{63}Cu,4n) E=400 MeV, excit (1978Ca11,1977Ca23).

^{166}Os Levels

Cross Reference (XREF) Flags

A ^{170}Pt α Decay
B ^{106}Cd(^{63}Cu,p2nγ)...
C ^{167}Ir p Decay (35.2 ms)
D ^{167}Ir p Decay (30.0 ms)
E ^{106}Cd(^{64}Zn,2p2nγ)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0#	0+§	ABCDE	199 ms *3*	%α=72 *13* (1981Ho10); %ε+%β^+=18 *13*. Jπ: even−even nucleus ground state. $T_{1/2}$: weighted average of 200 ms *7* (1996Pa01; 6000α(t)), 194 ms *17* (1991Se01) and 181 ms *38* (1981Ho10). Other: 0.3 s *1* (1978Ca11).
432.0# *3*	2+§	B E		Jπ: stretched E2 γ to 0+.
1021.0# *5*	4+§	B E		Jπ: stretched intraband Q γ to 2+; continuation of g.s. band.
1562.3@ *7*	(3−)	E		
1725.0# *7*	6+§	B E		Jπ: stretched intraband Q γ to 4+; continuation of g.s. band.
1931.3@ *7*	(5−)	E		
2351.3# *9*	8+§	B E		Jπ: stretched intraband Q γ to 6+; continuation of g.s. band.
2426.0?& *11*	(6−)	E		
2452.4@ *9*	(7−)	E		
3009.4# *12*	10+§	E		
3025.5?& *11*	(8−)	E		
3520.7# *13*	(12+)§	E		
3910.8?# *16*	(14+)§	E		

† From least−squares fit to adopted Eγ.
‡ Values given without comment are based on band structure deduced in ^{106}Cd(^{64}Zn,2p2nγ), similarities of band structure to that in ^{168}Os and on measured γ asymmetry.
§ Definite Jπ assigned for J≤10 g.s. band members based on Jπ=0+ for even−even nucleus g.s., mult=E2 for the J=2 to 0 432γ and stretched Q character for several other intraband transitions.
\# (A): Yrast band (2002Ap03). g.s. band crossed at ħω=0.30 MeV (with 11 ħ gain in alignment) by ν $i_{13/2}^2$ band (2002Ap03).
@ (B): Kπ=(3−), α=1 band (2002Ap03). Bandhead deexcites to J=2 and 4 members of g.s. band; structure of band appears to be similar to that of a 3− band in ^{168}Os. Possible configuration: ν ($i_{13/2}$)($h_{9/2}$,$f_{7/2}$).
& (C): π=(−), α=0 band (2002Ap03). Very weak band decaying through the (3−) band, analogous to a side band known in ^{168}Os; on this basis, authors tentatively assign π=− and even spin. Possible configuration: ν ($i_{13/2}$)($h_{9/2}$,$f_{7/2}$).

γ(^{166}Os)

E(level)	Eγ†	Iγ†	Mult.‡	α	Comments
432.0	432.0 *3*	100	E2	0.0330	Mult.: Q from γ asymmetry, not M2 from intensity balance in (^{64}Zn,2p2nγ).
1021.0	589.2 *4*	100	(E2)	0.01539	
1562.3	541.6 *7*	68 *24*	D		
	1129.2 *9*	100 *24*			
1725.0	704.0 *5*	100	(E2)	0.01031	
1931.3	368.8 *5*	100 *29*	(E2)	0.0505	
	910.9 *9*	71 *43*	D		
2351.3	626.3 *5*	100	(E2)	0.01337	
2426.0?	494.8§ *9*	100			
2452.4	521.1 *6*	100			
3009.4	658.1 *8*	100			
3025.5?	573.0§ *9*	33 *83*			
	599.6§ *9*	100 *83*			
3520.7	511.3 *5*	100			
3910.8?	390.1§ *9*	100			

Footnotes continued on next page

Adopted Levels, Gammas (continued)

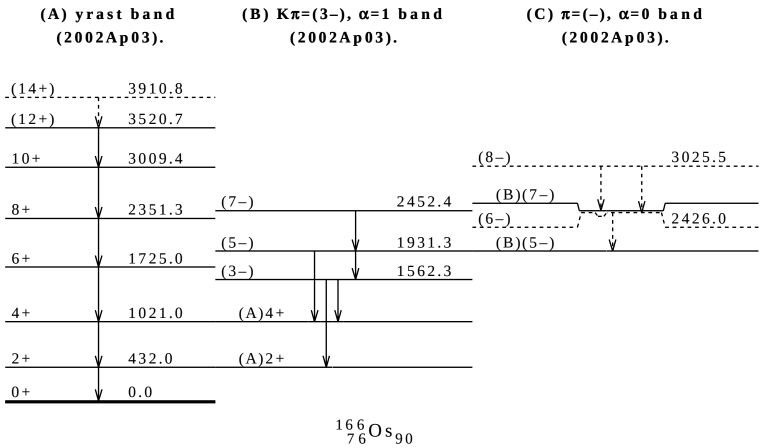
γ(^{166}Os) (continued)

† From ^{106}Cd(^{64}Zn,2p2nγ). Note that Eγ data from ^{106}Cd(^{63}Cu,p2nγ) (uncertainty 0.2 or 0.3 keV) are consistently lower than these data by 1.2 to 2.2 keV.

‡ From angular correlation data in ^{106}Cd(^{64}Zn,2p2nγ), assigning Δπ=(no) for intraband stretched Q transitions.

§ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)



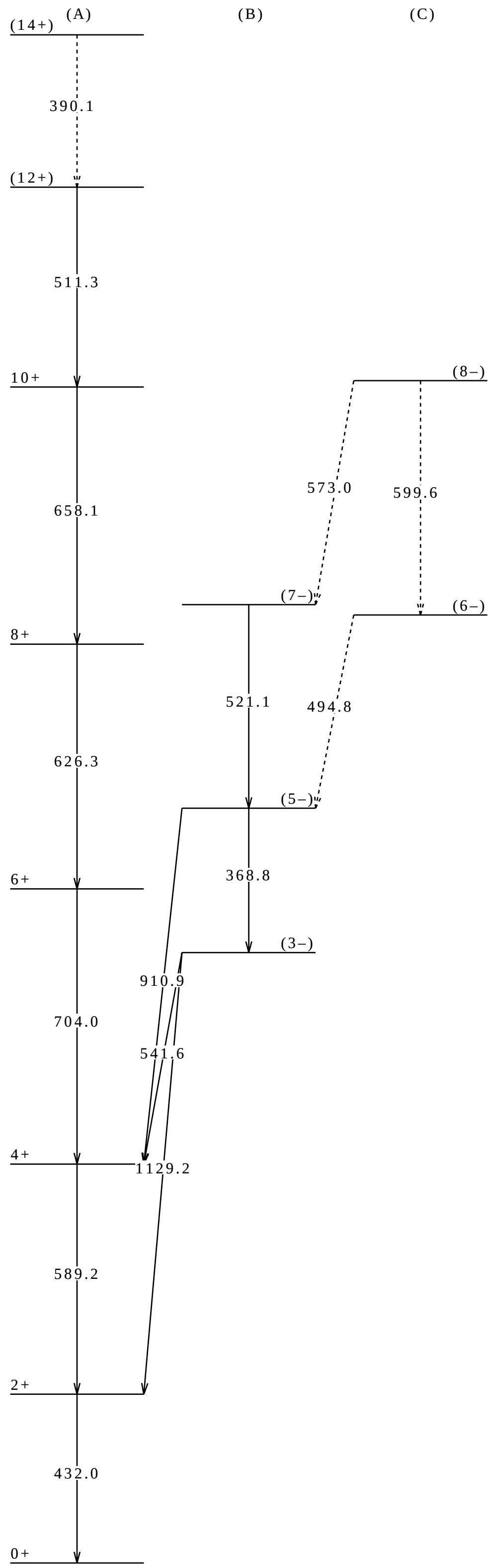
CITATION:
Nuclear Data Sheets (1992)

From NNDC(BNL)
program ENSDAT

$^{166}_{76}Os_{90}$–4

Adopted Levels, Gammas (continued)

Bands for ^{166}Os



$^{166}_{76}Os_{90}$

CITATION:
Nuclear Data Sheets (1992)

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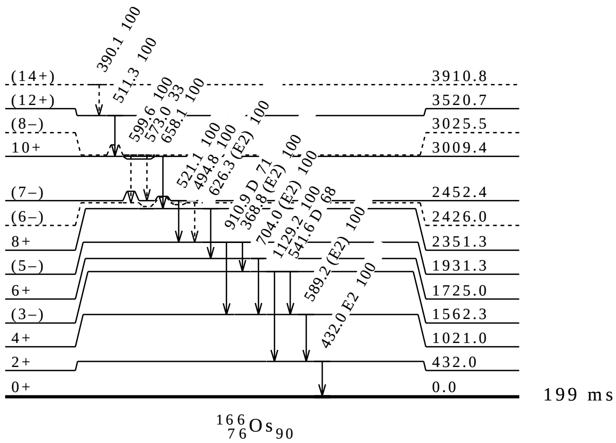
Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



^{167}Ir p Decay (35.2 ms) 1997Da07

Parent ^{167}Ir: E=0.0; Jπ=1/2+; $T_{1/2}$=35.2 ms *20*; Q(g.s.)=1071 *5*; %p decay=32 *4*.
^{167}Ir–%p decay: from 1997Da07.
1997Da07: source from 357–MeV ^{78}Kr bombardment of ^{92}Mo; fragment mass analyzer with position–sensitive parallel plate avalanche counter at focal plane, double–sided Si strip detector; measured E(p), Eα, p(t), α(t), recoil–p–α correlations.
Parent Jπ and $T_{1/2}$ are from 1997Da07. Q(g.s.) is from measured E(p)=1064 *6* (1997Da07) for g.s. to g.s. transition.

^{166}Os Levels

E(level)†	Jπ
0.0	0+

† From 1997Da07.

Protons

E(p)	E(^{166}Os)	L
1064 *6*	0.0	0

^{167}Ir p Decay (30.0 ms) 1997Da07

Parent ^{167}Ir: E=175.3 *22*; Jπ=11/2−; $T_{1/2}$=30.0 ms *6*; Q(g.s.)=1071 *5*; %p decay=0.4 *1*.
^{167}Ir−%p decay: from 1997Da07.
1997Da07: source from 357−MeV ^{78}Kr bombardment of ^{92}Mo; fragment mass analyzer with position−sensitive parallel plate avalanche counter at focal plane, double−sided Si strip detector; measured E(p), Eα, p(t), a(t), recoil−p−α correlations.
Parent Jπ and $T_{1/2}$ are from 1997Da07. Q(g.s.) is from measured E(p)=1064 *6* (1997Da07) for g.s. to g.s. transition. The parent excitation is from measured proton energy difference (1997Da07).

^{166}Os Levels

E(level)	Jπ	Comments
0.0	0+	Jπ: from Adopted Levels.

Protons

E(p)	E(^{166}Os)	L	Comments
1238 *7*	0.0	5	E(p),L: from 1997Da07.

^{170}Pt α Decay 2004GoZZ,2004Ke06,1997Uu01

Parent ^{170}Pt: E=0; Jπ=0+; $T_{1/2}$=13.93 ms *24*; Q(g.s.)=6708 *4*; %α decay=98 *4*.
^{170}Pt−%α decay: %α=98 *4* (2004GoZZ). Other: %α=98 calculated by 1981HoZM.
Others: 1981Ho01, 1996Bi07, 1998Ki20.
2004GoZZ: 84Sr+^{92,94,96}Mo, E(84Sr)=380−395 MeV; recoil−decay tagging technique; measured Eα, %α.
2004Ke06: ^{170}Pt obtained both as daughter of ^{171}Au proton decay and directly from fusion−evaporation reaction ^{96}Ru+^{78}Kr (E(^{78}Kr)=361−391 MeV, mid−target). Measured Eα, parent $T_{1/2}$.
1997Uu01: ^{170}Pt obtained as daughter of mass−separated ^{174}Hg produced using ^{36}Ar+^{144}Sm fusion reaction at E(^{36}Ar)=180−230 MeV. Measured Eα, parent $T_{1/2}$, α correlations.
$T_{1/2}$(^{170}Pt)=13.93 ms *24* (weighted average of 14.7 ms *5* (1996Bi07), 13.5 ms *3* (1998Ki20) and 14.0 ms *2* (2004Ke06)). Others: 6 ms *+5−2* (1981Ho10), 15 ms *+16−6* (1997Uu01).

^{166}Os Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	0+	181 ms *38*	$T_{1/2}$: from 1981Ho10.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
6548.4 *18*	0.0	100	1.0	Eα: weighted average of 6545 *8* (1981Ho10), 6553 *11* (1997Uu01), 6545 *5* (2004GoZZ) and 6549 *2* (2004Ke06). This Eα implies Q(α)=6706.2 *18* cf. Q(α)=6708 *4* from 2003Au03.

† r_0=1.5638 *12* from HF=1 if Q(α)=6706.2 *18*.
‡ For α intensity per 100 decays, multiply by 0.98 *4*.

From NNDC(BNL)
program ENSDAT

$^{106}Cd(^{63}Cu,p2n\gamma)$,$^{112}Sn(^{58}Ni,2p2n\gamma)$ 2000Ki33

2000Ki33: E(^{63}Cu)=292 MeV, E(^{58}Ni)=286 MeV; JUROSPHERE spectrometer consisting of 14 EUROGAM detectors and 10 TESSA detectors; measured Eγ, Iγ and γγ coin.

^{166}Os Levels

E(level)‡	Jπ†
0.0§	0+
430.8§ *2*	(2+)
1017.8§ *3*	(4+)
1719.9§ *4*	(6+)
2345.0?§ *5*	(8+)

† Authors' tentative values.
‡ From Eγ.
§ (A): Yrast sequence.

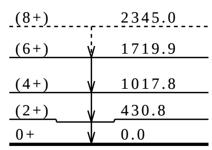
γ(^{166}Os)

Eγ†	E(level)	Iγ†
x367.3 *3*		20 *3*
430.8 *2*	430.8	100 *6*
587.0 *2*	1017.8	70 *5*
625.1‡ *3*	2345.0?	17 *5*
702.1 *2*	1719.9	47 *4*

† From 2000Ki33.
‡ Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{106}Cd(^{63}Cu,p2nγ),^{112}Sn(^{58}Ni,2p2nγ) 2000Ki33 (continued)

(A) yrast sequence.

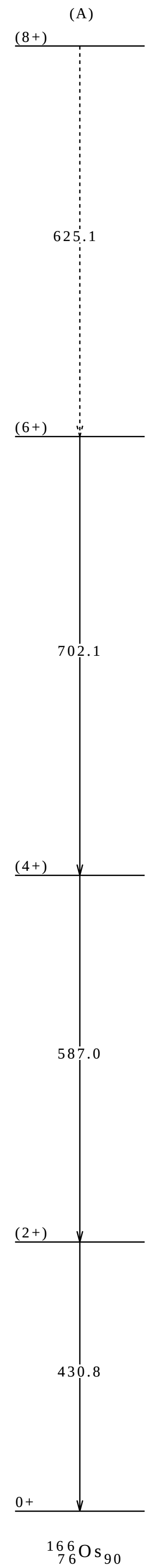


$^{166}_{76}Os_{90}$

$^{166}_{76}Os_{90}$–9

^{106}Cd(^{63}Cu,p2nγ),^{112}Sn(^{58}Ni,2p2nγ) 2000Ki33 (continued)

Bands for ^{166}Os

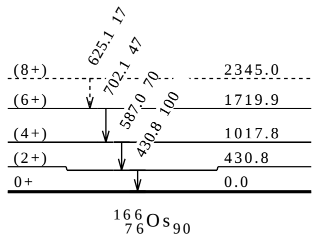


From NNDC(BNL)
program ENSDAT

^{106}Cd(^{63}Cu,p2nγ),^{112}Sn(^{58}Ni,2p2nγ) 2000Ki33 (continued)

Level Scheme

Intensities: relative Iγ



^{106}Cd(^{64}Zn,2p2nγ) 2002Ap03

2002Ap03: E(^{64}Zn)=334 MeV; 80% enriched ^{106}Cd target; JUROSPHERE detector array (5 NORDBALL (at 79°), 5 TESSA (at 101°) and 15 EUROGAM phase I (at 134° or 158°) Ge detectors); RITU gas–filled separator; recoils implanted into 16–strip position–sensitive Si detector; recoil decay tagging technique; measured Eγ, Iγ, recoil–α–γ–γ coin, γ asymmetry.

^{166}Os Levels

E(level)†	Jπ‡	Comments
0.0§	0+	
432.0§ *3*	2+	
1021.0§ *5*	4+	
1562.3# *7*	(3−)	
1725.0§ *7*	6+	E(level): an alternative value (E=1647.3) is possible because the order of the 626γ–704γ cascade is not established.
1931.3# *7*	(5−)	
2351.3§ *9*	8+	
2426.0?@ *11*	(6−)	
2452.4# *9*	(7−)	
3009.4§ *12*	(10+)	
3025.5?@ *11*	(8−)	
3520.7§ *13*	(12+)	
3910.8?§ *16*	(14+)	

† From least–squares fit to Eγ.
‡ Authors' values, based on deduced band structure, measured transition multipolarities and analogy to structures in ^{168}Os.
§ (A): Yrast sequence. g.s. band crossed at ħω=0.30 MeV (with 11 ħ gain in alignment) by (ν $i_{13/2}^2$) band (2002Ap03).
# (B): Kπ=(3−), α=1 band. Bandhead deexcites to J=2 and 4 members of g.s. band; structure of band appears to be similar to that of a 3− band in ^{168}Os. Possible configuration: ν ($i_{13/2}$)($h_{9/2}$,$f_{7/2}$).
@ (C): π=(−), α=0 band. Very weak band decaying through the (3−) band, analogous to a side band known in ^{168}Os; on this basis, authors tentatively assign π=− and even spin. Possible configuration: ν ($i_{13/2}$)($h_{9/2}$,$f_{7/2}$).

γ(^{166}Os)

Eγ†	E(level)	Iγ†	Mult.‡	α	Comments
x171.3 *5*		7 *3*			Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.74 *8*. Authors suggest that this γ may belong to decay from (3−) band to yrast band.
x321.5 *9*		7 *7*			
368.8 *5*	1931.3	21 *6*	(Q)		Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.84 *5*.
390.1§ *9*	3910.8?	3 *22*			
432.0 *3*	432.0	100 *2*	E2	0.0330	Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.90 *3*. Mult.: Q from γ asymmetry; not M2 from intensity balance at 432 level.
x443.3 *6*		14 *5*	D(+Q)		Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.44 *4*.

Continued on next page (footnotes at end of table)

^{106}Cd(^{64}Zn,2p2nγ) 2002Ap03 (continued)

γ(^{166}Os) (continued)

Eγ†	E(level)	Iγ†	Mult.‡	Comments
x482.2 *9*		8 *4*		
494.8§ *9*	2426.0?	6 *5*		
511.3 *5*	3520.7	18 *5*		
521.1 *6*	2452.4	18 *6*		
541.6 *7*	1562.3	17 *6*	D	Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.66 *7*.
573.0§ *9*	3025.5?	2 *5*		
589.2 *4*	1021.0	78 *2*	Q	Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.92 *6*.
599.6§ *9*	3025.5?	6 *5*		
x614.0 *5*		8 *5*		
626.3 *5*	2351.3	32 *7*	Q	Iγ(158°)/(Iγ(79°)+Iγ(101°))=1.20 *14*.
658.1 *8*	3009.4	13 *5*		
704.0 *5*	1725.0	33 *9*	Q	Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.88 *8*.
910.9 *9*	1931.3	15 *9*	D	Iγ(158°)/(Iγ(79°)+Iγ(101°))=0.46 *9*.
1129.2 *9*	1562.3	25 *6*		

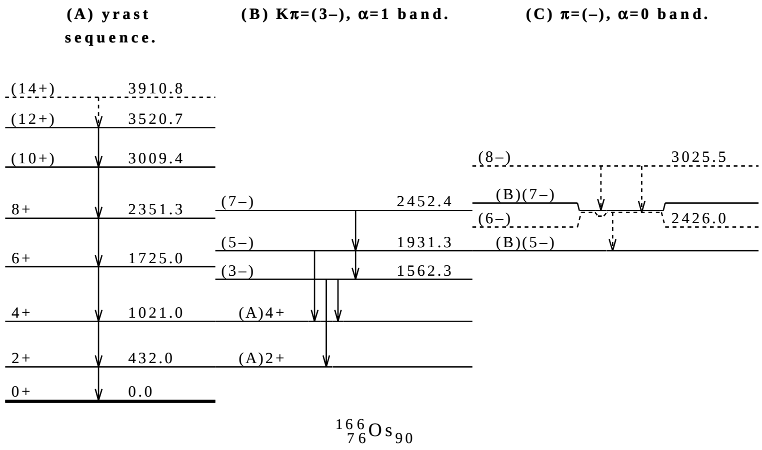
† From 2002Ap03.

‡ Based on γ asymmetry in recoil–α–γ data, except as noted. Values for ^{165}W transitions of known multipolarity, also observed in this experiment, served as an asymmetry calibration. Values expected for pure stretched D are 0.55 and, for stretched Q (or D, ΔJ=0), 1.0.

§ Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

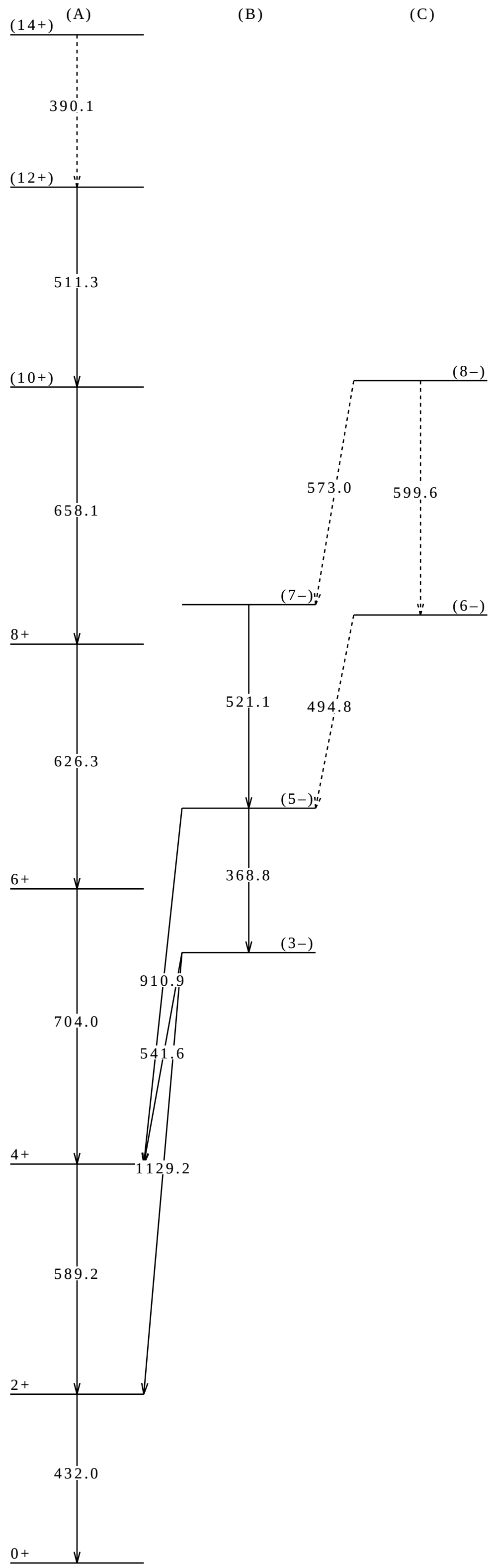
$^{106}Cd(^{64}Zn,2p2n\gamma)$ 2002Ap03 (continued)



From NNDC(BNL) program ENSDAT

$^{106}Cd(^{64}Zn,2p2n\gamma)$ 2002Ap03 (continued)

Bands for ^{166}Os



$^{166}_{76}Os_{90}$

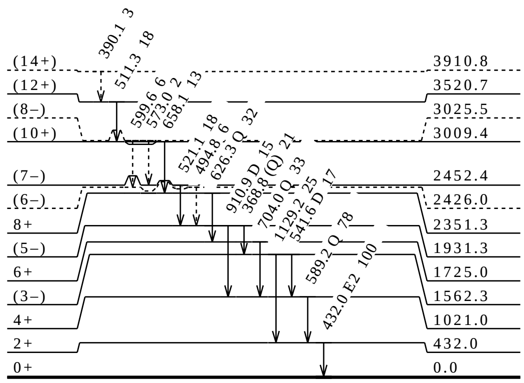
From NNDC(BNL)
program ENSDAT

$^{166}_{76}Os_{90}$–14

$^{106}Cd(^{64}Zn,2p2n\gamma)$ 2002Ap03 (continued)

Level Scheme

Intensities: relative Iγ



$^{166}_{76}Os_{90}$

From NNDC(BNL)
program ENSDAT

Adopted Levels

Q(β⁻)=–8410 *SY*; S(n)=9650 *SY*; S(p)=–1152 *8*; Q(α)=6724 *6* 2003Au03.
Uncertainty in Q(β⁻) and S(n) is 540 and 300 (2003Au03).
Assignment: targets of elements from Mo through Sn and V through Ni were irradiated with beams of ^{58}Ni and ^{107}Ag, respectively. Specific beam energies were in the range between 4.4 MeV/U and 5.9 MeV/U. Velocity filter, ion implantation in Si (surface–barrier and position–sensitive) detectors (1981Ho10,1981HoZM); ^{58}Ni bombardment of ^{112}Sn, E=297 MeV (1996Pa01).

^{166}Ir Levels

Cross Reference (XREF) Flags

A ^{170}Au α Decay (0.29 ms)
B ^{170}Au α Decay (0.62 ms)

E(level)	Jπ†	XREF	$T_{1/2}$	Comments
0.0	(2–)	A	10.5 ms *22*	%α=93 *3* (1997Da07); %p=7 *3* (1997Da07). %α: from 1997Da07. 99% calculated by 1981HoZM. Only α decay was investigated by 1981Ho10. Jπ: $d_{3/2}$ proton emission observed from level (1997Da07). Probable configuration=(π $d_{3/2}$)⊗(ν $f_{7/2}$); the Nordheim strong rule predicts that the lowest energy state for this configuration will have Jπ=2– (1997Da07) (possibly (π 3/2[402]–ν 7/2[514]) at small prolate deformation). $T_{1/2}$: 10.5 ms *22* from 1997Da07 (6565α(t)). Others: 17 ms *+12–5* (2004Ke06), 12 ms *1* (1996Pa01, 6556α(t)), >5 ms (1981Ho10).
172 *6*	(9+)	B	15.1 ms *9*	%α=98.2 *6* (1997Da07); %p=1.8 *6* (1997Da07). E(level): from 1997Da07, based on measured E(p)=1316 *8* and 1145 *8*, respectively, to ^{165}Os g.s. from this level and from ^{166}Ir g.s. (uncertainty takes into account the cancellation of systematic uncertainty included in quoted E(p)). $T_{1/2}$: from 6561α(t) (1997Da07). Other: 14.3 ms *+19–15* (2004Ke06) from 6545α(t). Jπ: $h_{11/2}$ proton emission observed from level (1997Da07). Probable configuration=(π $h_{11/2}$)⊗(ν $f_{7/2}$); the Nordheim weak rule favors Jπ=9+ or possibly 2+ (which should not be isomeric) for the lowest energy state for this configuration (1997Da07) (possibly π 11/2[505]+ν 7/2[514] at small prolate deformation).

† Based on a comparison between measured and calculated partial half–lives for proton emission to (7/2–) ^{165}Os, 1997Da07 conclude that the odd proton occupies the $d_{3/2}$ orbital in ^{166}Ir(g.s.) (L=2 proton emission) and the $h_{11/2}$ orbital in ^{166}Ir(172 level) (L=5 proton emission). At very small deformation, the 89th neutron is expected to occupy an $f_{7/2}$ orbital.

^{170}Au α Decay (0.29 ms) 2004Ke06

Parent ^{170}Au: E=0.0; Jπ=(2–); $T_{1/2}$=0.29 ms *+5–4*; Q(g.s.)=7170 *10*; %α decay=11 *10*.
^{170}Au–%α decay: based on %p(^{170}Au)=89 *10* (2004Ke06).
2004Ke06: source from ^{96}Ru(^{78}Kr,p3n), E(^{78}Kr)=385 MeV; tof and energy–loss gas detector and position–sensitive focal plane detector; observed correlated recoil–proton–α decay chain; measured $T_{1/2}$, %p, Eα for ^{170}Au α decay, α–α correlations (2004Ke06).
Parent Jπ: unhindered (HF<4) α decay to (2–) ^{166}Ir.

^{166}Ir Levels

E(level)	Jπ†
0.0	(2–)

† From Adopted Levels.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
7001 *10*	0.0	100	2.2 *21*	Iα: only one α group has been observed. Eα: from 2004Ke06; this Eα implies Q(α)=7170 *10*, cf. 7168 *21* from 2003Au03. Correlated with known α decays from g.s. of ^{166}Ir and ^{162}Re (2004Ke06).

Footnotes continued on next page

^{170}Au α Decay (0.29 ms) 2004Ke06 (continued)

α radiations (continued)

† If r_0=1.56 *1*, estimated from r_0(^{164}Os)=1.554 *17* (1998Ak04), r_0(^{166}Os)=1.5638 *12* (this evaluation), r_0(^{168}Pt)≈1.55; r_0(^{166}Pt) not known; Q(α)=7170 *10* (from Eα=7001 *10*); $T_{1/2}$=0.29 ms *+5–4* from combination of p(t) and α(t) data (2004Ke06).
‡ For α intensity per 100 decays, multiply by 0.11 *10*.

^{170}Au α Decay (0.62 ms) 2004Ke06,2002Ma61

Parent ^{170}Au: E=275 *12*; Jπ=(9+); $T_{1/2}$=0.62 ms *+5–4*; Q(g.s.)=7170 *10*; %α decay=42 *5*.
^{170}Au–%α decay: based on %p(^{170}Au)=58 *5* in fig. 6 and table III of 2004Ke06 (but reported as 59 *6* in text). Other %p: 75 *15* (misprinted as 0.75 *15*) from 2002Ma61; from simultaneous observation of 1735–keV proton and 7056–keV α, but that Eα differs significantly from Eα reported in 2004Ke06.
2004Ke06: source from ^{96}Ru(^{78}Kr,p3n), E(^{78}Kr)=385 MeV; tof and energy–loss gas detector and position–sensitive focal plane detector; observed correlated recoil–proton–α decay chain; measured $T_{1/2}$, %p, Eα for ^{170}Au α decay, α–α correlations.
2002Ma61: source from ^{96}Ru(^{78}Kr,p3n), E(^{78}Kr)=400 MeV; fragment mass analyzer, gas–filled position sensitive parallel–grid counter, double–sided Si strip detector; measured E(p), Eα, %p, parent $T_{1/2}$.
Parent Jπ: unhindered (HF<4) α decay to (9+) ^{166}Ir.

^{166}Ir Levels

E(level)	Jπ†	Comments
172 *6*	(9+)	E(level): from 2004Ke06.

† From Adopted Levels.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
7107 *6*	172	100	2.6 *4*	Eα: from 2004Ke06. Other Eα: 7056 *15* (2002Ma61); reason for discrepant value is unknown. Iα: only one α group has been observed. Correlated with known excited–state α decays from ^{166}Ir, ^{162}Re and ^{158}Ta (2004Ke06).

† If r_0=1.56 *1*, estimated from r_0(^{164}Os)=1.554 *17* (1998Ak04), r_0(^{166}Os)=1.5638 *12* (this evaluation), r_0(^{168}Pt)≈1.55; r_0(^{166}Pt) not known; Q(α)=7170 *10* (from Eα=7001 *10* for g.s. to g.s. decay); $T_{1/2}$=0.62 ms *+5–4* from combination of p(t) and α(t) data (2004Ke06) (other value: 0.57 ms *+31–15* (2002Ma61)).
‡ For α intensity per 100 decays, multiply by 0.42 *5*.

Adopted Levels

S(p)=460 *SY*; Q(α)=7286 *15* 2003Au03.
ΔS(p)=550 (2003Au03).
Production: ^{92}Mo(^{78}Kr,X), E=357,384 MeV; ^{96}Ru(^{78}Kr,2n2p), E=420 MeV. Measured $T_{1/2}$, Eα (1996Bi07).

^{166}Pt Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	0+	300 μs *100*	%α=100. Jπ: g.s. of even–even nucleus. $T_{1/2}$: from 1996Bi07.

KEYNUMBERS

1946Bo25
1949Co15
1949Gr01
1949Ke22
1949Wi03
1950An12
1950Bu30
1950Mc22
1950Mc79
1950Si20
1952Bu18
1952Mc05
1952Mi18
1954Mi16
1954Su12
1955Fr06
1955Gr07
1955Ne03
1956Be54
1957Go40
1957Mc34
1958Co61
1958Co76
1958Kl48
1958Sk59
1959Ba12
1959Bi10
1959Bo57
1959Br17
1959Dr75
1959Gr06
1959Jo33
1960Al27
1960Be28
1960Bo29
1960Bu27
1960Ge04
1960Ge12
1960Gr15
1960He09
1960Ja08
1960Ma19
1960Ma38
1960Ru05
1960Wi12
1961Bj02
1961Bo05
1961Bo15
1961De34
1961Es02
1961Ge14
1961Gr33
1961Ha14
1961Ha23
1961Kr01
1961Ku03
1961Zy02
1962Cl03
1962El12
1962En04
1962Ge02
1962Gr29
1962Gu03
1962Ha46
1963Bo19
1963Cl02
1963De21
1963Fo02
1963Fu17
1963Ge09
1963Gi03
1963Gr36
1963Ho15
1963Ja06
1963Li04
1963Ma08
1963Or02
1963Pa08
1963Pr13
1963Ra15
1963Ve11
1963Yo09
1964Br10
1964Gr33
1964KaZZ
1964Pr02
1965Bj03
1965Fa01
1965Hu01
1965Ma39
1965Mc03
1965Re02
1965Sc09
1965St03
1965St06
1966Be12
1966Da04
1966Ja16
1966Ka13
1966Mo01
1966Ne06
1966Zy01
1967Bu14
1967Gu04
1967Ku07
1967Mo05
1967Ne02
1968Da24
1968Fo11
1968He24
1968Ho19
1968Ku03
1968Me17
1968Mi13
1968Mu01
1968Ne02
1968Ni06
1968Tj02
1969Ar23
1969Bu01
1969Fo09
1969He02
1969KaZV
1969McZS
1969Ne02
1969Su07
1970Ap03
1970Bo29
1970Ka23
1970Ka45
1970McZQ
1970Re16
1971Be74
1971Ca08
1971DeZE
1971HeYO
1971HeYP
1971SkZX
1972Ad14
1972Be39
1972Ca42
1972Da33
1972Do01
1972Dr02
1972Er04
1972Li34
1972Ma37
1972To06
1972Yu03
1973Be40
1973Bi10
1973De22
1973Di18
1973He15
1973He28
1973Ko13
1973La32
1973Me17
1973Ne08
1973Oo01
1973PrZI
1973Sa14
1974Ar28
1974De09
1974Gr41
1974Ka02
1974Ke04
1974Li11
1974Ry01
1974Sh12
1974Wo01
1975Ba39
1975Le22
1975Mo13
1975Pa15
1975To05
1976Bo27
1976Da10
1976Fu06
1976Me04
1976Ra32
1976Sv01
1976We24
1977Al27
1977Bo14
1977Ca23
1977Fi01
1977Ge12
1977HaYI
1977InZV
1977Ka30
1977Ke06
1977Le08
1977Mc11
1977ScYH
1977Wo03
1978Ba78
1978Ca11
1978KaZK
1978Mc02
1978Sa14
1978Sc10
1978Sc26
1979Ad06
1979Ba40
1979Bo08
1979Ho10
1979Pa15
1980Al34
1980Bu26
1980Pe15
1980VyZZ
1981Bo40
1981Bu24
1981Ho01
1981Ho10
1981Ho31
1981HoZM
1981Ka37
1981Kr12
1981La27
1981Ma43
1981Se09
1981Si02
1981Wa23
1982Bl28
1982Bo39
1982Bu21
1982De11
1982De37
1982El02
1982En03
1982Li17
1982So12
1983Ag01
1983De02
1983Fa11
1983Fi12
1983Hu01
1983KeZS
1983Na14
1983Ro11
1984Fi18
1984Ic01
1984Ic02
1984Ke15
1984KeZV
1984Sc06
1984ScZQ
1985Al22
1985DaZV
1985Fi04
1985Ge05
1985Ma22
1986Ba61
1986Bo36
1986Br21
1986Do13
1986Ic02
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1988Ad05
1988Ad12
1988Al04
1988Ba79
1988Bu08
1988Ch44
1988DaZX
1988Ka44
1988Pe08
1989Ab05
1989Ad11
1989Ad12
1989Ch45
1989Da18
1989Du03
1989Hi04
1989KhZY
1989Kr16
1989Sp04
1990Ha34
1990HaZP
1990JaZR
1990Ka21
1990McZY
1991Be38
1991Ho27
1991Ry01
1991Se01
1991Zi01
1992Ar06
1992Be29
1992Br07
1992Bu16
1992Dr03
1992Fa01
1992HeZV
1992Ho02
1992Ka07
1992Me10
1992Sh31
1992Si12
1992Th04
1992Un01
1992Wa10
1992Wa33
1993AdZY
1993BaZS
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1993Li12
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1994KuZY
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1994Mi22
1994Ol04
1994OsZZ
1995Gi10
1995Hi02
1995KrZX
1995Ma07
1996Al31
1996As05
1996Bi07
1996Br09
1996Dr07
1996Fa21
1996Ic01
1996KrZW
1996Ma16
1996Ma18
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1996Pa01
1996We01
1997Da07
1997Ga11
1997Ga13
1997Uu01
1997Zh11
1998Ak04
1998Fa15
1998Ge13
1998Ki20
1998Wu04
1999De37
1999DeZX
1999Wo07
2000As04
2000De59
2000Ga22
2000Gr33
2000He14
2000Hi01
2000Ki33
2000Le25
2000Pr03
2000Pr10
2000Ri11
2000Ya22
2000Zh51
2001Bu11
2001Me07
2002Ap03
2002Be04
2002Ca46
2002Ma61
2002Ro17
2002Un02
2003Au03
2003ChZS
2003Pr03
2003Wa32
2004An14
2004GoZZ
2004Ke06
2005Ic02
2005KiZT
2005Mc01
2005St24
2006De30
2006HaZT
2006Ku03
2006Mc02
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2007ChZX
2007Ha45
2007Ha57
2007Mc08