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Nuclear Structure and Decay Data for A=25 Isobar*

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Abstract: Evaluated spectroscopic data and level schemes are presented for ^{25}N (unobserved), ^{25}O, ^{25}F, ^{25}Ne, ^{25}Na, ^{25}Mg, ^{25}Al, ^{25}Si, and ^{25}P based on the measured decay and nuclear reaction studies. This evaluation for A=25 supersedes the earlier one by R.B. Firestone (2009Fi05). Overall the decay datasets associated with ^{25}Ne, ^{25}Na, and ^{25}Mg remain the same compared with those in the previous evaluation, 2009Fi05, however, new β-n decay datasets are added in ^{25}Ne along with new reaction datasets almost for all of the above mentioned nuclides from older and new references.

Other highlights of this evaluation are the following:

Ground state of ^{25}O is neutron unbound. Several new articles reported resonance energies of this nuclide, studied using radioactive beams, like ^{24}O,^{27}Ne, ^{26}F, etc. These results have been included in this evaluation.

Due to the lack of direct experimental evidence, a tentative (5/2^{+}) assignment for the ground state and no spin-parity assignments for the known excited states of ^{25}Si has been adopted in the present evaluation.

In the absence of experimental evidence, tentative (1/2^{+}) assignment has been adopted for the ground state of ^{25}P. As suggested in 2015Fe02, light-ion scattering experiment in the inverse kinematics seems to be a probable probe for investigating the low-lying states of ^{25}P, which are the mirror analogs of the states of ^{25}Ne.

Cutoff Date: All data received by May 31, 2025 have been evaluated. During this evaluation, the NSR database (2014Pr09) was used extensively.

General Policies and Organization of Material: See the April 2025 issue of the *Nuclear Data Sheets* or https://www.nndc.bnl.gov/nds/docs/NDSPolicies.pdf.

General Comments: The internal conversion coefficients (α) presented in this evaluation have been calculated using the computer code BrIcc (2008Ki07) based on Band-Raman tables of conversion coefficients. For Log *ft* and related data, Betashape code (2023Mo21) was used. In cases of weighted averaging of the data, the assigned uncertainty in the result is generally not lower than the lowest uncertainty amongst the input data points, assuming that the contribution of the systematic uncertainty was significant.

Acknowledgements: This evaluation benefits from earlier evaluations by R.B. Firestone (2009Fi05), P.M. Endt (1998En04, 1990En08, 1978En02), and an ENSDF update of ^{25}N by E.A. McCutchan (Dated 1-May-2022). Evaluators are thankful to the compilers of the XUNDL datasets. Also the support of Ms. JoAnn Totans, NNDC, for providing secondary and other articles is deeply acknowledged. Finally, the evaluators are grateful to the reviewer for useful comments and suggestions and to Dr. E. McCutchan (NNDC, BNL) for the editorial comments and preparation of this manuscript for publication.

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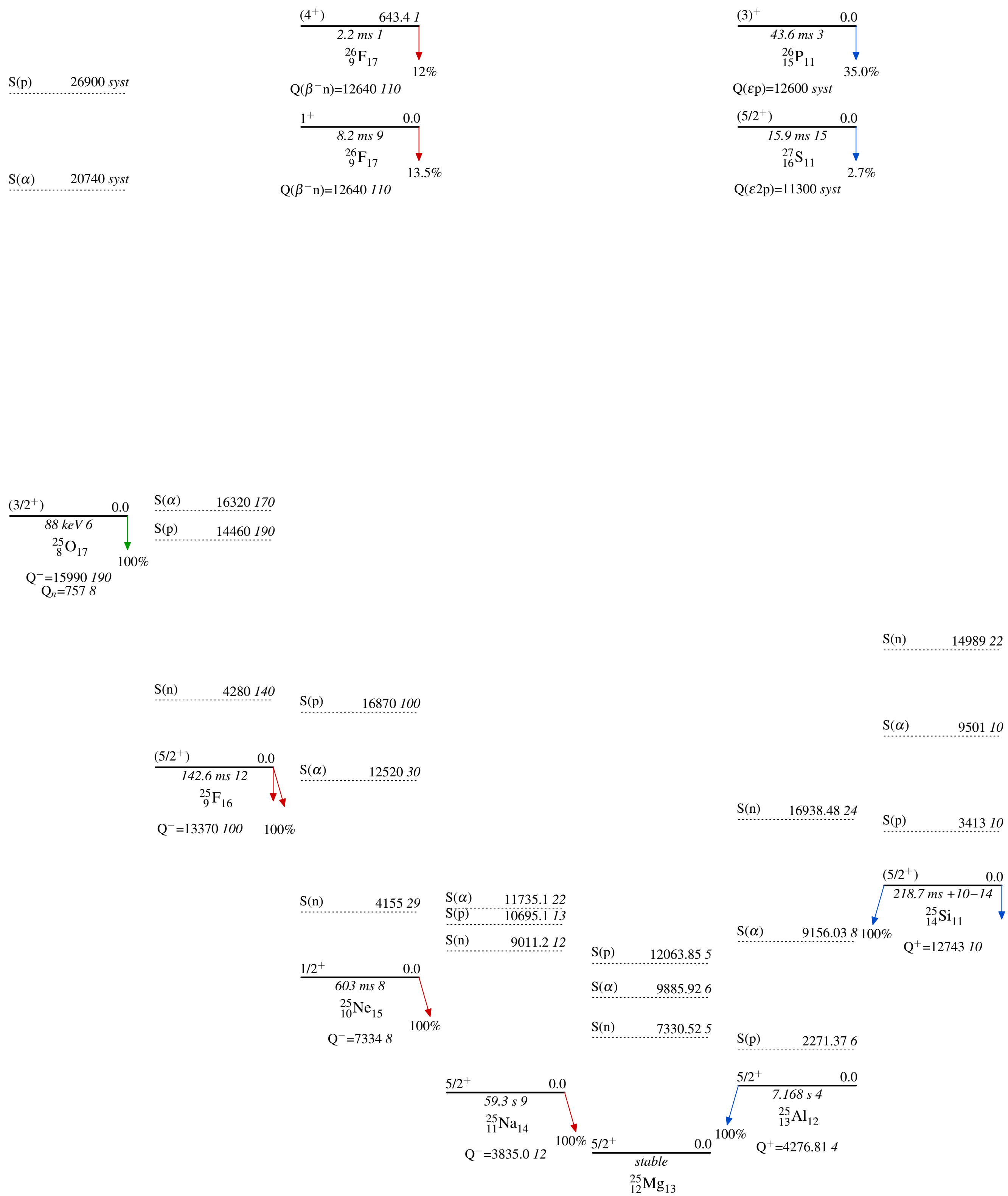
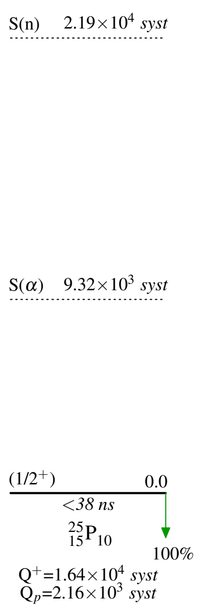
Index for A=25

Skeleton Scheme for A=25



Skeleton Scheme for A=25 (continued)



Ground-State and Isomeric-Level Properties

Nuclide	Level	Jπ	$T_{1/2}$	Decay Mode
^{25}O	0.0	(3/2$^+$)	88 keV *6*	%n=100
^{25}F	0.0	(5/2$^+$)	142.6 ms *12*	%β^-=100; %β^-n=38 *7*
^{25}Ne	0.0	1/2$^+$	603 ms *8*	%β^-=100
^{25}Na	0.0	5/2$^+$	59.3 s *9*	%β^-=100
^{25}Mg	0.0	5/2$^+$	stable	
^{25}Al	0.0	5/2$^+$	7.168 s *4*	%ε+%β^+=100
^{25}Si	0.0	(5/2$^+$)	218.7 ms *+10−14*	%ε+%β^+=100; %β^+p=37.0 *11*
^{25}P	0.0	(1/2$^+$)	<38 ns	%p=100
^{26}F	643.4	(4$^+$)	2.2 ms *1*	%β^-n=12 *8*
^{26}F	0.0	1$^+$	8.2 ms *9*	%β^-n=13.5 *4*
^{26}P	0.0	(3)$^+$	43.6 ms *3*	%εp=35.0 *20*
^{27}S	0.0	(5/2$^+$)	15.9 ms *15*	%ε2p=2.7 *6*

Adopted Levels:unobserved

Q(β^-)=28650 *syst*; S(n)=−970 *syst*; Q(α)=−24830 *syst* 2021Wa16
ΔQ(β^-)=530, ΔS(n)=640, ΔQ(α)=750 (syst,2021Wa16).
S(2n)=−3120 *660*, Q(β^-n)=29410 *530* (syst,2021Wa16).

1999Sa06: Unstable to ground state neutron emission. Reaction: Ta(^{40}Ar,x) E=94.1 MeV/nucleon, at RIKEN facility. Magnetic fragment separator, identification by measurements of energy loss, time-of-flight, magnetic rigidity for each fragment, etc. No ^{25}N events were identified. Similar results were reported in 2004Lu19.

Adopted Levels

$Q(\beta^-)=1.599\times10^4$ *19*; S(n)=−757 *8*; S(p)=26900 *syst*; $Q(\alpha)$=−20740 *syst* 2021Wa16
ΔS(p)=430, $\Delta Q(\alpha)$=620 (syst,2021Wa16).
S(2n)=3430 *210*, S(2p)=51420 *1010* (syst), $Q(\beta^-n)$=11710 *190* (2021Wa16).
Unstable to ground state neutron emission. No ^{25}O events observed:
2004Lu19: Projectile fragment separator, Ta(^{48}Ca,x) E=94.1 MeV/A. Magnetic separation, particle identification by ΔE and tof.
2003Th07: Projectile fragment separator, Be(^{40}Ar,x) E≈50 MeV/A. Magnetic separation, particle identification by ΔE and time-of-flight. Also 2003Th10, 2004Th15.
Other references: 1985La03, 1984AnZQ.

^{25}O Levels

Cross Reference (XREF) Flags

A	^{2}H(^{24}O,^{25}O)
B	^{2}H(^{27}Ne,^{25}O)
C	^{9}Be(^{26}F,^{25}O),C(^{26}F,^{25}O)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	(3/2$^+$)	88 keV *6*	A C	%n=100 E(level): g.s. of ^{25}O is neutron unbound with a measured resonance energy of 749 keV *10*, FWHM=430 keV at 750 keV, includes both statistical and systematic uncertainties (2016Ko11); 725 keV *+54−29* in 2013Ca18; 770 keV *+20−10* (2008Ho03) – all from (^{26}F,^{25}O),(^{26}F,^{25}O); and 830 keV *170* (2017Jo12) in (^{24}O,^{25}O). Weighted average of all values: 754 keV *+9−7*. J^π: from L(n)=2 in (^{24}O,^{25}O) and theoretical predictions. $T_{1/2}$: From C(^{26}F,^{25}O) – the measured width is closer to the calculated value of 63 keV reported in 2014Vo09. Others: 172 keV *30* (2008Ho03 – noted the width was a factor of 2 larger than the calculated single-particle width using a Woods-Saxon potential), 20 keV *+60−20* (2013Ca18). Width Γ=88 keV *6* corresponds to half-life=5.2×10^{-21} s *4*.
≈2500?	(1/2$^+$)	1 keV	A	E(level): from resonance energy of this state at 3.3 MeV (2017Jo12 – (^{24}O,^{25}O)) and g.s. resonance at 754 keV. J^π,$T_{1/2}$: measured data of resonance energy=3.3 MeV, width=1 keV, and a relative cross section of $\sigma(1/2^+)/\sigma$(g.s.)=0.25 *+100−0.25* are consistent with the inclusion of a 1/2$^+$ state predicted by theoretical calculations, but are insufficient to confirm the observation of this state and authors proposed tentative 1/2$^+$ (2017Jo12 – (^{24}O,^{25}O)).
9000			B	E(level): from the decay energy spectrum constructed using invariant mass spectroscopy (2019Sw04).

^{2}H(^{24}O,^{25}O) 2017Jo12

Adopted/Edited the XUNDL dataset compiled by Jun Chen (NSCL/MSU), December 1, 2017.

2017Jo12: E=83.4 MeV/nucleon ^{24}O beam was produced by fragmentation of ^{48}Ca beam on a ^{9}Be target at NSCL facility. Fragments were separated using A1900 fragment separator. The secondary target was the Ursinus College Liquid Hydrogen Target filled with liquid deuterium. Reacted ^{24}O was detected by a position and energy sensitive charged particle detector and separated and identified based on energy loss and time-of-flight. Emitted neutrons from ^{25}O decay were detected by the MoNA-LISA neutron detector array. Measured decay energy spectrum. Deduced neutron-unbound levels, width, limit of relative cross section of a possible 1/2^{+} excited state with respect to ground state. Comparisons with theoretical calculations.

^{25}O Levels

E(level)	J$^{\pi}$	Γ	L	Comments
0	3/2^{+}		2	E(level),L: neutron-unbound state with neutron-decay resonant energy=830 keV *170* from a best-fit to the measured decay-energy spectrum (2017Jo12). J$^{\pi}$: From L(n)=2 and theoretical predictions.
≈2500?	(1/2^{+})	1 keV		E(level): from resonance energy of this state at 3.3 MeV (2017Jo12) and g.s. resonance at 754 keV. J$^{\pi}$,Γ: measured data of resonance energy=3.3 MeV, width=1 keV, and a relative cross section of $\sigma(1/2^{+})/\sigma(\text{g.s.})$=0.25 *+100−0.25* are consistent with the inclusion of a 1/2^{+} state predicted by theoretical calculations, but are insufficient to confirm the observation of this state and proposed tentative 1/2^{+} (2017Jo12 – (^{24}O,^{25}O)). Relative cross section: $\sigma_{1/2+}/\sigma_{\text{g.s.}}$=0.25 *+100−25* (2017Jo12).

^{2}H(^{27}Ne,^{25}O) 2019Sw04

Adapted/Edited the XUNDL dataset compiled by J. Chen (NSCL, MSU), September 22, 2021.

2019Sw04: Neutron-unbound states were populated via a two-proton knockout reaction with an 101.3 MeV/nucleon ^{27}Ne beam produced by fragmentation of a 140 MeV/nucleon ^{48}Ca primary beam from the Coupled Cyclotron Facility at NSCL on a liquid deuterium target. Beam fragments were separated by the A1900 Fragment separator and charged fragments after reaction were re-directed by a large-gap superconducting dipole magnet and identified by energy loss in an ionization chamber and time-of-flight measured using a plastic scintillator. Emitted neutrons were detected by the MoNA-LISA array of 2-m-long plastic scintillator bars. Measured decay energy. Invariant mass spectroscopy was used to reconstruct the decay energy (^{22}O+3n). Deduced evidence for an excited state at E=9 MeV.

^{25}O Levels

E(level)	Comments
9000	E(level): from the decay energy spectrum constructed using invariant mass spectroscopy, based on measured neutron energies in a decay sequence of three neutrons. The sum of measured neutron energies of 2.3 MeV, 0.65 MeV and 50 keV is 3 MeV; and the three-neutron separation energy is about 6 MeV (2019Sw04).

^{9}Be(^{26}F,^{25}O),C(^{26}F,^{25}O) 2016Ko11,2013Ca18,2008Ho03

2016Ko11: C(^{26}F,^{25}O), ^{26}F beam was produced by fragmentation of ^{48}Ca primary beam, E=345 MeV/nucleon, on a Be target at RIKEN Nishina Center and Center for Nuclear Study, University of Tokyo. The fragments were separated by BigRIPS separator and ^{26}F secondary beam bombarded a C (thickness 1.8 g/cm^2) target with mean energies of 201 MeV/nucleon (mid target). The impact position on the target and incident angles of beam particles were determined event by event using two multiwire drift chambers (MWDCs). The decay products, ^{24}O and neutron were measured in coincidence using a magnetic spectrometer, SAMURAI, for momentum analysis of charged particles and by plastic scintillator array, NEBULA, consisting of 120 detector modules and 24 charged particle veto detectors, respectively. The trajectories of the charged fragments were determined using two MWDCs and a 16 element plastic scintillator hodoscope was used for energy loss and time-of-flight measurements.

2013Ca18: C(^{26}F,^{25}O), ^{26}F beam, E=442 MeV/nucleon, produced via fragmentation of a 490 MeV/nucleon ^{40}Ar primary beam on a 4 g/cm^2 ^{9}Be target using the R3B-LAND reaction setup at GSI. Neutron-unbound states in ^{25}O were populated via one-proton knockout reactions on different secondary targets: 922 mg/cm^2 CH_2, 935 mg/cm^2 C, and 2145 mg/cm^2 Pb. The secondary target was surrounded by the 4π Crystal Ball detector comprising 160 NaI(Tl) elements for photon and light-particle detection. Energy-loss and position measurements for charged beam particles were accomplished using two silicon-strip detectors placed behind the target. Ions were identified through time-of-flight and energy-loss measurements. Neutrons were detected 12 m downstream of the target using the LAND neutron detector with 92% single-neutron efficiency.

2008Ho03: ^{9}Be(^{26}F,^{25}O), E=85 MeV/nucleon, ^{26}F beam was produced from fragmentation of ^{48}Ca beam on a Be target and using A1900 fragment separator at NSCL facility. The ^{26}F beam was counted on an event-by-event basis by time-of-flight method. The neutrons emitted by ^{25}O decay were detected with a Modular Neutron array. The ^{24}O fragments were deflected by the large-gap Sweeper magnet, and were recorded by position and energy sensitive detectors. Neutron peak from ^{25}O decay was observed at 770 keV.

^{25}O Levels

E(level)	J$^\pi$	Γ	L	Comments
0	3/2$^+$	88 keV *6*	[2]	E(level): g.s. of ^{25}O is neutron unbound with a measured resonance of 749 keV *10*, FWHM=430 keV at 750 keV, includes both statistical and systematic uncertainties (2016Ko11); 725 keV *+54−29* in 2013Ca18; 770 keV *+20−10* in 2008Ho03. Γ: from 2016Ko11 − authors pointed out that their measured width is close to the calculated value of 63 keV reported in 2014Vo09. Others: 172 keV *30* (2008Ho03) − authors noted that their observed decay width was a factor of 2 larger than the calculated single-particle width using a Woods-Saxon potential; 20 keV *+60−20* (2013Ca18). Width Γ=88 keV *6* corresponds to half-life=5.2×10^{-21} s *4*. L: used for simulating the distribution of the neutron decay in 2008Ho03. E(n)=770 keV *+20−10*. Authors (2008Ho03) deduced mass excess 27440 keV *110* for ^{25}O, using the mass excess 18600 keV *100* of ^{24}O in 2007Ju03.

Adopted Levels, Gammas

Q(β^-)=1.337×10^4 *10*; S(n)=4.28×10^3 *14*; S(p)=1.446×10^4 *19*; Q(α)=−1.632×10^4 *17* 2021Wa16
S(2n)=8090.0 *1000*, S(2p)=39960 *430*, Q(β^-n)=9.21×10^3 *10* (2021Wa16).

Other studies:

1995ReZZ: Time-of-flight spectrometer at the LAMPF accelerator.

1970Ar09: Particle stability established in ^{232}Th(^{22}Ne,X).

2007No13: Production cross section ~0.1 nb, measured in ^{40}Ar fragmentation reaction of ^{9}Be(^{40}Ar,x), E=90 MeV/nucleon.

2006Kh08: Measured cross section=2256 mb *22* at magnetic rigidity (Bρ)=2.753 Tm, E=45.46 MeV/u and cross section=2300 mb *26* at Bρ=2.575 Tm, E=39.71 MeV/u for Si(^{28}Ne,x) and related reduced strong absorption radius <r_0^2>=1.236 fm^2 *9* are measured. The later one is used to study the isospin dependence of the reduced strong absorption radius.

Measured ^{25}F production cross-section: σ_F=0.60 μb *18* from ^{40}Ar fragmentation, E=1.06 GeV/u, on Be target (2000Oz01); 2003Oz01 reported fragmentation cross section from ^{40}Ar, E=94 MeV/u, σ_F=0.40 μb *15* on Be target and σ_F=10.5 μb *31* on Ta target.

2012Zh06: Production cross sections ~0.001 mb and ~0.01 mb were measured in fragmentation of ^{9}Be(^{40}Ar,X) and ^{181}Ta(^{40}Ar,X), E=57 MeV/nucleon, respectively.

^{25}F Levels

Cross Reference (XREF) Flags

A	^{1}H(^{27}F,^{25}F),Be(^{36}S,X)
B	C(^{26}Ne,^{25}Fγ)
C	^{9}Be(^{26}Ne,^{24}F)
D	^{9}Be(^{29}Na,^{25}F)

E(level)[†]	J$^\pi$	T$_{1/2}$/Γ_r[&]	XREF	Comments
0.0	(5/2$^+$)	142.6 ms *12*	AB	%β^-=100; %β^-n=38 *7* <r^2>$^{1/2}$(^{25}F)=3.12 fm *8* (matter radius) (2001Oz03). The r.m.s. charge radius <r^2>$^{1/2}$=2.8976 fm *25* (2013An02). J$^\pi$: from longitudinal and transverse momentum distributions, measured cross sections of one-neutron removal of ^{25}F on C target (2004Sa14, 2000Sa47). T$_{1/2}$: from time difference measurements of ^{25}F implantation and β delayed neutron detection (2025Pe11, authors also report 138 ms *5* from time difference of implantation and β decay and 149 ms *6* from γ(t) (574, 1613, 1622, or 1702γ)). Uncertainty includes both the statistical and systematic components. The data analysis procedure was verified by half-life measurements of ^{22}Ne (22.8 ms *2*), ^{24}O (138 ms *12*), and ^{26}F (9.1 ms *1*) − all data are in good agreement with the literature values (2025Pe11). Others: 90 ms *9* (2005Pa74), 70 ms *10* (2001Pe14), 87 ms *16* (2008ReZZ/1995ReZZ), 50 ms *6* (1999Re16) and 59 ms *40* (1991Re02 − assumed to be superseded by the datum in 2008ReZZ). %β^-n: from 2025Pe11, based on neutron emission measurements from ^{25}Ne neutron unbound states to the g.s. and 1st excited state of ^{24}Ne. Other values: 23.1 ms *45* (2005Pa74 − based on Iγ(1982) from 1st excited state to g.s of ^{24}Ne), 15 *10* (1991Re02 − from neutron emission measurements − the Iγ(1982)>11% *3* implied a g.s. neutron branching of 4%, much lower compared to the measured data of 2025Pe11), 14 ms *5* (2001Pe14), and 24.1 *46* (2008ReZZ/1995ReZZ), and 14 *5* (1999Re16) assumed to be superseded by the datum in 2008ReZZ.
1721 *15*	(1/2$^+$)[@]		B	
3090 *80*	(9/2$^+$)[@]		B	E(level): authors (2014Va02 − C(^{26}Ne,^{25}Fγ)) mentioned the work reported in 2002Az02 (Be(^{36}S,x)) as a preliminary work.
3442 *19*	(3/2$^+$)[@]		AB	XREF: A(3300)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{25}F Levels (continued)

E(level)†	J^π	$T_{1/2}/\Gamma_r$&	XREF	Comments
3700#			A	J^π: 3700γ to (5/2$^+$).
3830 *60*	(3/2$^+$)@		B	
4180 *30*	(5/2$^+$)@		AB	XREF: A(4430)
4.31×10^3 *14*	(1/2$^-$)	<20 keV	C	J^π: from shell model calculations. Γ: From ^{9}Be(^{26}Ne,^{24}F).
4.64×10^3 *14*	(5/2$^+$)	73[a] keV *70*	BCD	E(level): weighted average of 4.58E3 *22* from (^{29}Na,^{25}F) and 4.67E3 *14* from (^{26}Ne,^{25}Fγ). J^π: from L=2 (C(^{26}Ne,^{25}Fγ)) and shell model calculations. Γ: other: ≈200 keV (^{26}Ne,^{24}F).
4.85×10^3 *14*	(1/2$^-$)	51[a] keV *49*	B	J^π: from L=1 (C(^{26}Ne,^{25}Fγ)) and shell model calculations.
5450?‡ *60*		≈800[b] keV	A C	
5.83×10^3# *18*		2.50×10^3[a] keV *44*	B	

† From a least squares fit to the γ-ray energies, except where otherwise noted. For a level without depopulating γ, the level energy is from the particle dataset.
‡ Proposed 5450 levels is tentative.
# From ^{1}H(^{27}F,^{25}F),Be(^{36}S,x).
@ Spin and parity assignments are based on shell model calculations and γ placements (2014Va02 – C(^{26}Ne,^{25}Fγ)).
& Γ_r, resonance width.
[a] From C(^{26}Ne,^{25}Fγ).
[b] From (^{26}NE,^{24}F).

γ(^{25}F)

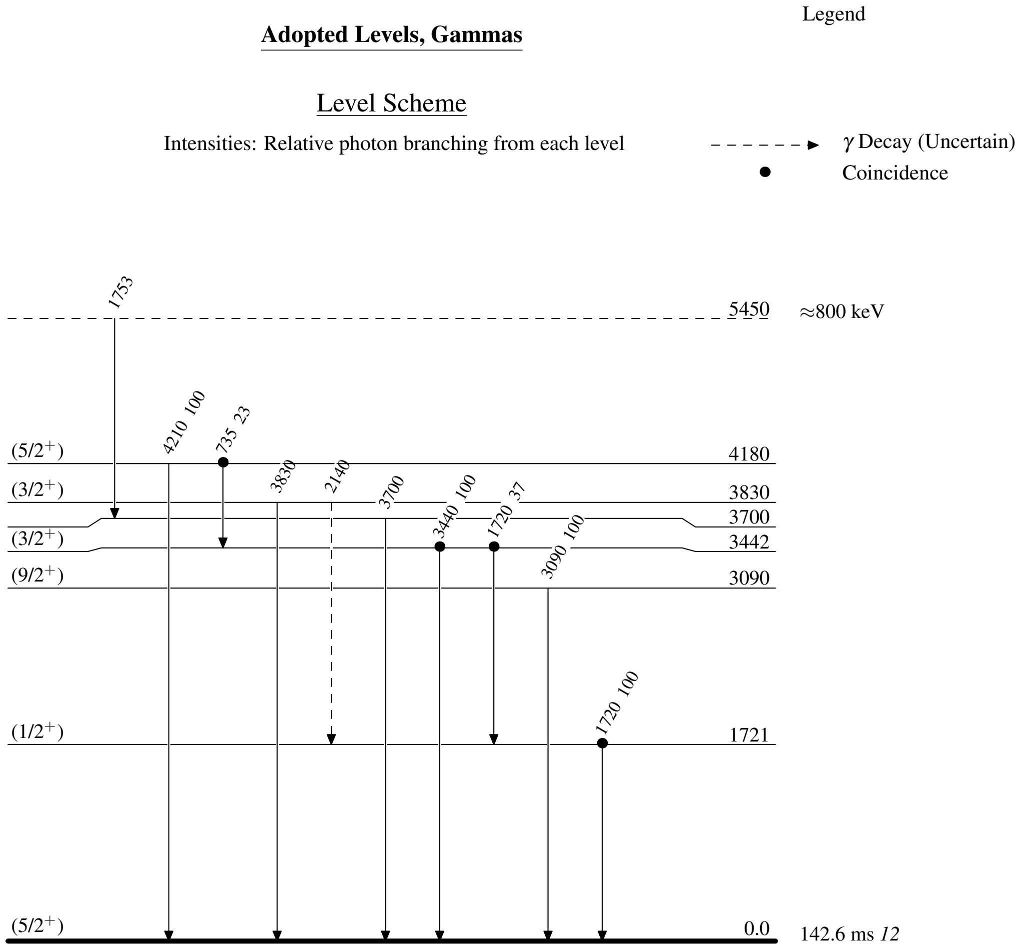
E_i(level)	J^π_i	E_γ†	I_γ#	E_f	J^π_f	Comments
1721	(1/2$^+$)	1720 *15*	100	0.0	(5/2$^+$)	
3090	(9/2$^+$)	3090 *75*	100	0.0	(5/2$^+$)	
3442	(3/2$^+$)	1720 *15*	37 *7*	1721	(1/2$^+$)	
		3440 *50*	100 *20*	0.0	(5/2$^+$)	E_γ: other: 3300 (Be(^{36}S,x) – 2002Az02).
3700		3700‡		0.0	(5/2$^+$)	
3830	(3/2$^+$)	2140@ *30*		1721	(1/2$^+$)	
		3830 *60*		0.0	(5/2$^+$)	
4180	(5/2$^+$)	735 *22*	23 *4*	3442	(3/2$^+$)	E_γ: weighted average of 750 *30* (^{26}Ne,^{25}Fγ) and 727 *22* (^{27}F,^{25}F),Be(^{36}S,X).
		4210 *80*	100 *19*	0.0	(5/2$^+$)	
5450?		1753 *53*		3700		

† From C(^{26}Ne,^{25}Fγ), except where otherwise noted.
‡ From ^{1}H(^{27}F,^{25}F),Be(^{36}S,x).
# From C(^{26}Ne,^{25}Fγ).
@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{25}_{9}F_{16}$

^{1}H(^{27}F,^{25}F),Be(^{36}S,X) 2004El10,2002Az02

2004El10: ^{1}H(^{27}F,^{25}F), E>40 MeV/A. Beam produced by Ta(^{40}Ar,x), E=94 MeV/A at the RIKEN particle fragment separator. Identification by E-ΔE and time-of-flight. NaI(Tl) detector array.
2002Az02: Be(^{36}S,x), E=77 MeV/A. SPEG Fragment separator, BaF_2 γ-ray array.
Others: 2002Gu08, (2002Az02 supersede – 2000Az03, 2001Be09, 2002Az01).

^{25}F Levels

E(level)†	J$^{\pi}$#	Comments
0	5/2^{+}	
3300‡		J$^{\pi}$: (9/2^{+}) from systematics in 2002Az02.
3700	(7/2^{+})	
4430?‡		
5450?		

† Suggested decay scheme from 2002Az02.
‡ In 2002Az02, 3300γ has been placed from 3300 keV level. The authors of 2014Va02 noted that the results in 2002Az02 are from a preliminary study. It appears that the placement of 3300γ would be more consistent for a placement from 3442 (3/2^{+}), instead of the 3300 keV (9/2^{+}) level. This would make 4430 keV level of this dataset comparable to 4180 in the adopted dataset. These levels and the depopulating gammas are listed in the adopted dataset accordingly.
# From systematics and Adopted Levels.

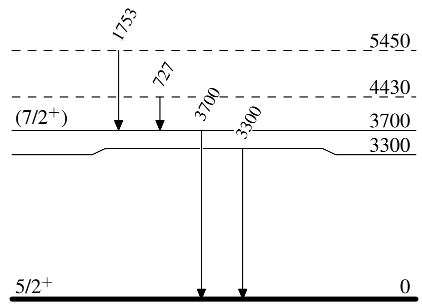
γ(^{25}F)

E$_{\gamma}$†	E$_{i}$(level)	J$^{\pi}_{i}$	E$_{f}$	J$^{\pi}_{f}$	Comments
727 *22*	4430?		3700	(7/2^{+})	
1753 *53*	5450?		3700	(7/2^{+})	
3300	3300		0	5/2^{+}	E$_{\gamma}$: from 2002Az02. See the footnote of the depopulating level about the placement of this γ.
3700	3700	(7/2^{+})	0	5/2^{+}	

† Energies with uncertainties from 2004El10, otherwise from 2002Az02.

$^{1}H(^{27}F,^{25}F),Be(^{36}S,X)$ 2004El10,2002Az02

Level Scheme



$^{25}_{9}F_{16}$

C(^{26}Ne,^{25}Fγ) 2014Va02,2017Va24

Includes C(^{27}Na,^{25}Fγ),(^{28}Na,^{25}Fγ). Secondary beam also contained ^{24}F, ^{25}Ne, ^{29}Mg, and ^{30}Mg (2014Va02).

2014Va02: ^{25}F was produced from fragmentation of ^{26}Ne and ^{27,28}Na secondary beams, E=54 to 65 MeV/nucleon, on an "active" target of plastic scintillator (thickness=103 mg/cm^2), sandwiched by two carbon foils of thickness 51 mg/cm^2. ^{25}F nuclei were selected by SPEG spectrometer and identified by energy loss, total energy, time-of-flight, and focal-plane position information. Secondary beams of ^{24}F, ^{25,26}Ne, ^{27,28}Na and ^{29,30}Mg with energies 54-65 MeV/nucleon were obtained from fragmentation of ^{36}S primary beam, E=77.5 MeV/nucleon, bombarding a carbon target of thickness 348 mg/cm^2 at GANIL. Product nuclei were selected by the α spectrometer equipped with a 130 mg/cm^2 Al wedge at the dispersive focal plane. γ rays were detected by an array of 74 BaF_2 crystals. Measured Eγ, Iγ, particle-γ, particle-$\gamma\gamma$ coincidences, deduced ^{25}F level scheme. Comparison with shell model, and coupled-cluster calculations. Plastic scintillator target contained hydrogen as well.

2017Va24: ^{25}F was produced via one-proton knockout reaction from ^{26}Ne secondary beams, E=456 MeV/nucleon (at entrance), on a CH_2 target (thickness=922 mg/cm^2). ^{26}Ne was produced from fragmentation of ^{40}Ar beam, E=490 MeV/nucleon, on a ^{9}Be target (thickness=4 g/cm^2). Fragments were separated and selected by the fragment separator at GSI facility and identified event-by-event from energy loss and time-of-flight. γ rays were detected by 159 NaI crystals of the 4π Crystal ball detector. Two pairs of double-sided silicon strip detectors (DSSSD) were placed before and after the reaction target to determine the energy loss. Also two scintillation fiber detectors (GFIs), composed of 480 fibers and time-of-flight wall (TFW) composed of plastic scintillator paddles, were used in combination with DSSSD detectors to identify atomic number Z and mass number A. Measured ^{25}F energy spectrum, Eγ, neutron-γ coincidences, deduced ^{25}F resonance levels. Comparison with shell model calculations.

Other: 2013Va06.

^{25}F Levels

E(level)†	J$^{\pi}$†	Γ_r@	L&	Comments
0.0	(5/2$^+$)			
1720 *15*	(1/2$^+$)			
3090 *75*	(9/2$^+$)			
3440 *20*	(3/2$^+$)			
3830 *60*	(3/2$^+$)			
4195 *35*	(5/2$^+$)			
4.67×10^3‡ *14*	(5/2$^+$)#	73 keV *70*	2	E(level): 4659 *104* in 2017Va24. E$_r$=389 *27* (2017Va24).
4.85×10^3‡ *14*	(1/2$^-$)#	51 keV *49*	1	E(level): 4840 *104* in 2017Va24. E$_r$=571 *9* from 49 keV *9* (2017Va24) + Eγ=521.5 keV *3* (in ^{24}F adopted gammas in ENSDF). In 2017Va24 E$_r$=570 *9* using Eγ=521 keV *1* of ^{24}F from 2015Ca09. 2017Va24 measured Eγ=510. Possible configuration: $(\pi 0p_{1/2})(\pi 0d_{5/2})^2$ (2017Va24).
5.83×10^3 *18*		2.50×10^3 keV *44*		E(level): 5816 *146* in 2017Va24. E$_r$=1546 *106* (2017Va24).

† From 2014Va02, except where otherwise noted. Spin and parity assignments are based on shell model calculations and γ placements.

‡ From 2017Va24, deduced using the resonance energy (listed in comments section) and Sn(^{25}F)=4280 keV *140* in AME2020 (2021Wa16). Values reported in 2017Va24, using Sn(^{25}F)=4270 keV *100* (2012Wa38 − AME2012), are listed in the comments.

From L value and shell model calculations.

@ Resonance width from 2017Va24.

& Proposed in 2017Va24 from the comparison of experimental and calculated single-particle widths.

C(^{26}Ne,^{25}Fγ) 2014Va02,2017Va24 (continued)

γ(^{25}F)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Comments
750 *30*	12 *2*	4195	(5/2$^+$)	3440	(3/2$^+$)	
1720# *15*	58# *12*	1720	(1/2$^+$)	0.0	(5/2$^+$)	
1720# *15*	37# *7*	3440	(3/2$^+$)	1720	(1/2$^+$)	
2140@ *30*		3830	(3/2$^+$)	1720	(1/2$^+$)	E_γ: weaker γ from the single step fragmentation reaction in 2013Va06; absent in 2014Va02 (double-step fragmentation reaction).
3090‡ *75*	35 *7*	3090	(9/2$^+$)	0.0	(5/2$^+$)	
3440‡ *50*	100 *20*	3440	(3/2$^+$)	0.0	(5/2$^+$)	
3830‡ *60*	89 *18*	3830	(3/2$^+$)	0.0	(5/2$^+$)	
4210‡ *80*	52 *10*	4195	(5/2$^+$)	0.0	(5/2$^+$)	

† From 2014Va02, except where otherwise noted. For Iγ, the uncertainties based on a general statement in 2014Va02 that these are below 20%.
‡ Decomposed from a broad structure of the γ-ray spectrum (2014Va02).
# Multiply placed with intensity suitably divided.
@ Placement of transition in the level scheme is uncertain.

C(^{26}Ne,^{25}Fγ) 2014Va02,2017Va24

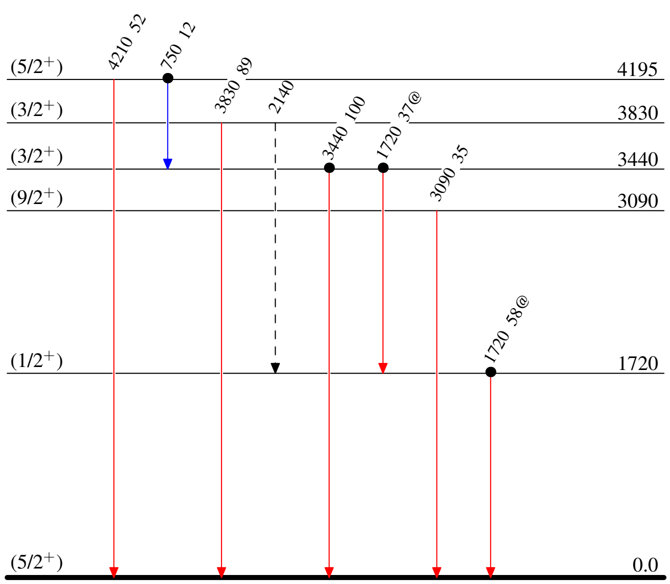
Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{25}_{9}F_{16}$

^{9}Be(^{26}Ne,^{24}F) 2011Fr13

Adapted/Edited the XUNDL dataset compiled by M. Birch and B. Singh (McMaster); September 30, 2011.

Proton-removal reaction followed by a neutron emission from ^{25}F.

Secondary ^{26}Ne beam, E=86 MeV/nucleon, produced from a ^{40}Ar primary beam, E=140 MeV/nucleon, at the National Superconducting Cyclotron Laboratory of MSU. Target=721 mg/cm^2 thick beryllium target. ^{24}F fragments deflected by the large-gap Sweeper Magnet were recorded by charged-particle detectors. Neutrons were detected in coincidence by the Modular Neutron Array (MoNA). Measured decay energy spectra. Deduced resonances, levels.

Data for ^{24}F+n coincidences can be described with three resonances, however no detailed fits were performed for the higher−lying resonances for the possibility of the presence of several levels that cannot be resolved with the set-up resolution (2011Fr13).

^{25}F Levels

Only the unbound neutron state observed in the present study is shown.

Decay energy spectra were calculated from the difference of the invariant mass of ^{25}F and the sum masses of the neutron and ^{24}F. The mass excess values of ^{24}F and ^{25}F used were 7560 keV *72* and 11410 keV *90*, respectively.

E(level)†	J$^\pi$	Γ	L	Comments
4.31×10^3 *14*	1/2$^-$	<20 keV		E$_r$=28 *4* (2011Fr13). E(level): other: 4249 keV *116* in 2011Fr13, deduced from measured E$_{res}$= 28 keV *4* and measured S(n)=4221 keV *115* (2007Ju03). Assignment assumes the resonance decays to the ground state of ^{24}F. J$^\pi$: assignment based on comparison with shell model calculations. Γ: based on experimental resolution, authors report an upper limit for the width.
4.63×10^3?‡ *14*		≈200 keV	1	E$_r$=350? (2011Fr13).
5.48×10^3?‡ *14*		≈800 keV	1	E$_r$=1200 (2011Fr13).

† From E$_r$ and Sn(^{25}F)=4280 keV *140* in AME2020 (2021Wa16). E$_r$ listed in the comments.

‡ Authors stated that the resolution of the experimental setup did not allow for a detailed comparison of this resonance. Sn(^{25}F)=4280 keV *140* in AME2020 (2021Wa16).

^{9}Be(^{29}Na,^{25}F) 2012Sm08

Adapted/Edited the XUNDL dataset compiled by J. Chen (NSCL, MSU): December 11, 2014.

2012Sm08: Secondary beam of ^{26}F (6%) and ^{29}Na (94%) was produced at the Superconducting Cyclotron Laboratory, MSU, from fragmentation of ^{48}Ca primary beam, E=140 MeV/nucleon, on a Be target (thickness=987 mg/cm^2). ^{29}Na ions were identified by time-of-flight and bombarded another Be target (thickness 470 mg/cm^2), E not listed. Charged fragments were detected by a suite of charged-particle detectors and neutrons were detected by the Modular Neutron Array (MoNA). The measured decay energy spectra were reconstructed from the ^{24}F+n system. Deduced an unbound level. Comparisons with shell model calculations.

^{25}F Levels

E(level)	J$^\pi$	Comments
4.58×10^3 *22*	(3/2$^-$,5/2$^+$)	E(level): from measured decay energy of 300 *170* and and Sn(^{25}F)=4280 keV *140* in AME2020 (2021Wa16). Note that 2012Sm08 quote 4.66 MeV *17* using S(n)=4360 *120* from 2009Fi05, 2003Au03 – AME2003. J$^\pi$: from shell-model predictions.

Adopted Levels, Gammas

Q(β^-)=7334 *8*; S(n)=4155 *29*; S(p)=1.687×10^4 *10*; Q(α)=−12520 *30* 2021Wa16,2023Ja05
S(2n)=13024 *29*, S(2p)=31230 *130* (2021Wa16).
Q(β^-) from recommended mass excess of −2023.5 *78* based on the measured mass excess of −2023.8 keV *80* of ^{25}Ne (2023Ja05) [Other: −2036 keV *29* (2021Wa16)] and mass excess of −9357.8 keV *12* of ^{25}Na (2021Wa16). Other: Q(β^-)=7322 *29* (2021Wa16).
Other studies:
1970Ar01: Isotope identification, ^{232}Th metallic target bombarded with ^{22}Ne ions, E=174 MeV. Reaction products at 40° were passed through a magnetic spectrometer and were detected with a telescope of E-ΔE surface barrier silicon detectors.
2012Kw02, 2012Zh06: Measurement of ^{25}Ne production cross sections in fragmentation reactions.

^{25}Ne Levels

Cross Reference (XREF) Flags

A	^{25}F β^- decay (142.6 ms)	F	C(^{36}S,^{25}Neγ)
B	^{26}F β^-n decay (2.2 ms)	G	^{26}Mg(^{7}Li,^{8}B)
C	^{26}F β^-n decay (8.2 ms)	H	^{26}Mg(^{13}C,^{14}O)
D	^{2}H(^{24}Ne,pγ),(^{26}Ne,^{25}Neγ)	I	^{208}Pb(^{26}Ne,^{25}Neγ)
E	^{9}Be(^{26}Ne,Xγ)		

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	1/2$^+$	603 ms *8*	ABCDEFGHI	%β^-=100 μ=−1.0060 *5* δ<r^2>(^{20}Ne,^{25}Ne)=−0.431 fm^2 *16* (2013An02, in 2011Ma48 −0.429 fm^2 *123* – uncertainty from 16(stat) and 122(syst)). J$^\pi$: 1/2 from LASER spectroscopy (2005Ge06,2013Ma15). L=0 in ^{2}H(^{24}Ne,pγ). T$_{1/2}$: weighted average of 602 ms *8* (1973Go11), 780 ms *180* (1982Mu08), and 606 ms *42* (2008ReZZ). μ: from 2019StZV, 2005Ge06 – Collinear fast beam LASER spectroscopy.
1702.5 *5*	(5/2,3/2)$^+$		A CDEFGHI	J$^\pi$: L=2 in ^{2}H(^{24}Ne,pγ),(^{26}Ne,^{25}Neγ); 5/2$^+$ from shell model calculations (^{24}Ne,pγ) (2010Ca10).
2087.9	(3/2,5/2)$^+$		A CDE G I	XREF: D(2062)G(2030)I(2000) J$^\pi$: L=2 in ^{2}H(^{24}Ne,pγ),(^{26}Ne,^{25}Neγ); 3/2$^+$ from shell model calculations in (^{24}Ne,pγ) (2010Ca10).
3115.8 *8*			C	J$^\pi$: (3/2$^+$,5/2$^+$) from shell model calculations in ^{25}F β-n decay (8.2 ms).
3316.2[‡] *11*			A defg	XREF: d(3321)e(3316)f(3324)g(3250)
3321[‡] *5*			A Cdefg	XREF: d(3321)e(3316)f(3324)g(3250) J$^\pi$: (3/2$^+$,5/2$^+$) from shell model calculations in ^{25}F β-n decay (8.2 ms).
3329	(3/2,1/2)$^-$		CD I	J$^\pi$: L=1 in ^{2}H(^{24}Ne,pγ),(^{26}Ne,^{25}Neγ); 3/2$^-$ from shell model calculations in (^{24}Ne,pγ) (2010Ca10).
3890.9 *11*	(3/2,5/2,7/2)$^+$		A	J$^\pi$: Log *ft*=4.6 from 5/2$^+$.
4050 *40*	(7/2,5/2)$^-$		D GH	J$^\pi$: L=3 in ^{2}H(^{24}Ne,pγ),(^{26}Ne,^{25}Neγ); 7/2$^-$ from shell model calculations in (^{24}Ne,pγ) (2010Ca10).
4493			A	
4539			A	
4640			A	
4.70×10^3 *10*			G	
5274			A	
5570			A	
5994			A	
6151			A	

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Adopted Levels, Gammas (continued)

^{25}Ne Levels (continued)

E(level)†	XREF
6280 *50*	H
6360	A
6773	A
7082	A
7161	A
7415	A

† From a least-squares fit to the γ-ray energies. Otherwise from the dataset, when "XREF" indicates one only.
‡ The levels at 3316.2 and 3321 are proposed as two different levels from the measured 1613γ and 1622γ as shown in Fig. 4 of 2005Pa74 (^{25}F β- decay (82 ms)).

$\gamma(^{25}$Ne)

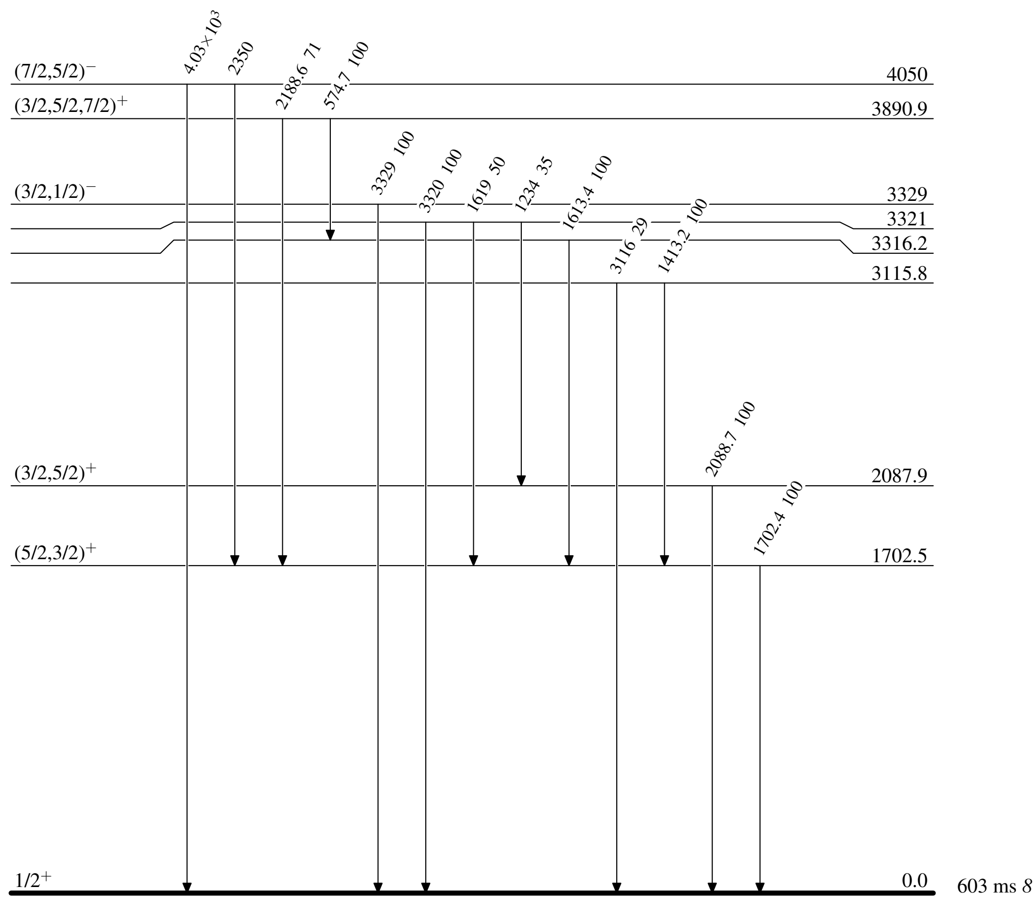
E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Comments
1702.5	$(5/2,3/2)^+$	1702.4 *5*	100	0.0	$1/2^+$	E_γ: weighted average of 1702.7 *7* from ^{25}F β^- decay, 1700.9 *4* from ^{26}F β^-n decay (8.2 ms), 1700 *2* from (^{24}Ne,pγ), 1703 *15* from (^{26}Ne,Xγ), and 1707 *4* from (^{36}S,Xγ).
2087.9	$(3/2,5/2)^+$	2088.7	100	0.0	$1/2^+$	E_γ: from ^{26}F β-n decay (8.2 ms). Others: 2062 *25* from (^{24}Ne,pγ) and 2090 *10* from (^{26}Ne,Xγ).
3115.8		1413.2‡ *7*	100‡ *14*	1702.5	$(5/2,3/2)^+$	
		3116‡ *2*	29‡ *14*	0.0	$1/2^+$	
3316.2		1613.4 *12*	100‡	1702.5	$(5/2,3/2)^+$	E_γ: from ^{25}F β^- decay. Other: 1613 *15* (^{26}Ne,Xγ).
3321		1234	35 *14*	2087.9	$(3/2,5/2)^+$	I_γ: from ^{25}F β- decay with respect to Iγ(1619)=50 *25*.
		1619 *5*	50‡ *25*	1702.5	$(5/2,3/2)^+$	E_γ: weighted average of 1621 *5* from (^{24}Ne,pγ) and 1617 *5* from (^{36}S,Xγ). Others: 1622 (^{25}F β- decay (82 ms)), 1620 (^{26}F β-n decay (8.2 ms)).
		3320‡	100‡ *25*	0.0	$1/2^+$	
3329	$(3/2,1/2)^-$	3329	100	0.0	$1/2^+$	E_γ: average of 3327 (^{26}F β-n decay (8.2 ms)) and 3330 (^{24}Ne,pγ),(^{26}Ne,^{25}Neγ).
3890.9	$(3/2,5/2,7/2)^+$	574.7 *5*	100 *21*	3316.2		
		2188.6 *13*	71 *21*	1702.5	$(5/2,3/2)^+$	
4050	$(7/2,5/2)^-$	2350# *40*		1702.5	$(5/2,3/2)^+$	
		4.03×10^3# *10*		0.0	$1/2^+$	

† From ^{25}F β- decay, except where otherwise noted.
‡ From ^{26}F β-n decay (8.2 ms).
# From (^{24}Ne,pγ),(^{26}Ne,^{25}Neγ).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{25}_{10}Ne_{15}$

^{25}F β^- decay (142.6 ms) 2025Pe11,2005Pa74,1999Re16

Parent: ^{25}F: E=0; J$^\pi$=(5/2$^+$); $T_{1/2}$=142.6 ms *12*; Q(β^-)=1.337×10^4 *10*; %β^- decay=100

^{25}F-Q(β^-): from 2021Wa16.

2025Pe11: Produced from fragmentation of Ar beam, 200 MeV/A, on a carbon target at the FRIB facility; isotopes were separated and selected using the Advanced Rare Isotope Separator and identified event-by-event by ion energy loss and time-of-flight (TOF) measurements; γ rays were detected by a subset of the Hybrid Array of Gamma Ray Detectors (HAGRiD), comprised 10 LaBr3 crystals; β-delayed neutrons were detected using a double wall of 88 Versatile Array of Neutron Detectors at Low Energy (a modular array of plastic scintillator detectors); measured β-n, β-γ coincidences, neutron TOF spectrum; deduced neutron unbound excited states of ^{25}Ne, Iβ from the measured β-delayed neutron measurements, half-life and beta-delayed neutron emission branching of ^{25}F. A total of 1.53 × 10^6 ^{25}F ions were implanted and 926,000 β decays were detected (61% β efficiency was achieved). In the beam setting, ^{22}Ne, ^{24}O, and ^{26}F isotopes were also transmitted significantly.

2005Pa74: Produced by Be(^{48}Ca,x), E(^{48}Ca)=140 MeV/nucleon. Fragment separator, double sided Si microstrip detector, segmented Ge array. Measured time-of-flight, Eγ, Iγ, $\gamma\gamma$- and $\beta\gamma$-coincidence.

1999Re16: Produced by Ta(^{36}S,x), E(^{36}S)=2.8 GeV. Magnetic spectrometer (LISE3). E-ΔE telescope. Measured time-of-flight, $\beta\gamma$ coincidence.

Other: 2005Be60.

^{25}Ne Levels

E(level)†	J$^\pi$‡	$T_{1/2}$‡	Comments
0	1/2$^+$	603 ms *8*	Iβ feeding to the g.s. is listed as 20 *20* in Fig. 6 (2005Pa74). Expected negligible feeding for second forbidden beta transition. In 2025Pe11, Iβ ≈100 without considering the g.s. β branching.
1702.7 *7*	(5/2,3/2)$^+$		
2090	(3/2,5/2)$^+$		
3316.4 *12*			
3324			
3891.1 *12*	(3/2,5/2,7/2)$^+$		
4493			
4539			
4640			
5274			
5570			
5994			
6151			
6360			
6773			
7082			
7161			
7415			

† Up to 3891.1 keV from Eγ, above level energies are from 2025Le11 (Fig. 5).
‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*
(5.96×10^3 *10*)	7415	0.9 *7*	5.3
(6.21×10^3 *10*)	7161	1.9 *12*	5.1
(6.29×10^3 *10*)	7082	3.6 *13*	4.8
(6.60×10^3 *10*)	6773	2.5 *5*	5.1
(7.01×10^3 *10*)	6360	3.5 *8*	5.1
(7.22×10^3 *10*)	6151	1.4 *5*	5.5
(7.38×10^3 *10*)	5994	4.4 *5*	5.1
(7.80×10^3 *10*)	5570	7.5 *6*	5.0

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^{25}F β^- decay (142.6 ms) 2025Pe11,2005Pa74,1999Re16 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- †‡	Log *ft*	Comments
(8.10×10^3 *10*)	5274	1.4 *5*	5.8	
(8.73×10^3 *10*)	4640	2.4 *4*	5.7	
(8.83×10^3 *10*)	4539	4.6 *5*	5.4	
(8.88×10^3 *10*)	4493	2.1 *4*	5.8	
(9.48×10^3 *10*)	3891.1	21 *5*	4.91 *11*	av Eβ=4476 *49* Iβ^-: other: 24 *4* (2005Pa74).
(1.005×10^4 *10*)	3324	21 *4*	5.0	av Eβ=4756 Iβ^-: other: 19 *2* (2005Pa74).
(1.128×10^4 *10*)	2090	8 *3*	5.7	av Eβ=5362 Iβ^-: other: 10 *2* (2005Pa74).
(1.167×10^4 *10*)	1702.7	12 *6*	5.59 *22*	av Eβ=5554 *49* Iβ^-: other: 6 *5* (2005Pa74).

† From intensity balance at each level up to 3891, above that Iβs are quoted from 2025Pe11. Authors deduced the values from their β-delayed neutron measurements feeding the g.s. and 1st excited state in ^{24}Ne from ^{25}Ne neutron unbound states.
‡ Absolute intensity per 100 decays.

γ(^{25}Ne)

Iγ normalization: from ΣIγ=62 *7* [100 − 38 *7* (%P(n))], assuming no g.s. feeding from (5/2$^+$) to 1/2$^+$ (second forbidden beta transition).

E$_\gamma$ †	I$_\gamma$ †#@	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
574.7 *5*	32 *8*	3891.1	(3/2,5/2,7/2)$^+$	3316.4		%Iγ=15 *4* I$_\gamma$: unweighted average of 24.3 *28* (1999Re16) and 39 *5* (2005Pa74) (estimated value, see Iγ footnote). %Iγ=9.5 *9* (1999Re16).
1234‡	14 *3*	3324		2090	(3/2,5/2)$^+$	%Iγ=6.6 *17* I$_\gamma$: from 2005Pa74 (estimated value, see Iγ footnote).
1613.4 *12*	32 *5*	3316.4		1702.7	(5/2,3/2)$^+$	%Iγ=15.1 *31* E$_\gamma$: other: 1613 (2005Pa74). I$_\gamma$: weighted average of 29.8 *50* (1999Re16) and 36 *6* (2005Pa74) (estimated value, see Iγ footnote). %Iγ=11.6 *18* (1999Re16).
1622‡	31 *5*	3324		1702.7	(5/2,3/2)$^+$	%Iγ=14.7 *30* I$_\gamma$: from 2005Pa74 (estimated value, see Iγ footnote).
1702.7 *7*	100 *7*	1702.7	(5/2,3/2)$^+$	0	1/2$^+$	%Iγ=47 *6* I$_\gamma$: from 1999Re16. %Iγ=39.1 *26* (1999Re16).
2090‡	31 *5*	2090	(3/2,5/2)$^+$	0	1/2$^+$	%Iγ=14.7 *26* I$_\gamma$: from 2005Pa74 (estimated value, see Iγ footnote).
2188.6 *13*	12.5 *35*	3891.1	(3/2,5/2,7/2)$^+$	1702.7	(5/2,3/2)$^+$	%Iγ=5.9 *18* I$_\gamma$: weighted average of 18.5 *43* (1999Re16) and 10.5 *25* (2005Pa74) (estimated value, see Iγ footnote). %Iγ=7.2 *16* (1999Re16).

† From 1999Re16, except where noted otherwise.
‡ From 2005Pa74.
\# Weighted average of available Iγ (rel) of 1999Re16 with the Iγ of 2005Pa74 (estimated from the arrow width of Fig. 6). The uncertainty, ΔIγ, considered to be the same %unc (rel) of 1999Re16 for the common Eγ. For Iγ(1622) and Iγ(2090) the %unc

Continued on next page (footnotes at end of table)

^{25}F β^- decay (142.6 ms) 2025Pe11,2005Pa74,1999Re16 (continued)

γ(^{25}Ne) (continued)

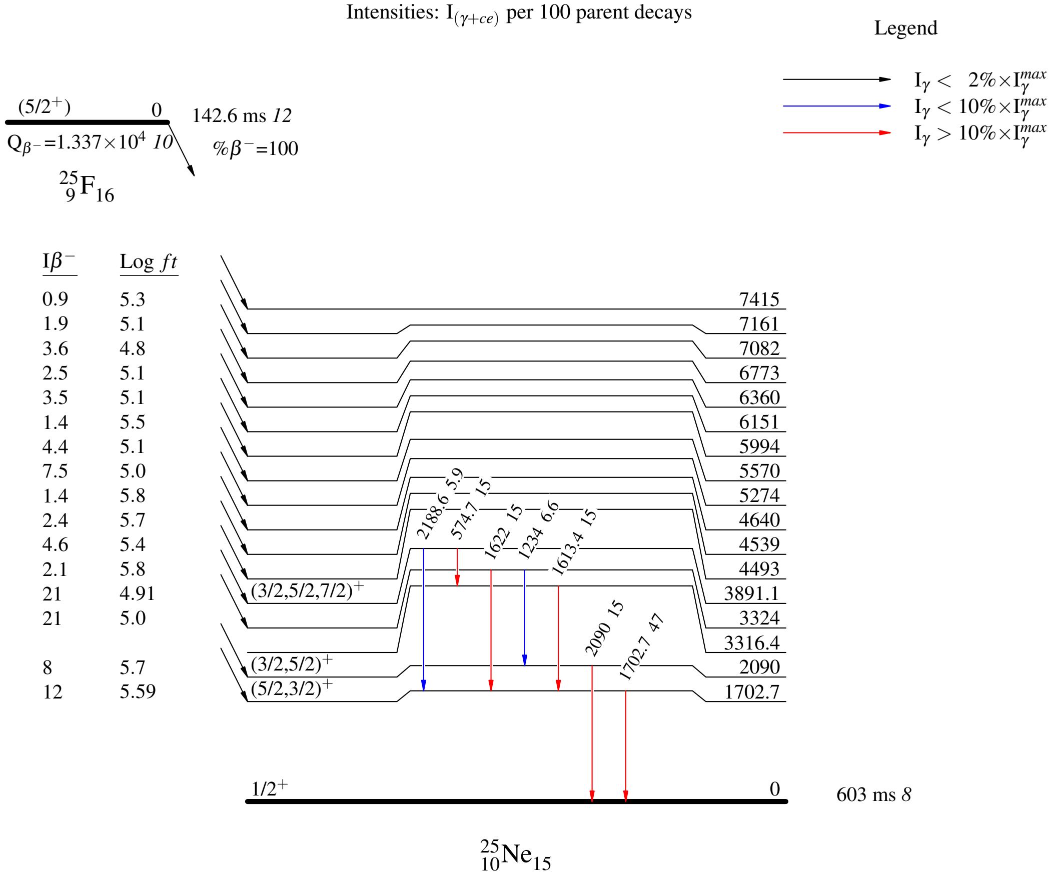
(rel) considered as ΔIγ(1613) of 1999Re16 and for Iγ(1234) as of ΔIγ(2188). %Iγ values of 1999Re16 from measured β and γ rates are listed in the comments.

@ For absolute intensity per 100 decays, multiply by 0.47 *6*.

^{25}F β^- decay (142.6 ms) 2025Pe11,2005Pa74,1999Re16

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{26}F β^-n decay (2.2 ms) 2013Le03

Parent: ^{26}F: E=643.4 *1*; J^π=(4$^+$); $T_{1/2}$=2.2 ms *1*; Q(β^-n)=12.64×10^3 *11*; %β^-n decay=12 *8*

^{26}F-E,J^π,$T_{1/2}$: from ^{26}F Adopted Levels in 2016Ba18.

^{26}F-Q(β^-n): from 2021Wa16: AME-2021.

^{26}F-%β^-n decay: 65% *18* of 18% *11* β^- decay branch of the isomer (2013Le03 – e-mail communication with A. Lepailleur (1st author of 2013Le03: dated Sept 10, 2015)). Note that no explanation or methodology for the extraction of this value is given in 2013Le03.

^{26}F was produced from fragmentation of a primary beam of ^{36}S, E=77.6 MeV/nucleon on a Be target (thickness=237 mg/cm^2), separated by LISE spectrometer at GANIL, identified from energy loss in a stack of Si detectors and time-of-flight, and implanted in a 1 mm-thick double-sided Si stripped (DSSSD) detector surrounded by four clover HPGe detectors. Measured half-life of ^{26}F g.s. and isomer, β^-n branch.

^{25}Ne Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	1/2$^+$	603 ms *8*	E(level): assumed that the ground state of ^{25}Ne is populated in this decay. J^π,$T_{1/2}$: from Adopted Levels.

^{26}F β^-n decay (8.2 ms) 2013Le03

Parent: ^{26}F: E=0.0; $J^\pi=1^+$; $T_{1/2}$=8.2 ms *9*; Q(β^-n)=12.64×10^3 *11*; %β^-n decay=13.5 *4*
^{26}F-J^π,$T_{1/2}$: from ^{26}F Adopted Levels in the ENSDF (2016Ba18).
^{26}F-Q(β^-n): from 2021Wa16: AME-2021.
^{26}F-%β^-n decay: from ^{26}F Adopted Levels in 2016Ba18.
^{26}F was produced from fragmentation of a primary beam of ^{36}S, E=77.6 MeV/nucleon on a Be target (thickness=237 mg/cm^2), separated by LISE spectrometer at GANIL, identified from energy loss in a stack of Si detectors and time-of-flight, and implanted in a 1 mm-thick double-sided Si stripped (DSSSD) detector surrounded by four clover HPGe detectors. Measured Eγ, Iγ, $\beta\gamma$ and $\gamma\gamma$ coincidences, half-life of ^{26}F g.s. and isomer, β^-n branch. Deduced levels, J, π. Comparison with Shell model calculations.

^{25}Ne Levels

E(level)†	J^π‡	$T_{1/2}$‡
0.0	$1/2^+$	603 ms *8*
1701.0 *4*	$(5/2,3/2)^+$	
2088.8	$(3/2,5/2)^+$	
3114.4 *8*		
3320.6		
3327	$(3/2,1/2)^-$	

† From Eγ data.
‡ From Adopted Level. Same value in 2013Le03.

γ(^{25}Ne)

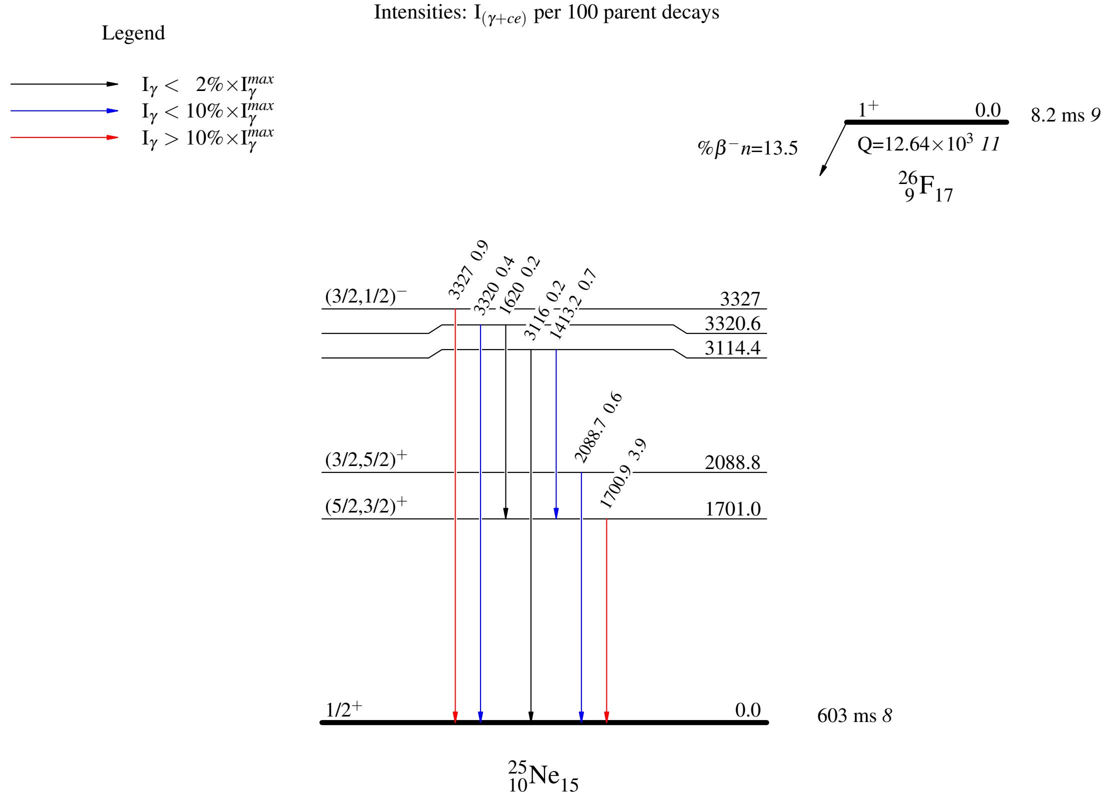
Eγ	Iγ†‡	E_i(level)	J^π_i	E_f	J^π_f
1413.2 *7*	0.7 *1*	3114.4		1701.0	$(5/2,3/2)^+$
1620	0.2 *1*	3320.6		1701.0	$(5/2,3/2)^+$
1700.9 *4*	3.9 *4*	1701.0	$(5/2,3/2)^+$	0.0	$1/2^+$
2088.7	0.6 *1*	2088.8	$(3/2,5/2)^+$	0.0	$1/2^+$
3116 *2*	0.2 *1*	3114.4		0.0	$1/2^+$
3320	0.4 *1*	3320.6		0.0	$1/2^+$
3327	0.9 *2*	3327	$(3/2,1/2)^-$	0.0	$1/2^+$

† Received from A. Lepailleur (1st author of 2013Le03) through e-mail communications (Sept 16, 2015).
‡ Absolute intensity per 100 decays.

^{26}F β^-n decay (8.2 ms) 2013Le03

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



$^{2}H(^{24}Ne,p\gamma),(^{26}Ne,^{25}Ne\gamma)$ 2010Ca10,2007Fe09,2006Ob05

2010Ca10: Target=deuterated polythene $(CD)_2$, E=10.6 MeV/nucleon from SPIRAL facility at GANIL. Measured proton spectra, angular distributions, γ-ray spectra in coincidence with protons and protons populating the 4.03 MeV level in coincidence with ^{25}Ne, ^{25}Ne-p-γ coincidence using TIARA, an array of E-ΔE silicon detectors and four EXOGAM segmented Ge detectors. Beam particles analyzed by VAMOS magnetic spectrometer. FWHM=65 keV for γ rays. Comparisons with shell-model calculations.

2007Fe09: E(^{24}Ne)=10 MeV/nucleon (10^4 particle/s), silicon particle detector array, measured particle-γ coincidence with EXOGAM γ-ray detector array; deduced excited levels, spin-parity, L-transfer, spectroscopic factor.

2006Ob05: E(^{26}Ne)=9.7 MeV/nucleon. EXOGAM γ-ray detector array. Measured Eγ, particle-γ coincidence; deduced excited levels, spin-parity.

Other references: 2005Ca44, 2005Ca50.

^{25}Ne Levels

E(level)†	J^{π}‡	L#	S
0	$1/2^+$	0@	0.80@
1700 *2*	$5/2^+$	2@	0.15@
2062 *25*	$3/2^+$	2@	0.44@
3321 *5*			
3330 *40*	$3/2^-$	1	0.75
4030? *40*	$7/2^-$	3	0.73

† From Eγ.
‡ From L-transfer, spectroscopic factor, comparison with shell model calculations (2010Ca10), and (d,p) reaction kinematics. Firm assignment in 2010Ca10.
# From 2010Ca10, based on $d\sigma/d\Omega(\theta)$ and comparison with normalized ADWA calculations.
@ Also in 2007Fe09. L-transfer from experimental angular distribution measurements and calculations (no details given).

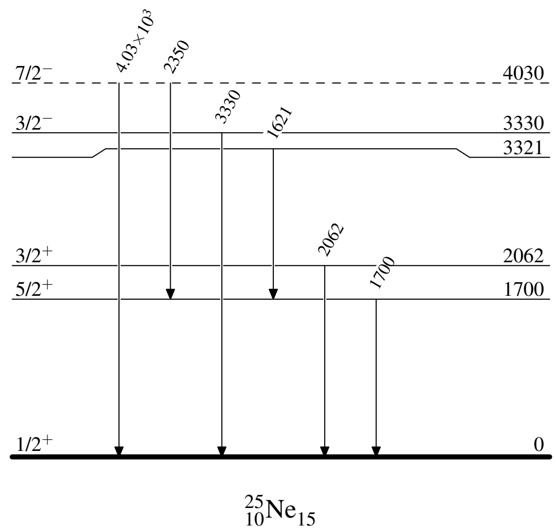
$\gamma(^{25}Ne)$

E_γ†	E_i(level)	J^{π}_i	E_f	J^{π}_f	Comments
ˣ320 *2*					
1621 *5*	3321		1700	$5/2^+$	
1700 *2*	1700	$5/2^+$	0	$1/2^+$	Eγ: other: 1680 *40* (2010Ca10). $FWHM_{exp}$=51 keV *7* (2006Ob05).
2062 *25*	2062	$3/2^+$	0	$1/2^+$	Eγ: weighted average of 2030 *40* (2010Ca10) and 2075 *25* (2006Ob05). $FWHM_{exp}$=38 keV *14* (2006Ob05).
2350‡ *40*	4030?	$7/2^-$	1700	$5/2^+$	
3330‡ *40*	3330	$3/2^-$	0	$1/2^+$	
4.03×10^3 *10*	4030?	$7/2^-$	0	$1/2^+$	Eγ: poor statistics. Placed in 2006Ob05, based on placement in other studies.

† From 2006Ob05, except where otherwise noted.
‡ From 2010Ca10.
ˣ γ ray not placed in level scheme.

$^{2}H(^{24}Ne,p\gamma),(^{26}Ne,^{25}Ne\gamma)$ 2010Ca10,2007Fe09,2006Ob05

Level Scheme



^{9}Be(^{26}Ne,Xγ) 2006Te04,2004Te03

E(^{26}Ne)=80 MeV/A. Measured Eγ, Iγ with segmented Ge array, recoil-γ coincidence, longitudinal momentum distribution. Deduced excited levels, L value, partial cross-section, spectroscopic factor, etc.
Total inclusive σ=98 mb *5*.

All data are from 2006Te04.

^{25}Ne Levels

E(level)†	J$^{\pi}$‡	L#	C^{2}S	Comments
0	1/2$^+$	0	1.4 *1*	Partial σ=42 mb *4*.
1703 *15*	5/2$^+$	2	1.3 *1*	L: for doublet. Partial σ=25 mb *2* (for doublet).
2090 *10*			0.5 *1*	C^{2}S: for 3/2$^+$. Partial σ=9 mb *2*.
3316 *20*	5/2$^+$	2	1.2 *2*	L: for doublet. Partial σ=22 mb *3* (for doublet).

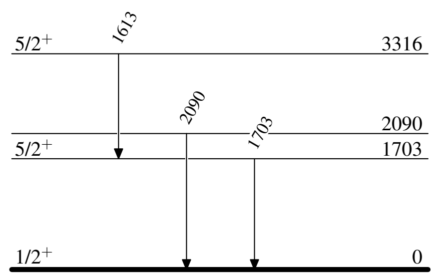
† From Eγ.
‡ Predicted value in 2006Te04, based on measured partial cross-section, spectroscopic factor, L-value, etc.
# From measured and calculated longitudinal momentum distribution.

γ(^{25}Ne)

E$_\gamma$	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$
1613 *15*	3316	5/2$^+$	1703	5/2$^+$
1703 *15*	1703	5/2$^+$	0	1/2$^+$
2090 *10*	2090		0	1/2$^+$

^{9}Be(^{26}Ne,Xγ) 2006Te04,2004Te03

Level Scheme



$^{25}_{10}Ne_{15}$

$C(^{36}S,^{25}Ne\gamma)$ 2005Be60

Also $^{9}Be(^{36}S,^{25}Ne\gamma)$.

^{25}Ne beam (54 MeV/u to 65 MeV/u) was obtained from double fragmentation of primary ^{36}S beam, E=77.5 MeV/u, on C target at GANIL, selected through the ALPHA spectrometer and directed on a second C target located at the SPEG spectrometer; Detector: A 74 element BaF_2 detector array and 4 Ge detectors; measured prompt $E\gamma$, $\gamma\gamma$ coincidence; deduced level scheme.

^{25}Ne Levels

E(level)†	J^π	Comments
0	1/2+	J^π: from Adopted Levels.
1707 *4*		
3324 *6*		

† From $E\gamma$.

$\gamma(^{25}Ne)$

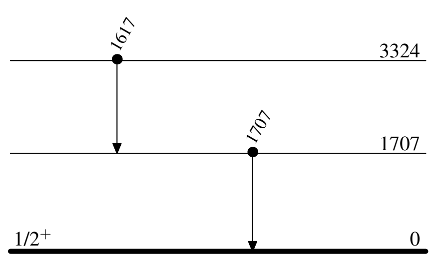
E_γ	E_i(level)	E_f	J^π_f
1617 *5*	3324	1707	
1707 *4*	1707	0	1/2+

Legend

● Coincidence

$C(^{36}S,^{25}Ne\gamma)$ 2005Be60

Level Scheme



$^{25}_{10}Ne_{15}$

^{26}Mg(^{7}Li,^{8}B) 1973Wi06

^{26}Mg(^{7}Li, ^{8}B) E=79 MeV. Magnetic spectrometer, Si E-ΔE particle telescope.

^{25}Ne Levels

E(level)
0
1650 *50*
2030 *50*
3250 *80*
4050 *80*
4.70×10^3 *10*

^{26}Mg(^{13}C,^{14}O) 1985Wo04

^{26}Mg(^{13}C,^{14}O), E=96 MeV. Magnetic spectrometer, enriched target.

^{25}Ne Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	1/2$^+$	603 ms *8*	J^π,$T_{1/2}$: from Adopted Levels.
1740 *30*			
3330 *30*			E(level): overlaps three levels in the adopted dataset. No “XREF” was assigned.
4070 *30*			
6280 *50*			

^{208}Pb(^{26}Ne,^{25}Neγ) 2008Gi09

Adapted/Edited the XUNDL dataset compiled by S. Geraedts and B. Singh (McMaster); Nov 24, 2008.

Coulomb excitation of ^{26}Ne was performed on ^{208}Pb and ^{27}Al targets using a 58 MeV/nucleon beam produced at the RIKEN accelerator facility. The secondary ^{26}Ne beam was produced in the reaction ^{9}Be(^{40}Ar,X) with a beam energy of 95 MeV/nucleon. Charged particles were detected with single-sided silicon strip detectors. Measured Eγ using 4π DALI2 array of 152 NaI(Tl) detectors. Detected neutrons using a hodoscope consisting of 29 sets of plastic rods and scintillators. States in ^{25}Ne were populated from neutron decay of a pygmy state at ≈9 MeV. These were identified by observing known γ decays from levels in ^{25}Ne, not listed in 2008Gi09. Secondary articles: 2005GiZX, 2005GiZW.

Other: 2007Be66: ^{208}Pb(^{24}Ne,X), E=7.9 MeV/nucleon; measured Eγ, (particle)γ-coincidence. Measurements were carried out at GANIL, France. Reported Doppler corrected Eγ of 1680 (doublet), 2030, 2350, 3300 and proposed the placements from 5/2$^+$ to 1/2$^+$ g.s., 3/2$^+$ to 1/2$^+$, 7/2$^+$ to 3/2$^+$, and 3/2$^-$ to g.s., respectively. Secondary articles: 2008BeZX, 2006BeZP. No level of spin parity 7/2$^+$ is proposed in 2008Gi09 (the evaluators assume that the study reported in 2008Gi09 supersedes that in 2007Be66).

^{25}Ne Levels

E(level)	J$^{\pi}$ †	Comments
0	1/2$^+$	%n=5 *+17−5* from 9 MeV state in ^{26}Ne and ^{208}Pb target.
1700	5/2$^+$	%n=66 *15* for 1700+2000 level from 9 MeV state in ^{26}Ne, and ^{208}Pb target.
2000	3/2$^+$	%n=66 *15* for 1700+2000 level from 9 MeV state in ^{26}Ne, and ^{208}Pb target.
3300	3/2$^-$	%n=35 *9* for 3300 level from 9 MeV state in ^{26}Ne, and ^{208}Pb target.

† As listed in 2008Gi09.

Adopted Levels, Gammas

$Q(\beta^-)$=3835.0 *12*; S(n)=9011.2 *12*; S(p)=10695.1 *13*; $Q(\alpha)$=−11735.1 *22* 2021Wa16
S(2n)=15970.6 *12*, S(2p)=27220 *30* (2021Wa16).

^{25}Na Levels

Cross Reference (XREF) Flags

A	^{25}Ne β^- decay (603 ms)	E	^{12}C(^{18}O,αpγ)
B	^{2}H(^{24}Na,p)	F	^{23}Na(t,p),^{26}Mg(t,α)
C	^{2}H(^{25}Na,^{25}Na′γ)	G	^{23}Na(t,pγ),^{26}Mg(t,$\alpha\gamma$)
D	^{9}Be(^{18}O,pnγ)	H	^{26}Mg(d,^{3}He),(pol d,^{3}He)

E(level)[†]	J$^\pi$	$T_{1/2}$[#]	XREF	Comments
0[a]	5/2$^+$	59.3 s *9*	A CDEFGH	%β^-=100 μ=+3.683 *4*; Q=−0.0015 *3* δ<r^2>(^{23}Na,^{25}Na)=−0.100 fm^2 *30* (2013An02). Also rms charge radius R=2.977 fm *25* (2013An02). J$^\pi$: 5/2 from measurements of β-asymmetry with optical pumping (1975De11), L=2 (d,^{3}He) for doublet (1973Ja04). $T_{1/2}$: weighted average of 58.727 s *930* (1978Be61), 60 s *2* (1956Na22), 60 s *2* (1955Iw01), 58.2 s *13* (1947Bl33), 61.3 s *24* (1944Hu06), and 60.0 s *12* (1944Ri01). Others: 62 s (1948Pe03), 57 s (1968Fa04). μ: From 1975De11, 2019StZV (Optical Pumping with Radiative Detection). Others: +3.685 *22* (1975Hu04 – isotopic shifts and hfs splitting by spectroscopy using a tunable dye LASER), +3.683 *4* (1975De11). Q: from 2021StZZ (based on 0.00136 b *29* (2004Og13) – β-NMR). Other: −0.095 b *50* (spectroscopic quadrupole moment) (1982To05 – LASER induced optical pumping of thermal atomic beam with magnetic state selection).
89.59[d] *10*	3/2$^+$	5.1 ns *3*	A CD FGH	J$^\pi$: L=0+2 (t,p); L=2 (d,^{3}He) for doublet (1973Ja04) and 5/2$^+$ for the g.s. $T_{1/2}$: other: 6.2 ns *41* from τ=9 ns *6* (1969Ni09).
1069.44[d] *15*	1/2$^+$	1.27 ps *14*	AB DEFGH	J$^\pi$: L=0 in (d,^{3}He) and from (pol d,^{3}He). $T_{1/2}$: weighted average of 1.21 ps *14* from (^{18}O,pnγ) and 1.32 ps *14* from (t,pγ).
2202.00[d] *20*	3/2$^+$	23 fs *4*	A DEFGH	J$^\pi$: L=2 in (d,^{3}He) and from (pol d,^{3}He). $T_{1/2}$: weighted average of 17 fs *10* from (^{18}O,pnγ), 18 fs *8* from (^{18}O,αpγ), and 25 fs *4* from (t,pγ).
2418.3[a] *7*	(9/2$^+$)	162 fs *28*	DEFGH	J$^\pi$: (E2) γ to 5/2$^+$. $T_{1/2}$: weighted average of 166 fs *28* from (^{18}O,pnγ), 159 fs *28* from (^{18}O,αpγ), and 139 fs *97* from (t,pγ).
2790.1[b] *6*	(7/2)$^+$	118 fs *16*	DEFG	J$^\pi$: L=2(+4) in (t,p), 668.8γ (M1), ΔJ=1, from (9/2$^+$) at 3459.4. $T_{1/2}$: weighted average of 132 fs *24* from (^{18}O,pnγ), 104 fs *14* from (^{18}O,αpγ), and 173 fs *35* from (t,pγ).
2915.8 *10*	5/2$^+$	10 fs *4*	D FGH	J$^\pi$: L=2 in (d,^{3}He) and from (pol d,^{3}He). $T_{1/2}$: other: 42 fs *28* (^{18}O,pnγ).
3356.1[c] *10*	(7/2$^+$)	16 fs *5*	DEFGH	J$^\pi$: 3356 $\gamma(\theta)$ measurement (^{18}O,pnγ) implies ΔJ=1 (i.e. 3/2$^+$ or 7/2$^+$), 7/2 for feeding from higher spin states.
3459.4[a] *7*	(9/2$^+$)	131 fs *17*	DEFG	J$^\pi$: population of high spin state in (^{18}O,pnγ), absence of γ feeding the low spin state, and 668.6 $\gamma(\theta)$ measurement implies ΔJ=1. $T_{1/2}$: weighted average of 90 fs *28* from (^{18}O,pnγ), 132 fs *21* from (^{18}O,αpγ), and 146 fs *17* from (t,pγ).
3687.6 *22*	(3/2)$^+$	18 fs *8*	AB FGH	J$^\pi$: L=(2) in (d,^{3}He), L=0 in ^{24m}Na(d,p) (inverse kinematics), Log *ft*=4.88 from 1/2$^+$.
3928 *7*	(1/2$^+$)	<28 fs	FGH	J$^\pi$: L=(0) in (d,^{3}He).

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Adopted Levels, Gammas (continued)

^{25}Na Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[#]	XREF	Comments
3955.1 *9*	$(1/2^+,3/2,5/2^+)$	<83 fs	B DEFG	XREF: E(3964) J^π: γs to $1/2^+$ and $5/2^+$. $(3/2^+)$ from shell model calculations.
3995 *5*	$1/2^-$	31 fs *7*	F H	E(level): from (t,pγ),(t,$\alpha\gamma$). J^π: from (pol d,^{3}He), L=1 (d,^{3}He),(pol d,^{3}He).
3999.0[b] *7*	$(7/2^+,9/2^+)$	62.4 fs *49*	DE G	J^π: 1209 D to $(5/2,7/2)^+$, γ to $(9/2^+)$. Shell model calculation $9/2^+$ (2015Vo12) (^{18}O,pnγ). $T_{1/2}$: other: 69 fs *14* (^{18}O,pnγ).
4003 *3*	$1/2^-$	33 fs *7*	EFGH	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He). $T_{1/2}$: from τ=47 fs *10*, weighted average of τ=90 fs *50* (^{18}O,αpγ) and τ=45 fs *10* (t,pγ),(t,$\alpha\gamma$).
4015.6 *20*			D	
4132 *5*		16 fs *6*	FG	
4289 *3*	$1/2^+$	<20[@] fs	AB DEF H	J^π: L=0 in (d,^{3}He) and from (pol d,^{3}He).
4340 *7*			F	
4450 *10*			F	
4710 *10*			F	
4800 *10*			F	
4965.8[a] *8*	$(11/2^+)$	51 fs *4*	DEF	J^π: 1506γ D+Q to $(9/2^+)$ and $\gamma(\theta)$ implies ΔJ=1. $T_{1/2}$: weighted average of 64 fs *14* from (^{18}O,pnγ) and 49.9 fs *42* from (^{18}O,αpγ).
5146 *10*			F	
5190[‡] *10*	$3/2^-$		F H	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He).
5231.8[c] *13*	$9/2,7/2,5/2,11/2^+$	<10[@] fs	DEF	J^π: $(9/2,7/2,5/2,11/2^+)$ from γ to $(7/2^+)$ and γ to $(5/2,7/2)^+$. $(9/2^+)$ from comparison with shell-model calculations. For field-length parentheses were avoided.
5347 *10*			F	
5388.4[&] *11*	$(9/2^+,11/2^+)$	<2.8[@] fs	DEF	J^π: 2970.2γ D to $(9/2^+)$. $(11/2^+)$ from comparison with shell-model calculations.
5465 *10*			F	
5484 *12*			F	
5690[‡] *12*	$3/2^-$		F H	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He).
5713 *12*			F	
5748 *4*	$(9/2,11/2,13/2^+)$	<194[@] fs	EF	J^π: γ to $(9/2^+)$.
5847.3 *25*		<52[@] fs	E	J^π: γs to $(5/2,7/2)^+$ and $(9/2^+)$. $(7/2^+)$ in (^{18}O,αpγ).
5876 *12*			H	
6005 *22*	$(1/2,3/2)^-$		H	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He).
6079 *15*			H	
6154 *15*			H	
6270[‡] *4*	$(9/2,11/2)$	<26[@] fs	E	J^π: γs to $(5/2,7/2)^+$ and $(9/2^+)$.
6379 *4*	$(11/2^+,9/2^+,13/2^+)$	<6.2[@] fs	DE	J^π: γ to $(9/2^+)$. $(11/2^+)$ from shell-model calculations.
6549 *15*	$3/2^-$		H	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He).
6581 *3*		<28[@] fs	E	
6736.2 *11*	$(13/2^+)$	<2.8[@] fs	DE	J^π: γs to $(9/2^+)$ and $(11/2^+)$. $(13/2^+)$ from comparison with shell-model.
6753 *21*	$(1/2,3/2)^-$		H	J^π: L=1 in (d,^{3}He).
6856.7[&] *13*	$(11/2^+,13/2^+)$	42[@] fs *28*	DE H	XREF: D(6958) J^π: γs to $(9/2^+)$ and $(9/2^+,11/2^+)$. $(13/2^+)$ from shell-model calculations. 1467.9$\gamma(\theta)$ implies ΔJ=1.
6936 *20*			H	
6985 *20*			H	
7217[b] *4*	$(9/2,11/2,13/2)$	<97[@] fs	E	J^π: γs to $(9/2^+)$ and $(7/2^+,9/2^+)$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{25}Na Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[#]	XREF	Comments
7603 *17*	$3/2^-$		H	J^π: L=1 in (d,^{3}He) and from (pol d,^{3}He).
7624[a] *4*	(11/2,13/2)	<52[@] fs	E	J^π: γ to ($11/2^+$), $\gamma(\theta)$ implies ΔJ=0 or 1.
7780 *25*			H	
8052 *26*	$(1/2,3/2)^-$		H	J^π: L=1 in (d,^{3}He).
8400 *25*			H	

[†] From a least-squares fit to Eγ, except where otherwise noted.
[‡] From (t,p),(t,α).
[#] From (t,pγ),(t,$\alpha\gamma$), except where otherwise noted.
[@] From (^{18}O,αpγ).
[&] Seq.(A): based on 5388, ($9/2^+$,$11/2^+$).
[a] Seq.(B): based on g.s. $5/2^+$.
[b] Seq.(C): based on 2790, $(5/2,7/2)^+$.
[c] Seq.(D): based on 3356, ($7/2^+$).
[d] Seq.(E): based on 89.59, $3/2^+$.

Adopted Levels, Gammas (continued)

$\gamma(^{25}Na)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	δ	α[a]	Comments
89.59	3/2+	89.55 *10*	100	0	5/2+	M1(+E2)	+0.074 *74*	0.0027 *15*	B(M1)(W.u.)=0.0060 *4*; B(E2)(W.u.)<100 E_γ: weighted average of 89.53 *10* from ^{25}Ne β^- decay and 89.7 *3* from (^{18}O,pnγ). Mult.: $\gamma(\theta)$ data of 89.55γ in (t,pγ) and (^{18}O,pnγ) are consistent with D+Q, ΔJ=1, transition. RUL favors M1(+E2). δ: upper limit of ≤0.148 can be obtained from RUL for B(E2) W.u.≤100 for this mass range. δ=0.074 *74* obtained for a possible value in the range from 0 to 0.148.
1069.44	1/2+	979.77[‡] *16*	100.0[@] *22*	89.59	3/2+				
		1069.3 *3*	10.5 *9*	0	5/2+	[E2]			B(E2)(W.u.)=7.0 *+10−9* I_γ: weighted average of 12.9 *21* from ^{25}Ne β^- decay, 10.0 *9* from (^{18}O,pnγ), and 11.1 *22* from (t,pγ).
2202.00	3/2+	1132.2 *3*	58 *6*	1069.44	1/2+	M1(+E2)	+0.05 *9*	9.95×10^{-6} *16*	B(M1)(W.u.)=0.19 *+8−6* E_γ: weighted average of 1132.8 *10* from ^{25}Ne β^- decay, 1132.4 *3* from (^{18}O,pnγ), 1131.8 *4* from (^{18}O,αpγ), and 1132 *2* from (t,pγ). I_γ: weighted average of 65 *5* from (^{18}O,pnγ) and 49 *6* from (t,pγ). Other: 36 *27* from ^{25}Ne β^- decay. Mult.,δ: From (t,pγ),(t,$\alpha\gamma$) and level lifetime.
		2112.2 *4*	40 *9*	89.59	3/2+	(M1(+E2))	−0.09 *13*	2.93×10^{-4} *5*	B(M1)(W.u.)=0.020 *+11−8* I_γ: unweighted average of 56 *17* from ^{25}Ne β^- decay, 23.5 *25* from (^{18}O,pnγ), and 40 *4* from (t,pγ). Mult.,δ: from (t,pγ),(t,$\alpha\gamma$), δ=−0.09 *13* for 3/2 to 3/2 and +0.8 *4* for to 3/2 to 5/2.
		2202.3 *3*	100[@] *6*	0	5/2+	(M1)		3.29×10^{-4} *5*	B(M1)(W.u.)=0.045 *+10−7*
2418.3	(9/2+)	2419 *1*	100	0	5/2+	(E2)		5.22×10^{-4} *7*	B(E2)(W.u.)=9.7 *+20−14*
2790.1	(7/2)+	2699 *1*	8.9 *9*	89.59	3/2+	[E2]		6.52×10^{-4} *9*	B(E2)(W.u.)=0.63 *+12−10* I_γ: weighted average of 8.8 *9* from (^{18}O,pnγ) and 9.4 *21* from (^{18}O,αpγ).
		2790 *1*	100 *6*	0	5/2+	(M1)		5.74×10^{-4} *8*	B(M1)(W.u.)=0.0079 *+13−10*
2915.8	5/2+	2826 *1*	100	89.59	3/2+	(M1)		5.88×10^{-4} *8*	B(M1)(W.u.)=0.10 *+6−3*
3356.1	(7/2+)	3266 *3*	12.8 *17*	89.59	3/2+	[E2]		8.98×10^{-4} *13*	B(E2)(W.u.)=2.5 *+12−6* E_γ: weighted average of 3269 *3* from (^{18}O,pnγ) and 3263 *3* from (t,pγ).

$^{25}_{11}Na_{14}$-4

$\gamma(^{25}Na)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	α[a]	Comments
								I_γ: weighted average of 13.3 *17* from (^{18}O,pnγ) and 11.1 *33* from (t,pγ).
3356.1	(7/2$^+$)	3356 *1*	100[@] *3*	0	5/2$^+$			
3459.4	(9/2$^+$)	668.8 *5*	6.2 *10*	2790.1	(7/2)$^+$	(M1)		B(M1)(W.u.)=0.031 *+7−6* E_γ: weighted average of 668.6 *5* from (^{18}O,pnγ) and 669.1 *7* from (^{18}O,αpγ). I_γ: unweighted average of 7.2 *4* from (^{18}O,pnγ) and 5.2 *7* from (^{18}O,αpγ). Mult.: M1 in (^{18}O,pnγ). RUL allows both M1 or E1.
		1041.3[#] *4*	100.0[#] *26*	2418.3	(9/2$^+$)	(M1)		B(M1)(W.u.)=0.131 *+20−15* Mult.: M1 in (^{18}O,pnγ). RUL allows both M1 or E1.
		3462[#] *3*	7.5[#] *26*	0	5/2$^+$	[E2]	9.77×10^{-4} *14*	B(E2)(W.u.)=0.13 *5*
3687.6	(3/2)$^+$	3598 *3*	25[@] *6*	89.59	3/2$^+$			E_γ: weighted average of 3599 *3* from ^{25}Ne β^- decay and 3595 *4* from (t,pγ).
		3687 *3*	100[@] *6*	0	5/2$^+$			E_γ: weighted average of 3688 *3* from ^{25}Ne β^- decay and 3685 *5* from (t,pγ).
3928	(1/2$^+$)	3928[@]	100	0	5/2$^+$			
3955.1	(1/2$^+$,3/2,5/2$^+$)	2887 *2*	59 *5*	1069.44	1/2$^+$			E_γ: weighted average of 2886 *2* from (^{18}O,pnγ), 2891 *3* from (^{18}O,αpγ), and 2887 *3* from (t,pγ).
		3865 *1*	100.0[@] *25*	89.59	3/2$^+$			
		3950[@] *5*	23.5[@] *25*	0	5/2$^+$			
3999.0	(7/2$^+$,9/2$^+$)	1209.0[#] *4*	100 *4*	2790.1	(7/2)$^+$	(M1)	1.458×10^{-5} *21*	B(M1)(W.u.)=0.171 *+16−14* E_γ: other: 1207 *3* (t,pγ),(t,$\alpha\gamma$). Mult.: M1 in (^{18}O,pnγ). RUL allows both M1 or E1.
		1579.7[#] *10*	17 *4*	2418.3	(9/2$^+$)			E_γ: weighted average of 1580 *1* from (^{18}O,pnγ) and 1579.1 *13* from (^{18}O,αpγ). I_γ: unweighted average of 13.7 *11* from (^{18}O,pnγ) and 20.7 *30* from (^{18}O,αpγ).
4003	1/2$^-$	2933[#] *3*	100	1069.44	1/2$^+$	[E1]	1.21×10^{-3} *2*	B(E1)(W.u.)=9.5×10^{-4} *+26−17* E_γ: placement also available in (t,pγ),(t,$\alpha\gamma$), Eγ from level energy difference.
4015.6		2946 *2*	100	1069.44	1/2$^+$			
4132		4132[@] *5*	100	0	5/2$^+$			
4289	1/2$^+$	3221[b] *1*	100	1069.44	1/2$^+$			
4965.8	(11/2$^+$)	966.7 *9*	8 *4*	3999.0	(7/2$^+$,9/2$^+$)			E_γ: weighted average of 966 *1* from (^{18}O,pnγ) and 967.3 *9* from (^{18}O,αpγ).

$^{25}_{11}Na_{14}$-5

$\gamma(^{25}Na)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	α[a]	Comments
								I_γ: unweighted average of 11.8 *11* from (^{18}O,pnγ) and 4.5 *12* from (^{18}O,αpγ).
4965.8	(11/2$^+$)	1506.4 *6*	100[#] *4*	3459.4	(9/2$^+$)	D+Q		E_γ: weighted average of 1507 *1* from (^{18}O,pnγ) and 1506.2 *6* from (^{18}O,αpγ).
		2547.4[‡] *10*	48 *9*	2418.3	(9/2$^+$)	(M1)	4.74×10^{-4} *7*	B(M1)(W.u.)=0.0080 *+12−13* E_γ: weighted average of 2547 *1* from (^{18}O,pnγ) and 2548.0 *12* from (^{18}O,αpγ). I_γ: unweighted average of 38.9 *22* from (^{18}O,pnγ) and 57 *4* from (^{18}O,αpγ). Mult.: M1 in (^{18}O,pnγ). RUL allows both M1 or E1.
5231.8	9/2,7/2,5/2,11/2$^+$	1773[b] *3*	29 *8*	3459.4	(9/2$^+$)			
		1875.6 *10*	100 *6*	3356.1	(7/2$^+$)			E_γ: weighted average of 1876 *1* from (^{18}O,pnγ) and 1875.0 *12* from (^{18}O,αpγ).
		2441[#] *3*	23 *8*	2790.1	(7/2)$^+$			
5388.4	(9/2$^+$,11/2$^+$)	2970.2 *12*	100	2418.3	(9/2$^+$)	D+Q		E_γ: weighted average of 2971 *1* from (^{18}O,pnγ) and 2968.4 *15* from (^{18}O,αpγ). Mult.: from (^{18}O,pnγ).
5748	(9/2,11/2,13/2$^+$)	3329[#] *4*	100	2418.3	(9/2$^+$)			
5847.3		3058[#] *3*	82[#] *18*	2790.1	(7/2)$^+$			
		3427[#] *4*	100[#] *18*	2418.3	(9/2$^+$)			
6270	(9/2,11/2)	3480[#] *4*	100[#] *20*	2790.1	(7/2)$^+$			
		3851[#b] *5*	<40[#]	2418.3	(9/2$^+$)			
6379	(11/2$^+$,9/2$^+$,13/2$^+$)	2924[#] *5*	49[#] *14*	3459.4	(9/2$^+$)			
		3958[#] *4*	100[#] *11*	2418.3	(9/2$^+$)			E_γ: other: 3965 *3* (^{18}O,pnγ).
6581		3120[#] *4*	74[#] *15*	3459.4	(9/2$^+$)			
		4163[#] *4*	100[#] *11*	2418.3	(9/2$^+$)			
6736.2	(13/2$^+$)	1348.9[#] *13*	33[#] *8*	5388.4	(9/2$^+$,11/2$^+$)			
		1770.2 *10*	100[#] *13*	4965.8	(11/2$^+$)			E_γ: weighted average of 1770 *1* from (^{18}O,pnγ) and 1770.7 *16* from (^{18}O,αpγ).
		3275[#] *6*	19[#] *6*	3459.4	(9/2$^+$)			
		4313[#] *3*	83[#] *6*	2418.3	(9/2$^+$)	Q[#]		
6856.7	(11/2$^+$,13/2$^+$)	1467.9[#] *10*	93 *8*	5388.4	(9/2$^+$,11/2$^+$)	D+Q	5.96×10^{-5} *9*	I_γ: weighted average of 97 *8* from (^{18}O,pnγ) and 84 *13* from (^{18}O,αpγ). Mult.: from (^{18}O,pnγ).
		3395[#] *5*	48[#] *13*	3459.4	(9/2$^+$)			

$^{25}_{11}Na_{14}$-6

Adopted Levels, Gammas (continued)

γ(^{25}Na) (continued)

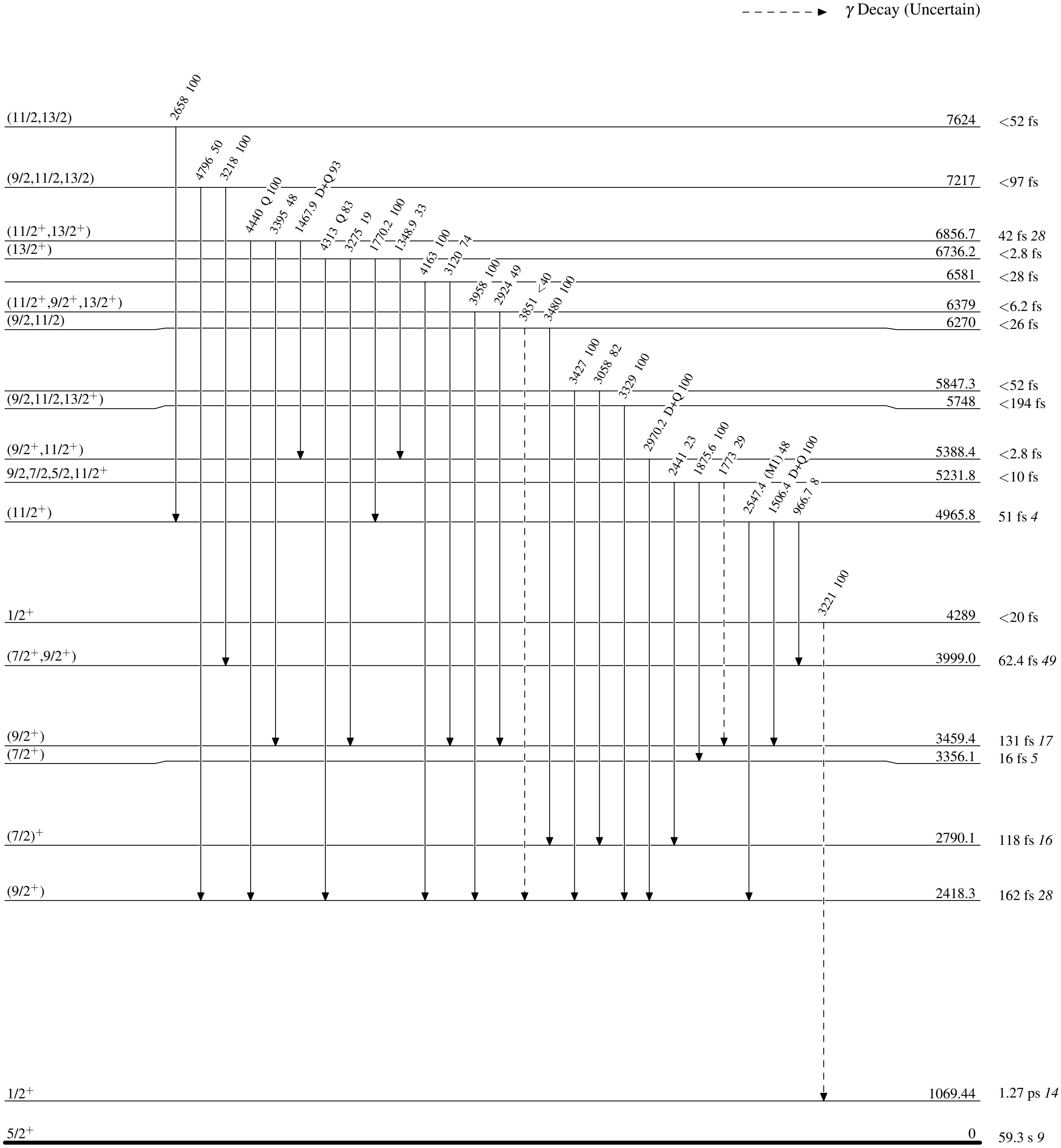
E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [&]	Comments
6856.7	(11/2$^+$,13/2$^+$)	4440 *2*	100 *10*	2418.3	(9/2$^+$)	Q [#]	E_γ: weighted average of 4441 *2* from (^{18}O,pnγ) and 4436 *3* from (^{18}O,αpγ).
7217	(9/2,11/2,13/2)	3218 [#] *4*	100 [#] *25*	3999.0	(7/2$^+$,9/2$^+$)		
		4796 [#] *9*	50 [#] *17*	2418.3	(9/2$^+$)		
7624	(11/2,13/2)	2658 [#] *4*	100	4965.8	(11/2$^+$)		

† From (^{18}O,pnγ), except where otherwise noted.
‡ From ^{25}Ne β- decay (603 ms).
# From (^{18}O,αpγ).
@ From (t,pγ),(t,$\alpha\gamma$).
& From (^{18}O,pnγ) based on $\gamma(\theta)$, except where noted otherwise.
a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with “Frozen Orbitals” approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

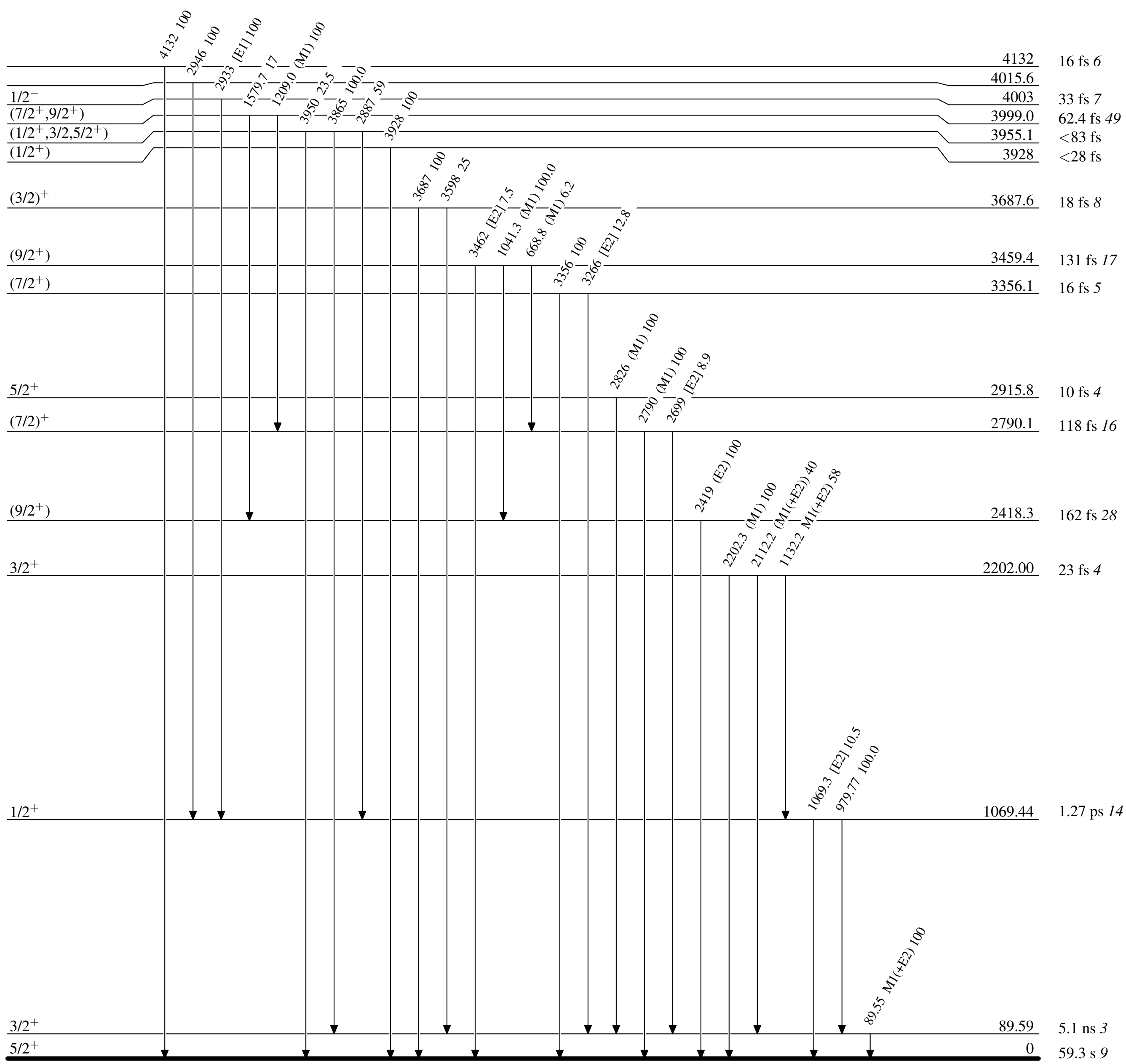


$^{25}_{11}Na_{14}$

Adopted Levels, Gammas

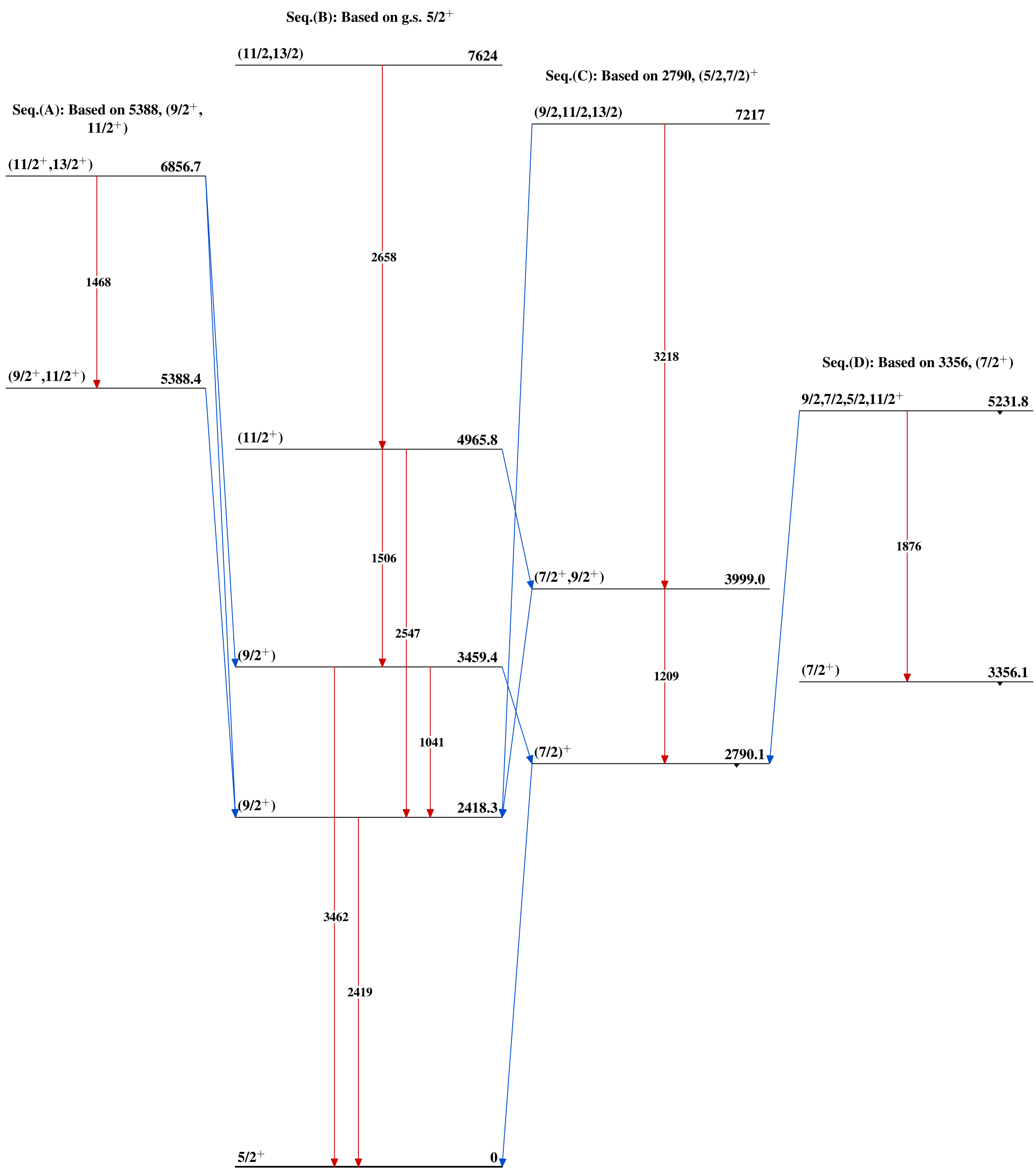
Level Scheme (continued)

Intensities: Relative photon branching from each level



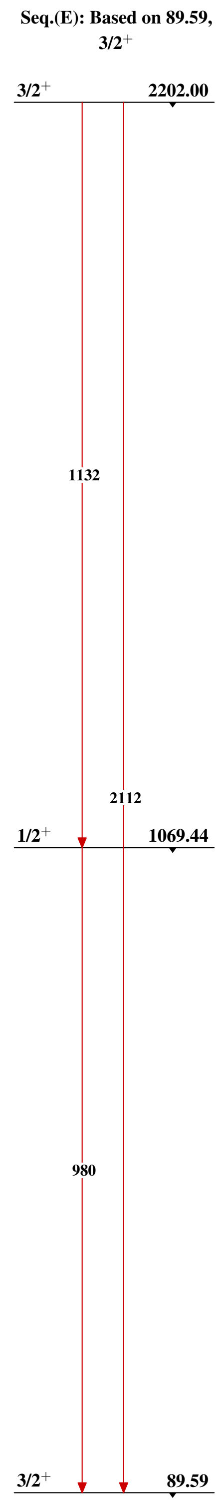
$^{25}_{11}Na_{14}$

Adopted Levels, Gammas



$^{25}_{11}Na_{14}$

Adopted Levels, Gammas (continued)



$^{25}_{11}Na_{14}$

$^{25}Ne\ \beta^-$ decay (603 ms) 1973Go11

Parent: ^{25}Ne: E=0.0; $J^\pi=1/2^+$; $T_{1/2}$=603 ms *8*; $Q(\beta^-)$=7334 *8*; %β^- decay=100

^{25}Ne-J^π,$T_{1/2}$: from ^{25}Ne Adopted Levels.

^{25}Ne-$Q(\beta^-)$: from 2021Wa16.

Source produced by $^9Be(^{18}O,2p)$ E=44 MeV; Ge(Li) detector, NE102 scintillator. Measured Eγ, Iγ, γ-β coincidence; deduced β feeding, log *ft*, ^{25}Ne half-life, etc.

^{25}Na Levels

E(level)†	J^π	$T_{1/2}$‡
0	$5/2^+$	59.3 s *9*
89.53 *10*	$3/2^+$	5.1 ns *3*
1069.32 *19*	$1/2^+$	1.27 ps *14*
2202.1 *10*	$3/2^+$	23 fs *4*
3688 *3*	$(3/2)^+$	18 fs *8*
4290 *3*	$1/2^+$	

† From a least-squares fit to Eγ ignoring the calculated Eγ.
‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(3044# *9*)	4290	>0.52	<4.9	Iβ^-: tentatively proposed limit (≥0.52 *15*) by authors based on the Iγ(3220) in 1973Go11, since total γ branch from the level is not known. Other: 0.53 *15* from intensity balance.
(3646 *9*)	3688	1.2 *3*	4.87 *11*	Iβ^-: other: 1.18 *30* (1973Go11).
(5132 *8*)	2202.1	2.1 *5*	5.3 *1*	Iβ^-: other: 2.3 *5* (1973Go11).
(6265 *8*)	1069.32	20.0 *20*	4.72 *5*	Iβ^-: other: 19.2 *20* (1973Go11).
(7245 *8*)	89.53	76.8 *21*	4.43 *1*	Iβ^-: other: 76.8 *19* (1973Go11).
(7334 *8*)	0			Iβ^-: In 1973Go11, an upper limit of ≤20 (at the 85% confidence level) g.s. feeding was proposed based on their measured value of β_0/β_1=0.17 *9*. For a g.s. feeding of Iβ=10 *10*, the log *ft*=4.43 *1* can be obtainted, which would indicate an allowed transition, whereas for a $1/2^+$ to $5/2^+$ non-unique 2nd forbidden β transition log *ft*≥10.95 (2023Tu02) can be expected. Only a very small branch like Iβ≤0.004 can satisfy the log *ft* limit. The evaluator assumes a "zero" g.s. β feeding.

† From intensity balance at each level, except where noted otherwise. The values of 1973Go11 are listed in the comments.
‡ Absolute intensity per 100 decays.
\# Existence of this branch is questionable.

γ(^{25}Na)

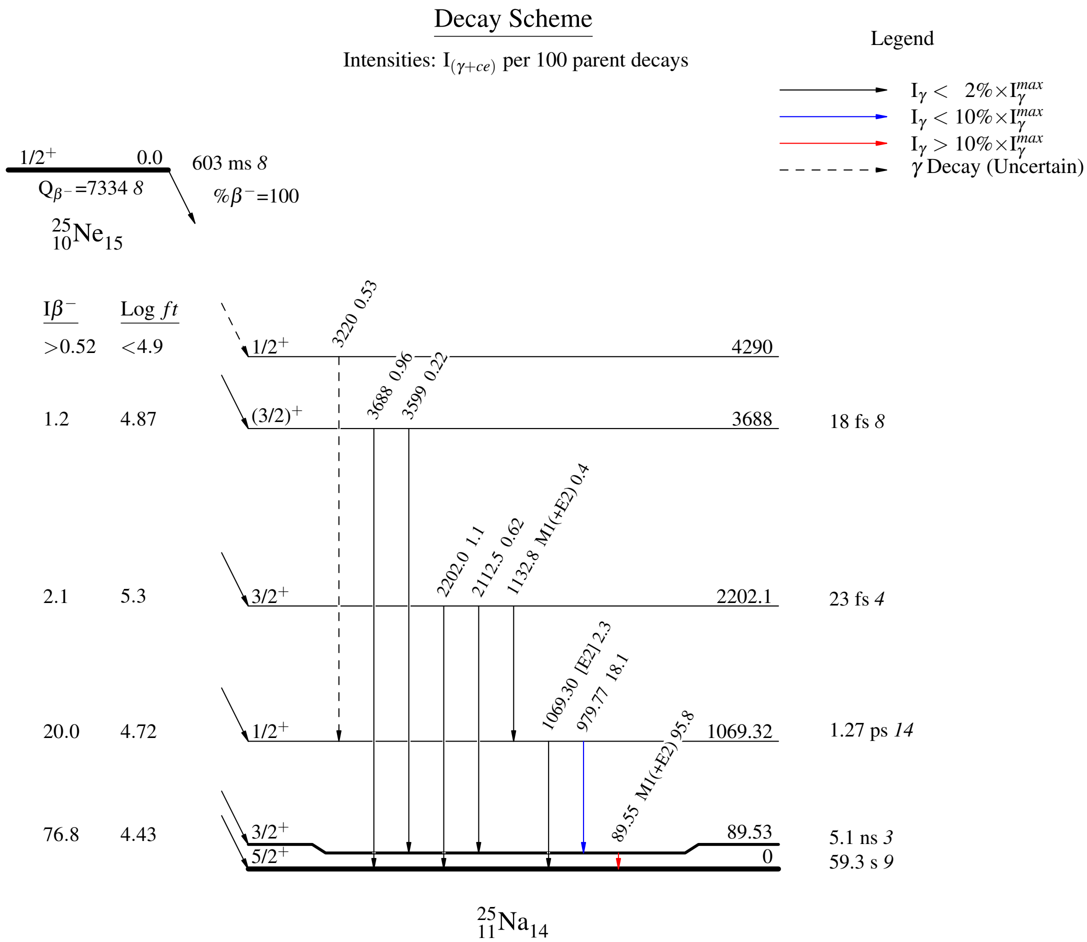
Iγ normalization: authors report Iγ per 100 decay in 1973Go11 (calculated assuming Σ(Iγ) to the g.s.=100 and no β feeding to the g.s.). Note that in the abstract the same Iγ's are mentioned as relative intensity, in fact it is relative in absolute scale, i.e. per 100 decay.

E_γ	I_γ †#	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	α@	Comments
89.55 *10*	95.5 *6*	89.53	3/2$^+$	0	5/2$^+$	M1(+E2)	+0.074 *74*	0.0027 *15*	E_γ: from Adopted Gammas. Other: 89.53 *10* (1973Go11).
979.77 *16*	18.1 *19*	1069.32	1/2$^+$	89.53	3/2$^+$				
1069.30 *19*	2.34 *38*	1069.32	1/2$^+$	0	5/2$^+$	[E2]			E_γ: calculated value (89.53 *10* + 979.77 *16*) in 1973Go11.
1132.8 *10*	0.4 *3*	2202.1	3/2$^+$	1069.32	1/2$^+$	M1(+E2)	+0.05 *9*	9.97×10^{-6} *16*	E_γ: calculated value (2202.0 *10* − 1069.30) in 1973Go11.
2112.5 *10*	0.62 *19*	2202.1	3/2$^+$	89.53	3/2$^+$				E_γ: calculated value (2202.0 *10* − 89.53) in 1973Go11.
2202.0 *10*	1.1 *3*	2202.1	3/2$^+$	0	5/2$^+$				
3220& *3*	0.53 *15*	4290	1/2$^+$	1069.32	1/2$^+$				
3599 *3*	0.22 *16*	3688	(3/2)$^+$	89.53	3/2$^+$				E_γ: calculated value (3688 *3* − 89) in 1973Go11.
3688 *3*	0.96 *24*	3688	(3/2)$^+$	0	5/2$^+$				

† From 1973Go11.
‡ From Adopted Gammas.
# Absolute intensity per 100 decays.
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
& Placement of transition in the level scheme is uncertain.

$^{25}_{11}$Na$_{14}$-13

^{25}Ne β^- decay (603 ms) 1973Go11



^{2}H(^{24}Na,p) 2021Ge09

J^{π}(^{24m}Na)=1^{+}.

Adapted/Edited the XUNDL dataset compiled by E.A. McCutchan (NNDC,BNL) January 4, 2022.

Beam=radioactive ion beam of ^{25m}Na from RESOLUT facility at FSU. E(^{25m}Na)=85.5 MeV. Target=Deuterated polyethylene, 517 μg/cm^{2} thickness. Measured Ep, $\sigma(\theta)$ using a double-sided 300 μm thick Si detector in the angular range of θ_{lab}=161.6°−173.7°. Heavy reactants were measured with a downstream ionization chamber. DWBA and USDB shell model calculations.

First measurement of (d,p) reaction from the isomeric 1^{+} state in ^{24}Na.

^{25}Na Levels

E(level)†	J^{π}‡	L#	C^2S	Comments
1069	1/2$^+$	0	0.19 *10*	E(level): mirror level of 870 (^{25}Si).
3687	3/2$^+$	0	0.31 *15*	
3955	(3/2$^+$)			J^{π}: from shell model calculations.
4289	1/2$^+$	0	0.44 *22*	E(level): mirror level of 3802 (^{25}Si).

† From 2021Ge09.
‡ As listed in 2021Ge09.
# Based on measured dσ/dΩ (≈3° to ≈8°) and DWBA.

$^{2}H(^{25}Na,^{25}Na'\gamma)$ 2004Sc43

Adapted/Edited the XUNDL dataset compiled by B. Singh (McMaster) March 21, 2005.
Beam=radioactive ion beam of ^{25}Na at ISOLDE, E(^{25}Na)=2.2 MeV/nucleon.
Target=Deuterated polyethylene.
Measured Eγ, γ(ions) coin using MINIBALL array of 24 six-fold segmented, individually encapsulated HPGe detectors for γ rays and detector telescope ΔE-E for charged particles. Gamma spectra detected in coincidence with any signal in the ΔE-E detector.
Preliminary report as stated by 2004Sc43.

^{25}Na Levels

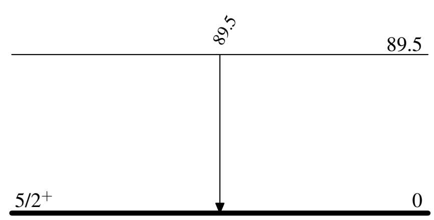
E(level)	J^{π}	Comments
0	$5/2^{+}$	J^{π}: from Adopted Levels.
89.5		

$\gamma(^{25}Na)$

E_{γ}	E_i(level)	E_f	J^{π}_f
89.5	89.5	0	$5/2^{+}$

$^{2}H(^{25}Na,^{25}Na'\gamma)$ 2004Sc43

Level Scheme



$^{25}_{11}Na_{14}$

^{9}Be(^{18}O,pnγ) 2015Vo12

Adapted/Edited the XUNDL dataset compiled by B. Singh (McMaster), Sept 5, 2015.

2015Vo12: E(^{18}O)=35 MeV beam from FSU tandem accelerator facility. Measured Eγ, Iγ, E(p), $\gamma\gamma$-coin, pγ-coin, $\gamma(\theta)$, level half-lives by DSAM using E-ΔE Si detectors for protons, and seven Compton- suppressed single crystal Ge detectors, and three four-crystal Compton- suppressed Clover Ge detectors for γ rays. The γ detectors were placed at 35°, 90° and 145°. Target was thick enough to stop the incident beam. Deduced levels, J, π, multipolarity. Comparison with shell-model calculations.

Other: ^{9}Be(^{18}O,d), E = 10 − 40 MeV (1985Di17).

^{25}Na Levels

E(level)†	J$^\pi$‡	T$_{1/2}$#	Comments
0.0	5/2$^+$		
89.80 *21*	3/2$^+$		
1069.52 *20*	1/2$^+$	1.21 ps *14*	T$_{1/2}$: from τ=1750 fs *200* (2015Vo12).
2202.16 *22*	3/2$^+$	17 fs *10*	T$_{1/2}$: from measured mean lifetime of τ=25 fs *15* from 2202γ as well as from 1132γ.
2418.5 *8*	(9/2)$^+$	166 fs *28*	J$^\pi$: 2015Vo12 list (9/2)$^+$ in some places in the paper and (7/2,9/2)$^+$ in others. Comparison with shell-model calculations suggests 9/2$^+$; and also from decay pattern of this level as discussed in 2015Vo12. T$_{1/2}$: from τ=240 fs *40* (2015Vo12).
2789.9 *7*	(7/2)$^+$	132 fs *24*	T$_{1/2}$: from τ=190 fs *35* (2015Vo12).
2916.0 *11*	5/2$^+$	42 fs *28*	T$_{1/2}$: from τ=60 fs *40* (2015Vo12).
3356.5 *10*	(7/2)$^+$		J$^\pi$: 3356 $\gamma(\theta)$ measurement implies ΔJ=1 (i.e. 3/2$^+$ or 7/2$^+$), 7/2 for feeding from higher spin states (^{18}O,pnγ).
3458.6 *8*	(9/2$^+$)	90 fs *28*	J$^\pi$: population of high spin state in (^{18}O,pnγ), absence of γ feeding the low spin state, and 668.6 $\gamma(\theta)$ measurement implies ΔJ=1. T$_{1/2}$: from τ=130 fs *40* (2015Vo12).
3955.2 *10*			J$^\pi$: (3/2$^+$) from comparison with shell-model calculations.
3999.0 *9*	(9/2)$^+$	69 fs *14*	T$_{1/2}$: from τ=100 fs *20* (2015Vo12).
4015.7 *21*			J$^\pi$: (5/2$^+$) from comparison with shell-model calculations.
4290.7 *11*	1/2$^+$		J$^\pi$: from Adopted Levels.
4965.4 *9*	(11/2)$^+$	64 fs *14*	T$_{1/2}$: from τ=92 fs *20*: weighted average of mean lifetime τ=120 fs *30* from 2547γ, and 80 fs *20* from 1507γ.
5232.6 *14*			J$^\pi$: (9/2$^+$) from comparison with shell-model calculations.
5390.0 *12*	(9/2,11/2)$^+$		J$^\pi$: (11/2$^+$) from comparison with shell-model calculations.
6384 *3*	(9/2$^+$,11/2$^+$,13/2$^+$)		J$^\pi$: (11/2$^+$) from comparison with shell-model calculations.
6735.5 *14*	(11/2 to 15/2)$^{(+)}$		J$^\pi$: (13/2$^+$) from comparison with shell-model calculations.
6858.4 *14*	(11/2,13/2)$^+$		J$^\pi$: (13/2$^+$) from comparison with shell-model calculations.

† From a least-squares fit to Eγ.

‡ From Table I and Figure 1 in 2015Vo12, based on γ transition placement and known spin-parity for low lying states, $\gamma(\theta)$ measurements, etc. Specific and additional arguments, if available, are listed in the comments section.

From DSAM (2015Vo12) unless otherwise stated.

γ(^{25}Na)

Eγ	Iγ	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.†	Comments
89.7 *3*	50 *10*	89.80	3/2$^+$	0.0	5/2$^+$	M1	A$_2$=−0.56 *9* B(M1)(W.u.)=0.020 *2* (2015Vo12).
668.6 *5*	3.6 *2*	3458.6	(9/2$^+$)	2789.9	(7/2)$^+$	M1	A$_2$=−0.67 *8* B(M1)(W.u.)=0.18 *+7−4* (2015Vo12).
966 *1*	3.3 *3*	4965.4	(11/2)$^+$	3999.0	(9/2)$^+$	[M1]	B(M1)(W.u.)=0.08 *+9−3* (2015Vo12).
979.7 *2*	34 *2*	1069.52	1/2$^+$	89.80	3/2$^+$	[M1]	B(M1)(W.u.)=0.06 *1* (2015Vo12).
1041 *1*	50 *3*	3458.6	(9/2$^+$)	2418.5	(9/2)$^+$	M1	A$_2$=+0.28 *9* B(M1)(W.u.)=0.65 *+25−14* (2015Vo12).
1069.3 *3*	3.4 *3*	1069.52	1/2$^+$	0.0	5/2$^+$	[E2]	B(E2)(W.u.)=6.8 *7* (2015Vo12).

Continued on next page (footnotes at end of table)

^{9}Be(^{18}O,pnγ) 2015Vo12 (continued)

γ(^{25}Na) (continued)

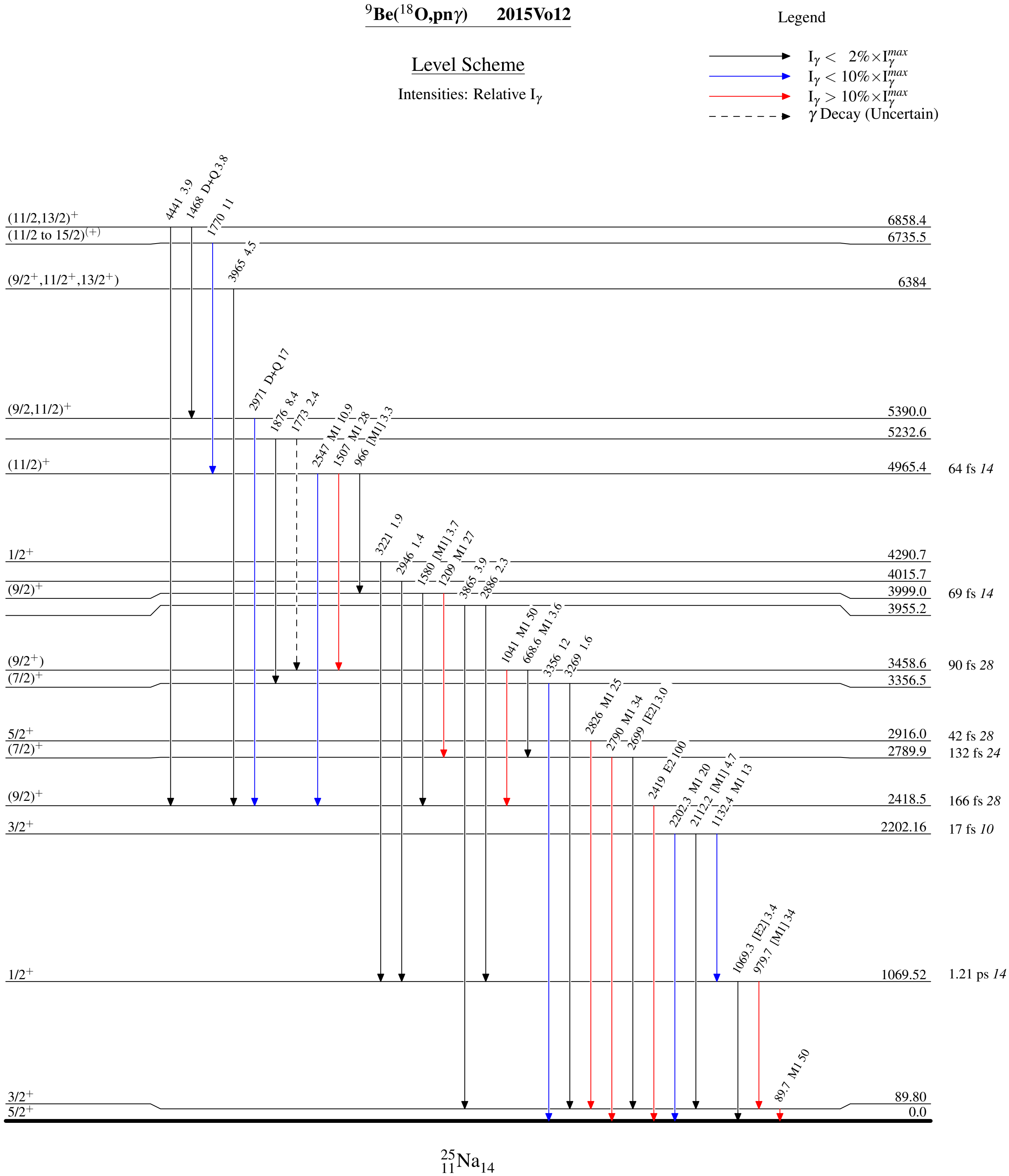
E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	Comments
1132.4 *3*	13 *1*	2202.16	3/2$^+$	1069.52	1/2$^+$	M1	A_2=−0.30 *9* B(M1)(W.u.)=0.99 *+372−49* (2015Vo12).
1209 *1*	27 *1*	3999.0	(9/2)$^+$	2789.9	(7/2)$^+$	M1	A_2=−0.38 *9* B(M1)(W.u.)=0.51 *+29−13* (2015Vo12).
1468 *1*	3.8 *3*	6858.4	(11/2,13/2)$^+$	5390.0	(9/2,11/2)$^+$	D+Q‡	A_2=−0.87 *14*
1507 *1*	28 *2*	4965.4	(11/2)$^+$	3458.6	(9/2$^+$)	M1	A_2=−0.60 *8* B(M1)(W.u.)=0.18 *+19−6* (2015Vo12).
1580 *1*	3.7 *3*	3999.0	(9/2)$^+$	2418.5	(9/2)$^+$	[M1]	B(M1)(W.u.)=0.03 *+2−1* (2015Vo12).
1770 *1*	11 *1*	6735.5	(11/2 to 15/2)$^{(+)}$	4965.4	(11/2)$^+$		A_2=+0.21 *9*
1773@ *3*	2.4 *7*	5232.6		3458.6	(9/2$^+$)		
1876 *1*	8.4 *5*	5232.6		3356.5	(7/2)$^+$		
2112.2 *4*	4.7 *5*	2202.16	3/2$^+$	89.80	3/2$^+$	[M1]	B(M1)(W.u.)=0.050 *+20−3* (2015Vo12).
2202.3 *3*	20 *2*	2202.16	3/2$^+$	0.0	5/2$^+$	M1#	A_2=−0.08 *9* B(M1)(W.u.)=0.20 *+77−10* (2015Vo12).
2419 *1*	100	2418.5	(9/2)$^+$	0.0	5/2$^+$	E2	A_2=+0.27 *9* B(E2)(W.u.)=9.4 *+18−14*
2547 *1*	10.9 *6*	4965.4	(11/2)$^+$	2418.5	(9/2)$^+$	M1#	A_2=+0.14 *9* B(M1)(W.u.)=0.01 *1* (2015Vo12).
2699 *1*	3.0 *3*	2789.9	(7/2)$^+$	89.80	3/2$^+$	[E2]	B(E2)(W.u.)=0.5 *2* (2015Vo12).
2790 *1*	34 *2*	2789.9	(7/2)$^+$	0.0	5/2$^+$	M1#	A_2=+0.02 *9* B(M1)(W.u.)=0.02 *1* (2015Vo12).
2826 *1*	25 *2*	2916.0	5/2$^+$	89.80	3/2$^+$	M1#	A_2=+0.39 *9* B(M1)(W.u.)=0.08 *+18−3* (2015Vo12).
2886 *2*	2.3 *2*	3955.2		1069.52	1/2$^+$		
2946 *2*	1.4 *1*	4015.7		1069.52	1/2$^+$		
2971 *1*	17 *1*	5390.0	(9/2,11/2)$^+$	2418.5	(9/2)$^+$	D+Q‡	A_2=−0.15 *9*
3221 *1*	1.9 *2*	4290.7	1/2$^+$	1069.52	1/2$^+$		
3269 *3*	1.6 *2*	3356.5	(7/2)$^+$	89.80	3/2$^+$		
3356 *1*	12 *1*	3356.5	(7/2)$^+$	0.0	5/2$^+$		A_2=+0.01 *9*
3865 *1*	3.9 *3*	3955.2		89.80	3/2$^+$		
3965 *3*	4.5 *5*	6384	(9/2$^+$,11/2$^+$,13/2$^+$)	2418.5	(9/2)$^+$		
4441 *2*	3.9 *4*	6858.4	(11/2,13/2)$^+$	2418.5	(9/2)$^+$		

† As listed in Table IV of 2015Vo12, except where otherwise noted. Listed multipolarities with transition strength, but without $\gamma(\theta)$ data are presented by the evaluators in square brackets (i.e. assumed assignment).

‡ Assigned by the evaluator based on the $\gamma(\theta)$ data, deduced from two independent angles of 45°/135° and 90°. Assuming A_4 term in Legendre expansion is small, expected A_2=−0.32 for ΔJ=1, dipole and +0.45 for ΔJ=2, quadrupole transition. For ΔJ=1, mixed D+Q transition, A_2 can have a value between +0.5 and −1.0 for δ values between −0.5 and +0.5, as noted in 2015Vo12.

$\gamma(\theta)$ datum is not consistent for a dipole, ΔJ=1, transition.

@ Placement of transition in the level scheme is uncertain.



^{9}Be(^{18}O,pnγ) 2015Vo12
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
(11/2,13/2)+ 6858.4
(11/2 to 15/2)(+) 6735.5
(9/2+,11/2+,13/2+) 6384
(9/2,11/2)+ 5390.0
5232.6
(11/2)+ 4965.4 64 fs 14
1/2+ 4290.7
4015.7
(9/2)+ 3999.0 69 fs 14
3955.2
(9/2+) 3458.6 90 fs 28
(7/2)+ 3356.5
5/2+ 2916.0 42 fs 28
(7/2)+ 2789.9 132 fs 24
(9/2)+ 2418.5 166 fs 28
3/2+ 2202.16 17 fs 10
1/2+ 1069.52 1.21 ps 14
3/2+ 89.80
5/2+ 0.0
4441 3.9
1468 D+Q 3.8
1770 11
3965 4.5
2971 D+Q 17
1876 8.4
1773 2.4
2547 M1 10.9
1507 M1 28
966 [M1] 3.3
3221 1.9
2946 1.4
1580 [M1] 3.7
1209 M1 27
3865 3.9
2886 2.3
1041 M1 50
668.6 M1 3.6
3356 12
3269 1.6
2826 M1 25
2790 M1 34
2699 [E2] 3.0
2419 E2 100
2202.3 M1 20
2112.2 [M1] 4.7
1132.4 M1 13
1069.3 [E2] 3.4
979.7 [M1] 34
89.7 M1 50
$^{25}_{11}$Na$_{14}$

^{12}C(^{18}O,αpγ) 2020Wi11

Adapted/Edited the XUNDL dataset compiled by J. Chen (NSCL, MSU), December 8, 2020.

2020Wi11: ^{18}O beam, E=48 MeV, was produced from the TRIUMF-ISAC facility. Targets were a thin and a backed foil of natural carbon. γ rays were detected with the TIGRESS array consisting of 13 Compton-suppressed HPGe clovers and charged particles were detected with a 38-element array of CsI(Tl) scintillators. Measured Eγ, Iγ, γγ-coin, particle-γ-coin, γ(θ). Deduced excited level energies, spin, parity, lifetimes, γ-ray multipolarities, transition strengths. Shell-model calculations.

Other reactions: ^{12}C,^{16}O(^{16}O,X) at E=70-130 MeV (1986Ik03).

^{25}Na Levels

E(level)[†]	J$^{\pi}$[#]	$T_{1/2}$[&]	Comments
0[c]	5/2^{+}[@]		
(92[f] *3*)	3/2^{+}[@]		E(level): from energy difference of transitions depopulating 2791 level. Not observed in this work (2020Wi11).
1072[f] *3*	1/2^{+}[@]	>0.55 ps	$T_{1/2}$: from τ>900 fs.
2204[f] *3*	3/2^{+}[@]	18 fs *8*	$T_{1/2}$: from τ=26 fs *11*.
2419.7[c] *8*	(9/2^{+})	159[a] fs *28*	$T_{1/2}$: from τ=230 fs *40*.
2791.1[d] *9*	7/2^{+}	104[a] fs *14*	J$^{\pi}$: from literature in 2020Wi11. $T_{1/2}$: from τ=150 fs *20*.
3356.1[e] *22*	(7/2^{+})[@]	<34 fs	$T_{1/2}$: from τ<49 fs.
3460.8[c] *9*	(9/2^{+})	132[a] fs *21*	$T_{1/2}$: from τ=190 fs *30*.
3964 *4*	(1/2,3/2,5/2^{+})	<173 fs	$T_{1/2}$: from τ<250 fs.
4000.0[d] *9*	(9/2^{+})	62.4 fs *49*	J$^{\pi}$: from literature in 2020Wi11. $T_{1/2}$: from τ=90 fs *7*.
4006 *4*	(1/2,3/2)	62 fs *35*	$T_{1/2}$: from τ=90 fs *50*.
4295 *4*	1/2^{+}[@]	<20 fs	$T_{1/2}$: from τ<29 fs.
4967.2[c] *9*	(11/2^{+})[@]	49.9[a] fs *42*	$T_{1/2}$: from τ=72 fs *6*.
5231.4[e] *22*	(7/2,9/2)	<10 fs	$T_{1/2}$: from τ<15 fs.
5388.1[b] *14*	(11/2^{+})	<2.8 fs	$T_{1/2}$: from τ<4 fs.
5749 *4*	(9/2,11/2,13/2)	<194 fs	$T_{1/2}$: from τ<280 fs.
5848 *3*		<52 fs	$T_{1/2}$: from τ<75 fs.
6271[‡] *3*	(9/2,11/2)	<26 fs	$T_{1/2}$: from τ<37 fs.
6381 *3*	(9/2,11/2,13/2)	<6.2 fs	$T_{1/2}$: from τ<9 fs.
6582 *3*		<28 fs	J$^{\pi}$: (11/2^{-}) from literature (Ph.D. thesis) for a 6.55 MeV level. $T_{1/2}$: From τ<40 fs.
6737.0 *14*	(13/2^{+})	<2.8 fs	$T_{1/2}$: from τ<4 fs.
6856.1[b] *16*	(13/2^{+})	42 fs *28*	$T_{1/2}$: from τ=60 fs *40*.
7218[‡][d] *4*	(9/2,11/2,13/2)	<97 fs	$T_{1/2}$: from τ<140 fs.
7625[‡][c] *4*	(11/2,13/2)	<52 fs	$T_{1/2}$: from τ<75 fs.

[†] From a least-squares fit to γ-ray energies. The bands proposed in 2020Wi11 are labelled as “sequence” in this dataset. Same spin is proposed for two states by the authors doe most of their proposed bands.

[‡] Newly identified level in 2020Wi11 compared to the known excited levels of ^{25}Na prior to their work.

[#] As given in 2020Wi11 based on γ(θ) and γ de-excitation pattern, unless otherwise noted.

[@] From Adopted Levels. In 2020Wi11, it was quoted from the literature.

[&] From DSAM in 2020Wi11. Limit reported to a 90% confidence level. Authors note that most of their mean lifetime values are lower than those reported in ^{9}Be(^{18}O,pnγ) (2015Vo12), this is most likely a systematic effect resulting from the use of two stopping models in this work compared to ^{9}Be(^{18}O,pnγ) that used the SRIM model exclusively.

[a] Corrected for feeding from an observed transition (2020Wi11).

[b] Seq.(A): based on 5388, (11/2^{+}).

[c] Seq.(B): based on g.s., 5/2^{+}.

[d] Seq.(C): based on 2791, 7/2^{+}.

Continued on next page (footnotes at end of table)

$^{12}C(^{18}O,\alpha p\gamma)$ **2020Wi11 (continued)**

^{25}Na Levels (continued)

[e] Seq.(D): based on 3356, (7/2$^+$).
[f] Seq.(E): based on 92, 3/2$^+$.

$\gamma(^{25}Na)$

E_γ	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
669.1 *7*	2.2 *3*	3460.8	(9/2$^+$)	2791.1	7/2$^+$		A_2=−0.4 *2*
967.3 *9*	1.1 *3*	4967.2	(11/2$^+$)	4000.0	(9/2$^+$)		A_2=−0.2 *5*
980.4 *5*	17.0 *14*	1072	1/2$^+$	92?	3/2$^+$		A_2=−0.7 *3*
1041.3 *4*	42.7 *11*	3460.8	(9/2$^+$)	2419.7	(9/2$^+$)	D+Q[@]	A_2=+0.20 *6*; A_4=+0.12 *7*
1131.8 *4*	6.9 *12*	2204	3/2$^+$	1072	1/2$^+$		A_2=−0.1 *3*
1209.0 *4*	13.5 *10*	4000.0	(9/2$^+$)	2791.1	7/2$^+$		A_2=−0.31 *9*
1348.9[†] *13*	2.1 *5*	6737.0	(13/2$^+$)	5388.1	(11/2$^+$)		A_2=+0.3 *3*
1467.9 *10*	2.6 *4*	6856.1	(13/2$^+$)	5388.1	(11/2$^+$)		A_2=−0.6 *3*
1506.2 *6*	24.4 *10*	4967.2	(11/2$^+$)	3460.8	(9/2$^+$)	D+Q[@]	A_2=−0.54 *13*; A_4=+0.24 *16*
1579.1 *13*	2.8 *4*	4000.0	(9/2$^+$)	2419.7	(9/2$^+$)		A_2=+0.0 *3*
1770.7 *16*	6.4 *8*	6737.0	(13/2$^+$)	4967.2	(11/2$^+$)		A_2=−0.3 *2*
1875.0 *12*	4 *2*	5231.4	(7/2,9/2)	3356.1	(7/2$^+$)		A_2=+0.3 *2*
2419.6 *11*	100 *3*	2419.7	(9/2$^+$)	0	5/2$^+$	Q[@]	A_2=+0.13 *6*; A_4=−0.27 *7*
2441[†] *3*	0.9 *3*	5231.4	(7/2,9/2)	2791.1	7/2$^+$		A_2=−0.9 *9*
2548.0 *12*	14.0 *9*	4967.2	(11/2$^+$)	2419.7	(9/2$^+$)		A_2=−0.03 *13*
2658[†] *4*	2.7 *5*	7625	(11/2,13/2)	4967.2	(11/2$^+$)		A_2=−0.6 *4*
2699 *3*	1.8 *4*	2791.1	7/2$^+$	92?	3/2$^+$		A_2=+0.9 *3*
2790.8 *13*	19.2 *15*	2791.1	7/2$^+$	0	5/2$^+$		A_2=+0.39 *14*
2891 *3*	2.6 *9*	3964	(1/2,3/2,5/2$^+$)	1072	1/2$^+$		A_2=+0.0 *5*
2924[†] *5*	1.8 *5*	6381	(9/2,11/2,13/2)	3460.8	(9/2$^+$)		A_2=−0.6 *8*
2933 *3*	2.6 *9*	4006	(1/2,3/2)	1072	1/2$^+$		A_2=−0.8 *6*
2968.4 *15*	17.0 *10*	5388.1	(11/2$^+$)	2419.7	(9/2$^+$)		A_2=−0.15 *13*
3058 *3*	1.4 *3*	5848		2791.1	7/2$^+$		A_2=+0.9 *5*
3120 *4*	2.0 *4*	6582		3460.8	(9/2$^+$)		A_2=−0.2 *7*
3218[†] *4*	1.2 *3*	7218	(9/2,11/2,13/2)	4000.0	(9/2$^+$)		A_2=+0.6 *4*
3222 *3*	3.0 *10*	4295	1/2$^+$	1072	1/2$^+$		A_2=−0.4 *7*
3275[†] *6*	1.2 *4*	6737.0	(13/2$^+$)	3460.8	(9/2$^+$)		A_2=−0.1 *10*
3329[†] *4*	1.6 *3*	5749	(9/2,11/2,13/2)	2419.7	(9/2$^+$)		A_2=+0.1 *4*
3355 *3*	4.5 *16*	3356.1	(7/2$^+$)	0	5/2$^+$		A_2=−0.2 *3*
3395[†] *5*	1.5 *4*	6856.1	(13/2$^+$)	3460.8	(9/2$^+$)		A_2=−0.7 *7*
3427 *4*	1.7 *3*	5848		2419.7	(9/2$^+$)		A_2=+0.1 *4*
3462[†] *3*	3.2 *11*	3460.8	(9/2$^+$)	0	5/2$^+$		A_2=−0.1 *7*
3480[†] *4*	1.0 *2*	6271	(9/2,11/2)	2791.1	7/2$^+$		A_2=−0.3 *7*
3851[†&] *5*	<0.4	6271	(9/2,11/2)	2419.7	(9/2$^+$)		
3958 *4*	3.7 *4*	6381	(9/2,11/2,13/2)	2419.7	(9/2$^+$)		A_2=−0.1 *2*
4163 *4*	2.7 *3*	6582		2419.7	(9/2$^+$)		A_2=−0.1 *3*
4313[†] *3*	5.3 *4*	6737.0	(13/2$^+$)	2419.7	(9/2$^+$)	Q	A_2=+0.3 *2*
4436 *3*	3.1 *3*	6856.1	(13/2$^+$)	2419.7	(9/2$^+$)	Q	A_2=+0.5 *4*
4796[†] *9*	0.6 *2*	7218	(9/2,11/2,13/2)	2419.7	(9/2$^+$)		A_2=−1.4 *13*

[†] New transition (2020Wi11).
[‡] Relative intensity with respect to Iγ(2419.6γ)=100. In 2020Wi11, relative intensities were reported with respect to Iγ(2419.6γ)=1.00.
[#] From γ(θ) (2020Wi11), proposed by the evaluator, except where otherwise noted.

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$^{12}C(^{18}O,\alpha p\gamma)$ 2020Wi11 (continued)

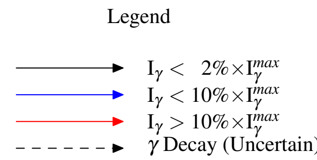
$\gamma(^{25}Na)$ (continued)

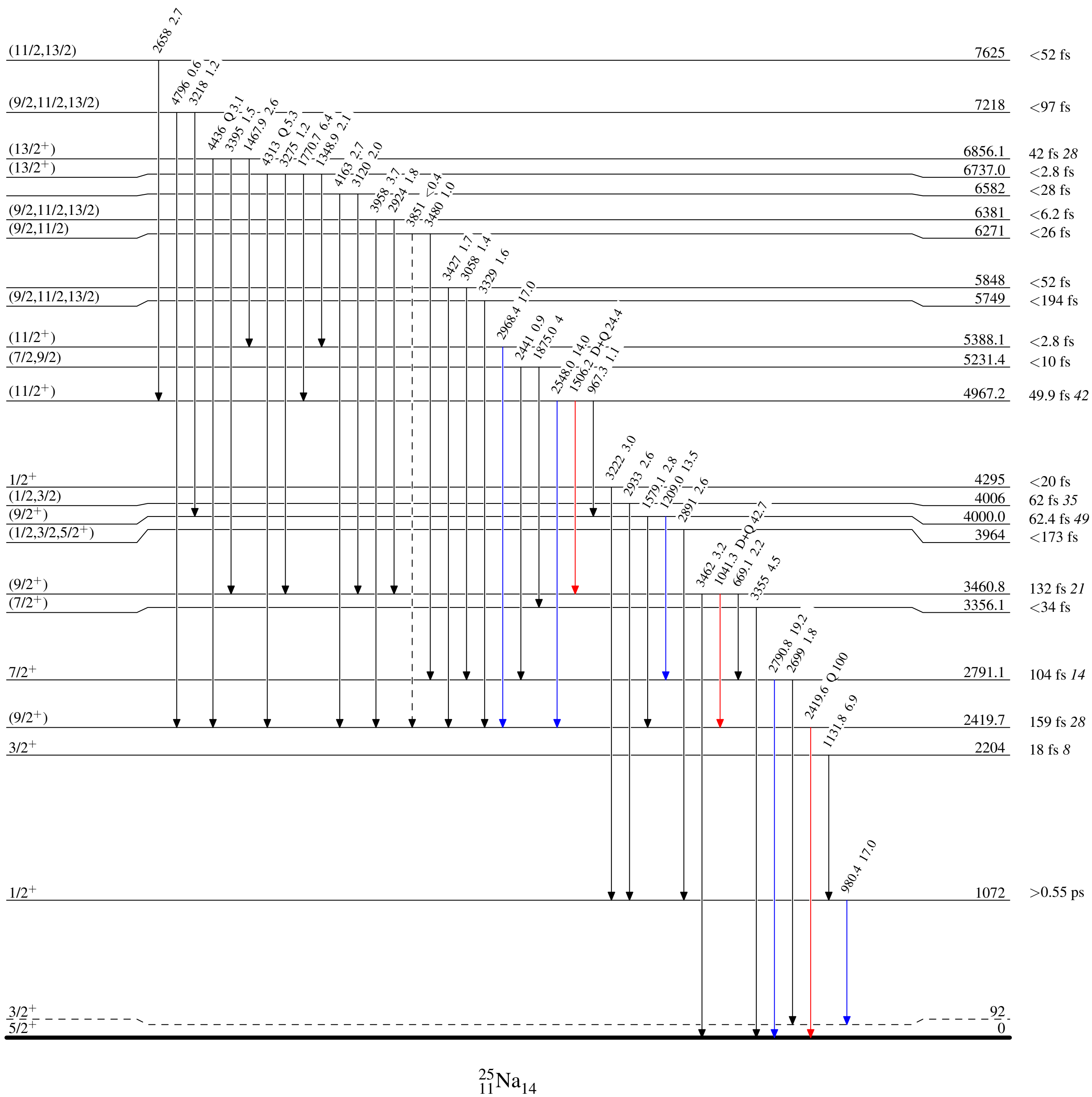
@ Assignment in 2020Wi11, based on their $\gamma(\theta)$ data.
& Placement of transition in the level scheme is uncertain.

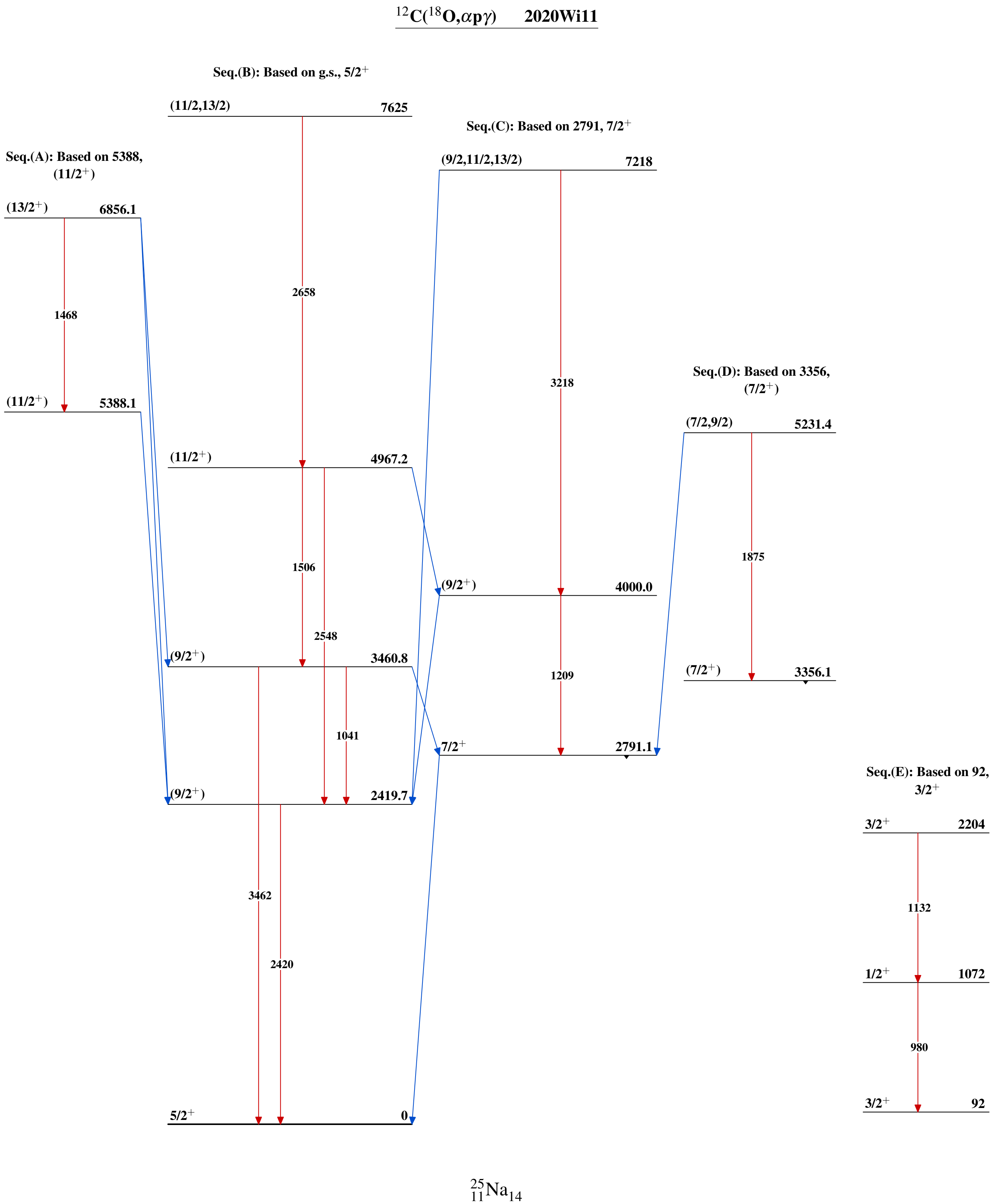
^{12}C(^{18}O,αpγ) **2020Wi11**

Level Scheme

Intensities: Relative I_γ







$^{12}C(^{18}O,\alpha p\gamma)$ 2020Wi11
Seq.(B): Based on g.s., 5/2$^+$
Seq.(A): Based on 5388, (11/2$^+$)
Seq.(C): Based on 2791, 7/2$^+$
Seq.(D): Based on 3356, (7/2$^+$)
Seq.(E): Based on 92, 3/2$^+$
(11/2,13/2) 7625
(9/2,11/2,13/2) 7218
(13/2$^+$) 6856.1
(11/2$^+$) 5388.1
(7/2,9/2) 5231.4
(11/2$^+$) 4967.2
(9/2$^+$) 4000.0
(9/2$^+$) 3460.8
(7/2$^+$) 3356.1
7/2$^+$ 2791.1
(9/2$^+$) 2419.7
3/2$^+$ 2204
1/2$^+$ 1072
3/2$^+$ 92
5/2$^+$ 0
1468
2658
3218
1875
1506
2548
1041
1209
3462
2420
1132
980
$^{25}_{11}Na_{14}$

^{23}Na(t,p),^{26}Mg(t,α) 1962Hi01,1975Pa14,1978Fo28

Includes ^{26}Mg(^{11}B,^{12}C),(^{16}O,^{17}F).

1962Hi01,1961Hi15: ^{23}Na(t,p),^{26}Mg(t,α) E≈6 MeV. The emitted charged particles were analyzed at several angles (20°, 30°, 40° and 45°) for ^{23}Na target; 20°, 30°, 40° and 50° with E=5.75 MeV and 30°, 45°, and 60° with E=5.96 MeV for ^{26}Mg target with the broad-range magnetic spectrograph. Deduced levels,

1975Pa14: ^{26}Mg(^{11}B,^{12}C), E=114 MeV; measured $\sigma(\theta)$. spectroscopic factors.

1978Fo28: ^{23}Na(t,p), E=12 MeV; measured $\sigma(\theta)$. Deduced levels, spin, parity, DWBA analysis.

1976Si05: ^{26}Mg(^{16}O,^{17}F), E=126 MeV; measured $\sigma(\theta)$ and DWBA.

1984An17: ^{23}Na(t,p), E=3.3 MeV; measured $\sigma(\theta)$, deduced ground state mass defect, Coulomb energy differences, radius parameter.

Others: 1961Hi15, 1976Si05, 1982Al27.

^{25}Na Levels

E(level)†	L‡	C^2S	Comments
0	2+4	4.60	C^2S: from 1975Pa14. Other: 2.75 (1975Si05).
90 *5*	0+2		
1068 *7*	2	0.23	E(level): other: 1070 *5* (1978Fo28). C^2S: From 1975Si05.
2204 *7*	2+0		E(level): other: 2200 *5* (1978Fo28).
2418 *7*			E(level): other: 2420 *5* (1978Fo28).
2788 *5*	2(+4)		E(level): other: 2790 *5* (1978Fo28).
2913 *5*			E(level): other: 2910 *10* (1978Fo28).
3353 *5*			
3456 *7*			
3685 *7*			
3928 *7*			
3952 *7*			
3995 *7*			
4136 *7*			
4286 *7*			
4340 *7*			
4450 *10*			
4710 *10*			
4800 *10*			
4962 *10*			
5146 *10*			
5190 *10*			
5223 *10*			
5347 *10*			
5378 *10*			
5465 *10*			
5484 *12*			
5690 *12*			
5713 *12*			
5746 *12*			

† From 1962Hi01,1961Hi15, weighted mean of the results from (t,p) and (t,α).
‡ From 1978Fo28, based on measured $\sigma(\theta)$ and DWBA.

^{23}Na(t,pγ),^{26}Mg(t,$\alpha\gamma$) 1969Be63,1977Be20,1983Ko18

1969Be63: ^{26}Mg(t,$\alpha\gamma$), E=2.6 MeV; ^{23}Na(t,pγ), E=2 MeV. Measured Eγ, Iγ, σ(Eα,Eγ,$\theta(\alpha\gamma)$), σ(Ep,Eγ); deduced excited level, γ branching ratios, spin, and parity.

1977Be20: ^{26}Mg(t,$\alpha\gamma$), E=1.9-3.2 MeV. Measured Eγ, Iγ, σ(Eγ,$\theta(\gamma)$), $\alpha\gamma$-coincidence; deduced levels, γ-branching ratios, mean lifetime by DSAM.

1983Ko18: t(^{26}Mg,$\alpha\gamma$), E(^{26}Mg)=E=40 MeV. Measured Doppler broadened lineshapes, particle-γ coincidence. Deduced mean lifetime of excited levels.

^{25}Na Levels

E(level)†	J$^\pi$	T$_{1/2}$‡	Comments
0			
90 *1*		5.1 ns *3*	T$_{1/2}$: average of 5.1 ns *5* (1969Be63 – τ=7.3 ms *7*) and 5.1 ns *3* (1977Be20 – τ=7.4 ns *4*). Other: <14 ns (1969Be63 – from τ<20 ns).
1068.6 *9*	1/2$^+$	1.32 ps *14*	J$^\pi$: from 979$\gamma(\theta)$ measurements (1969Be63). T$_{1/2}$: from τ=1900 fs *200* (1983Ko18). Others: 1.6 ps *+14−6* (1977Be20 – τ=2.3 ps *+20−8*), <14 ns (1969Be63 – τ<20 ns).
2200.7 *14*		25 fs *4*	T$_{1/2}$: from τ=36 fs *6* (1983Ko18). Others: <14 ns (1969Be63 – from τ<20 ns), <17.3 fs (1977Be20 – τ<25 fs).
2416 *3*		139 fs *97*	T$_{1/2}$: from 1977Be20 (τ=200 fs *140*). Other: <14 ns (1969Be63 – from τ<20 ns).
2788.2 *20*		173 fs *35*	T$_{1/2}$: from τ=250 fs *50* (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
2915 *3*		10 fs *4*	T$_{1/2}$: from τ=15 fs *6* (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3353.2 *22*		16 fs *5*	T$_{1/2}$: from τ=23 fs *7* (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3459 *4*		146 fs *17*	T$_{1/2}$: from τ=210 fs *25* (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3685 *4*		18 fs *8*	T$_{1/2}$: from τ=26 fs *12* (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3928 *7*		<28 fs	E(level): from Adopted Levels. T$_{1/2}$: from τ<40 fs (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3953.7 *24*		<83 fs	T$_{1/2}$: from τ<120 fs (1983Ko18). Other: <14 ns (1969Be63 – from τ<20 ns).
3995 *4*		<14 ns	T$_{1/2}$: from τ<20 ns (1969Be63).
4000		31 fs *7*	E(level): from 1983Ko18 (Table 1). T$_{1/2}$: from τ=45 fs *10* (1983Ko18).
4132 *5*		16 fs *6*	T$_{1/2}$: from τ=23 fs *9* (1983Ko18).

† From 1969Be63, except where otherwise noted.
‡ From 1983Ko18, except where noted.

γ(^{25}Na)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	δ‡	Comments
90		90		0		D+Q		A$_2$=+0.27 *9* (1977Be20) E$_\gamma$: from 1977Be20. Not observed by 1969Be63 (list 90 *1* from level energy difference).
1068.6	1/2$^+$	979 *1*	90 *2*	90				A$_2$=−0.02 *2*; A$_4$=−0.02 *2* (1969Be63) A$_2$=+0.01 *6*; A$_4$=+0.01 *8* (1977Be20) I$_\gamma$: From 100 − 10 *2*. Others: 91 *1* (1969Be63), 87.5 *15* (1977Be20).
		1068 *2*	10 *2*	0				A$_2$=−0.07 *16*; A$_4$=−0.09 *22* (1977Be20) I$_\gamma$: weighted average of 9 *1* (1969Be63) and 12.5 *15* (1977Be20).
2200.7		1132 *2*	26 *3*	1068.6	1/2$^+$	D(+Q)	+0.05 *9*	A$_2$=−0.60 *7*; A$_4$=+0.02 *7* (1969Be63) A$_2$=−0.56 *12*; A$_4$=+0.29 *20* (1977Be20) I$_\gamma$: weighted average of 28 *4* (1969Be63) and 25 *3* (1977Be20). δ: +0.05 *9* stated to be the only solution (1977Be20 – also listed 1.5 *3*); −0.03≤0.09≤0.21; 1.07≤1.43≤1.88 for J=3/2 (1969Be63).

Continued on next page (footnotes at end of table)

^{23}Na(t,pγ),^{26}Mg(t,$\alpha\gamma$) 1969Be63,1977Be20,1983Ko18 (continued)

γ(^{25}Na) (continued)

E_i(level)	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
2200.7	2110 *3*	21 *2*	90		D+Q		A_2=+0.60 *15*; A_4=+0.26 *21* (1977Be20) I_γ: unweighted average of 19 *2* (1969Be63) and 22 *3* (1977Be20). δ: −0.09 *13* and −2.5 *13* for 3/2 to 3/2; δ=+0.8 *4* for 3/2 to 5/2 (1977Be20).
	2201 *2*	53 *3*	0				A_2=−0.09 *7*; A_4=+0.05 *11* (1977Be20) I_γ: weighted average of 53 *3* (1969Be63) and 53 *4* (1977Be20). δ: −0.02 *9* and +4.8 *19* for 3/2 to 5/2 (1977Be20).
2416	2416 *3*	100	0		Q(+D)	+8 *+19−3*	A_2=−0.15 *13*; A_4=+0.77 *20* (1977Be20) δ: from 1977Be20 for 7/2 to 5/2.
2788.2	2788 *2*	100	0				δ: −1.2 *9* for 3/2 to 5/2 (1977Be20).
2915	2825 *3*	100	90				A_2=−0.18 *4*; A_4=+0.07 *4* (1969Be63)
3353.2	3263 *3*	10 *3*	90				
	3353 *3*	90 *3*	0				
3459	1043 *2*	100	2416				
3685	3595 *4*	20 *5*	90				
	3685 *5*	80 *5*	0				
3928	(3928)		0				E_γ: from level energy difference. Not reported in 1969Be63.
3953.7	2887 *3*		1068.6	1/2$^+$			
	3861 *5*	81 *2*	90				
	3950 *5*	19 *2*	0				
3995	1207 *3*	100	2788.2				
4000	2931.4		1068.6	1/2$^+$			E_γ: placement from Fig. 7 (1983Ko18). Eγ From level energy difference.
4132	4132 *5*	100	0				

† From 1969Be63, except otherwise noted.
‡ From 1977Be20, based on $\gamma(\theta)$ measurements.
^{x} γ ray not placed in level scheme.

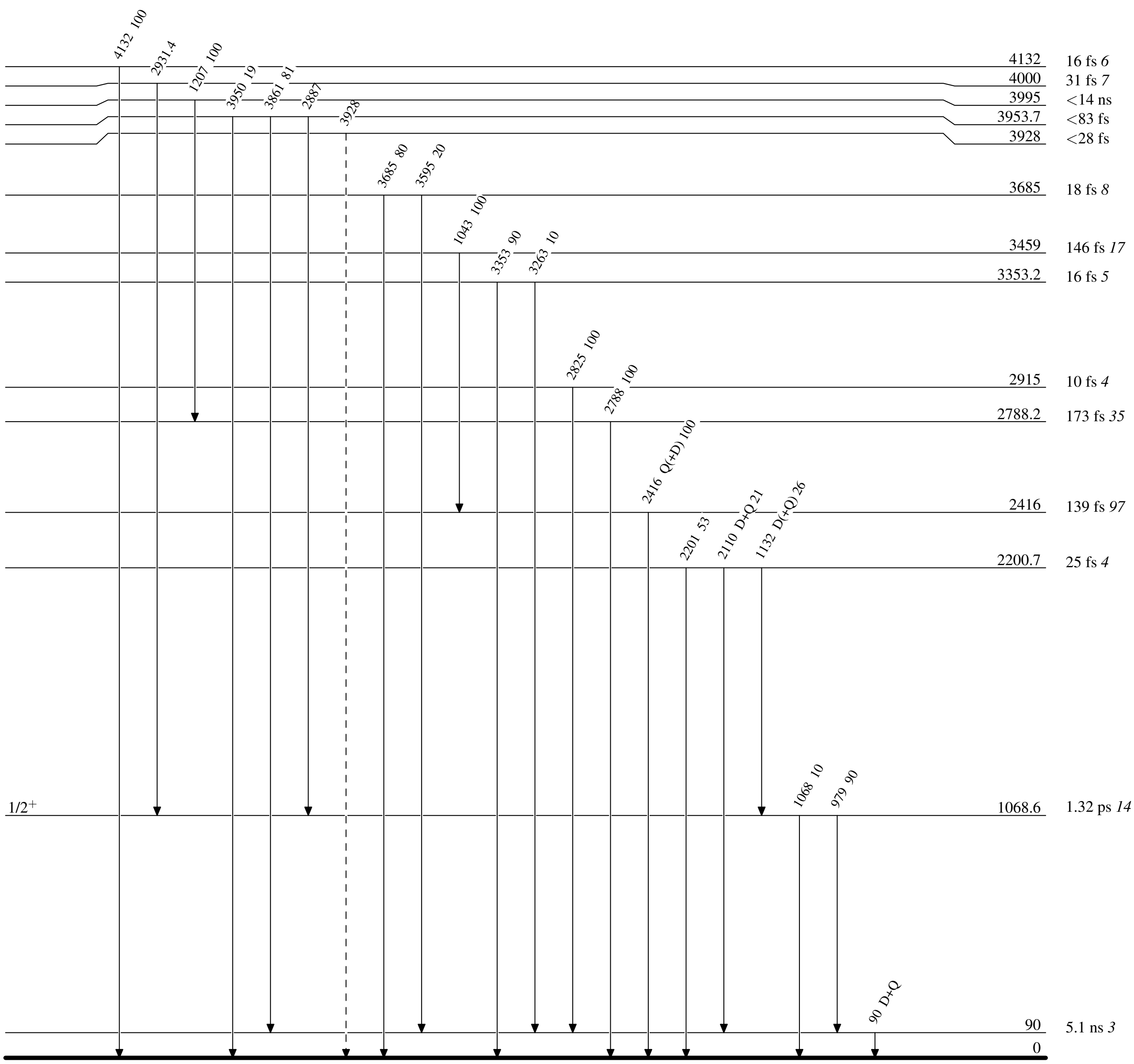
$^{23}Na(t,p\gamma),^{26}Mg(t,\alpha\gamma)$ 1969Be63,1977Be20,1983Ko18

Level Scheme

Intensities: % photon branching from each level

Legend

γ Decay (Uncertain)



$^{25}_{11}Na_{14}$

^{26}Mg(d,^{3}He),(pol d,^{3}He) 1971Kr04,1973Ja04,1984Ki11

1971Kr04: ^{26}Mg(d,^{3}He), E=52 MeV. Measured $\sigma(E\gamma,\theta)$, E-ΔE telescope.
1973Ja04: ^{26}Mg(d,^{3}He), E=29 MeV. Measured $\sigma(\theta)$.
1984Ki11: ^{26}Mg(pol d,^{3}He),(d,^{3}He),(d,t) E=52 MeV. Measured $\sigma(\theta)$,$\sigma(E(^{3}He))$,$\sigma(E(t))$. DWBA calculations.
Others:
1980Wo05: ^{26}Mg(^{6}Li,^{7}Be), E=36 MeV; measured $\sigma(\theta)$. Deduced C^{2}S.
1985Wi18: ^{26}Mg(^{9}Be,^{10}B), E=43 MeV; measured $\sigma(\theta)$. Deduced C^{2}S.
1987Pe09: ^{26}Mg(t,α), E=36 MeV; measured $\sigma(\theta)$. Deduced C^{2}S.

^{25}Na Levels

E(level)[†]	J$^{\pi}$[#]	L[&]	C^{2}S[a]	Comments
0	5/2^{+}[@]	2[@]	3.91	C^{2}S: for doublet, contribution of 90-keV 3/2^{+} is expected to be 8%. Others: 3.02 for doublet (1971Kr04), 3.0 *3* (1980Wo05), 4.1 (1985Wi18 – for doublet, also 6.8 – calculated with different entrance and exit channel OM potentials); 2.83, 2.10, 2.02 – all from 1987Pe09.
90	3/2^{+}[@]	2[@]	0.33[b]	E(level): from Adopted Levels. Other: 110 *70* (1971Kr04).
1066 *9*	1/2^{+}	0	0.38	C^{2}S: other: 0.33 (1971Kr04), 0.49 (1985Wi18 also 0.95 – calculated with different entrance and exit channel OM potentials); 0.12, 0.08 – both from 1987Pe09.
2205 *16*	3/2^{+}	2	0.27	C^{2}S: others: 0.09 (1971Kr04); 0.20, 0.31, 0.14 – all from 1987Pe09.
2419 *13*				
2910 *20*	5/2^{+}	2	0.41	E(level),C^{2}S: doublet (2788+2913). C^{2}S≈0.06 and 0.32 (1971Kr04); 0.19, 0.28, 0.14 – for doublet – all from 1987Pe09.
3357 *20*				
3682 *24*		(2)	0.08[c]	
3928	(1/2^{+})[@]	(0)[@]	0.06[c]	E(level): from Adopted Levels.
3995 *9*	1/2^{-}	1	2.84	
4266 *24*	1/2^{+}[@]	0[@]	≈0.10[c]	
5188 *19*	3/2^{-}	1	1.24	
5692 *21*	3/2^{-}	1	0.26	
5876[‡] *12*				
6005 *22*	(1/2,3/2)$^{-}$[@]	1[@]	0.09	
6079[‡] *15*				
6154[‡] *15*				
6549 *15*	3/2^{-}	1	0.21	
6753 *21*		1	<0.12[c]	
6863[‡] *20*				
6936[‡] *20*				
6985[‡] *20*				
7603 *17*	3/2^{-}	1	0.40	
7780[‡] *25*				
8052 *26*	(1/2,3/2)$^{-}$	1	0.18	L: from 1973Ja04 (mentioned in the text).
8400[‡] *25*				

[†] From 1971Kr04, except where otherwise noted.
[‡] From 1973Ja04.
[#] From (pol d,^{3}He) (1984Ki11), except where otherwise noted.
[@] From 1973Ja04.
[&] From 1984Ki11, except where otherwise noted, based on measured $\sigma(\theta)$ and DWBA.
[a] From 1984Ki11, except where otherwise noted.
[b] From 1973Ja04.
[c] From 1971Kr04. Note that in 1990En08, a few values are 33% higher.

Adopted Levels, Gammas

$Q(\beta^-)=-4276.81$ *4*; S(n)=7330.52 *5*; S(p)=12063.85 *5*; $Q(\alpha)=-9885.92$ *6* 2021Wa16
S(2n)=23861.74 *6*, S(2p)=22616.68 *11* (2021Wa16).
Other reaction:
^{28}Si(n,α): 1962Ai01, 1962Co07, 1962Co12, 1963An03, 1963Ma38, 1966Fo03, and 1971Mi25.

^{25}Mg Levels

Cross Reference (XREF) Flags

A	^{25}Na β^- decay (59.3 s)	I	^{24}Mg(n,γ) E=thermal	Q	^{25}Mg(d,d′)
B	^{25}Al ε decay (7.168 s)	J	^{24}Mg(n,γ) E=resonance	R	^{25}Mg(α,α)
C	^{6}Li(^{22}Ne,t),(^{22}Ne,tγ)	K	^{24}Mg(d,p),(pol d,p)	S	Coulomb excitation
D	^{9}Be(^{18}O,2nγ)	L	^{24}Mg(d,pγ)	T	^{26}Mg(γ,n),(γ,nγ')
E	^{12}C(^{14}N,pγ),(^{15}N,pnγ)	M	^{25}Mg(γ,γ')	U	^{26}Mg(^{3}He,α),(d,t),(p,d)
F	^{21}Ne(^{6}Li,d)	N	^{25}Mg(e,e′)	V	^{27}Al(μ^-,ν2nγ)
G	^{22}Ne(α,nγ)	O	^{25}Mg(p,p′γ)	W	^{27}Al(d,α),(d,$\alpha\gamma$)
H	^{23}Na(^{3}He,p)	P	^{25}Mg(n,n′γ)	X	^{28}Si(μ^-,νp2nγ)

E(level)[†]	J^π	$T_{1/2}$ or Γ[a]	XREF	Comments
0[d]	5/2$^+$	stable	ABCDEFG I KLMNOPQ STUVWX	$\mu=-0.8533$ *3*; Q=+0.199 *2* δ<r^2>(^{26}Mg,^{25}Mg)=−0.030 fm^2 *4* (stat) *11* (syst) (2012Yo01). <r^2>$^{1/2}$=3.0290 fm *7* (stat) *31* (syst) (2012Yo01). J^π: 5/2 from optical spectroscopy (1949Cr18,2013Ma15); L=2 in (pol d,p). μ: From 2013An23, 2019StZV (Nuclear Magnetic Resonance). Q: From 2008Py02, 2021StZZ (Coulomb excitation reorientation).
585.042[e] *22*	1/2$^+$	3.38 ns *7*	ABCDEFG I KL OPQ STUVWX	J^π: L=0 in (d,p), E2 to 5/2$^+$. $T_{1/2}$: others: 2.8 ns *7* (^{18}O,2nγ), 3.5 ns *4* (d,pγ), and 3.38 ns *7* (p,p′γ).
974.746[e] *23*	3/2$^+$	11.2 ps *7*	ABCDEFG I KL NOPQ STUVWX	J^π: from vector analyzing power in (pol d,p). $T_{1/2}$: weighted average of 10.1 ps *17* from (d,pγ), 10 ps *7* from (e,e′), 11.7 ps *7* (from τ=16.9 ps *10*) in 1975Eg01, 10.1 ps *12* (from τ=14.6 ps *18* in 1978KaZO), 11.3 ps *4* (from τ=16.3 ps *6* in 1981Ru01). Others: 1.4 ps < $T_{1/2}$ < 7 ps from (^{18}O,2nγ) (1969Ni09), >7 ps (p,p′γ), 7.4 ps (Coul. excitation).
1611.767[d] *11*	7/2$^+$[@]	17[b] fs *3*	ABC EFG KLMNOPQ STUVWX	J^π: M1+E2 γ to 5/2$^+$, $\gamma\gamma(\theta)$ in (p,p′γ). $T_{1/2}$: others: 18 fs *+4−3* (γ,γ'), 16 fs *3* (n,n′γ), and 15 fs *+5−3* (p,p′γ).
1964.615[e] *24*	5/2$^+$[@]	0.69 ps *6*	ABC EFG I KL NOPQ TUVWX	J^π: L(d,p)=2 and $\gamma\gamma(\theta)$ in (d,pγ). $T_{1/2}$: weighted average of 0.700 ps *55* from (^{14}N,pγ), 0.72 ps *12* from (e,e′), 0.60 ps *11* (symetric value of 0.56 ps *+14−7* (n,n′γ)), and 0.69 ps *27* from (p,p′γ).
2563.40 *4*	1/2$^+$[@]	11 fs *+5−4*	C FG I KL NOPQ TUVWX	J^π: L(d,p)=0. $T_{1/2}$: weighted average of 14 fs *4* from (e,e′) and 8 fs *+5−4* from (p,p′γ). Other: 54 fs *16* (n,n′γ).
2737.95[e] *15*	7/2$^+$	0.286 ps *+24−25*	c EFG KL NOPQ UVW	J^π: 7/2 from $\gamma\gamma(\theta)$ in (p,p′γ), M1+E2 γ to 5/2$^+$. $T_{1/2}$: weighted average of 0.291 ps *+26−29* from (d,pγ), 0.27 ps *6* from (n,n′γ), and 0.28 ps *8* from (p,p′γ).

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Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[a]	XREF	Comments
2801.46 *4*	3/2+	26[‡] fs *3*	A c EFG I KL NO Q TU W	J^π: L(d,p)=2 and M1+E2 γs to 1/2+ and 5/2+. $T_{1/2}$: also in (e,e′). Other: 33 fs *14* (p,p′γ).
3404.59[d] *20*	9/2+	7.6[b] fs *4*	c EfG KL NOPQ U W	J^π: 9/2 from γγ(θ) in (p,p′γ), M1+E2 γ to 7/2+. $T_{1/2}$: others: 6 fs *4* (^{14}N,pγ), 8 fs *+4−3* (p,p′γ), 21 fs *+12−15* (d,pγ) and 35 fs *21* (n,n′γ).
3413.41[f] *4*	3/2−	7 fs *4*	c EfG I KL O U W	J^π: L=1 in (d,p); γ to 5/2+ ≠ M2 from RUL. $T_{1/2}$: unweighted average of 2.8 fs *14* from (n,γ) E=thermal and 11 fs *4* from (d,pγ).
3908.11 *19*	5/2+	6[#] fs *2*	EFG I KL NO Q TU W	J^π: L=2 in (d,p), 5/2 in (d,α) from measured σ(θ) and the 2J+1 rule.
3970.59[f] *22*	7/2−	22 fs *5*	C E G KL O Q U W	J^π: L=3 in (d,p), γ to 5/2+ and ΔJ=1 from γ(θ) in (d,pγ). $T_{1/2}$: weighted average of 18 fs *8* from (d,pγ), 20 fs *8* from (p,p′γ), and 25 fs *5* from (^{14}N,pγ).
4059.2 *4*	9/2+	50 fs *4*	E G KL NO Q U W	J^π: 9/2 from γγ(θ) and γ-ray polarization measurements (α,nγ); E2 γ to 5/2+. $T_{1/2}$: weighted average of 55 fs *4* from (^{14}N,pγ), 34 fs *14* from (d,pγ), 54 fs *4* from (e,e′), and 41 fs *+4−5* from (p,p′γ).
4276.43[g] *5*	1/2−[@]	<4[c] fs	c G I KL O U W	J^π: also from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14).
4359.62 *15*	3/2+	<7 fs	c FGHI KL O TU W	J^π: L=2 in (d,p); M1+E2 3774γ, ΔJ=1 from γ(θ), to 1/2+.
4711.7[e] *5*	9/2+	27 fs *3*	c EfG KL O W	XREF: K(4701) J^π: from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14). $T_{1/2}$: weighted average of 25 fs *3* from (^{14}N,pγ), 29 fs *3* from (d,pγ), and 18 fs *11* from (p,p′γ).
4722.1 *13*	5/2+,3/2+	<7 fs	c EfGH KL O TU W	E(level): weighted average of 4723.6 *21* from (α,nγ), 4721.8 *13* from (d,pγ), 4721 *2* from (p,p′γ), 4728 *5* from (^{3}He,α), and 4718 *6* from (d,α). Other: 4711 *10* from (d,p). J^π: L=2 in (^{3}He,α).
5012.4 *3*	7/2+	<7 fs	EFG KL O W	J^π: 7/2 from γ(θ) in (α,nγ) (1974Ro10), 2210.8γ to 3/2+.
5116.80 *12*	1/2−[@]	<7 fs	G I KL O U W	XREF: K(5511) J^π: also from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14).
5251.45 *25*	11/2+	15[#] fs *2*	EFG KL NO W	J^π: M1 γ, ΔJ=1, to 9/2+ and E2 γ, ΔJ=2, to 7/2+.
5460.6 *3*	13/2+	1.9 ps *7*	E G KL O W	XREF: W(5465) J^π: from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14). $T_{1/2}$: unweighted average of 1.44 ps *13* from (^{14}N,pγ), 0.96 ps *+46−34* from (d,pγ), and 3.2 ps *4* from (p,p′γ).
5474.38 *19*	1/2+	<7[‡] fs	G I KL O U	J^π: L=0 in (d,p).
5521.20[f] *25*	5/2−	46[#] fs *6*	E G KL O W	J^π: 5/2 from γ(θ) and γ-particle correlation measurements (α,nγ) (1974Ro10). Parity from band assignment.
5533.2[d] *7*	11/2+	6[#] fs *2*	E G KL O W	J^π: from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14).
5746.4[‡] *14*	7/2,9/2+[&]	<7[‡] fs	kL o w	J^π: D+Q γ to 9/2+, γ to 5/2+.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J$^{\pi}$	T$_{1/2}$ or Γ[a]	XREF	Comments
5748[‡] *2*	3/2$^+$,5/2$^+$[&]	<7[#] fs	E G kL o w	J$^{\pi}$: D+Q 5747γ to 5/2$^+$, γ to 1/2$^+$.
5792.94 *23*	(7/2$^-$)	46 fs *9*	E G KL O U W	J$^{\pi}$: L=(3) in (p,d). 11/2$^-$ or 7/2$^-$ in (α,nγ) (1975Bu14) from γ(θ) and linear polarization measurements. 11/2$^-$,(7/2) in (^{14}N,pγ). T$_{1/2}$: weighted average of 52 fs *17* from (α,nγ), 33 fs *7* from (d,pγ), and 58 fs *+9−5* from (p,p′γ).
5860 *2*	5/2$^+$	<7[‡] fs	G KL O U W	E(level): weighted average of 5862 *2* from (d,pγ), 5859 *2* from (p,p′γ), and 5854 *5* from (d,α). Others: 5851 *10* from (d,p) and 5866 *20* from (^{3}He,α). J$^{\pi}$: 5/2 from γ(θ) and γ-particle correlation measurements (α,nγ) (1974Ro10). L(d,p)=2.
5971.3 *4*	9/2$^+$	<7 fs	E G kL O W	J$^{\pi}$: from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14); E2 γ to 5/2$^+$.
5977.1 *8*	7/2$^+$	<7 fs	G kL O	J$^{\pi}$: from γ(θ) and linear polarization measurements (α,nγ) (1975Bu14); D and D+Q γ to 7/2$^+$ and 5/2$^+$.
6041.1 *4*	7/2$^+$,11/2$^+$	<6[#] fs	E G KL O W	XREF: E(6033.4) J$^{\pi}$: from (d,pγ), based on γ(θ) and p-γ angular correlation measurements.
6082[‡] *1*	5/2$^+$	<7[‡] fs	KL O U W	J$^{\pi}$: L=2 in (^{3}He,α), D+Q to 7/2$^+$.
6168 *3*	(3/2)	<7[‡] fs	KL W	E(level): weighted average of 6159 *10* from (d,p), 6169 *3* from (d,pγ), and 6167 *5* from (d,α). J$^{\pi}$: 3/2 in 1991He05 (d,pγ) based on the experimental-theoretical correlation of the J$^{\pi}$= 3/2$^+$ states; γs to 1/2$^-$; 1/2$^+$; and 5/2$^+$; A$_2$, A$_4$ data in 1991He05 (d,pγ) allow both ΔJ=1 or 0, i.e. J$^{\pi}$=1/2 is also possible.
6361 *2*	3/2	<7[‡] fs	E KL W	E(level): weighted average of 6362 *4* from (^{14}N,pγ), 6350 *10* from (d,p), 6362 *2* from (d,pγ), and 6358 *5* from (d,α). J$^{\pi}$: γ to 1/2$^+$ and D+Q 6361γ to 5/2$^+$, ΔJ=1 from A$_2$, A$_4$.
6409 *10*			K	
6434 *2*	9/2$^+$	<7[‡] fs	E KL W	E(level): weighted average of 6435 *2* from (^{14}N,pγ), 6433 *2* from (d,pγ), and 6434 *6* from (d,α). Other: 6423 *10* from (d,p). J$^{\pi}$: D and D+Q γs to 11/2$^+$ and 7/2$^+$, γ to 5/2$^+$.
6468[‡] *2*	3/2$^-$	<7[‡] fs	KL U W	J$^{\pi}$: (1/2,3/2)$^-$ in (d,t) (1984Ki11); γ to 1/2$^-$ and 5/2$^+$,3/2$^+$.
6570 *1*	1/2$^+$,3/2	<7[‡] fs	L W	J$^{\pi}$: γs to 1/2$^+$; 1/2$^-$; and 5/2$^+$.
6678[‡] *1*	5/2	10 fs *+30−3*	KL W	J$^{\pi}$: 5/2 from γ(θ) (d,pγ). T$_{1/2}$: from (d,pγ).
6777[‡] *3*	1/2$^+$	<7[‡] fs	KL U W	XREF: U(6790)W(6766) J$^{\pi}$: L(d,t)=0 used in spectroscopic factor (1984Ki11); γ to 1/2$^-$; 1/2$^+$; 3/2$^-$; 3/2$^+$; and 5/2$^+$.
6832[‡] *2*	(3/2$^-$,5/2)	<28[‡] fs	KL	J$^{\pi}$: γs to 3/2$^-$; 3/2$^+$; and 7/2$^-$.
6840 *2*	5/2	<7[‡] fs	E L U W	E(level): weighted average of 6842 *2* from (^{14}N,pγ), 6839 *2* from (d,pγ), and 6837 *6* from (d,α). Other: 6840 *50* from (^{3}He,α). J$^{\pi}$: 5/2 from γ(θ) (d,pγ).
6862.2[#] *12*		<9[#] fs	E k	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[a]	XREF	Comments
6885[‡] *3*	7/2,9/2	97[‡] fs *42*	kL W	XREF: W(6876) J^π: D+Q γ to $7/2^+$ and $9/2^+$.
6914[‡] *2*	$5/2^-$		E KL U W	XREF: U(6919) J^π: L(p,d)=3, γ to $3/2^+$.
6958[‡] *2*	$5/2^-$	<7[‡] fs	E KL U W	XREF: K(6944) J^π: L(p,d)=3, γ to $3/2^+$.
7042.7 *2*	5/2	<21[‡] fs	I KL N W	XREF: K(7026)L(7038) J^π: γs to $3/2^+$, $3/2^-$, $7/2^+$, and $7/2^-$.
7088[‡] *4*	$(5/2,3/2)^+$	<7[‡] fs	KL U W	J^π: L(d,p)=2, $5/2^+$ used in spectroscopic factor – 1988Pe19 (p,d).
7181[‡] *2*	(3/2,7/2)	<18[‡] fs	e KL W	XREF: W(7178) J^π: D+Q γ to $5/2^+$, A_2, A_4 support ΔJ=1.
7185[‡] *2*		<14[‡] fs	e L	
7228[‡] *3*	$(3/2,5/2)^+$	<7[‡] fs	E KL U W	XREF: K(7215) J^π: L(d,p)=2.
7265.52 *4*	$1/2^+$		J	J^π: from ^{24}Mg(n,γ) E=Resonance.
7285[‡] *2*	$(7/2)^-$	<7[‡] fs	C E KL U W	XREF: K(7271) J^π: L(d,p)=3, 7/2 from $\gamma(\theta)$ (d,pγ).
7375.15 *4*	$3/2^+$	1.9 eV *2*	JKL W	XREF: K(7364)W(7370) E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
7411.22 *4*	$3/2^-$	6.1 keV *12*	JK W	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ: weighted average of 5.6 keV *8* from (n,γ) E=resonance and 9 keV *2* from (d,p).
7493[#] *2*	$11/2^{(+)}$	21[‡] fs *8*	E KL W	J^π: D+Q γs to $9/2^+$ and $13/2^+$, positive parity from shell model calculations (d,pγ) (1991He05).
7500.24 *4*	$(1/2^-)$	3 eV	J	J^π: from ^{24}Mg(n,γ) E=Resonance.
7505[‡] *3*	5/2	<10[‡] fs	E L	XREF: E(7501) J^π: from $\gamma(\theta)$, ΔJ=1 transition, D+Q γs to $7/2^+$; $3/2^+$.
7524[‡] *2*	$(7/2^+,5/2)$	<10[‡] fs	E KL W	XREF: K(7513) J^π: D+Q γs to $5/2^+$; $7/2^+$; and γ to $3/2^+$.
7551[‡d] *1*	$(13/2)^+$	<21[‡] fs	E L W	J^π: D+Q γ to $11/2^+$, rotational band assignment.
7577.47 *4*	$(5/2^+)$	31 eV *5*	E JKL W	XREF: K(7563)W(7571) E(level),J^π: $3/2^+$,$5/2^+$ from ^{24}Mg(n,γ) E=Resonance, Q(+D) γ to $7/2^+$.
7587.36 *4*	$1/2^-$	≈79 keV	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
7633[‡] *5*	3/2,5/2,7/2	<49[‡] fs	KL W	J^π: D+Q to $5/2^+$.
7652 *2*	9/2	<21[‡] fs	E KL W	E(level): weighted average of 7653 *3* from (^{14}N,pγ), 7640 *10* from (d,p), 7653 *2* from (d,pγ), and 7646 *7* from (d,α). J^π: D 4914γ, ΔJ=1, to $7/2^+$; γ to $11/2^+$.
7685 *3*			E	
7744.07 *4*	$3/2^-$	31 keV *5*	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
7786.85 *4*	$5/2^+$	20.4 eV *20*	E JK TU W	T=3/2 E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
7801[‡] *2*	9/2	<12[‡] fs	L	J^π: D+Q, ΔJ=1, 2008γ to $(7/2^-)$; γ to $11/2^+$.
7808.85 *4*	$3/2^-$	0.56 keV *1*	J	J^π: from ^{24}Mg(n,γ) E=Resonance.
7838[‡] *2*	7/2	<28[‡] fs	L U w	J^π: D γs to $5/2^+$ and $9/2^+$.
7859.47 *7*	$3/2^+$	13 eV *4*	J N TU W	T=3/2 XREF: T(7863.4) E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.

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Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[a]	XREF	Comments
7866[‡] *2*	7/2$^+$,11/2$^+$[&]	<12[‡] fs	E L	J^π: 3806γ D+Q, ΔJ=1, to 9/2$^+$; γs to 11/2$^+$ and 7/2$^+$.
7946.8 *6*	1/2$^-$	0.9 keV *3*	J W	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
7961[‡] *2*	7/2$^{(+)}$	<14[‡] fs	L W	J^π: D+Q γs to 5/2$^+$ and 9/2$^+$. Parity from shell model calculations (d,pγ) (1991He05).
7962.6 *7*	1/2$^+$	21 keV *4*	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
8012[‡] *3*	(9/2,13/2$^+$)	37[#] fs *4*	E L W	J^π: D+Q γ, ΔJ=1, to 11/2$^+$. If J^π(6041.1)=7/2$^+$, then 13/2$^+$ can be excluded, since 1971γ to J^π(6041.1)=7/2$^+$,11/2$^+$.
8076[‡] *2*	5/2,7/2,9/2	<14[‡] fs	E L W	J^π: D+Q γ to 7/2$^+$.
8119[‡] *3*	7/2$^{(+)}$	<10[‡] fs	KL W	J^π: D+Q γ, ΔJ=1, to 5/2$^+$.
8140.8 *8*	3/2$^+$	13 keV *7*	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
8244.3 *10*			J w	$T_{1/2}$ or Γ: Γ=1.10 *4*/(2J+1) keV. E(level): from ^{24}Mg(n,γ) E=Resonance.
8267[‡] *2*	(7/2$^+$)	<10[‡] fs	E KL w	J^π: 4862 D(+Q), ΔJ=1, to 9/2$^+$; 6654γ, DJ=0, to 7/2$^+$; π≠− from expected n_0 decay with l=≤3 (d,pγ) (1992He05).
8311.2 *10*	5/2$^+$		J W	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance.
8316.5 *10*			J	$T_{1/2}$ or Γ: Γ=680 *40*/(2J+1) eV.
8324.4 *10*	1/2$^+$	14 keV *4*	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8351.3 *11*			JK W	E(level): from ^{24}Mg(n,γ) E=Resonance. Γ=1.34 *6*/(2J+1) keV.
8362.5 *11*	1/2$^+$	18 keV *6*	JK	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8400			W	
8447 *6*			W	
8532 *2*	(7/2,11/2)	<10[‡] fs	E KL	XREF: K(8510) E(level): weighted average of 8534 *2* from (^{14}N,pγ) and 8530 *2* from (d,pγ). Other: 8510 *20* from (d,p). J^π: D+Q γ, ΔJ=1 transition, to 9/2$^+$.
8548 *3*	(5/2,7/2,9/2)	<17[‡] fs	E L	E(level): weighted average of 8550 *2* from (^{14}N,pγ) and 8544 *3* from (d,pγ). J^π: D+Q γ to 7/2$^+$.
8551	11/2	<5[‡] fs	L	J^π: D+Q γ, ΔJ=0 transition, to 11/2$^+$.
8552 *3*	(1/2)	8 keV *4*	K W	E(level): from (d,α). J^π: from (d,p), based on extracted total neutron cross section (1976Bo18). Γ from (d,p).
8558.7 *13*	5/2$^+$		J	J^π: from ^{24}Mg(n,γ) E=Resonance.
8569.5 *13*	3/2$^-$		J	J^π: from ^{24}Mg(n,γ) E=Resonance.
8579.5 *13*	3/2$^+$	12 keV *5*	JK	T=3/2 XREF: K(8573) E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8596.6 *13*			JK	XREF: K(8581) E(level): from ^{24}Mg(n,γ) E=Resonance. $T_{1/2}$ or Γ: Γ=1.10 *4*/(2J+1) keV.
8656[‡] *2*	7/2	<10[‡] fs	L W	J^π: D+Q γ, ΔJ=1, to 9/2$^+$; γ to 5/2$^+$.
8720 *15*			W	
8791 *7*	1/2$^+$		U	J^π: L=0 in (^{3}He,α).

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Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[a]	XREF	Comments
8811 *2*	9/2,11/2	<8[‡] fs	L	J^π: D+Q γ to 11/2$^+$, γ to 7/2$^+$,11/2$^+$.
8834.4 *13*	1/2$^+$	50 keV *10*	E JK U W	T=3/2 E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8869.0 *16*	3/2$^-$		J	J^π: from ^{24}Mg(n,γ) E=Resonance.
8888 *3*		<17[‡] fs	L	J^π: D+Q γ to 9/2$^+$.
8893.9 *16*	1/2$^-$	32 keV *8*	JK	XREF: K(8899) J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8896 *1*		17[‡] fs *8*	E L	J^π: 3103 γ D+Q, ΔJ=0, to (7/2$^-$) implies (7/2) for this level. However, 15/2$^-$ or 11/2,15/2$^-$ is proposed in 1991He05 (d,pγ) from band assignment. 4836γ to 9/2$^+$.
8970.7 *17*	5/2$^+$	16 keV *4*	JK w	E(level),J^π: from ^{24}Mg(n,γ) E=Resonance. Γ from (d,p).
8999.5[#] *15*		<9[#] fs	E w	
9013.9 *18*		<10 keV	JK	XREF: K(9022) Γ from (d,p) . Γ=5.2 *8*/(2J+1) keV.
9014 *3*	7/2,9/2,11/2	<5[‡] fs	L	J^π: D(+Q) to 9/2$^+$.
9071.7 *7*			JK	XREF: K(9050) E(level): from ^{24}Mg(n,γ) E=Resonance.
9153 *4*	(3/2)		K	J^π: from (d,p), based on total neutron cross section (1976Bo18).
9325.7 *9*			JK	XREF: K(9335)
9410 *3*		12[‡] fs *8*	L	J^π: D(+Q) γ to 7/2$^+$,11/2$^+$; γ to (7/2$^-$). 13/2,9/2 in (d,pγ) where 9/2 is less likely from expected n_0 decay with l≤4 and n_1 decay with l≤3.
9502.0 *15*			JK	E(level): from ^{24}Mg(n,γ) E=Resonance.
9651 *2*		<5[‡] fs	E L	E(level): weighted average of 9650 *3* from (^{14}N,pγ) and 9652 *2* from (d,pγ).
9685[#] *2*	(11/2,7/2)	<5[‡] fs	E L	J^π: D+Q γ to 9/2$^+$, γ to 11/2$^+$. 7/2 is highly improbable from expected n_0 decay with l≤4 and n_1 decay with l≤3 (d,pγ) (1991He05).
9830 *10*			KL	J^π: γ to 9/2$^+$. 11/2$^+$,13/2 in (d,pγ).
9948[#] *2*	(15/2)$^+$		E kL	E(level): weighted average of 9949 *2* (^{14}N,pγ) and 9946 *4* (d,pγ). J^π: D+Q γ to (13/2)$^+$, rotational band assignment.
10038.7 *15*			Jk	
10050 *20*			K	
10137[#] *4*			E L	
10252.5 *9*			JK	XREF: K(10200) E(level): From ^{24}Mg(n,γ) E=Resonance.
10270 *40*		[b]	K	
10360 *30*		[b]	K N	XREF: N(10430)
10520 *40*		[b]	K	
10618 *8*	(3/2,5/2)$^+$		k U	T=3/2
10653[d] *2*	(15/2$^+$)		E k	J^π: γs to (13/2)$^+$ and 11/2$^+$; rotational band assignment.
10730 *40*			K	
10860 *40*			K	

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Adopted Levels, Gammas (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	XREF	Comments
10996 *10*		L	
11004 *3*		E	
11045.4 *18*		JK	XREF: K(11070)
11200 *10*		KL	XREF: K(11180)
11361[#] *3*		E K	XREF: K(11350)
11388.9 *14*		J	
11410 *3*		E L	
11460 *3*		E	
11486 *6*		E K	
11590 *30*		K	
11725 *5*	$(1/2,3/2)^-$	U	T=3/2 J^π: L(d,t)=1 and also in (^{3}He,α).
11747 *10*		U	
11775 *10*		U	
11998.7 *18*		J	
12810		T	
12898 *10*	$(3/2,1/2)^-$	TU	T=3/2 E(level): from (^{3}He,α). J^π: L(d,t)=1 and also in (^{3}He,α).
13040		T	
13143 *4*		E	
13332[#] *10*		E T	
13440		T	
13670		T	
13830		T	
14490		T	
15100		T	
15590		T	
18.20×10^3 *23*		R	
18.55×10^3 *20*		R	
19.27×10^3 *18*		R	
19.85×10^3 *18*		R	
20.34×10^3 *18*		R	
20.69×10^3 *18*		R	
21.12×10^3 *15*		R	
22.02×10^3 *13*		R	
22.49×10^3 *13*		R	

† From least-squares fit to the γ-ray energies, except where otherwise noted.
‡ From (d,pγ).
# From (^{14}N,pγ).
@ From vector analyzing power (pol d,p).
& Selection/rejection of parity based on the RUL for hypothetical M2 transition rate/s (d,pγ) (1991He05).
a $T_{1/2}$ from (p,p′γ), except where otherwise noted. Γ from (n,γ) E=Resonance, except where otherwise noted.
b From (e,e′).
c From (n,γ) E=Thermal.
d Band(A): 5/2[202].
e Band(B): 1/2[211].
f Band(C): 1/2[330].
g Level not shown in the level scheme in 1988He15 (^{14}N,pγ),(^{15}N,pnγ), however, Nilsson quantum numbers 1/2[300]. are given as a possible assignment to rotational band for J^π=1/2$^-$ in their Table IV.

$\gamma(^{25}Mg)$

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	α[h]	Comments
585.042	1/2+	585.028 30	100	0	5/2+	E2			B(E2)(W.u.)=0.563 12
974.746	3/2+	389.710 35	86.6 15	585.042	1/2+	M1+E2	+0.13 3		B(M1)(W.u.)=0.0153 10; B(E2)(W.u.)=10 +5−4 I_γ: weighted average of 84.8 15 from ^{25}Na β^- decay, 88 12 from ^{25}Al ε decay, 85 6 from (α,nγ), 88 4 from (n,γ) E=thermal, 96 10 from (d,pγ), 96 4 from (p,p′γ), 96 10 from (μ^-,ν2nγ), and 73 20 from (μ^-,νp2nγ). δ: weighted average of +0.12 3 from (α,nγ) and +0.15 5 from (p,p′γ).
		974.742 35	100.0[c] 15	0	5/2+	M1+E2	+0.34[#] 12		B(M1)(W.u.)=0.00101 10; B(E2)(W.u.)=0.7 +5−4
1611.767	7/2+	1611.712 11	100	0	5/2+	M1+E2	−0.207 13	1.05×10^{-4} 2	B(M1)(W.u.)=0.30 +7−5; B(E2)(W.u.)=29 +8−5 E_γ: weighted average of 1611.716 11 from ^{25}Na β^- decay and 1611.708 11 from ^{25}Al ε decay. δ: weighted average of −0.22 2 from (α,nγ), −0.23 4 from (p,p′γ), −0.19 2 from (γ,γ′), and −0.18 7 from (^{14}N,pγ).
1964.615	5/2+	989.865 30	56.9 21	974.746	3/2+	M1+E2	−0.25[#] 7		B(M1)(W.u.)=0.0080 8; B(E2)(W.u.)=3.0 +18−14 I_γ: weighted average of 50 6 from (^{14}N,pγ), 56.5 22 from (α,nγ), 50 10 from (n,γ) E=thermal, 68 7 from (d,pγ), 57.5 21 from (p,p′γ), and 54 29 from (μ^-,ν2nγ). Others: 100 10 from (μ^-,νp2nγ), 71.9 14 and 58 12 from 1982Al27 and 1971Al10, respectively, in ^{25}Na β^- decay.
		1379.543 30	100.0[#] 21	585.042	1/2+	E2		5.90×10^{-5} 8	B(E2)(W.u.)=17.1 +17−15 Mult.: from Q in (^{14}N,pγ) and RUL.
		1964.501 45	61.9 16	0	5/2+	M1+E2	−0.58[e] 7	2.51×10^{-4} 5	B(M1)(W.u.)=0.00087 +10−9; B(E2)(W.u.)=0.45 +10−9 I_γ: weighted average of 63.4 10 from ^{25}Na β^- decay, 50 6 from (^{14}N,pγ), 61 5 from (α,nγ), 60 20 from (n,γ) E=thermal, 76 7 from (d,pγ), 55.3 21 from (p,p′γ), and 70 12 from (μ^-,ν2nγ). Other: 70 70 from (μ^-,νp2nγ).
2563.40	1/2+	1588.65[‡] 9	21.3 14	974.746	3/2+				I_γ: weighted average of 19.8 13 from (α,nγ), 26.2 29 from (n,γ) E=thermal, 18 6 from (d,pγ), and 23.5 25 from (p,p′γ).
		1978.25[‡] 3	100.0[@] 13	585.042	1/2+				
		2563.6[‡] 5	4.1 12	0	5/2+	[E2]		5.90×10^{-4} 8	B(E2)(W.u.)=3.0 +25−12 I_γ: weighted average of 3.7 13 from (α,nγ), 5.0 14 from (n,γ) E=thermal, and 3.7 12 from (d,pγ).
2737.95	7/2+	773.3	8.4 7	1964.615	5/2+	M1+E2			I_γ: weighted average of 8.1 7 from (α,nγ), 11 4 from (d,pγ), 8.1 12 from (p,p′γ), and 12.1 24 from (d,α). δ: +0.47 +20−12 or +4.2 +35−18 from (p,p′γ) (1969So09). B(M1)(W.u.)=0.0120 +16−13 if M1. B(E2)(W.u.)=119 +15−13 exceeds RUL=100 if E2.

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	α[h]	Comments
2737.95	7/2+	1763.13[#] *15*	100.0[@] *12*	974.746	3/2+	E2		2.07×10^{-4} *3*	B(E2)(W.u.)=23.2 *+23−18*
		2737.8	6.9[#] *12*	0	5/2+	M1+E2	−0.12[@] *6*	5.56×10^{-4} *8*	B(M1)(W.u.)=2.22×10^{-4} *+40−37*; B(E2)(W.u.)=0.0025 *+32−19* δ: Sign from (α,nγ).
2801.46	3/2+	836.86 *5*	100.0[c] *25*	1964.615	5/2+	M1(+E2)	<−0.25[@]		B(M1)(W.u.)<0.67 E_γ: weighted average of 836.841 *50* from ^{25}Na β^- decay and 836.95 *10* from (n,γ) E=thermal. I_γ: strongenst branch in ^{25}Na β^- decay and in (d,pγ): 100 *9*. Others: 97.6 *25* (α,nγ), 97 *5* (p,p′γ), 90 *10* (d,α), and 84 *12* (n,γ) E=thermal.
		2216.267 *50*	89.9[c] *20*	585.042	1/2+	M1+E2	+0.21[#] *9*	3.40×10^{-4} *6*	B(M1)(W.u.)=0.0282 *+36−33*; B(E2)(W.u.)=1.5 *+15−10* I_γ: other: 81 *9* (d,pγ). In all other datasets, it is the strongest branch: 100 *5* (α,nγ), 100 *5* (p,p′γ), 100 *16* (n,γ) E=thermal, and 100 *15* (d,α).
		2801.30 *5*	47.5[c] *15*	0	5/2+	M1+E2	−0.64[@] *8*	6.14×10^{-4} *11*	B(M1)(W.u.)=0.0055 *+9−7*; B(E2)(W.u.)=1.69 *+38−34* E_γ: weighted average of 2801.312 *35* from ^{25}Na β^- decay, 2800.9 *2* from (α,nγ), and 2801.50 *25* from (n,γ) E=thermal. I_γ: others: 46 *5* from (α,nγ), and 59.0 *26* from (p,p′γ), 52 *16* from (n,γ) E=thermal, 51 *16* from (d,pγ), and 54 *15* from (d,α). δ: other: −0.5 *+4−16* (α,nγ).
3404.59	9/2+	1793.1[@] *3*	100.0[#] *12*	1611.767	7/2+	M1+E2	−0.13 *2*	1.68×10^{-4} *2*	B(M1)(W.u.)=0.400 *+23−21*; B(E2)(W.u.)=12.5 *+43−35* δ: weighted average of −0.14 *2* from (α,nγ), −0.13 *3* from (p,p′γ), and −0.12 *2* from (^{14}N,pγ).
		3403.0[&] *4*	23.5 *18*	0	5/2+	E2		9.54×10^{-4} *13*	B(E2)(W.u.)=7.2 *5* I_γ: weighted average of 33 *4* from (^{14}N,pγ), 26.6 *25* from (α,nγ), 21 *6* from (d,pγ), and 22.0 *12* from (p,p′γ). Mult.: from Q in (^{14}N,pγ) and RUL.
3413.41	3/2−	849.9[‡] *3*	0.23[‡] *7*	2563.40	1/2+	[E1]			B(E1)(W.u.)=0.00031 *+33−14*
		2438.53[‡] *3*	19.7 *6*	974.746	3/2+	E1(+M2)[g]	<0.2[@]	9.21×10^{-4} *18*	B(E1)(W.u.)=0.0011 *+16−5* I_γ: weighted average of 20.0 *7* from (n,γ) E=thermal and 18.7 *13* from (p,p′γ). Others: 21 *7* from (α,nγ) and 25 *8* from (d,pγ). Mult.: E1(+M2) from ΔJ^π based on D(+Q) (α,nγ).
		2828.27[‡] *9*	100.0[#] *13*	585.042	1/2+	E1(+M2)[g]		1.16×10^{-3} *2*	B(E1)(W.u.)=0.0037 *+35−14* Mult.: E1 from ΔJ^π based on D(+Q) (α,nγ).

$\gamma(^{25}$Mg) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	α[h]	Comments
3413.41	3/2⁻	3413.25[‡] *12*	16.3 *9*	0	5/2⁺	E1(+M2)[g]	<0.2[@]	1.42×10⁻³ *3*	B(E1)(W.u.)=0.00032 *+49−14* I_γ: weighted average of 16.7 *7* from (n,γ) E=thermal, and 14.7 *13* from (p,p′γ). Others: 22 *8* from (d,pγ), 10.5 *26* from (α,nγ). Mult.: E1(+M2) from ΔJ^π based on D(+Q) (α,nγ).
3908.11	5/2⁺	1106.6	15.4 *15*	2801.46	3/2⁺				I_γ: weighted average of 17 *4* from (α,nγ) and 15.2 *15* from (p,p′γ).
		1170.1	18.6 *22*	2737.95	7/2⁺				I_γ: weighted average of 14.3 *29* from (α,nγ) and 19.7 *15* from (p,p′γ).
		2933.18[‡] *18*	100[#] *3*	974.746	3/2⁺	M1+E2		0.00070 *6*	B(M1)(W.u.)=0.096 *+48−24* if M1, B(E2)(W.u.)=66 *+33−17* if E2. Mult.: M1+E2 from ΔJ^π based on D+Q (α,nγ).
		3907.8	16.4 *15*	0	5/2⁺	M1+E2	−0.56 *14*	1.03×10⁻³ *2*	B(M1)(W.u.)=0.0051 *+27−14*; B(E2)(W.u.)=0.62 *+42−26* I_γ: weighted average of 11 *6* from (α,nγ) and 16.7 *15* from (p,p′γ). Mult.: M1+E2 from ΔJ^π based on D+Q (α,nγ). δ: From (e,e′). Other: <−0.8 (α,nγ). Sign from (α,nγ).
3970.59	7/2⁻	1232.6	2.5 *13*	2737.95	7/2⁺	[E1]		8.57×10⁻⁵ *12*	B(E1)(W.u.)=0.00039 *+23−18*
		2006.0[@] *3*	26.0 *20*	1964.615	5/2⁺	E1(+M2)	−0.04 *4*	6.50×10⁻⁴ *9*	B(E1)(W.u.)=0.00067 *+28−18* I_γ: weighted average of 29.9 *26* from (α,nγ), and 25.0 *13* from (p,p′γ). Other: 18.5 *13* from (d,pγ).
		2358.7	2.5 *13*	1611.767	7/2⁺	[E1]		8.84×10⁻⁴ *12*	B(E1)(W.u.)=5.5×10⁻⁵ *+34−26*
		3970.3	100.0[#] *13*	0	5/2⁺	E1(+M2)	−0.02[@] *3*	1.67×10⁻³ *2*	B(E1)(W.u.)=0.00047 *+14−9*
4059.2	9/2⁺	654.6	1.7[#] *3*	3404.59	9/2⁺				
		2447.3	65.0[#] *17*	1611.767	7/2⁺	M1+E2	−0.49 *10*	4.53×10⁻⁴ *9*	B(M1)(W.u.)=0.0094 *11*; B(E2)(W.u.)=2.2 *8* I_γ: (p,p′γ) reports all γ transitions. Others: 82 *7* from (^{14}N,pγ), 85 *8* from (α,nγ), 79 *9* from (d,pγ). δ: weighted average of −0.46 *10* from (α,nγ) and −0.53 *12* from (p,p′γ).
		4058.9[@] *5*	100.0[#] *17*	0	5/2⁺	E2		1.19×10⁻³ *2*	B(E2)(W.u.)=1.42 *+13−11* I_γ: others: 100 *7* from (^{14}N,pγ), 100 *8* from (α,nγ), 100 *11* from (d,pγ).
4276.43	1/2⁻	863.03[‡] *7*	6.6 *4*	3413.41	3/2⁻				I_γ: weighted average of 6.8 *4* from (n,γ) E=thermal, 5.3 *26* from (d,pγ), and 5.1 *13* from (p,p′γ). Other: 4.0 *27* from (α,nγ).
		1712.94[‡] *4*	15.4 *13*	2563.40	1/2⁺	E1		4.37×10⁻⁴ *6*	I_γ: weighted average of 16.0 *27* from (α,nγ), 18.7 *26*

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[f]	δ	α[h]	Comments
									from (n,γ) E=thermal, 14.5 *13* from (d,pγ), and 15.2 *13* from (p,p′γ).
4276.43	1/2⁻	3301.9 *3*	100.0[#] *25*	974.746	3/2⁺	[E1]		1.39×10^{-3} *2*	E_γ: unweighted average of 3302.2 *2* from (α,nγ) and 3301.52 *10* from (n,γ) E=thermal.
		3691.17[‡] *13*	11.3[‡] *4*	585.042	1/2⁺	E1		1.56×10^{-3} *2*	I_γ: others: 13 *4* from (α,nγ), 12 *4* from (d,pγ), 6.3 *13* from (p,p′γ),
4359.62	3/2⁺	1796.2	5.5[#] *18*	2563.40	1/2⁺				I_γ: others: 2.0 *10* from (α,nγ), 1.8 *5* from (d,pγ).
		3384.6[@] *2*	76.4[#] *18*	974.746	3/2⁺	M1+E2	+0.09[@] *7*	8.09×10^{-4} *12*	I_γ: others: 100 *8* from (α,nγ), 90 *4* from (d,pγ).
		3774.3[@] *2*	100.0[#] *18*	585.042	1/2⁺	M1+E2	−0.19[@] *9*	9.52×10^{-4} *14*	I_γ: others: 98 *8* from (α,nγ), 74 *7* from (d,pγ).
4711.7	9/2⁺	1973.5 *13*	6.4[#] *11*	2737.95	7/2⁺				
		2746.9[@] *5*	100.0[#] *11*	1964.615	5/2⁺	E2		6.74×10^{-4} *9*	B(E2)(W.u.)=29.0 +*36*−*30*
4722.1	5/2⁺,3/2⁺	2757.3	18 *6*	1964.615	5/2⁺				
		3747.1	100 *5*	974.746	3/2⁺	D+Q			δ: −0.02 *7* and 1.28 *63* for J^π=5/2⁺ and 3/2⁺, respectively, from (^{14}N,pγ) and −0.25 *15* from (α,nγ).
		4721.6	1.2 *6*	0	5/2⁺				
5012.4	7/2⁺	1041.8	2.5 *13*	3970.59	7/2⁻	[E1]			
		1104.3	4.8[@] *12*	3908.11	5/2⁺				
		2210.8	30.2[#] *23*	2801.46	3/2⁺	[E2]		4.21×10^{-4} *6*	I_γ: others: 41 *5* from (α,nγ), 20 *5* from (d,pγ).
		3047.6[@] *3*	100.0[#] *23*	1964.615	5/2⁺	D			
		3400.4	28.1 *23*	1611.767	7/2⁺				I_γ: weighted average of 33 *10* from (α,nγ), 28 *5* from (d,pγ), and 27.9 *23* from (p,p′γ).
		5011.9	74.4[#] *23*	0	5/2⁺	D+Q	+0.27[@] *3*		I_γ: others: 57 *10* (α,nγ), 95 *10* (d,pγ). Unweighted average of all: 76 *11*.
5116.80	1/2⁻	1702.6[‡] *7*	4.1[@] *14*	3413.41	3/2⁻				I_γ: other: 21 *5* [from (n,γ) – outlier, perhaps due to a misprint in the original publication.].
		2553.7[‡] *8*	22 *5*	2563.40	1/2⁺	E1		1.00×10^{-3} *1*	I_γ: weighted average of 26 *4* from (α,nγ) and 16 *5* from (n,γ) E=thermal.
		4141.70[‡] *12*	100[‡] *5*	974.746	3/2⁺				
		4531.3	6.9[@] *28*	585.042	1/2⁺	E1		1.87×10^{-3} *3*	
5251.45	11/2⁺	1192.4[@] *6*	61 *4*	4059.2	9/2⁺	M1+E2	−0.12 *2*	1.554×10^{-5} *23*	B(M1)(W.u.)=0.203 +*33*−*26*; B(E2)(W.u.)=12 +*5*−*4* I_γ: weighted average of 46 *8* from (^{14}N,pγ), 43 *14* from (α,nγ), and 63.2 *26* from (p,p′γ). Other: 68 *24* from (d,pγ). δ: weighted average of −0.11 *2*, −0.18 *4* both from (α,nγ) and −0.052 *58* from (p,p′γ).
		1846.4[@] *5*	68 *3*	3404.59	9/2⁺	M1+E2	+0.18[@] *3*	1.89×10^{-4} *3*	B(M1)(W.u.)=0.060 +*10*−*8*; B(E2)(W.u.)=3.4 +*13*−*11*

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[f]	δ	α[h]	Comments
									I_γ: weighted average of 52 *14* from (α,nγ), and 68.4 *26* from (p,p′γ). Others: 100 *12* from (d,pγ), 40 *6* from (^{14}N,pγ),
									δ: other: +0.14 *9* from (^{14}N,pγ).
5251.45	11/2$^+$	2513.4	31 *3*	2737.95	7/2$^+$	[E2]		5.67×10^{-4} *8*	B(E2)(W.u.)=10.5 *+19−15*
									I_γ: weighted average of 25 *8* from (^{14}N,pγ), 32 *14* from (α,nγ), and 31.6 *26* from (p,p′γ). Other: 38 *12* from (d,pγ).
		3639.5[@] *3*	100.0[#] *26*	1611.767	7/2$^+$	E2		1.05×10^{-3} *2*	B(E2)(W.u.)=5.1 *+8−6*
5460.6	13/2$^+$	2055.9[@] *2*	100	3404.59	9/2$^+$	E2		3.46×10^{-4} *5*	B(E2)(W.u.)=1.9 *+11−5*
5474.38	1/2$^+$	2061	6 *3*	3413.41	3/2$^-$				I_γ: weighted average of 4.7 *31* from (α,nγ) and 7.8 *31* from (d,pγ).
		2911[i]	4.7 *16*	2563.40	1/2$^+$				
		4499	49 *3*	974.746	3/2$^+$				I_γ: weighted average of 51.6 *31* from (α,nγ) and 44 *5* from (d,pγ).
		4888.82[‡] *18*	100[@] *11*	585.042	1/2$^+$				
5521.20	5/2$^-$	1550.1[@] *5*	53[#] *3*	3970.59	7/2$^-$	D			
		2107.7	12 *4*	3413.41	3/2$^-$				I_γ: weighted average of 10.3 *33* [from 10.0 *33* (d,pγ) w.r. to Iγ(3909)=100] and 20 *7* from (p,p′γ).
		2719.8[@] *3*	35 *5*	2801.46	3/2$^+$	D			I_γ: weighted average of 63 *13* from (α,nγ), and 33.3 *33* from (p,p′γ). Other: 37 *13* from (d,pγ).
		3556.1[@] *6*	53[#] *7*	1964.615	5/2$^+$	D			I_γ: others: 67 *17* from (α,nγ), 43 *13* from (d,pγ).
		3909.1	100[#] *10*	1611.767	7/2$^+$	D+Q	+0.15[@] *5*		I_γ: others: 100 *17* from (α,nγ), 97 *10* from (d,pγ).
		5520.6	73[#] *3*	0	5/2$^+$	D+Q	+0.07[@] *1*		I_γ: others: 100 *10* from (d,pγ), 47 *17* from (α,nγ).
5533.2	11/2$^+$	2128.5[@] *6*	100[#] *5*	3404.59	9/2$^+$	M1+E2	−0.119[@] *9*	3.02×10^{-4} *4*	B(M1)(W.u.)=0.22 *+11−6*; B(E2)(W.u.)=4.1 *+22−12*
		3921.1	70[@] *7*	1611.767	7/2$^+$	[E2]		1.14×10^{-3} *2*	B(E2)(W.u.)=9.5 *+48−25*
									I_γ: weighted average of 61 *7* from (α,nγ), and 75 *5* from (p,p′γ). Other: 41 *6* from (^{14}N,pγ).
5746.4	7/2,9/2$^+$	1687.1	3.5 *24*	4059.2	9/2$^+$	D+Q			δ: +0.18 *+7−2* for J^π=7/2; δ<+0.6 or δ>+1 for 9/2$^+$ from (d,pγ).
		2341.7	4.4 *13*	3404.59	9/2$^+$				I_γ: weighted average of 5.9 *24* from (d,pγ) and 3.9 *13* from (p,p′γ).
		3008.3	8.2 *24*	2737.95	7/2$^+$				
		5745.7	100[#] *13*	0	5/2$^+$				
5748	3/2$^+$,5/2$^+$	1840	4.4 *22*	3908.11	5/2$^+$				
		2946	11 *5*	2801.46	3/2$^+$				
		3783	31 *7*	1964.615	5/2$^+$				
		4773	67 *11*	974.746	3/2$^+$				

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	α[h]	Comments
5748	3/2+,5/2+	5162	9 5	585.042	1/2+				
		5747	100 33	0	5/2+	D+Q			δ: −0.40 11 for 5/2+ and −0.07 2 for 3/2+ from (α,pγ), −0.62 11 for 5/2+ and −0.19 13 for 3/2+ from (^{14}N,pγ).
5792.94	(7/2−)	1822.4[@] 2	51.9 16	3970.59	7/2−	(E2)		2.34×10^{-4} 3	B(E2)(W.u.)=48 +12−9 I_γ: weighted average of 51.5 30 from (α,nγ), 64 7 from (d,pγ), and 51.5 15 from (p,p′γ). Other: 35 6 from (^{14}N,pγ),
		2388.1[@] 2	100.0[#] 15	3404.59	9/2+	(E1)		9.03×10^{-4} 13	B(E1)(W.u.)=0.00081 +20−14 δ: −0.18 6 in (^{14}N,pγ) yields B(M2)(W.u.)=21 +17−12 exceeds RUL=3. δ=0.02 2 and −0.01 2 in (α,nγ).
5860	5/2+	2455	18[#] 14	3404.59	9/2+				
		3058	62[@] 30	2801.46	3/2+				
		3122	29 6	2737.95	7/2+				
		4885	25 6	974.746	3/2+				
		5859	100 12	0	5/2+	M1+E2	>0.14[@]	0.00163 9	
5971.3	9/2+	1912.0[@] 2	62 9	4059.2	9/2+	D			I_γ: weighted average of 46 6 from (α,nγ), 67 7 from (d,pγ), and 74 4 from (p,p′γ). Other: 37 8 from (^{14}N,pγ),
		4359.1[@] 5	100[#] 4	1611.767	7/2+	M1+E2	−0.31[@] 4	1.15×10^{-3} 2	δ: other: −0.07 10 from (^{14}N,pγ).
		5970.5	10.5 12	0	5/2+	E2		1.74×10^{-3} 2	I_γ: weighted average of 9.5 32 from (α,nγ), 5.2 35 from (d,pγ), and 11.1 11 from (p,p′γ).
5977.1	7/2+	3238.7[@] 10	52 3	2737.95	7/2+	D			I_γ: weighted average of 61 10 from (α,nγ), 48 5 from (d,pγ), and 53.9 31 from (p,p′γ).
		4012.4[@] 10	100[#] 3	1964.615	5/2+	D+Q	−0.14[@] 3		
		5976.3	13 5	0	5/2+				
6041.1	7/2+,11/2+	1982	6.3 13	4059.2	9/2+				I_γ: weighted average of 6.7 13 from (d,pγ) and 4.8 24 from (p,p′γ). Other: 33 11 from (α,nγ).
		2636.4[@] 3	100.0[#] 24	3404.59	9/2+	D+Q			δ: −0.16 3 for J^π=11/2+ and +0.32 8 for J^π=7/2+ (1975Bu14), −0.13 4 for 11/2 and +0.31 <δ<+0.37 or +3.7 4 for 7/2 (1974Ro10) − all from (α,nγ) and −0.31 +15−21 from (^{14}N,pγ).
		3303	16 4	2737.95	7/2+				
		4429	12.7 24	1611.767	7/2+				I_γ: weighted average of 10.7 27 from (d,pγ) and 14.3 24 from (p,p′γ).
6082	5/2+	1722	4.4 22	4359.62	3/2+				
		2111	8.7 22	3970.59	7/2−	[E1]		7.23×10^{-4} 10	

$^{25}_{12}Mg_{13}$-13

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	α[h]	Comments
6082	5/2$^+$	2668	13.0 *22*	3413.41	3/2$^-$	D[d]			I_γ: other: 23 *4* from (p,p′γ).
		3280	6.5 *22*	2801.46	3/2$^+$				
		4117	48 *4*	1964.615	5/2$^+$				I_γ: weighted average of 54 *9* from (d,pγ) and 47 *4* from (p,p′γ).
		4470	100[#] *4*	1611.767	7/2$^+$	D+Q[d]			
		5107	8.7 *22*	974.746	3/2$^+$				
		6081	20.1 *19*	0	5/2$^+$	D+Q[d]			I_γ: weighted average of 21.7 *22* from (d,pγ) and 18.9 *19* from (p,p′γ).
6168	(3/2)	1891	7.5 *25*	4276.43	1/2$^-$				
		2754	5.0 *25*	3413.41	3/2$^-$				
		3366	20 *5*	2801.46	3/2$^+$				
		4203	83 *10*	1964.615	5/2$^+$				
		5193	100 *13*	974.746	3/2$^+$				
		5582	15 *5*	585.042	1/2$^+$				
		6167	20 *5*	0	5/2$^+$				
6361	3/2	2001	2.9 *14*	4359.62	3/2$^+$				
		4396	10 *3*	1964.615	5/2$^+$				
		5386	17 *5*	974.746	3/2$^+$				
		5775	14 *3*	585.042	1/2$^+$				
		6360	100 *10*	0	5/2$^+$	D+Q[d]			E_γ: From (^{14}N,pγ),(^{15}N,pnγ).
6434	9/2$^+$	901	26 *8*	5533.2	11/2$^+$	D[d]			
		1183	11 *4*	5251.45	11/2$^+$				
		1422	60 *15*	5012.4	7/2$^+$				I_γ: weighted average of 51 *17* from (^{14}N,pγ) and 67 *15* from (d,pγ).
		1722	35 *8*	4711.7	9/2$^+$				I_γ: weighted average of 42 *17* from (^{14}N,pγ) and 33 *8* from (d,pγ).
		2375	48 *11*	4059.2	9/2$^+$	D+Q[d]			I_γ: other: 17 *10* from (^{14}N,pγ).
		2526	44 *11*	3908.11	5/2$^+$	E2		5.73×10^{-4} *8*	I_γ: weighted average of 34 *10* from (^{14}N,pγ) and 56 *11* from (d,pγ).
		3696	30 *8*	2737.95	7/2$^+$				
		4822	100 *22*	1611.767	7/2$^+$	D+Q[d]	1.0[d] *+15−6*		I_γ: From (^{14}N,pγ). Other: 100 *22* (d,pγ).
6468	3/2$^-$	1351	39 *11*	5116.80	1/2$^-$				
		1746	14 *4*	4722.1	5/2$^+$,3/2$^+$				
		2191	21 *4*	4276.43	1/2$^-$				
		2560	61 *14*	3908.11	5/2$^+$				
		3054	11 *4*	3413.41	3/2$^-$				
		4503	100 *18*	1964.615	5/2$^+$				
		5493	50 *11*	974.746	3/2$^+$				
		5882	61 *14*	585.042	1/2$^+$				
6570	1/2$^+$,3/2	2293	9 *3*	4276.43	1/2$^-$				

$^{25}_{12}Mg_{13}$-14

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[f]	δ	Comments
6570	1/2$^+$,3/2	2662	12 3	3908.11	5/2$^+$			
		4006	42 9	2563.40	1/2$^+$			
		4605	52 9	1964.615	5/2$^+$			
		5595	88 12	974.746	3/2$^+$			
		5984	100 12	585.042	1/2$^+$			
6678	5/2	1157	1.3 7	5521.20	5/2$^-$			
		1666	2.7 13	5012.4	7/2$^+$			
		2770	6.7 13	3908.11	5/2$^+$	D+Q[d]	−0.10[d] 9	
		3876	100 9	2801.46	3/2$^+$	D+Q[d]	−0.30[d] 4	
		4713	5.3 13	1964.615	5/2$^+$	D(+Q)[d]	+0.4[d] +7−4	
		6677	17 4	0	5/2$^+$	D(+Q)[d]	+0.25[d] +12−35	
6777	1/2$^+$	2500	2.5 13	4276.43	1/2$^-$			
		3363	53 10	3413.41	3/2$^-$			
		3975	8 5	2801.46	3/2$^+$			
		4213	23 5	2563.40	1/2$^+$			
		5802	48 10	974.746	3/2$^+$			
		6191	100 18	585.042	1/2$^+$			
		6776	18 5	0	5/2$^+$	[E2]		
6832	(3/2$^-$,5/2)	2472	56 11	4359.62	3/2$^+$			
		2861	61 11	3970.59	7/2$^-$			
		3418	61 17	3413.41	3/2$^-$			
		4030	100 17	2801.46	3/2$^+$	D(+Q)[d]	−0.36[d] +46−22	
6840	5/2	4102	100 10	2737.95	7/2$^+$	D(+Q)[d]	+0.07[d] 8	I_γ: from (^{14}N,pγ). Other: 100 25 from (d,pγ).
		5228	41 10	1611.767	7/2$^+$			
		5865	63 15	974.746	3/2$^+$	D[d]		
		6839	33 10	0	5/2$^+$	D[d]		I_γ: weighted average of 23 13 from (^{14}N,pγ) and 39 10 from (d,pγ).
6862.2		5250	100	1611.767	7/2$^+$			
6885	7/2,9/2	3480	19 5	3404.59	9/2$^+$	D+Q		
		5273	100 5	1611.767	7/2$^+$	D(+Q)[d]		
6914	5/2$^-$	3006	6.3 21	3908.11	5/2$^+$			
		4112	31 6	2801.46	3/2$^+$			
		4176	23 4	2737.95	7/2$^+$			
		4949	17 4	1964.615	5/2$^+$			
		5302	13 4	1611.767	7/2$^+$			
		5939	19 4	974.746	3/2$^+$			
		6913	100 15	0	5/2$^+$			
6958	5/2$^-$	3544	4.9 16	3413.41	3/2$^-$			
		4156	13.1 16	2801.46	3/2$^+$			
		4220	23 3	2737.95	7/2$^+$			

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[b]	E_f	J^{π}_f	Mult.[f]	δ	Comments
6958	5/2$^-$	5982	23 *3*	974.746	3/2$^+$			
		6957	100 *10*	0	5/2$^+$			
7042.7	5/2	3072	10 *3*	3970.59	7/2$^-$			
		3629	23 *5*	3413.41	3/2$^-$	D+Q[d]		
		4304	15 *3*	2737.95	7/2$^+$			
		5077.53 *19*	100 *15*	1964.615	5/2$^+$	D[d]		E_{γ}: from (n,γ) E=thermal.
		5430	63 *13*	1611.767	7/2$^+$			
		6067	40 *8*	974.746	3/2$^+$			
7088	(5/2,3/2)$^+$	6112	14 *5*	974.746	3/2$^+$			
		7087	100 *5*	0	5/2$^+$	D+Q[d]		
7181	(3/2,7/2)	5216	100 *5*	1964.615	5/2$^+$	D+Q[d]		
		7180	25 *5*	0	5/2$^+$			
7185		4447	8.7 *22*	2737.95	7/2$^+$			
		5573	100.0 *22*	1611.767	7/2$^+$			
7228	(3/2,5/2)$^+$	6252	22 *5*	974.746	3/2$^+$	D+Q[d]		δ: +0.36 *+6−2* for J^{π}=5/2$^+$; +5<δ<−0.07 or −0.5<δ<−5 for 3/2$^+$ (1991He05) from (d,pγ).
		7227	100 *5*	0	5/2$^+$	D+Q[d]		δ: −0.53 *+10−22* for J^{π}=5/2$^+$. No value calculated for J^{π}=3/2$^+$ (1991He05) from (d,pγ).
7285	(7/2)$^-$	5320	64 *7*	1964.615	5/2$^+$	D+Q[d]		
		5673	18 *4*	1611.767	7/2$^+$			
		7284	100 *11*	0	5/2$^+$	D[d]		
7375.15	3/2$^+$	7374	100	0	5/2$^+$	D[d]		
7493	11/2$^{(+)}$	1522	44 *12*	5971.3	9/2$^+$	D(+Q)[d]	+0.00[d] *3*	
		1960	32 *9*	5533.2	11/2$^+$			
		2032	53 *12*	5460.6	13/2$^+$	D+Q[d]	+0.07[d] *6*	
		3434	100 *18*	4059.2	9/2$^+$	D+Q[d]	−0.07[d] *6*	
		4088	29 *9*	3404.59	9/2$^+$			
		5880	35 *9*	1611.767	7/2$^+$			
7505	5/2	4767	100 *12*	2737.95	7/2$^+$	D+Q[d]		
		6529	73 *12*	974.746	3/2$^+$	D+Q[d]	+0.10[d] *+90−3*	
		7504	31 *8*	0	5/2$^+$			
7524	(7/2$^+$,5/2)	3616	44 *7*	3908.11	5/2$^+$	D+Q[d]		
		4786	100 *15*	2737.95	7/2$^+$	D+Q[d]		
		6548	17 *7*	974.746	3/2$^+$			
		7523	83 *12*	0	5/2$^+$	D+Q[d]	−1.5[d] *+6−20*	
7551	(13/2)$^+$	2018	39 *10*	5533.2	11/2$^+$			I_{γ}: weighted average of 36 *10* from (^{14}N,pγ) and 50 *18* from (d,pγ).

$^{25}_{12}Mg_{13}$-16

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	Comments
7551	$(13/2)^+$	2090	19 *6*	5460.6	$13/2^+$			I_γ: weighted average of 18 *6* from (^{14}N,pγ) and 25 *13* from (d,pγ).
		2299	100[e] *14*	5251.45	$11/2^+$	D+Q[e]	−0.23[e] *4*	
		4146	53 *14*	3404.59	$9/2^+$			I_γ: weighted average of 46 *14* from (^{14}N,pγ) and 75 *25* from (d,pγ).
7577.47	$(5/2^+)$	5965.0	100	1611.767	$7/2^+$	Q(+D)[d]	+2.7[d] *+50−15*	
7633	3/2,5/2,7/2	6020	100 *13*	1611.767	$7/2^+$			
		7632	61 *13*	0	$5/2^+$	D+Q[d]		
7652	9/2	1681	15 *4*	5971.3	$9/2^+$	D+Q[d]	+0.5[d] *4*	
		1906	17.4 *22*	5746.4	$7/2,9/2^+$			
		2119	6.5 *22*	5533.2	$11/2^+$			
		2639	22 *4*	5012.4	$7/2^+$	D+Q[d]		
		3593	26 *7*	4059.2	$9/2^+$			
		4914	100 *13*	2737.95	$7/2^+$	D[d]		
		6039	30 *7*	1611.767	$7/2^+$			
7685		3626	100	4059.2	$9/2^+$			
7786.85	$5/2^+$	4382	3[e] *2*	3404.59	$9/2^+$			
		6174	100[e] *2*	1611.767	$7/2^+$			
7801	9/2	2008	6 *3*	5792.94	$(7/2^-)$	D+Q[d]	+0.14[d] *2*	
		2268	2.6 *13*	5533.2	$11/2^+$			
		2549	3.8 *13*	5251.45	$11/2^+$			
		5063	15 *4*	2737.95	$7/2^+$			
		6188	100 *9*	1611.767	$7/2^+$	D(+Q)[d]	−0.10[d] *15*	
7838	7/2	2092	4.5 *15*	5746.4	$7/2,9/2^+$			
		4433	34 *6*	3404.59	$9/2^+$	D[d]		
		5099	10 *3*	2737.95	$7/2^+$			
		7837	100 *10*	0	$5/2^+$	D[d]		
7866	$7/2^+,11/2^+$	2333	27 *10*	5533.2	$11/2^+$			
		2614	33 *10*	5251.45	$11/2^+$			
		2853	33 *10*	5012.4	$7/2^+$	D+Q[d]		
		3806	67 *13*	4059.2	$9/2^+$	D+Q[d]		
		4461	73 *13*	3404.59	$9/2^+$			
		5128	100 *17*	2737.95	$7/2^+$			
7961	$7/2^{(+)}$	3239	7 *3*	4722.1	$5/2^+,3/2^+$			
		3249	12 *5*	4711.7	$9/2^+$	D+Q[d]		
		4556	7 *3*	3404.59	$9/2^+$			
		5996	13 *5*	1964.615	$5/2^+$			
		6348	28 *7*	1611.767	$7/2^+$	D[d]		

$^{25}_{12}Mg_{13}$-17

Adopted Levels, Gammas (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	Comments
7961	7/2$^{(+)}$	7960	100 *15*	0	5/2$^+$	D+Q[d]		
8012	(9/2,13/2$^+$)	1971	65 *15*	6041.1	7/2$^+$,11/2$^+$			
		2760	85 *15*	5251.45	11/2$^+$	D+Q[d]		
		3300	100 *20*	4711.7	9/2$^+$			
8076	5/2,7/2,9/2	6463	100	1611.767	7/2$^+$	D+Q[d]		
8119	7/2$^{(+)}$	4211	15 *6*	3908.11	5/2$^+$			
		8118	100 *6*	0	5/2$^+$	D+Q[d]		
8267	(7/2$^+$)	4862	35 *10*	3404.59	9/2$^+$	D(+Q)[d]		
		6302	20 *8*	1964.615	5/2$^+$			
		6654	100 *20*	1611.767	7/2$^+$	D+Q[d]		
		8266	49 *16*	0	5/2$^+$			
8532	(7/2,11/2)	3820	31 *12*	4711.7	9/2$^+$	D+Q[d]		
		4472	18 *8*	4059.2	9/2$^+$			
		5127	100[e] *14*	3404.59	9/2$^+$	D+Q[d]	+0.10[d] *6*	
8548	(5/2,7/2,9/2)	5143	25 *13*	3404.59	9/2$^+$			
		6935	100 *13*	1611.767	7/2$^+$	D+Q[d]	−1.4[d] *+6−36*	
8551	11/2	2510	28 *6*	6041.1	7/2$^+$,11/2$^+$			
		3018	30 *6*	5533.2	11/2$^+$	D+Q[d]		
		3299	26 *6*	5251.45	11/2$^+$	D+Q[d]	−0.14[d] *9*	
		3839	30 *6*	4711.7	9/2$^+$			
		4491	100 *17*	4059.2	9/2$^+$	D[d]		
8656	7/2	3944	35 *8*	4711.7	9/2$^+$	D+Q[d]	+0.21[d] *15*	
		5251	58 *12*	3404.59	9/2$^+$			
		5917	100 *23*	2737.95	7/2$^+$			
		6690	46 *12*	1964.615	5/2$^+$			
		7043	54 *12*	1611.767	7/2$^+$			
		8654	92 *23*	0	5/2$^+$	D(+Q)[d]	+0.04[d] *9*	
8811	9/2,11/2	2770	97 *14*	6041.1	7/2$^+$,11/2$^+$	D+Q[d]		
		3278	100 *14*	5533.2	11/2$^+$	D+Q[d]		
		4099	89 *23*	4711.7	9/2$^+$			
8888		4828	100	4059.2	9/2$^+$	D+Q[d]		
8896		3103	100[e] *3*	5792.94	(7/2$^-$)	D+Q		Mult.: from (^{14}N,pγ),(^{15}N,pnγ). δ: in (^{14}N,pγ),(^{15}N,pnγ): −0.93 *−44+33* assuming J^π=9/2$^-$; +0.3 *3* for 11/2 or +0.7 *3* for 13/2$^+$. In (d,pγ): ∞ for 15/2; +1.04 *18* or −0.18 *15* for 11/2 (1991He05),
		4836	4[e] *3*	4059.2	9/2$^+$			

Adopted Levels, Gammas (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[f]	δ	Comments
8999.5		3748	75[e] 26	5251.45	11/2$^+$			
		4287	100[e] 26	4711.7	9/2$^+$			
9014	7/2,9/2,11/2	3762	63 13	5251.45	11/2$^+$			
		4302	100 20	4711.7	9/2$^+$			
		4954	88 18	4059.2	9/2$^+$	D(+Q)[d]	[d]	δ: +0.03 5 for 11/2; >−0.49 for 9/2; +0.07 10 for 7/2 (1991He05: (d,pγ)).
9410		3369	48 9	6041.1	7/2$^+$,11/2$^+$	D(+Q)[d]	[d]	δ: −0.07 8 for 13/2; +0.14 14 for J^π=9/2 (d,pγ).
		3617	37 9	5792.94	(7/2$^-$)			
		4158	100 15	5251.45	11/2$^+$	D[d]		
9651		4190	100	5460.6	13/2$^+$			
9685	(11/2,7/2)	4151	59 11	5533.2	11/2$^+$			
		6280	100 11	3404.59	9/2$^+$	D+Q[d]		
9830		6424	100	3404.59	9/2$^+$			
9948	(15/2)$^+$	2397	64[e] 18	7551	(13/2)$^+$	D+Q[d]	−0.16[d] 4	
		4487	100[e] 27	5460.6	13/2$^+$	D[d]		
		4696	18[e] 9	5251.45	11/2$^+$			
10137		4603	100	5533.2	11/2$^+$			
10653	(15/2$^+$)	3102[e]	6[e] 3	7551	(13/2)$^+$			
		5119[e]	100[e] 3	5533.2	11/2$^+$			
10996		5535[a]	100	5460.6	13/2$^+$			
11004		5543[e]	100	5460.6	13/2$^+$			
11200		5739[a]	100	5460.6	13/2$^+$			
11361		5567[e]	100	5792.94	(7/2$^-$)			
11410		3859[e]	10[e] 3	7551	(13/2)$^+$			
		5949[e]	100[e] 3	5460.6	13/2$^+$			
11460		5999[e]		5460.6	13/2$^+$			
		6209[e]		5251.45	11/2$^+$			
11486		3474[e]	100[e]	8012	(9/2,13/2$^+$)			I_γ: represents >62% decay branching for level.
		6025[e]	<61[e]	5460.6	13/2$^+$			
13143		7349[e]	100	5792.94	(7/2$^-$)			
13332		7870[e]	100	5460.6	13/2$^+$			

† From ^{25}Na β- decay, except where otherwise noted. Eγ without uncertainty: from level energy differences, recoil value subtracted.

‡ From (n,γ) E=Thermal.

From (p,p′γ).

@ From (α,nγ).

$^{25}_{12}$Mg$_{13}$-19

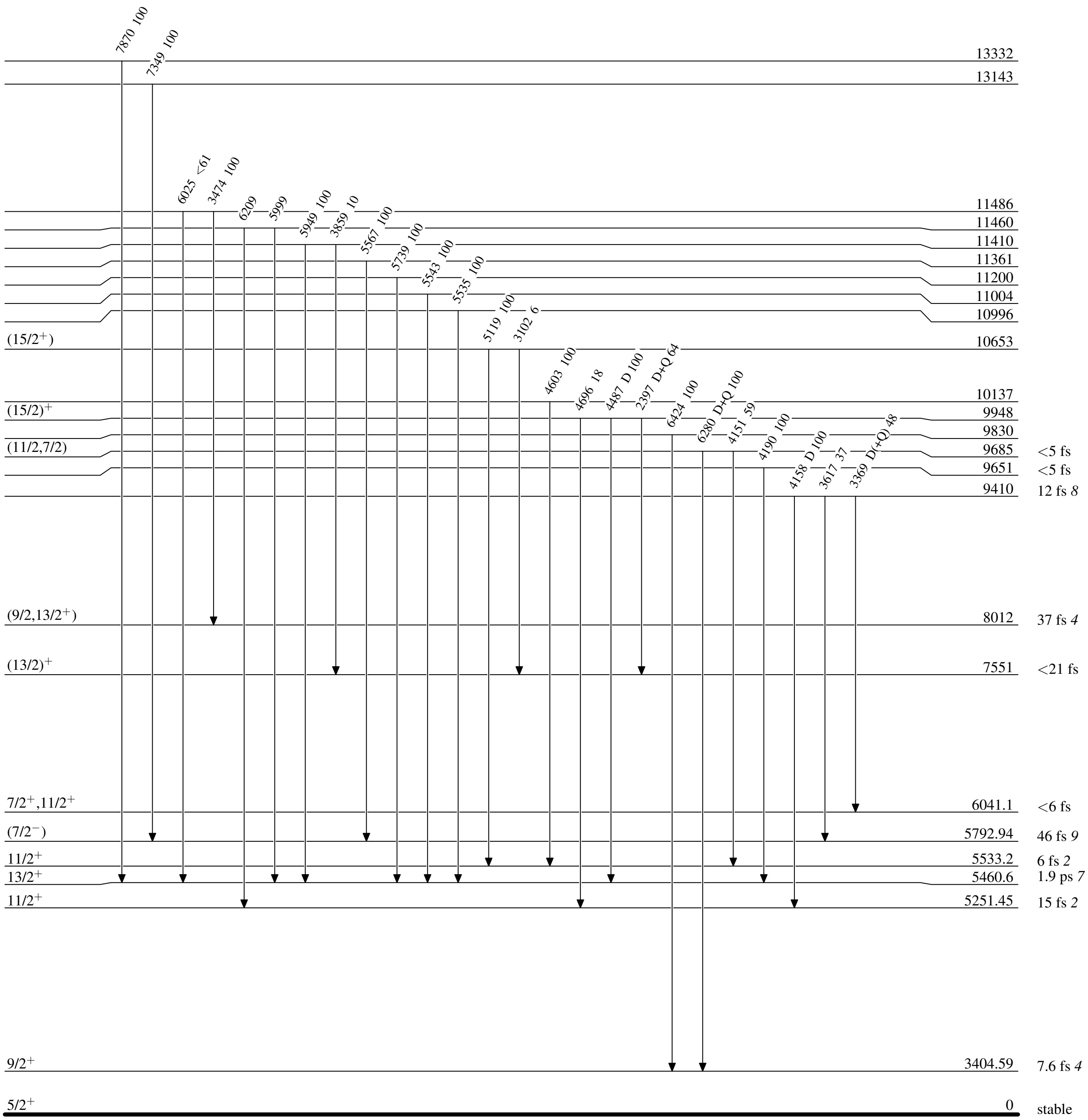
$\gamma(^{25}Mg)$ (continued)

[&] From (n,n′γ).
[a] From (d,pγ). Eγ without uncertainty is from level energy difference.
[b] From (d,pγ), except where otherwise noted. For Iγ, dataset(s) having more depopulating γ and their branching was(were) preferred over those with incomplete or fewer depopulating γ and their branching.
[c] From ^{25}Na β- decay.
[d] From (d,pγ).
[e] From (^{14}N,pγ).
[f] Based on D+Q or D or Q in (α,nγ) and/or (p,p′γ) and RUL, if applicable, except where otherwise noted.
[g] From level scheme. D+Q or D or Q in (α,nγ) and/or (p,p′γ); RUL allows both the electric or magnetic multipolarity.
[h] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[i] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

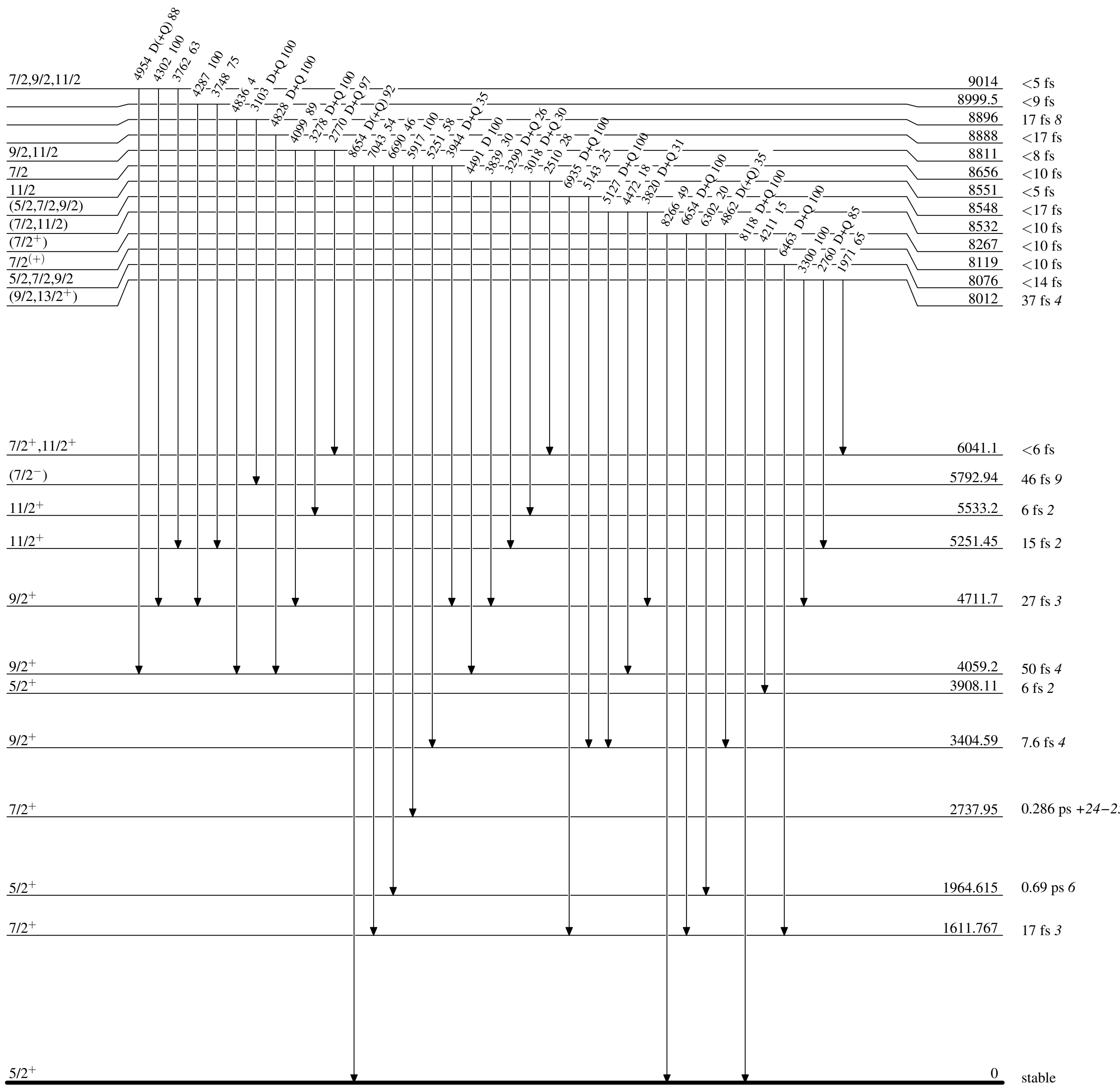


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

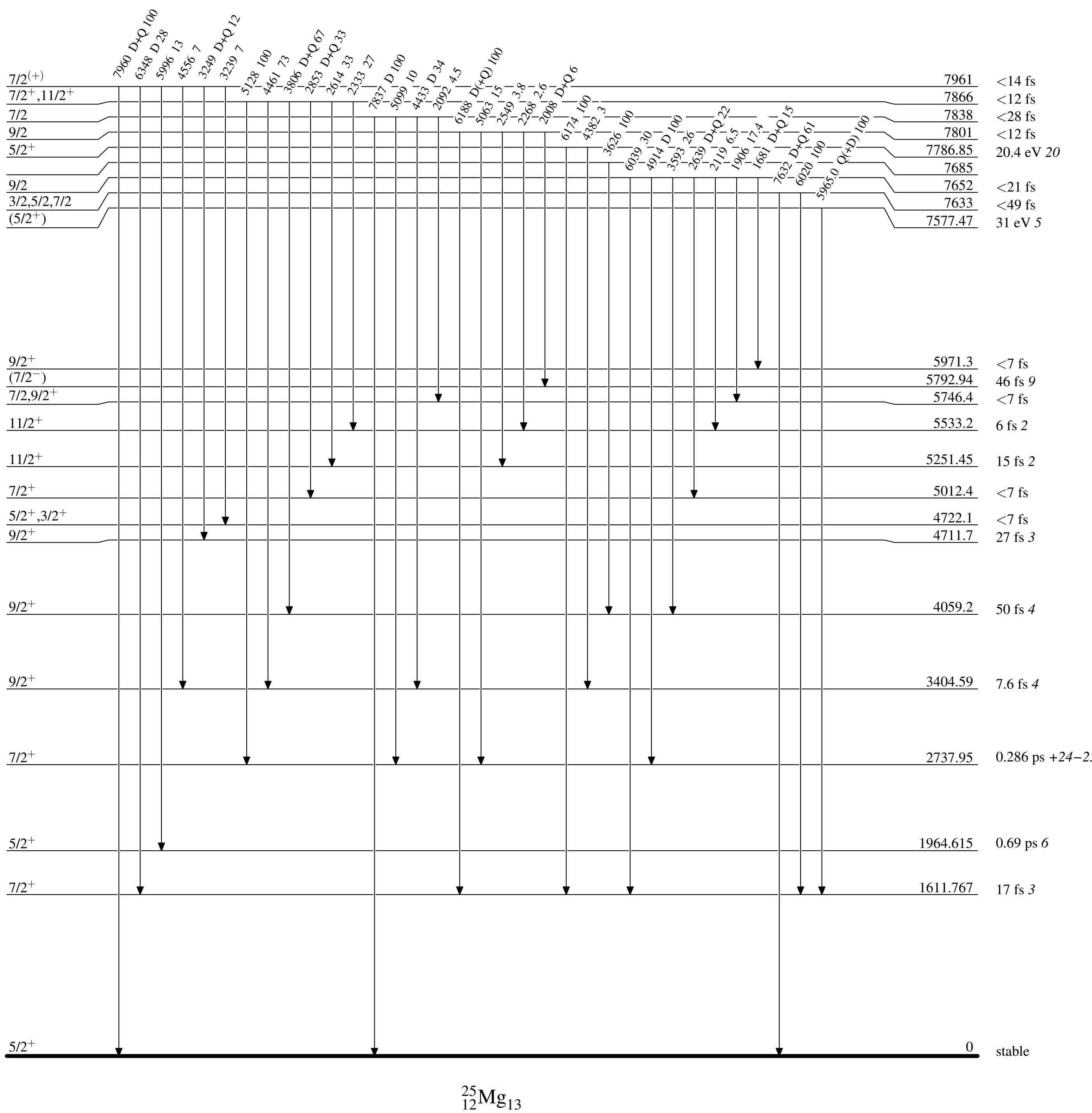


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

Level Scheme (continued)

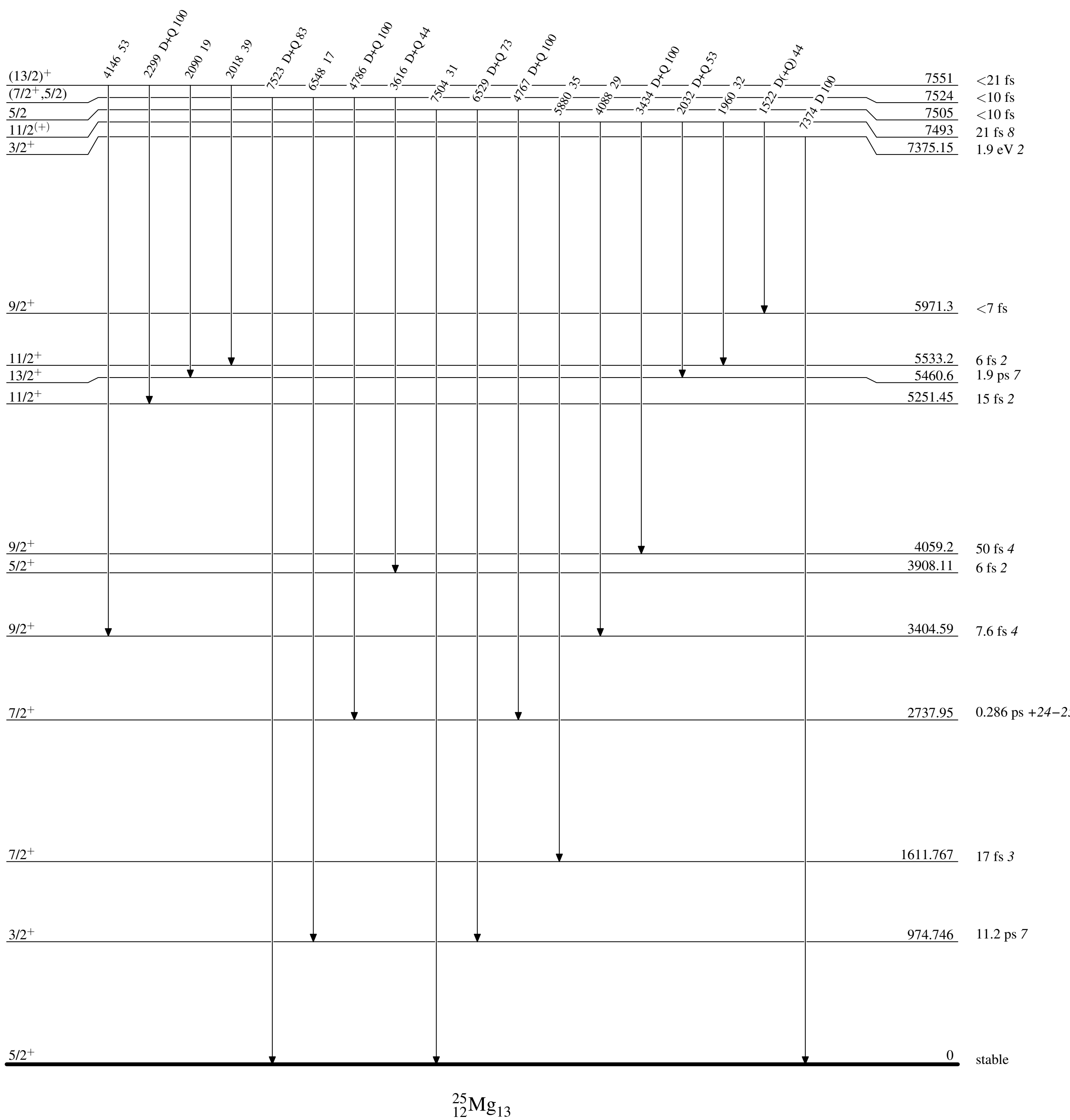
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

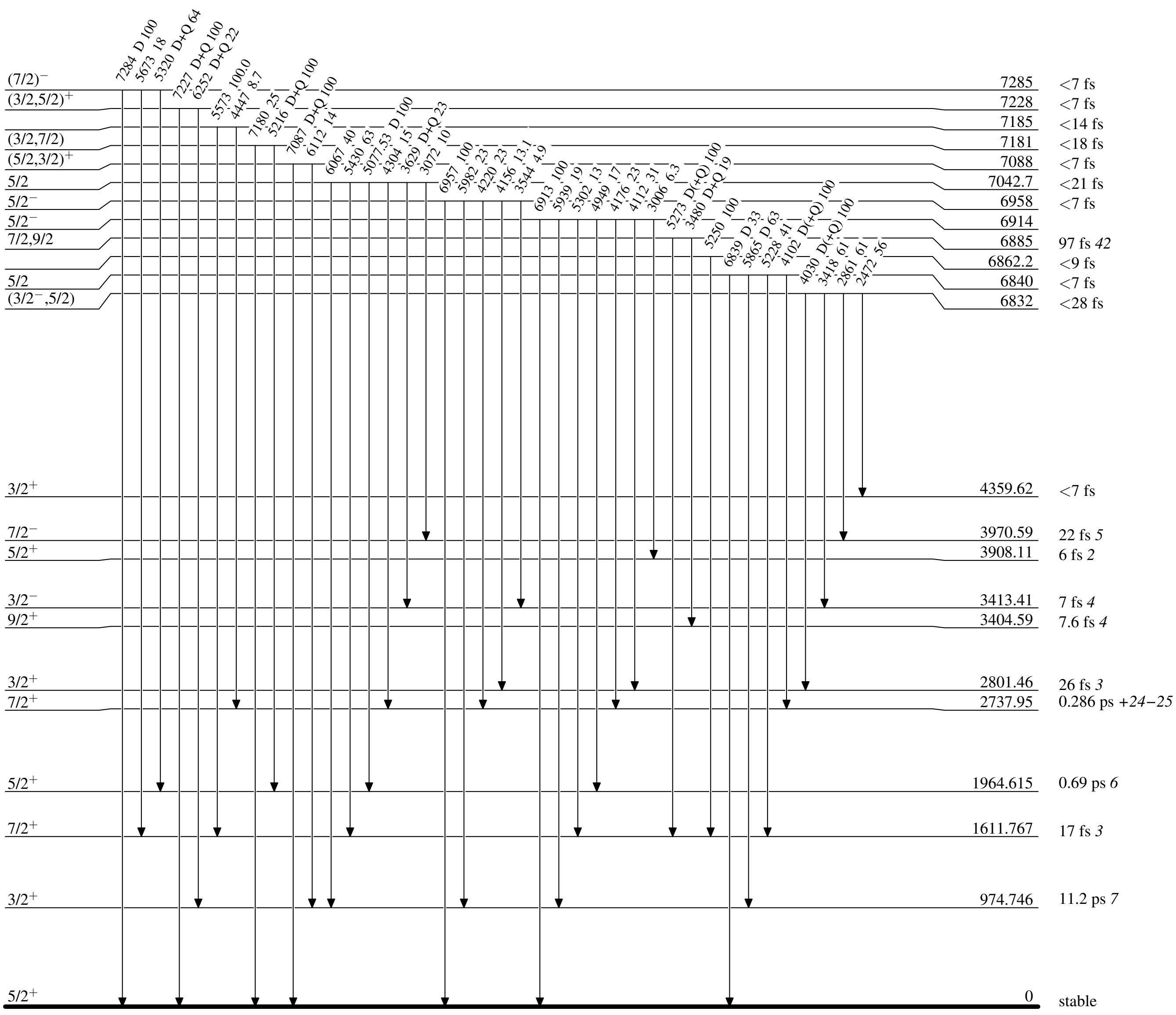
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

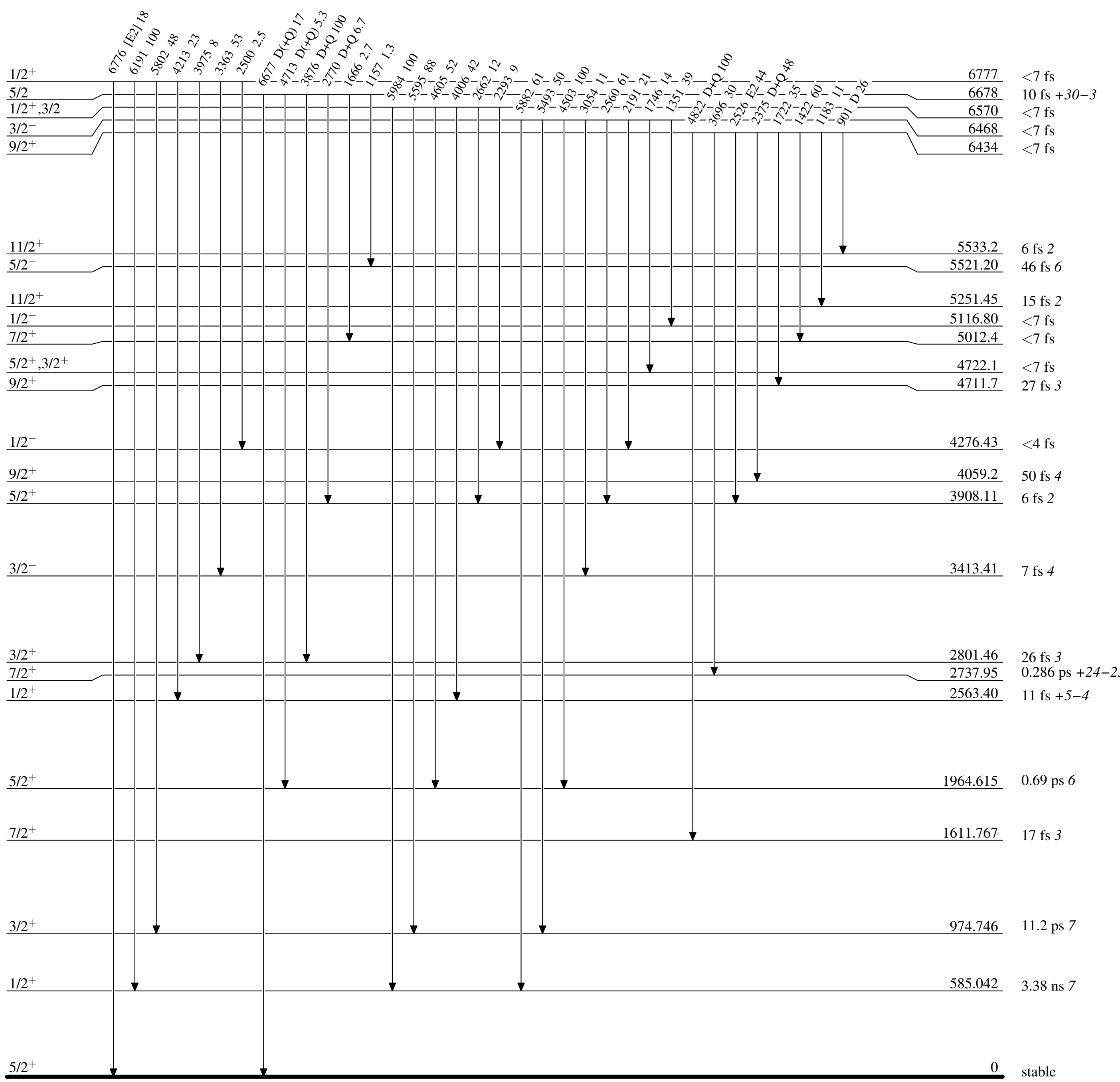


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

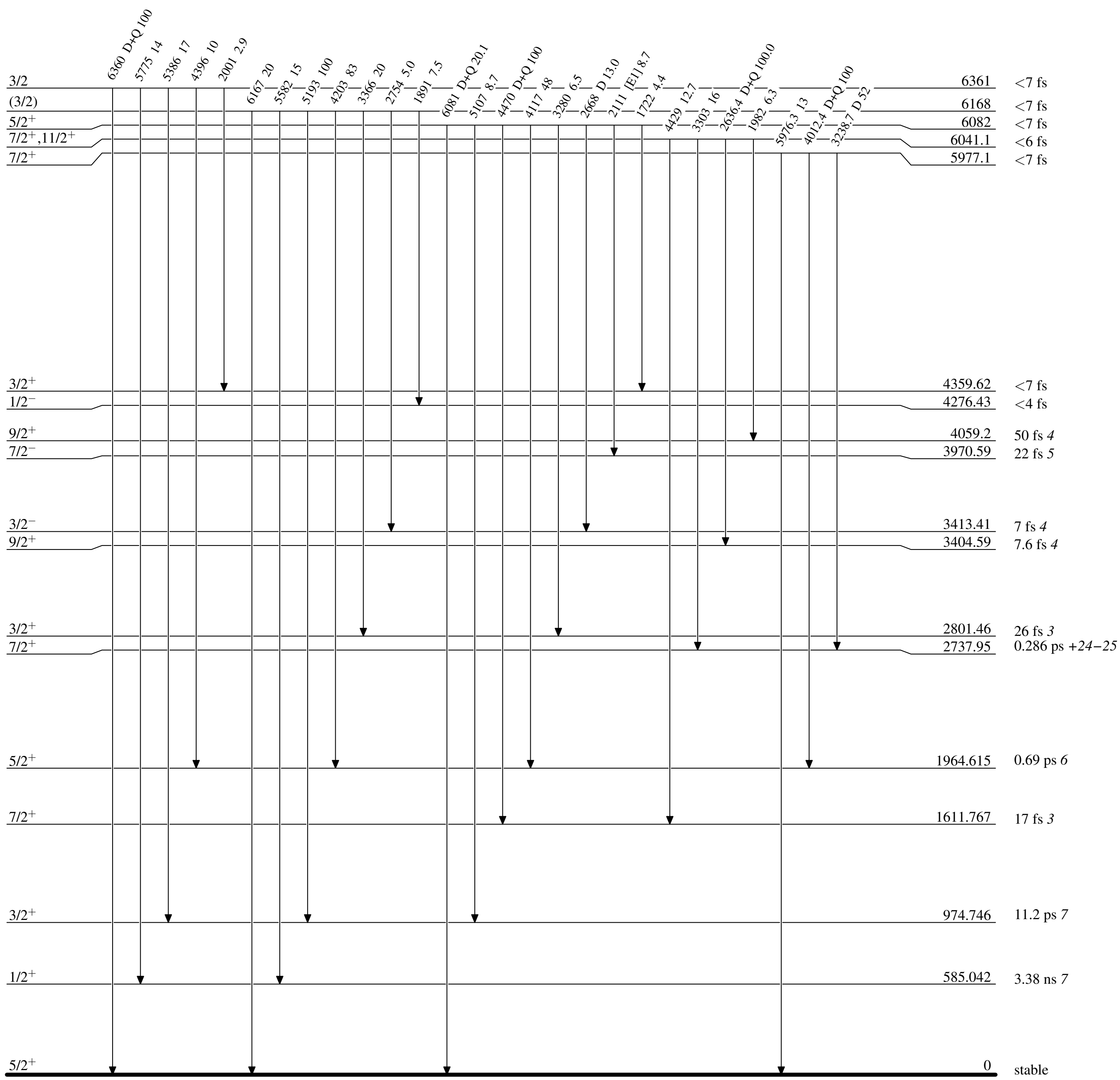


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

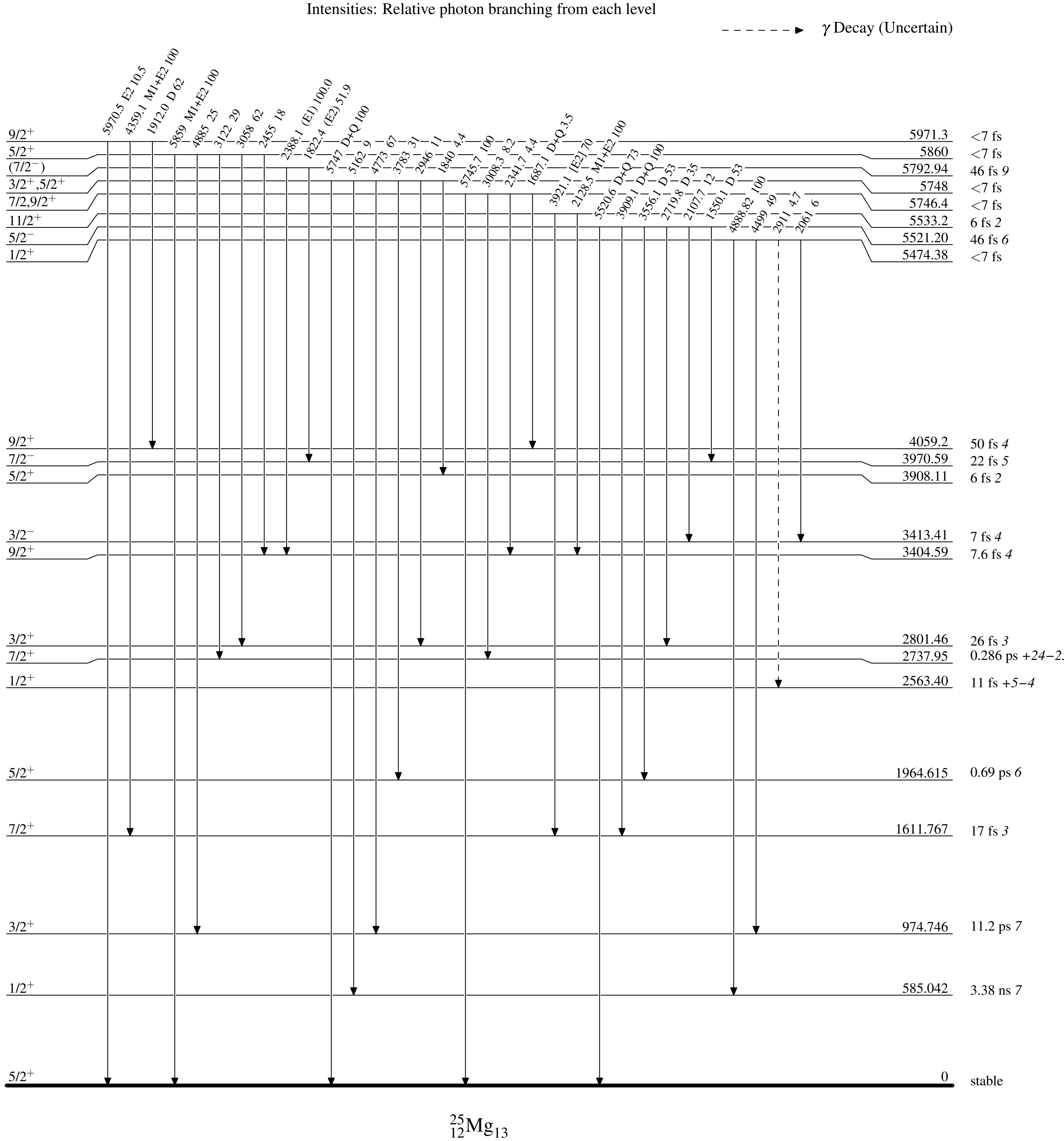


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

Level Scheme (continued)

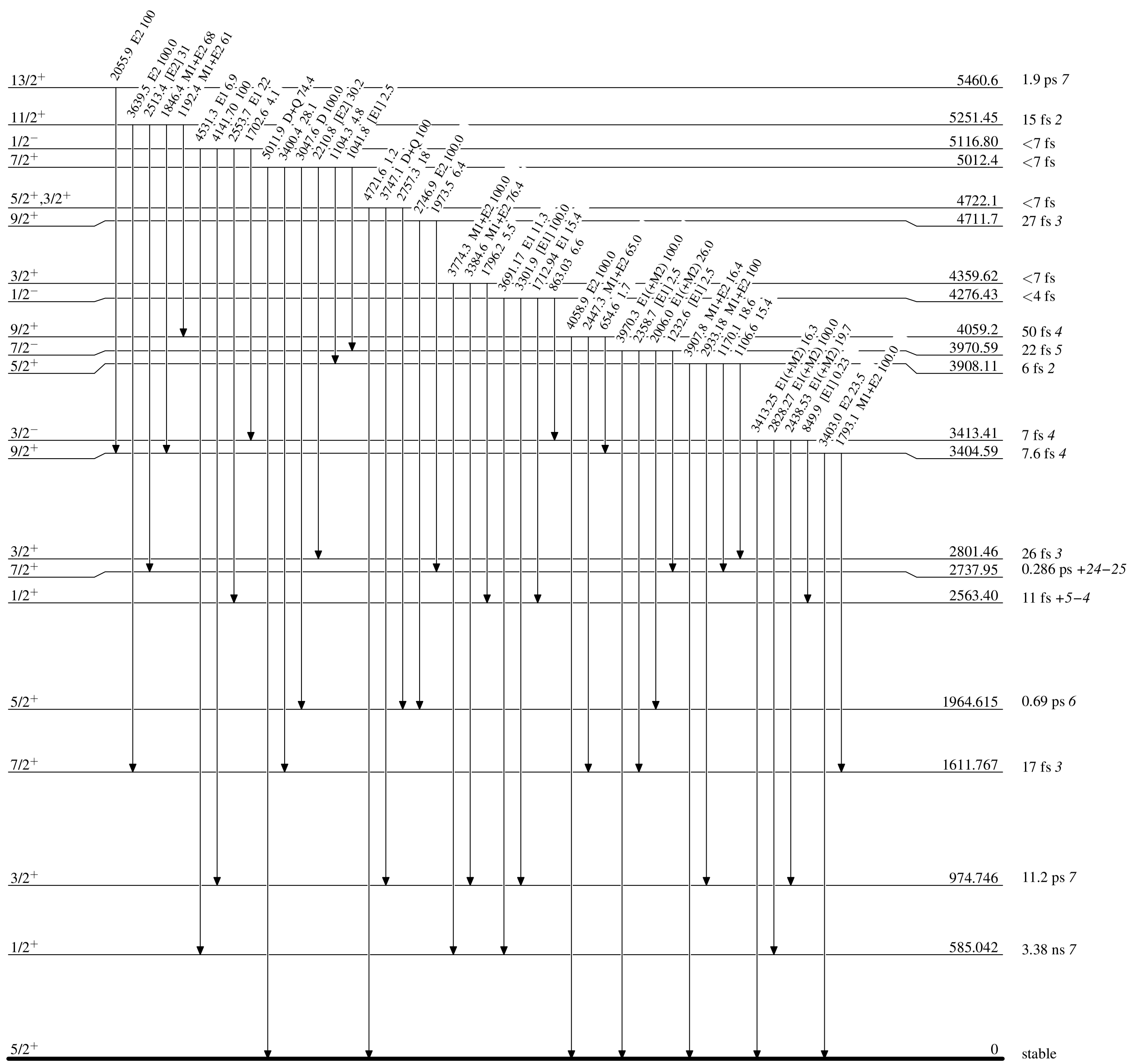
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

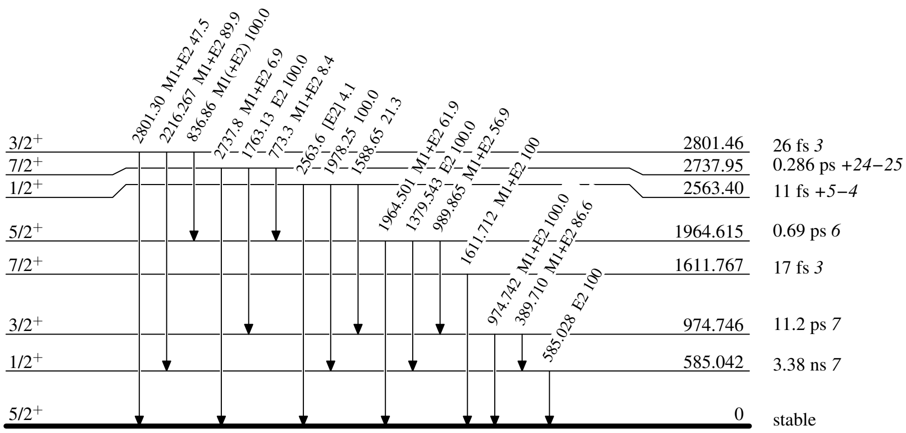


$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas

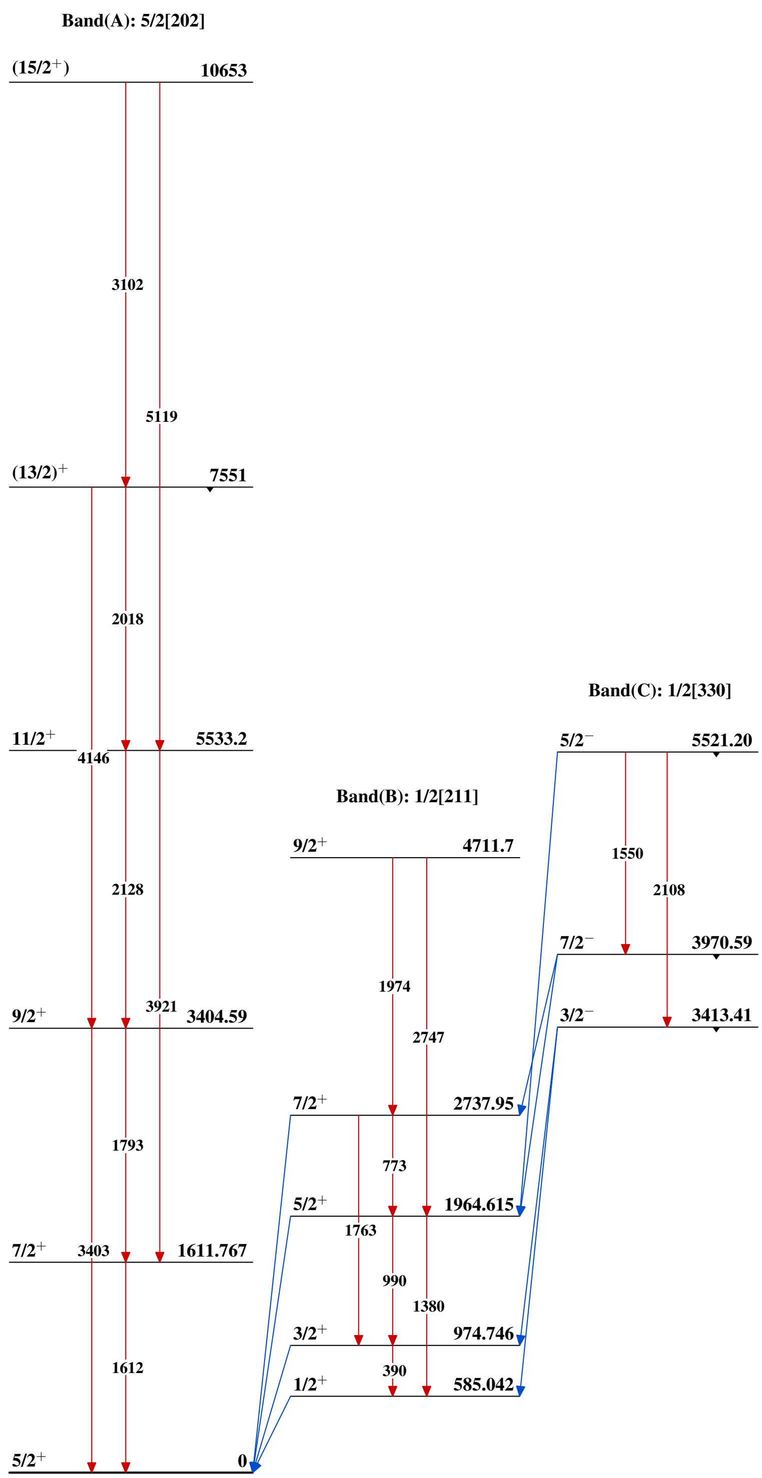
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{25}_{12}Mg_{13}$

Adopted Levels, Gammas



$^{25}_{12}Mg_{13}$

^{25}Na β^- decay (59.3 s) 1982Al27,1971Al10

Parent: ^{25}Na: E=0.0; J^π=5/2$^+$; $T_{1/2}$=59.3 s *9*; Q(β^-)=3835.0 *12*; %β^- decay=100

1982Al27: Source produced by ^{23}Na(t,p) E=3.2 MeV. 40 sec irradiation followed by 60 sec counting. Ge(Li) detector − NaI(Tl) Compton-suppressed; measured Eγ, Iγ; deduced levels, β feeding.

1971Al10: Source produced by ^{23}Na(t,p) E=3.0 MeV. Thirty samples each 90 sec irradiation followed by transportation and counting; Ge(Li) and NaI(Tl) detectors, plastic scintillator; measured Eγ, Iγ, $\beta\gamma$ and $\gamma\gamma$ coin; deduced level scheme, spin, parity, I_β feeding.

Other references: 1944Ri01, 1955Ma63, 1956Na22, 1970Jo06.

^{25}Mg Levels

E(level)†	J^π‡	$T_{1/2}$
0	5/2$^+$	stable
585.042 *22*	1/2$^+$	3.38 ns *7*
974.749 *24*	3/2$^+$	11.2 ps *7*
1611.772 *11*	7/2$^+$	17 fs *3*
1964.620 *24*	5/2$^+$	0.69 ps *6*
2801.46 *3*	3/2$^+$	26 fs *3*

† Least-square fit to γ-ray energies.
‡ From Adopted Levels, Gammas.

β^- radiations

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(1033.5 *16*)	2801.46	0.247 *14*	5.25 *3*	Iβ^-: other: 0.3 *1* (1970Jo06).
(1870.4 *16*)	1964.620	0.440 *25*	6.05 *3*	Iβ^-: other: 0.4 *1* (1970Jo06).
(2223.2 *16*)	1611.772	9.5 *6*	5.03 *3*	Iβ^-: other: 8.8 *5* (1970Jo06).
(2860.3 *16*)	974.749	27.5 *16*	5.05 *3*	Iβ^-: other: 25.5 *5* (1970Jo06).
(3250.0 *16*)	585.042			Iβ^-: <1 (1970Jo06).
(3835.0 *19*)	0	62.5 *20*	5.254 *14*	Iβ^-: from 1971Al10 based on the β-γ coincidence measurements. Other: 65 (1955Ma63, 1970Jo06).

† Absolute intensity per 100 decays.

$\gamma(^{25}$Mg)

Iγ normalization: from ΣIγ(1+α) to g.s.=37.5 *20* (100-62.5 *20* (I$_\beta$ to the g.s.)).

E$_\gamma$ [†]	I$_\gamma$ [†#]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult. [‡]	δ [‡]	α [@]	Comments
389.710 *35*	97.5 *17*	974.749	3/2$^+$	585.042	1/2$^+$	M1+E2	+0.13 *3*	9.71×10^{-5} *27*	%Iγ=12.6 *7* E$_\gamma$: others: 389.66 *9* (1971Al10), 390.7 *5* (1970Jo06). I$_\gamma$: relative branching from the level=48.0 *5* (1971Al10).
585.028 *30*	100.0 *14*	585.042	1/2$^+$	0	5/2$^+$	E2		9.44×10^{-5} *13*	%Iγ=13.0 *7* E$_\gamma$: others: 585.06 *8* (1971Al10), 585.9 *4* (1970Jo06).
836.841 *50*	0.800 *20*	2801.46	3/2$^+$	1964.620	5/2$^+$	M1(+E2)	<−0.25	1.96×10^{-5} *5*	%Iγ=0.104 *6* E$_\gamma$: other: 836.1 *12* (1971Al10). I$_\gamma$: relative branching from the level=41 *11* (1971Al10).
974.742 *35*	115.0 *17*	974.749	3/2$^+$	0	5/2$^+$	M1+E2	+0.34 *12*	1.52×10^{-5} *6*	%Iγ=14.9 *8* E$_\gamma$: others: 974.71 *12* (1971Al10), 975.2 *4* (1970Jo06). I$_\gamma$: relative branching from the level=52.0 *5* (1971Al10).
989.865 *30*	1.280 *24*	1964.620	5/2$^+$	974.749	3/2$^+$	M1+E2	−0.25 *7*	1.44×10^{-5} *3*	%Iγ=0.166 *9* E$_\gamma$: other: 990.1 *6* (1971Al10). I$_\gamma$: relative branching from the level=27 *4* (1971Al10).
1379.543 *30*	1.78 *4*	1964.620	5/2$^+$	585.042	1/2$^+$	E2		5.90×10^{-5} *8*	%Iγ=0.231 *13* E$_\gamma$: other: 1379.7 *5* (1971Al10). I$_\gamma$: relative branching from the level=44 *8* (1971Al10).
1611.716 *11*	72.9 *11*	1611.772	7/2$^+$	0	5/2$^+$	M1+E2	−0.207 *13*	1.05×10^{-4} *2*	%Iγ=9.4 *5* E$_\gamma$: listed in the abstract (1982Al27). Others: 1611.7 *2* (1971Al10) 1611.9 *4* (1970Jo06).
1964.501 *45*	1.128 *17*	1964.620	5/2$^+$	0	5/2$^+$	M1+E2	−0.58 *7*	2.51×10^{-4} *5*	%Iγ=0.146 *8* E$_\gamma$: others: 1964.8 *6* (1971Al10), 1965.1 *9* (1970Jo06). I$_\gamma$: relative branching from the level=29 *3* (1971Al10).
2216.267 *50*	0.719 *16*	2801.46	3/2$^+$	585.042	1/2$^+$	M1+E2	+0.21 *9*	3.40×10^{-4} *6*	%Iγ=0.093 *5* E$_\gamma$: others: 2215.7 *10* (1971Al10), 2215.6 *7* (1970Jo06). I$_\gamma$: relative branching from the level=38 *6* (1971Al10).
2801.312 *35*	0.380 *12*	2801.46	3/2$^+$	0	5/2$^+$	M1+E2	−0.64 *8*	6.14×10^{-4} *11*	%Iγ=0.0492 *31* E$_\gamma$: others: 2800.9 *10* (1971Al10), 2800.6 *11* (1970Jo06). I$_\gamma$: relative branching from the level=21 *3* (1971Al10).

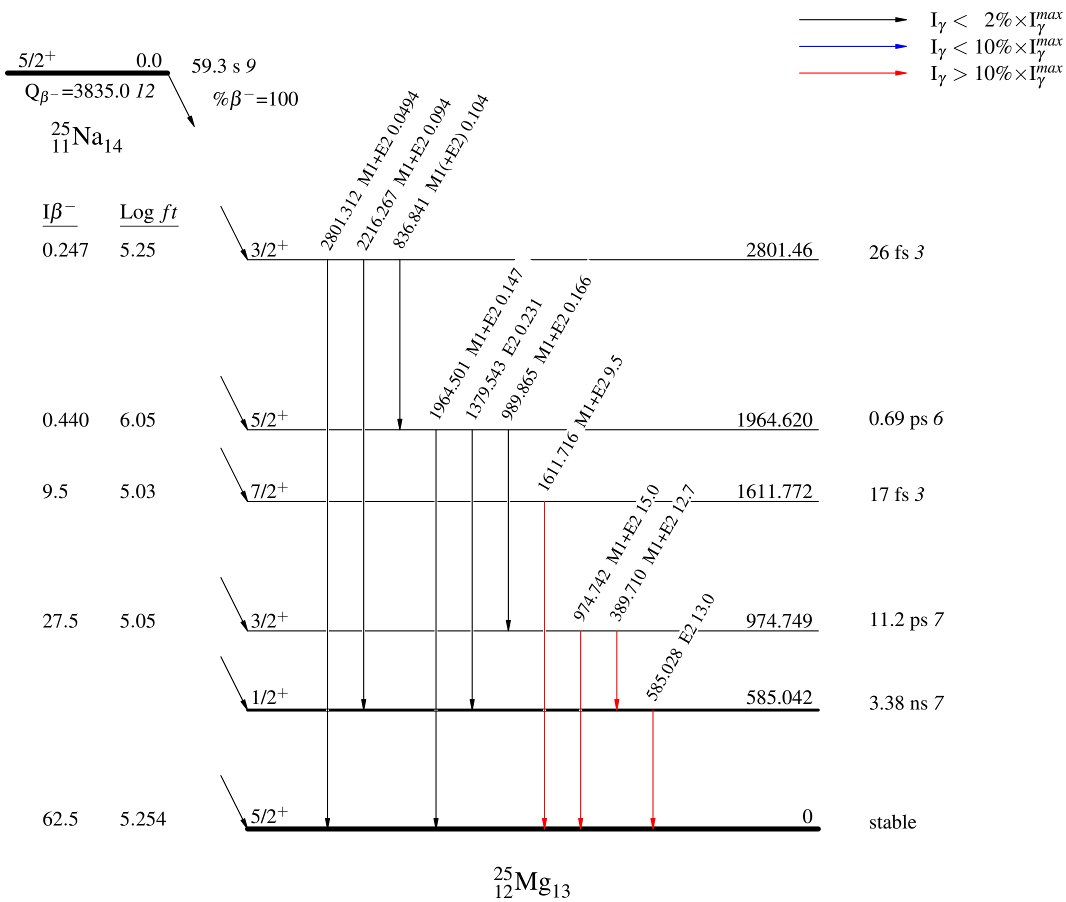
† From 1982Al27.
‡ From Adopted Gammas.
\# For absolute intensity per 100 decays, multiply by 0.130 *7*.
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with “Frozen Orbitals” approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{25}_{12}$Mg$_{13}$-33

^{25}Na β^- decay (59.3 s) 1982Al27,1971Al10

Decay Scheme

Intensities: I_γ per 100 parent decays



^{25}Al $\varepsilon+\beta^+$ decay (7.168 s) 1976Ma14,1977Az01,1982Al27

Parent: ^{25}Al: E=0; J$^\pi$=5/2$^+$; T$_{1/2}$=7.168 s *4*; Q(ε)=4276.81 *4*; %ε+%β^+ decay=100

^{25}Al-Q($\varepsilon+\beta^+$): From 2021Wa16.

1976Ma14: Source from ^{24}Mg(d,n), E not mentioned, natural Mg target; Ge(Li) detector; measured delayed Iγ, deduced Iε. Also reported %Iε<0.0046, <0.0011, and <0.00031 limits for 2736 (7/2$^+$), 2801 (3/2$^+$), and 3901 (3/2,5/2)$^+$ keV levels, respectively.

1977Az01: Ge(Li) detector, measured Iγ, deduced Iε. ^{25}Al production reaction was not mentioned.

1982Al27: Source produced by ^{24}Mg(d,n) E=2.8 MeV, natural Mg target; measured Eγ(1611) relative to Eγ(1620) of ^{228}Th.

Other: 1980Wi13: Source from ^{24}Mg(d,n), E=7.1 MeV, 99.96% enriched ^{24}Mg target; Ge(Li) detector, measured Iγ of 1611γ and 511γ, deduced %Iγ(1611) with respect to Iγ(511) trapping the positrons. Same laboratory of the reported work in 1976Ma14.

Other references: 1958Ar15, 1960Ta14, 1964Ar18, 1971Ju03, 1971Mo23, 1976Ma14, 1977Az01.

In weighted average value, uncertainty is the lowest input value (assuming the reported total uncertainty represents both statistical and systematic uncertainties).

^{25}Mg Levels

E(level)†	J$^\pi$‡	T$_{1/2}$	Comments
0.0	5/2$^+$	stable	
585.04 *3*	1/2$^+$	3.38 ns *7*	
974.76 *3*	3/2$^+$	11.2 ps *7*	
1611.764 *11*	7/2$^+$	17 fs *3*	E(level): other:1611.5 *2* (1971Ju03).
1964.58 *5*	5/2$^+$	0.69 ps *6*	

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

ε,β^+ radiations

I$_\beta$<0.03 (1971Ju03) to the 585 keV J$^\pi$=1/2$^+$.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(2312.2 *10*)	1964.58	0.006 *4*	8×10^{-5} *5*	6.05 *29*	0.006 *4*	Iβ^+: from reported Iγ(1965)=0.006 *4* (1977Az01). Others: <0.12 (1971Ju03), <0.0022 (1976Ma14).
(2665.1 *10*)	1611.764	0.783 *28*	0.00475 *34*	4.373 *15*	0.788 *28*	I($\varepsilon+\beta^+$): weighted average of 0.84 *7* (1971Ju03), 0.776 *28* (1980Wi13), and 0.794 *35* (1977Az01).
(3302.1 *10*)	974.76	0.047 *6*	1.06×10^{-4} *15*	6.21 *6*	0.047 *6*	Iβ^+: From 1976Ma14. Other: <0.05 (1971Ju03).
(4276.8 *14*)	0.0	99.07 *4*	0.0888 *49*	3.5739 *7*	99.16 *4*	Iβ^+: weighted average of 99.16 *4* (1977Az01) and 99.16 *7* (1971Ju03). Other: 99.11 *8* (1976Ma14) with respect to Iε(1611)=0.84 *7* of 1971Ju03. Other: >99.1% (1960Ta14).

† Absolute intensity per 100 decays.

γ(^{25}Mg)

E$_\gamma$†	I$_\gamma$‡@	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.#	δ#	α&	Comments
389.710 *35*	0.023 *4*	974.76	3/2$^+$	585.04	1/2$^+$	M1+E2	+0.13 *3*	9.71×10^{-5} *27*	I$_\gamma$: central value is that of Iγ(585). Uncertainty is based on the ΔI$_\beta$=0.006 of Iβ feeding the 974.76 keV level, deconvoluted for ΔIγ(389.710) and ΔIγ(974.742).

Continued on next page (footnotes at end of table)

^{25}Al $\varepsilon+\beta^+$ decay (7.168 s) 1976Ma14,1977Az01,1982Al27 (continued)

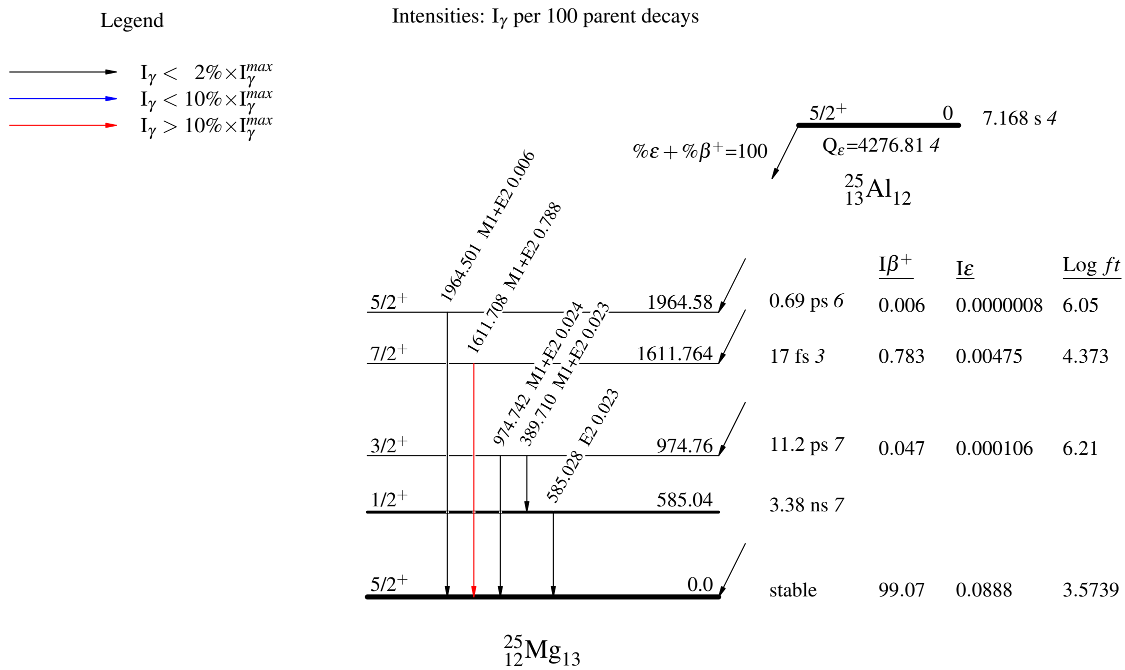
$\gamma(^{25}Mg)$ (continued)

E_γ †	I_γ ‡@	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	δ#	α&	Comments
585.028 *30*	0.023 *4*	585.04	1/2$^+$	0.0	5/2$^+$	E2		9.44×10^{-5} *13*	I_γ: central value based on I_β<0.03 (1971Ju03) to the 585 keV and Iγ=0.03 *1* (1977Az01): (0.015 *15*+0.03 *1*)/2. Uncertainty is that of Iγ(585) from 974.76 keV level.
974.742 *35*	0.024 *4*	974.76	3/2$^+$	0.0	5/2$^+$	M1+E2	+0.34 *12*	1.52×10^{-5} *6*	E_γ: other: 975 *2* (1971Mo23). I_γ: from subtraction of the Iγ(389) from Iβ feeding to the 974.76 keV level. Other: 0.01 *1* (1977Az01).
1611.708 *11*	0.788 *28*	1611.764	7/2$^+$	0.0	5/2$^+$	M1+E2	−0.207 *13*	1.05×10^{-4} *2*	E_γ: from 1982Al27. I_γ: from Iβ.
1964.501 *45*	0.006 *4*	1964.58	5/2$^+$	0.0	5/2$^+$	M1+E2	−0.58 *7*	2.51×10^{-4} *5*	I_γ: from 1977Az01.

† From Adopted Gammas except as noted.
‡ Based on the γ-ray intensity balance and experimental beta feedings, except wher noted otherwise.
# From Adopted Gammas.
@ Absolute intensity per 100 decays.
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{25}Al ε+β^+ decay (7.168 s) 1976Ma14,1977Az01,1982Al27

Decay Scheme



^{6}Li(^{22}Ne,t),(^{22}Ne,tγ) 2021Ot02

Adapted/Edited the XUNDL dataset compiled by E.A. McCutchan (NNDC,BNL) April 28, 2022.

^{6}LiF target (thickness 30 μg/cm^2), ^{22}Ne beam, E=7 MeV/nucleon. Tritons were detected with the TIARA Si detector array consisting of 6 wedge-shaped double Si detectors and 8 resistive charge division Si detectors; Mg recoils were detected with the MDM spectrometer consisting of 3 ionization detector zones along with 4-wire proportional counter zones and gamma rays were detected using four closely packed HPGe detectors.

^{25}Mg Levels

E(level)†	J$^\pi$‡	C^{2}S#	Comments
0	5/2$^+$	0.02 *1*	
585	1/2$^+$	0.04 *2*	
975	3/2$^+$	0.11 *2*	
1611	7/2$^+$	0.08 *3*	
1964	5/2$^+$	0.09 *2*	
2563	1/2$^+$	0.16 *3*	
2769	7/2$^+$,3/2$^+$	0.20 *4*	E(level): based on the assigned doublet to 2737, 2801 states (2021Ot02). 2711 is a misprint in Fig. 5 (2021Ot02). C^{2}S: 0.20 *4*, 0.12 *2* for doublet.
3410	9/2$^+$,3/2$^-$	0.41 *8*	E(level): doublet assigned to 3405, 3413 states (2021Ot02). C^{2}S: 0.41 *8*, 0.34 *6* for doublet.
3970	5/2$^+$,7/2$^-$,9/2$^+$	0.18 *4*	E(level): triplet assigned to 3907, 3970, 4059 states (2021Ot02). Not cross referenced (XREF) in the Adopted Levels. C^{2}S: 0.18 *4*, 0.12 *3*, 0.30 *6* for triplet.
4330	1/2$^-$,3/2$^+$	0.14 *3*	E(level): doublet assigned to 4277, 4359 states (2021Ot02). C^{2}S: 0.14 *3*, 0.08 *2* for doublet.
4720	9/2$^+$,(3/2$^+$,5/2$^+$)	0.03 *1*	E(level): doublet assigned to 4711, 4722 states by 2021Ot02. C^{2}S: 0.03 *1*, 0.02 *1* for doublet.
7280	1/2$^+$,7/2$^-$,3/2$^+$	0.66 *17*	E(level): triplet assigned to 7265, 7286, 7375 states by 2021Ot02. Not cross referenced (XREF) in the Adopted Levels. C^{2}S: 0.66 *17*, 0.03 *1*, 0.09 *2* for triplet.

† From Figure 5 in 2021Ot02.
‡ From Adopted Levels, except a few cases (doublet, triplet).
# Obtained by assuming one single state dominates in a given multiplet peak.

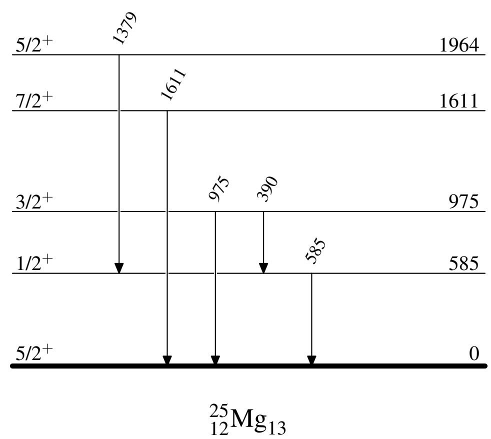
γ(^{25}Mg)

E$_\gamma$†	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
390	975	3/2$^+$	585	1/2$^+$
585	585	1/2$^+$	0	5/2$^+$
975	975	3/2$^+$	0	5/2$^+$
1379	1964	5/2$^+$	585	1/2$^+$
1611	1611	7/2$^+$	0	5/2$^+$

† From level energy difference. Gamma transition indicated in Figure 8.

$^{6}Li(^{22}Ne,t),(^{22}Ne,t\gamma)$ **2021Ot02**

Level Scheme



^{9}Be(^{18}O,2nγ) 1969Ni09

E=15 MeV; measured Doppler-shift attenuation; deduced mean lifetime.

^{25}Mg Levels

E(level)†	J^π	$T_{1/2}$‡	Comments
0	5/2+		
585.042 *22*	1/2+	2.8 ns *7*	$T_{1/2}$: from τ=4.1 ns *10*.
975	3/2+		$T_{1/2}$: 1.4≤$t_{1/2}$≤7 ps from 2≤τ≤10 ps.

† From Adopted Levels.
‡ Doppler-shift attenuation, plunger method.

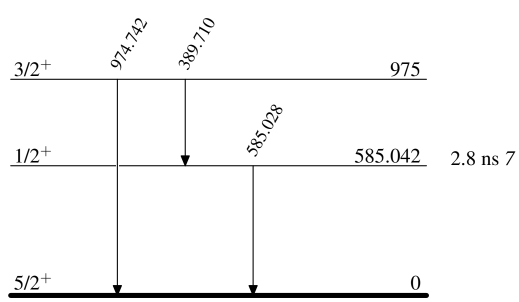
γ(^{25}Mg)

E_γ†	E_i(level)	J^π_i	E_f	J^π_f
389.710 *35*	975	3/2+	585.042	1/2+
585.028 *30*	585.042	1/2+	0	5/2+
974.742 *35*	975	3/2+	0	5/2+

† From Adopted Gammas.

^{9}Be(^{18}O,2nγ) 1969Ni09

Level Scheme



$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

1988He15,1987He26: $^{12}C(^{14}N,p\gamma)$ E=23.5 MeV. Measured Eγ, Iγ, pγ(θ). E-ΔE Si telescope, Ge(Li) detectors.
1991Ti02: $^{12}C(^{15}N,pn\gamma)$ E=1.2-1.8 MeV. Measured DSA. Ge(Li), HPGe detectors.
Other references: 1987He26, 1974Ol06, 1972Vo02.

^{25}Mg Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
0[@]	5/2+		
585[&]	1/2+		
975[&]	3/2+		
1612[@]	7/2+		
1965[&]	5/2+	0.700 ps *55*	$T_{1/2}$: From τ=1010 fs *80*.
2738[&]	7/2+		
2801	3/2+		
3405.2[@] *3*	9/2+	6 fs *4*	$T_{1/2}$: From τ=9 fs *6*.
3414[a]	3/2−		
3908		6 fs *2*	$T_{1/2}$: From τ=9 fs *3*.
3967.5[a] *5*	7/2−	25 fs *5*	$T_{1/2}$: From τ=36 fs *7*.
4059.9 *5*	9/2+	55 fs *4*	$T_{1/2}$: From τ=80 fs *6*.
4711[&]	9/2+	25 fs *3*	$T_{1/2}$: From τ=36 fs *4*.
4722	5/2+,3/2+		
5012	7/2+		
5251.7 *3*	11/2+	15 fs *2*	$T_{1/2}$: From τ=22 fs *3*.
5460.3 *2*	13/2+	1.44 ps *13*	$T_{1/2}$: From τ=2.08 ps *19*.
5523.0[a] *3*	5/2−	46 fs *6*	$T_{1/2}$: From τ=67 fs *8*.
5530.4[@] *5*	11/2+	6 fs *2*	$T_{1/2}$: From τ=8 fs *3*.
5747	3/2+,5/2+	<7 fs	$T_{1/2}$: From τ<10 fs.
5793	11/2−,(7/2)		Jπ: in Table IV (1988He15), authors propose 11/2− as a possible member of the 1/2[330] band, however, 7/2 or 7/2+ is also possible as noted considering the γ decay scheme as noted in the text. The level not adopted as a band member of 1/2[330] in the adopted dataset.
5972	9/2+		
6033.4 *13*	7/2+,11/2+	<6 fs	$T_{1/2}$: From τ<8 fs.
6362 *4*			
6435 *2*			
6842 *2*			
6862.2 *12*		<9 fs	$T_{1/2}$: From τ<13 fs.
6911 *3*			
6958 *2*			
7184 *2*			E(level): appears to be a doublet of 7181 and 7185 in the Adopted Levels.
7225 *3*			
7287 *3*			
7493 *2*			
7501 *3*			
7526 *3*			
7550[@] *1*	(13/2)+		
7653 *3*			
7685 *3*			
7791.0 *15*		<7 fs	$T_{1/2}$: From τ<10 fs.
7866 *2*			
8016 *2*		37 fs *4*	$T_{1/2}$: From τ=53 fs *5*.
8074 *3*			
8264 *5*			
8534 *2*			
8550 *2*			

Continued on next page (footnotes at end of table)

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02 (continued)

^{25}Mg Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	Comments
8818.5 *7*			
8895 *1*			
8999.5 *15*		<9 fs	$T_{1/2}$: From τ<13 fs.
9650 *3*			
9685 *2*			
9949 *2*	$(15/2)^+$		
10137 *4*			
10653@ *2*	$(15/2^+)$		
11004 *3*			
11361 *3*			
11410 *3*			
11460 *3*			
11486 *6*			
13143 *4*			
13332 *10*			

† From 1988He15 if rounded to nearest keV. Otherwise from 1991Ti02. Agreement between 1988He15 and 1991Ti02 for levels >6800 keV is poor.
‡ From Adopted Levels, except where otherwise noted.
# From 1991Ti02 – Doppler shift attenuation method. Mean lifetime values are listed in the comments.
@ Band(A): 5/2[202].
& Band(B): 1/2[211].
a Band(C): 1/2[330].

$\gamma(^{25}Mg)$

E_i(level)	J_i^π	E_γ†	I_γ#	E_f	J_f^π	Mult.@	δ#	Comments
1612	$7/2^+$	1612	100	0	$5/2^+$	D+Q	−0.18 *7*	A_2=−0.59; A_4=+0.010 (1988He15)
1965	$5/2^+$	990	25 *3*	975	$3/2^+$	D+Q	−0.25 *17*	A_2=−0.68; A_4=+0.016 (1988He15)
		1380	50 *3*	585	$1/2^+$	Q		A_2=+0.29; A_4=−0.48 (1988He15) δ: −0.34 *25* (1988He15).
		1965	25 *3*	0	$5/2^+$	D+Q	−0.58 *7*	A_2=−0.15; A_4=−0.04 (1988He15)
2801	$3/2^+$	2216‡		585	$1/2^+$	D+Q	+0.21 *9*	A_2=−0.060; A_4=+0.0 (1988He15)
3405.2	$9/2^+$	1793	75 *3*	1612	$7/2^+$	D+Q	−0.12 *2*	A_2=−0.052; A_4=+0.01 (1988He15)
		3405	25 *3*	0	$5/2^+$	Q		A_2=+0.058; A_4=−0.024 (1988He15) δ: +0.14 *9* (1988He15).
4059.9	$9/2^+$	2448	45 *4*	1612	$7/2^+$	D+Q	−0.53 *12*	A_2=−1.8; A_4=+0.10 (1988He15)
		4060	55 *4*	0	$5/2^+$	Q		A_2=+0.34; A_4=−0.32 (1988He15) δ: −0.09 *5* (1988He15).
4711	$9/2^+$	2746‡		1965	$5/2^+$	Q		A_2=+0.49; A_4=−0.14 (1988He15) δ: +0.05 *8* (1988He15).
4722	$5/2^+,3/2^+$	3747	100	975	$3/2^+$	D(+Q)	−0.02 *7*	A_2=−0.35; A_4=+0.0 (1988He15) for $5/2^+$ to $3/2^+$ A_2=−0.34; A_4=+0.0 (1988He15) for $3/2^+$ to $3/2^+$ δ: assuming $J^\pi=5/2^+$. δ=1.28 *63* for $J^\pi=3/2^+$ (1988He15).
5012	$7/2^+$	3047‡		1965	$5/2^+$	D(+Q)	−0.11 *11*	A_2=−0.50; A_4=+0.005 (1988He15)
5251.7	$11/2^+$	1191	22 *4*	4059.9	$9/2^+$	D(+Q)	−0.052 *58*	A_2=−0.39; A_4=+0.001 (1988He15)
		1846	19 *3*	3405.2	$9/2^+$	D+Q	+0.14 *9*	A_2=−0.027; A_4=+0.009 (1988He15)
		2513	12 *4*	2738	$7/2^+$			
		3639	48 *5*	1612	$7/2^+$	Q		A_2=+0.34; A_4=−0.28 (1988He15) δ: −0.07 *9* (1988He15).

Continued on next page (footnotes at end of table)

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ **1988He15,1991Ti02 (continued)**

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ #	E_f	J^π_f	Mult. @	δ #	Comments
5460.3	13/2+	2055	100	3405.2	9/2+	Q		A_2=+0.33; A_4=−0.26 (1988He15) δ: −0.07 *7* (1988He15).
5530.4	11/2+	2125	71 *4*	3405.2	9/2+	D+Q	−0.12 *6*	A_2=−0.52; A_4=+0.01 (1988He15)
		3918	29 *4*	1612	7/2+			
5747	3/2+,5/2+	5747‡		0	5/2+	D+Q		A_2=−0.18; A_4=−0.044 (1988He15) for 5/2+ to 5/2+ A_2=−0.19; A_4=−0.0 (1988He15) for 3/2+ to 5/2+ δ: −0.62 *11* for J^π=5/2+ and −0.19 *13* for J^π=3/2.
5793	11/2−,(7/2)	1822	26 *4*	3967.5	7/2−	Q		A_2=+0.40; A_4=−0.21 (1988He15)
		2388	74 *4*	3405.2	9/2+	D+Q	−0.18 *6*	A_2=−0.61; A_4=−0.01 (1988He15) δ: assuming J^π=11/2−.
5972	9/2+	1912	27 *6*	4059.9	9/2+	D(+Q)	+0.27 *54*	A_2=+0.54; A_4=−0.03 (1988He15)
		4360	73 *6*	1612	7/2+	D(+Q)	−0.07 *10*	A_2=−0.43; A_4=+0.06 (1988He15)
6033.4	7/2+,11/2+	2628‡		3405.2	9/2+	D+Q	−0.31 *+15−21*	A_2=−0.08; A_4=+0.039 (1988He15) for 11/2+ to 9/2+ A_2=−0.78; A_4=+0.026 (1988He15) for 7/2+ to 9/2+ δ: For 11/2+.
6362		6362	100	0	5/2+			
6435		1423	21 *7*	5012	7/2+			
		1724	17 *7*	4711	9/2+			
		2375	7 *4*	4059.9	9/2+			
		2527	14 *4*	3908				
		4823	41 *8*	1612	7/2+			
6842		1830	3 *2*	5012	7/2+			
		4104	79 *8*	2738	7/2+			
		6842	18 *10*	0	5/2+			
6862.2		5250	100	1612	7/2+			
6911		6911	100	0	5/2+			
6958		6958	100	0	5/2+			
7184		5219	44 *16*	1965	5/2+			E_γ: comparable with the stronger γ transition (5216γ) from 7182 keV level. See comment for the level.
		5572	56 *16*	1612	7/2+			E_γ: comparable with the stronger γ transition (5573γ) from 7185 keV level. See comment for the level.
7225		7225	100	0	5/2+			
7287		5322	46 *16*	1965	5/2+			
		7287	54 *16*	0	5/2+			
7493		1521	4 *2*	5972	9/2+			
		2031	28 *4*	5460.3	13/2+			
		3433	68 *8*	4059.9	9/2+			
7501		4763	100	2738	7/2+			
7526		4788	100	2738	7/2+			
7550	(13/2)+	2017	18 *5*	5530.4	11/2+			
		2088	9 *3*	5460.3	13/2+			
		2299	50 *7*	5251.7	11/2+	D+Q	−0.23 *4*	δ: assuming J^π=13/2+.
		4145	23 *7*	3405.2	9/2+			
7653		4915	100	2738	7/2+			
7685		3625	100	4059.9	9/2+			
7791.0		4386	3 *2*	3405.2	9/2+			
		6179	97 *2*	1612	7/2+			
7866		2333	17 *7*	5530.4	11/2+			

Continued on next page (footnotes at end of table)

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02 (continued)

$\gamma(^{25}Mg)$ (continued)

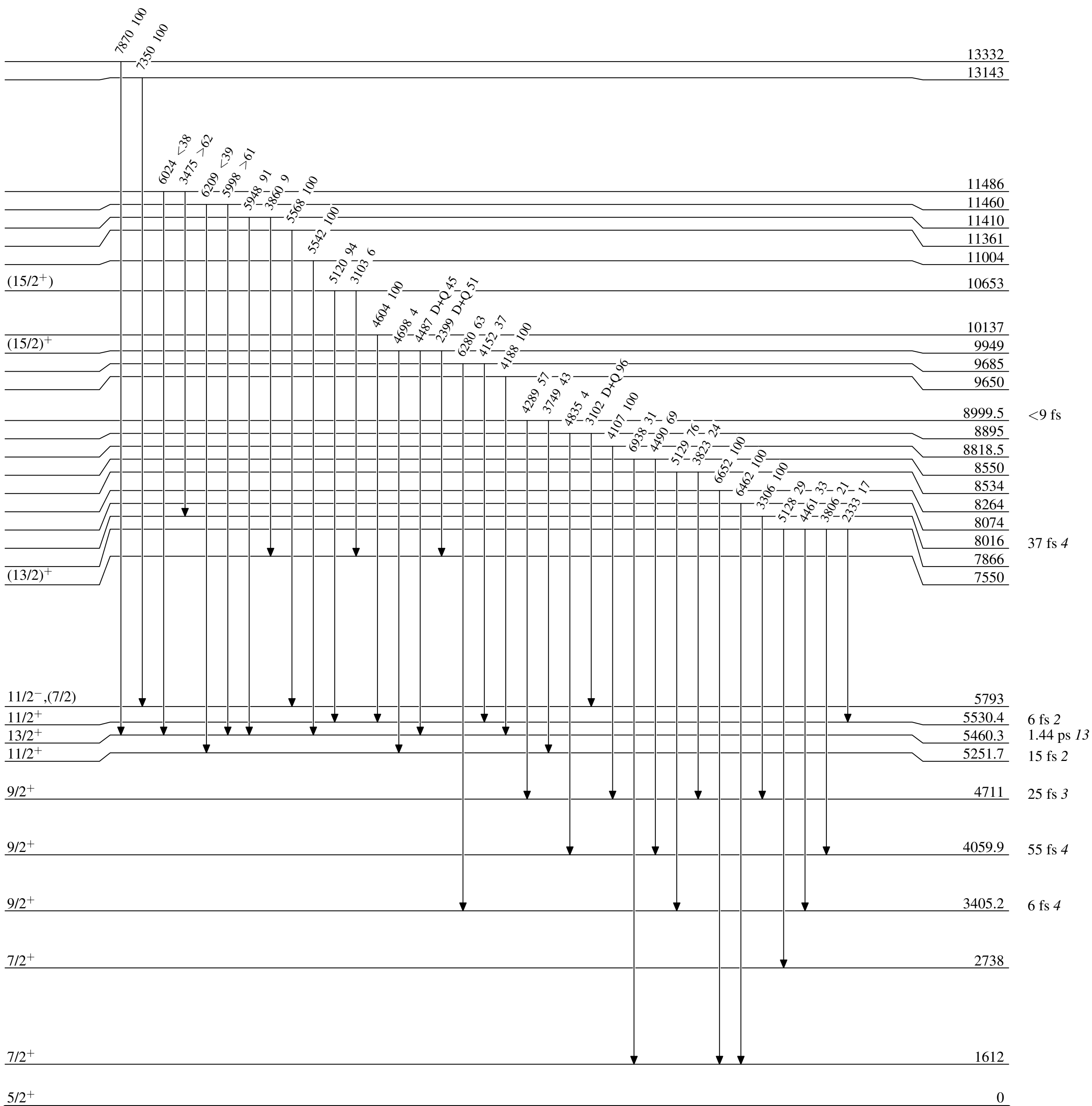
E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. @	δ #	Comments
7866		3806	21 *10*	4059.9	9/2+			
		4461	33 *16*	3405.2	9/2+			
		5128	29 *13*	2738	7/2+			
8016		3306	100	4711	9/2+			
8074		6462	100	1612	7/2+			
8264		6652	100	1612	7/2+			
8534		3823	24 *11*	4711	9/2+			
		5129	76 *11*	3405.2	9/2+			
8550		4490	69 *13*	4059.9	9/2+			
		6938	31 *13*	1612	7/2+			
8818.5		4107	100	4711	9/2+			
8895		3102	96 *6*	5793	11/2−,(7/2)	D+Q	−0.93 *−44+33*	δ: assuming J^π=9/2−. +0.3 *3* for 11/2 or +0.7 *3* for 13/2+.
		4835	4 *3*	4059.9	9/2+			
8999.5		3749	43 *15*	5251.7	11/2+			
		4289	57 *15*	4711	9/2+			
9650		4188	100	5460.3	13/2+			
9685		4152	37 *7*	5530.4	11/2+			
		6280	63 *7*	3405.2	9/2+			
9949	(15/2)+	2399	51 *8*	7550	(13/2)+	D+Q	−0.16 *4*	
		4487	45 *9*	5460.3	13/2+	D+Q	+0.5 *5*	I_γ: single and double-escape yields not included.
		4698	4 *2*	5251.7	11/2+			I_γ: at 158° detector only (1988He15).
10137		4604	100	5530.4	11/2+			
10653	(15/2+)	3103	6 *3*	7550	(13/2)+			
		5120	94 *3*	5530.4	11/2+			
11004		5542	100	5460.3	13/2+			
11361		5568	100	5793	11/2−,(7/2)			
11410		3860	9 *3*	7550	(13/2)+			
		5948	91 *3*	5460.3	13/2+			
11460		5998	>61	5460.3	13/2+			
		6209	<39	5251.7	11/2+			
11486		3475	>62	8016				
		6024	<38	5460.3	13/2+			
13143		7350	100	5793	11/2−,(7/2)			
13332		7870	100	5460.3	13/2+			

† From level energy difference, recoil energy subtracted.
‡ Weaker branches not observed.
# From 1988He15, except where otherwise noted.
@ Assigned by the evaluators based on the mixing ratio and A_2, A_4 data.

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme

Intensities: % photon branching from each level

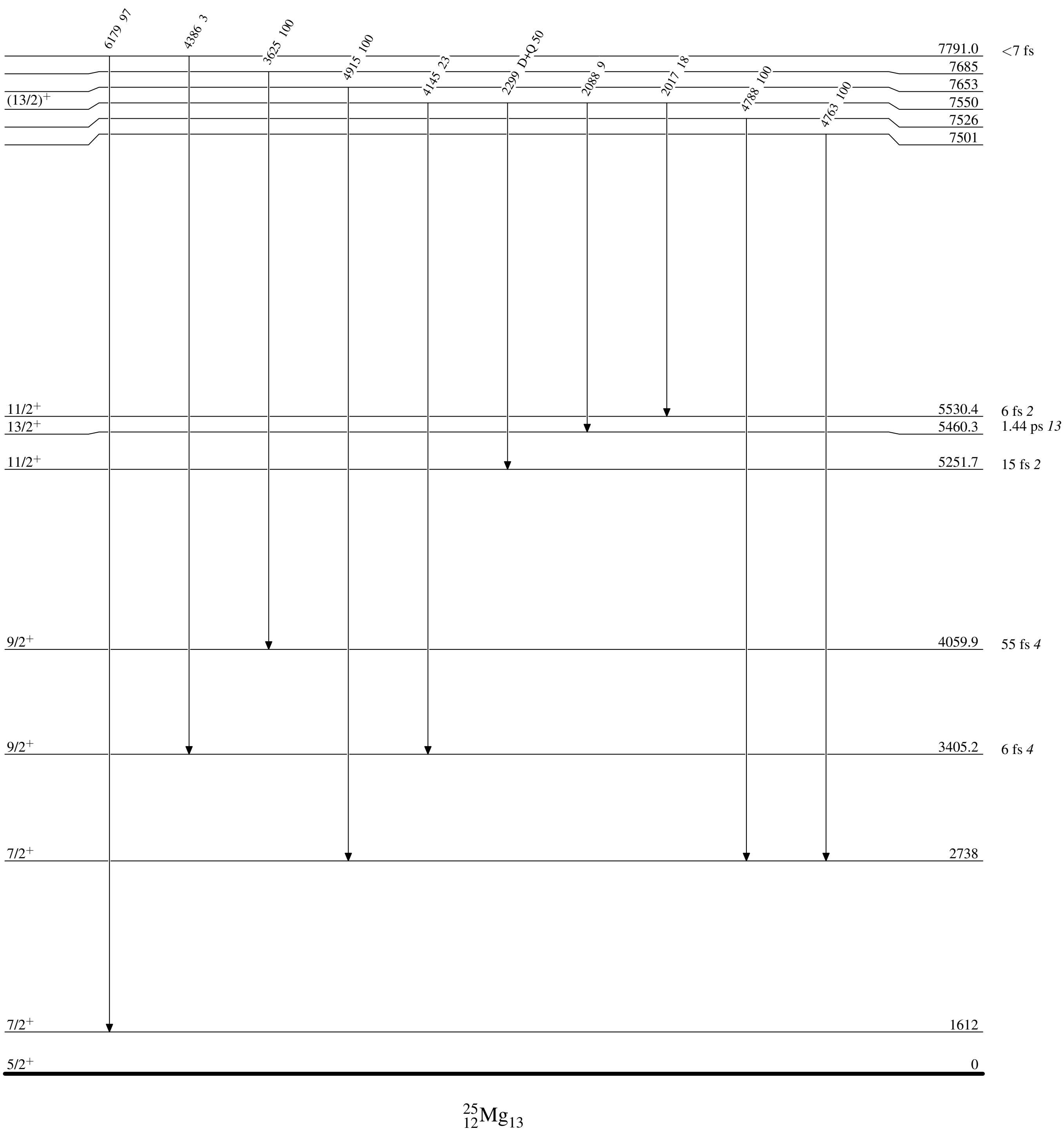


$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme (continued)

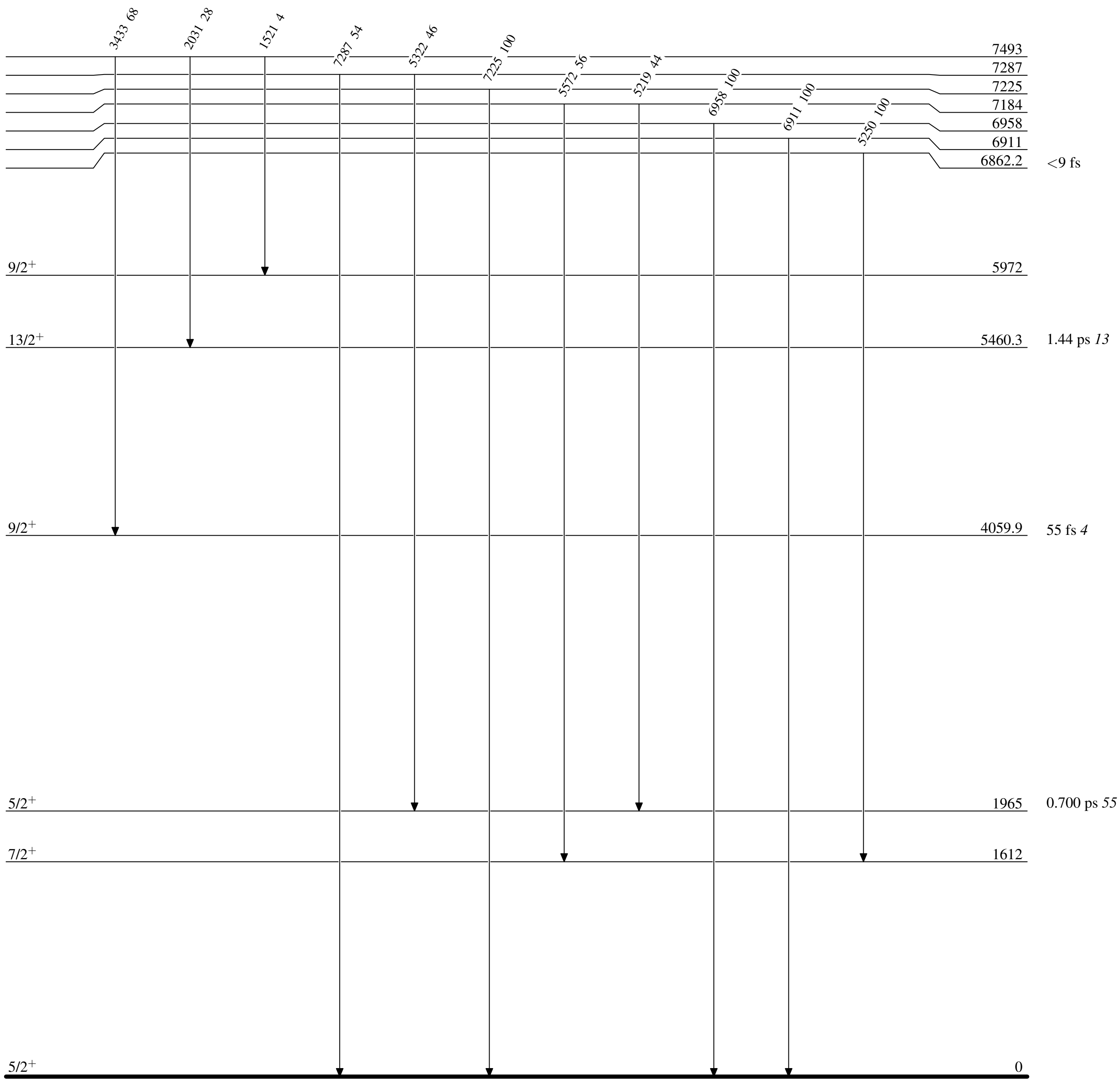
Intensities: % photon branching from each level



$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme (continued)

Intensities: % photon branching from each level

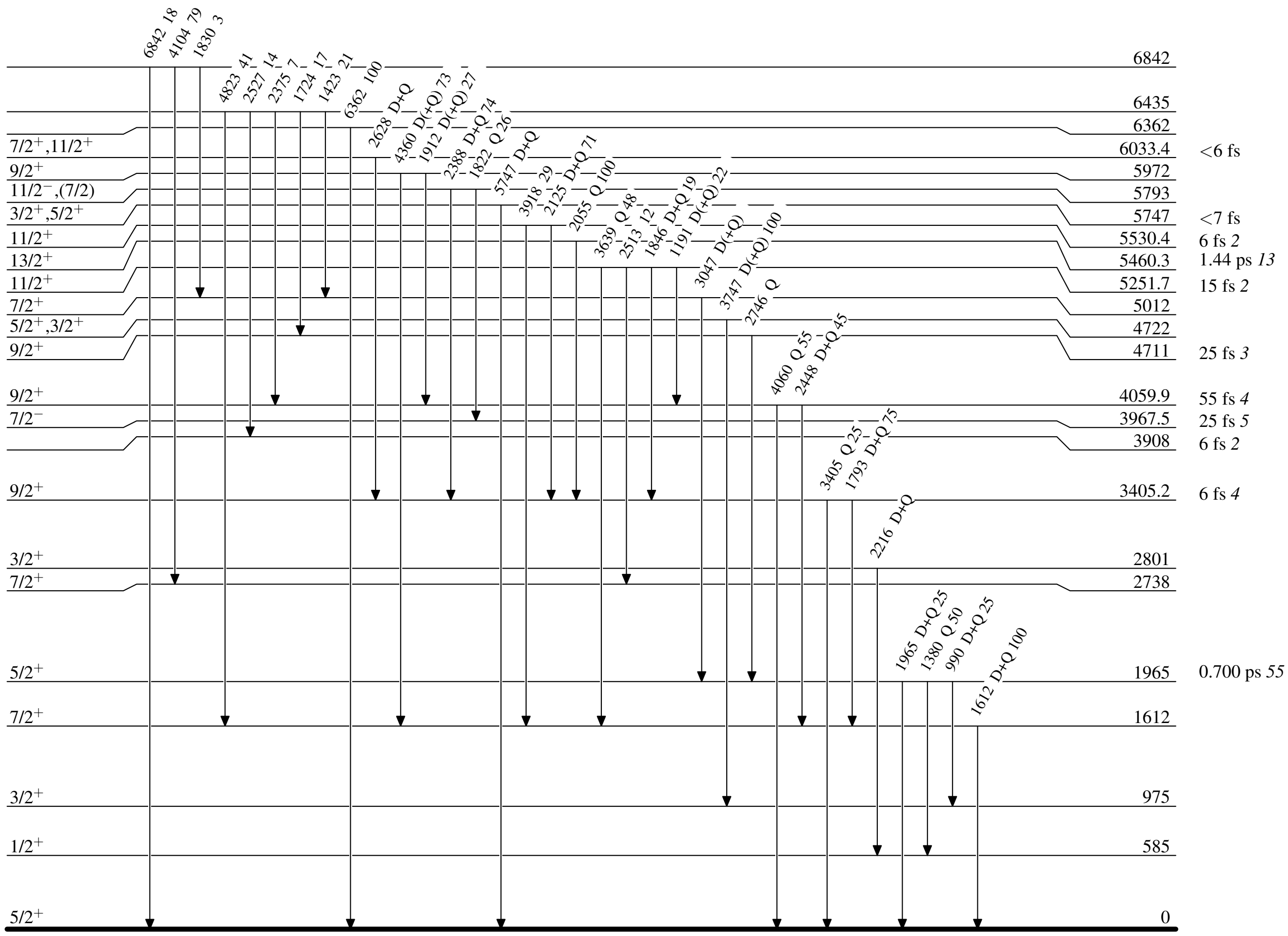


$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

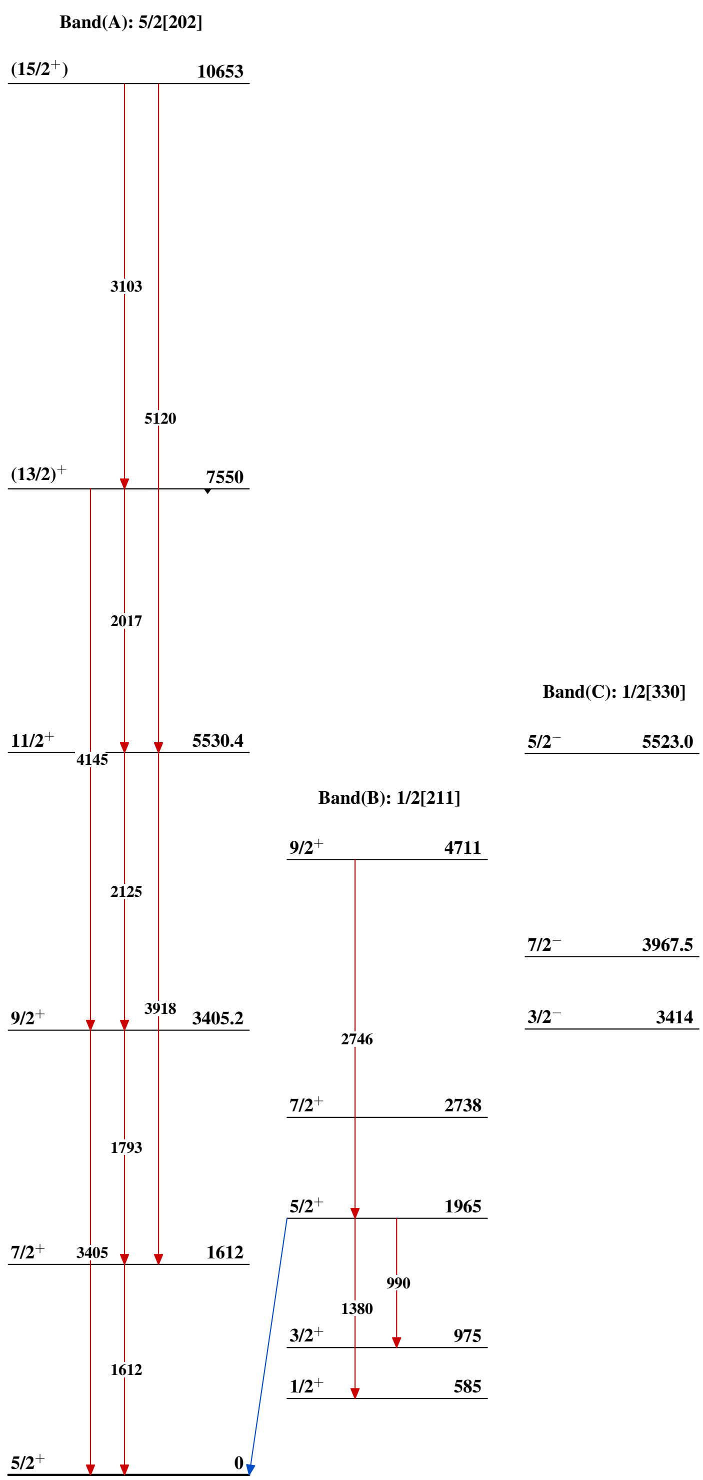
Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02



$^{25}_{12}Mg_{13}$

^{21}Ne(^{6}Li,d) 1976An01,1977An06

$J^\pi(^{21}Ne)=3/2^+$.

1976An01,1977An06: Gas-cell target of ^{21}Ne (92% enriched), ^{6}Li beam, E=32 MeV; deuterons were analyzed by an Enge split-pole magnetic spectrograph and detected by nuclear emulsion plates; measured $\sigma(E_d,\theta)$, deduced excited levels, spectroscopic strengths, L, spin, parity. FWHM 70 to 80 keV.

^{25}Mg Levels

E(level)†	J^π	L#	S@	Comments
0.0	$5/2^+$	2	1.00	
580	$1/2^+$	2	0.24	
980	$3/2^+$	2	1.94	
1610	$7/2^+$	2	1.90	
1970	$5/2^+$	2	1.45	
2560	$1/2^+$	2	0.37	
2740	$7/2^+$	4	1.17	S: 0.98 for L=2.
2800	$3/2^+$	0	2.12	S: 0.88 for L=2.
3410‡				E(level): doublet.
3900	$5/2^+$	2	0.42	S: 0.26 for L=4.
4350‡				
4715‡				E(level): doublet − listed as 4.71 and 4.72 MeV.
5000‡				
5250‡				

† From 1977An06 (Table 3), except where otherwise noted.
‡ From 1977An06 (Fig. 2), not listed in Table 3.
# Based on $\sigma(\theta)$ and DWBA analysis (plots in 1976An01).
@ Relative spectroscopic strengths.

^{22}Ne(α,nγ) 1976Ch29,1975Bu14,1974Ro10

1976Ch29: ^{22}Ne(α,nγ), E=10 MeV. Measured $\alpha\gamma$-,nγ-,$\gamma\gamma$-coin. Ge(Li) detector.
1975Bu14: ^{22}Ne(α,nγ), E=8.00, 9.15 MeV. Measured σ(Eγ,θ), linear polarization.
1974Ro10: ^{22}Ne(α,nγ), E=8, 8.8 MeV. Measured $\gamma(\theta)$, DSA. Ge(Li) detectors, Ge(Li)-NaI(Tl) pair spectrometer.
Others: 1961De10 (report a resonance at E_α=2.88 MeV), 1969As02, 1971Ke18, 1972Ke13, 1991Ha06.

^{25}Mg Levels

E(level)[†]	J^π	$T_{1/2}$[a]	Comments
0			
585.1 *2*			
974.8 *1*			
1611.8 *1*			
1964.6 *2*			
2564.1 *6*			
2738.2 *6*	7/2+[@]		
2801.1 *2*	3/2+[@]		
3404.9 *4*	9/2+[@]		
3414.2 *13*	3/2−[@]		
3908.3 *15*	5/2+[@]		
3970.6 *4*	7/2−[@]		
4058.9 *5*	9/2+[@]		J^π: based on $\gamma\gamma(\theta)$ and γ-ray polarization measurements (1972Ke13, 1971Ke18).
4277.0 *2*	1/2−[&]		
4359.4 *2*	3/2+[@]		
4711.5 *5*	9/2+[&]		
4723.6 *21*	1/2,3/2,5/2[@]		
5012.2 *4*	7/2		E(level): other: 5005 (1974Ro10). J^π: from $\gamma(\theta)$ and γ-particle correlation measurements (1974Ro10).
5116.3[‡] *10*	1/2−[&]		
5251.3 *3*		31 fs *10*	$T_{1/2}$: From τ=30-60 fs (1974Ro10).
5460.8 *5*	13/2+[&]	>0.7 ps	$T_{1/2}$: from τ>1 ps (1974Ro10).
5474[‡]			
5520.7[‡] *5*	5/2		E(level): other: 5511 (1974Ro10). J^π: from $\gamma(\theta)$ and γ-particle correlation measurements (1974Ro10).
5533.4 *5*	11/2+[&]		
5747[#]	5/2+		J^π: from 1975Bu14.
5793.0 *5*	11/2−,(7/2−)[&]	52 fs *17*	$T_{1/2}$: from τ=50-100 fs (1974Ro10).
5859[‡]	5/2		E(level): other: 5851 (1974Ro10). J^π: from $\gamma(\theta)$ and γ-particle correlation measurements (1974Ro10).
5970.9 *5*	9/2+[&]		E(level): other: 5967 (1974Ro10). J^π: also 9/2 from $\gamma(\theta)$ and γ-particle correlation measurements (1974Ro10). $T_{1/2}$: 52 fs *17* from τ=50-100 fs (1974Ro10).
5977.0 *10*	7/2+[&]		
6041.3[#] *5*			

[†] From 1976Ch29 except as noted.
[‡] From 1975Bu14.
[#] From 1974Ro10, energy increased by 9 keV for consistency with later measurements.
[@] From $\gamma\gamma(\theta)$ and γ-ray polarization measurements (1972Ke13).
[&] From $\gamma(\theta)$ and linear polarization measurements (1975Bu14).
[a] From 1974Ro10, by DSAM. Authors noted all levels in the 5000 to 6000 keV region have $T_{1/2}$<42 fs (from τ<60 fs).

^{22}Ne(α,nγ) 1976Ch29,1975Bu14,1974Ro10 (continued)

γ(^{25}Mg)

For a few γ-transitions two sets of A_2, A_4 are listed from 1974Ro10 for E_α=8- and 8.8-MeV, respectively.

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[a]	Comments
585.1		585.1	100	0				
974.8		389.7[‡] *1*	46 *3*	585.1		D+Q	+0.12 *3*	
		974.8[‡] *1*	54 *3*	0		D+Q	<−0.12	I_γ: weighted average of 57 *1* (1975Bu14) and 52 *1* (1976Ch29). δ: or >−3.5.
1611.8		1611.7[‡] *1*	100	0		D+Q	−0.22 *2*	
1964.6		989.8[‡] *1*	26 *1*	974.8		D+Q	−0.25 *7*	
		1379.5	46 *2*	585.1				
		1965.0	28 *2*	0				
2564.1		1589.4	16 *1*	974.8				
		1978.9	81 *1*	585.1				
		2564.0	3 *1*	0				
2738.2	7/2$^+$	773.1	7.0 *6*	1964.6				
		1763.5	87 *1*	974.8		Q		Mult.: from 1972Ke13, based on γ(θ).
		2738.0	6 *1*	0		D+Q	−2.9[c] *5*	δ: inconsistent with B(E2)(↑) from (e,e′).
2801.1	3/2$^+$	836.5	40 *1*	1964.6		D+Q	<−0.25	δ: −2.0<δ<−0.25 (1972Ke13).
		2215.9	41 *2*	585.1		D(+Q)		δ: −2.3<δ<+0.11 (1972Ke13).
		2800.9[‡] *2*	19 *2*	0		D+Q	−0.5 *+4−16*	δ: other value: −2.0<δ<0.25 (1972Ke13).
3404.9	9/2$^+$	1793.1[‡] *3*	79 *2*	1611.8		D+Q	−0.14 *2*	δ: other value: −0.15 *2* (1972Ke13).
		3404.7	21 *2*	0				
3414.2	3/2$^-$	2439.5	16 *5*	974.8		D(+Q)	<0.2[c]	
		2828.9	76 *3*	585.1		D(+Q)		δ: −0.18<δ<+0.12 (1972Ke13).
		3413.9	8 *2*	0		D(+Q)	<0.2[c]	
3908.3	5/2$^+$	1107.1	12 *3*	2801.1	3/2$^+$			
		1170.1	10 *2*	2738.2	7/2$^+$			
		2933.5	70 *5*	974.8		D+Q		δ: −0.07<δ<+0.03 (1972Ke13).
		3908.0	8 *4*	0		D+Q	<−0.8[c]	
3970.6	7/2$^-$	2006.0[‡] *3*	23 *2*	1964.6		D+Q	−0.04 *4*	δ: other value: +0.02 *2* (1972Ke13).
		3970.3	77 *2*	0		D+Q	−0.02[c] *3*	
4058.9	9/2$^+$	2447.0	46 *4*	1611.8		D+Q	−0.46[c] *10*	
		4058.9[‡] *5*	54 *4*	0		Q(+O)	−0.02 *2*	
4277.0	1/2$^-$	862.8	3 *2*	3414.2	3/2$^-$			
		1713.3	12 *2*	2564.1				
		3302.2[‡] *2*	75 *4*	974.8				
		3692.1	10 *3*	585.1				
4359.4	3/2$^+$	1795.0	1.0 *5*	2564.1				
		3384.6[‡] *2*	50 *4*	974.8		D+Q	+0.09 *7*	δ: other value: δ>−0.2 (1972Ke13).
		3774.3[‡] *2*	49 *4*	585.1		D+Q	−0.19 *9*	δ: other value: δ<−0.05 (1972Ke13).
4711.5	9/2$^+$	1973.2	6 *2*	2738.2	7/2$^+$			
		2746.9[‡] *5*	94 *2*	1964.6		Q(+O)	+0.00 *4*	
4723.6	1/2,3/2,5/2	3748.7	100	974.8		D+Q	−0.25[c] *15*	
5012.2	7/2	1041.6	1.0 *5*	3970.6	7/2$^-$			
		1104.3	2.0 *5*	3908.3	5/2$^+$			
		2211.0	17 *2*	2801.1	3/2$^+$			
		3047.6[‡] *3*	42 *4*	1964.6		D(+Q)	+0.00[b] *5*	A_2=−0.39 *6*; A_4=+0.10 *6* (1974Ro10)
		3400.6	14 *4*	1611.8				
		5012.1	24 *4*	0		D+Q	+0.27[b] *3*	A_2=+0.17 *2*; A_4=+0.08 *2* (1974Ro10)

Continued on next page (footnotes at end of table)

^{22}Ne(α,nγ) 1976Ch29,1975Bu14,1974Ro10 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[a]	Comments
5116.3	1/2$^-$	1702	3 *1*	3414.2	3/2$^-$			
		2552	19 *3*	2564.1				
		4141.5[‡] *10*	73 *4*	974.8				
		4530.8	5 *2*	585.1				
5251.3		1192.4[‡] *6*	19 *6*	4058.9	9/2$^+$	D+Q	−0.11 *2*	A_2=−0.50 *4*; A_4=−0.0 *4* (1974Ro10) δ: from 1974Ro10. Other value: −0.18 *4* (1975Bu14) − both for 11/2$^+$.
		1846.4[‡] *5*	23 *6*	3404.9	9/2$^+$	D+Q	+0.18 *3*	A_2=−0.32 *5*; A_4=−0.05 *5* (1974Ro10) δ: other value: +0.13 *4* (1974Ro10).
		2513.0	14 *6*	2738.2	7/2$^+$			
		3639.5[‡] *3*	44 *8*	1611.8		Q(+O)	+0.02 *3*	A_2=+0.43 *8*; A_4=−0.15 *8* (1974Ro10) A_2=+0.41 *5*; A_4=−0.10 *5* (1974Ro10) δ: other value: $\propto$ (1974Ro10).
5460.8	13/2$^+$	2055.9[‡] *2*	100	3404.9	9/2$^+$	Q(+O)	+0.02 *2*	A_2=+0.41 *3*; A_4=−0.12 *3* (1974Ro10) A_2=+0.48 *8*; A_4=−0.17 *10* (1974Ro10)
5474		2060	3 *2*	3414.2	3/2$^-$			
		4499	33 *2*	974.8				
		4888	64 *7*	585.1				
5520.7	5/2	1550.1[‡] *5*	17 *3*	3970.6	7/2$^-$	D(+Q)	+0.00 *3*	
		2719.8[‡] *3*	19 *4*	2801.1	3/2$^+$	D(+Q)	+0.05 *6*	
		3556.1[‡] *6*	20 *5*	1964.6		D(+Q)	0.00 *10*	δ: other value: −0.05 *2* (1974Ro10).
		3909	30 *5*	1611.8		D+Q	+0.15[b] *5*	A_2=−0.35 *4*; A_4=+0.05 *4* (1974Ro10)
		5520	14 *5*	0		D+Q	+0.07[b] *1*	A_2=+0.28 *26*; A_4=+0.10 *20* (1974Ro10) A_2=+0.28 *7*; A_4=+0.0 *8* (1974Ro10)
5533.4	11/2$^+$	2128.5[‡] *6*	62 *4*	3404.9	9/2$^+$	D+Q	−0.119 *9*	A_2=−0.55 *5*; A_4=−0.02 *4* (1974Ro10) A_2=+0.52 *5*; A_4=+0.02 *5* (1974Ro10) δ: other value: −0.14 *5* (1974Ro10).
		3921.3	38 *4*	1611.8				
5747	5/2$^+$	4772	62 *7*	974.8				A_2=+0.07 *7*; A_4=−0.06 *7* (1974Ro10)
		5746	38 *7*	0		D+Q	−0.40 *11*	A_2=−0.06 *6*; A_4=+0.09 *6* (1974Ro10) δ: −0.40 *11* for 5/2$^+$ and −0.07 *2* for 3/2$^+$ (1974Ro10).
5793.0	11/2$^-$,(7/2$^-$)	1822.4[‡] *2*	34 *2*	3970.6	7/2$^-$	Q(+O)		A_2=+0.68 *13*; A_4=−0.15 *13* (1974Ro10) δ: +0.07 *7* for J^π=11/2$^-$ and +0.3 *2* for 7/2$^-$ (1975Bu14); $\propto$ for 11/2$^-$ and +0.6 *1* for 7/2$^-$ (1974Ro10).
		2388.1[‡] *2*	66 *2*	3404.9	9/2$^+$	D(+Q)		A_2=−0.33 *4*; A_4=−0.02 *4* (1974Ro10) A_2=−0.32 *2*; A_4=+0.07 *2* (1974Ro10) δ: +0.02 *2* for J^π=11/2$^-$ and +0.08 *2* for 7/2$^-$ (1975Bu14); −0.01 *2* for 11/2$^-$ and +0.13 *3* for 7/2$^-$ (1974Ro10).
5859	5/2	3058	31[@] *15*	2801.1	3/2$^+$			
		4884	19[@] *10*	974.8				
		5858	50[@] *20*	0		D+Q	>0.14[b]	A_2=+1.01 *7*; A_4=−0.10 *7* (1974Ro10) A_2=+0.62 *3*; A_4=+0.01 *3* (1974Ro10) δ: also <0.75.
5970.9	9/2$^+$	1912.0[‡] *2*	29 *4*	4058.9	9/2$^+$	D(+Q)	+0.00 *7*	A_2=+0.40 *6*; A_4=+0.12 *6* (1974Ro10) I_γ: from 1974Ro10. Other: 50 *7* (1976Ch29 − reported two gamma transitions). δ: other value: +0.00 *15* (1974Ro10).

Continued on next page (footnotes at end of table)

^{22}Ne(α,nγ) 1976Ch29,1975Bu14,1974Ro10 (continued)

γ(^{25}Mg) (continued)

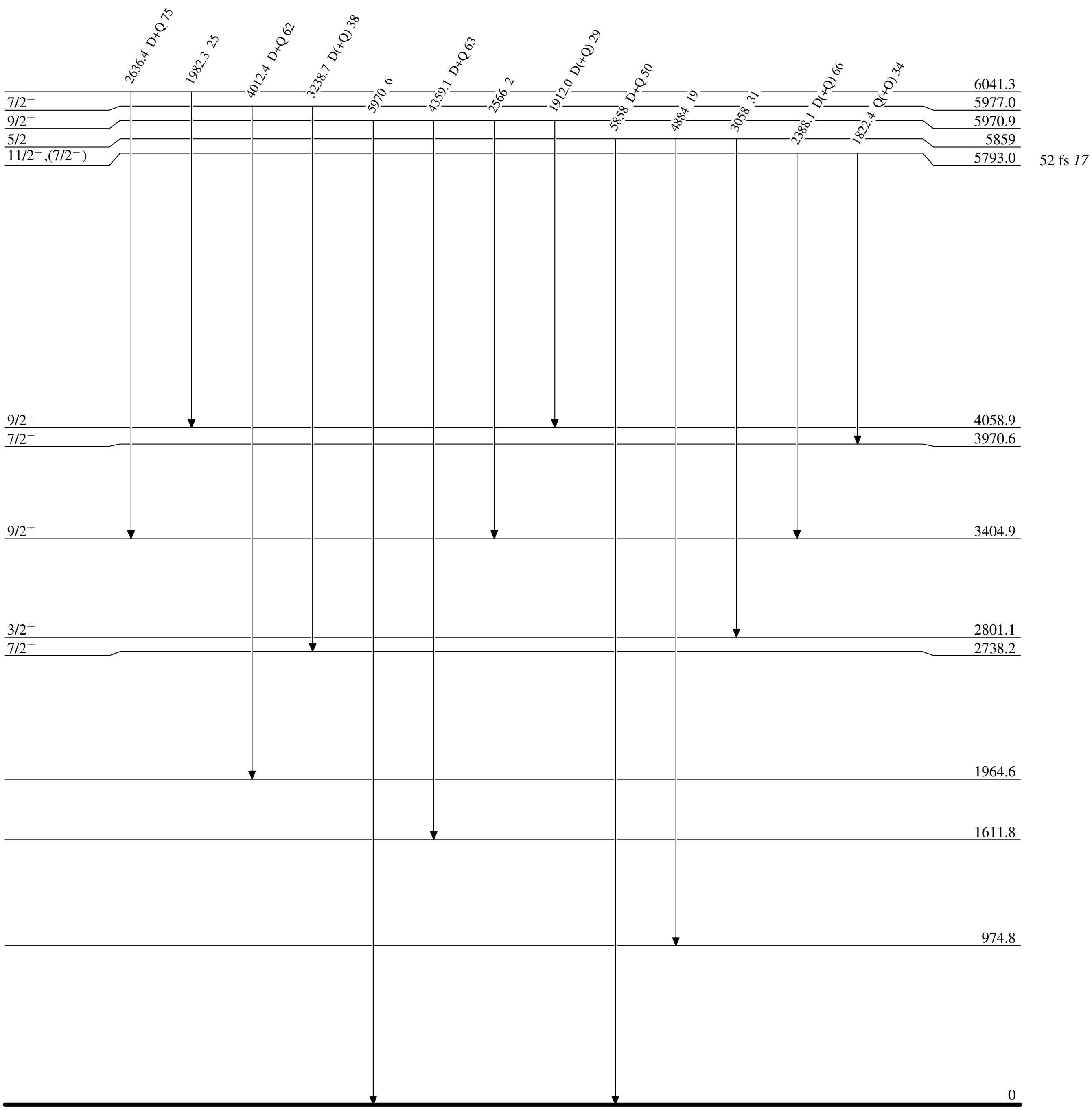
E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[a]	Comments
5970.9	9/2+	2566	2 *1*	3404.9	9/2+			E_γ,I_γ: from Fig. 2 in 1974Ro10, absent in Table 1. Placement not reported in 1976Ch29, neither reported in other datasets − not adopted.
		4359.1[‡] *5*	63 *4*	1611.8		D+Q	−0.31 *4*	A_2=−0.84 *4*; A_4=+0.02 *3* (1974Ro10) I_γ: from 1974Ro10. Other: 50 *7* (1976Ch29 – reported two gamma transitions). δ: other value: −0.31 *6* (1974Ro10).
		5970	6 *2*	0				A_2=+0.40 *10*; A_4=−0.06 *9* (1974Ro10) E_γ,I_γ: from 1974Ro10. Placement not reported in 1976Ch29.
5977.0	7/2+	3238.7[‡] *10*	38 *6*	2738.2	7/2+	D(+Q)	+0.00 *9*	
		4012.4[‡] *10*	62 *6*	1964.6		D+Q	−0.14 *3*	A_2=−0.38 *6*; A_4=+0.01 *5* (1974Ro10) δ: other value: −0.03 *3* (1974Ro10).
6041.3		1982.3	25[@] *8*	4058.9	9/2+			
		2636.4[‡] *3*	75[@] *8*	3404.9	9/2+	D+Q		A_2=−0.58 *8*; A_4=+0.09 *8* (1974Ro10) δ: −0.16 *3* for J^π=11/2+ and +0.32 *8* for J^π=7/2+ (1975Bu14), −0.13 *4* for 11/2 and +0.31 <δ<+0.37 or +3.7 *4* for 7/2 (1974Ro10).

[†] From level energy differences corrected for recoil except as noted.
[‡] From 1975Bu14.
[#] From 1976Ch29 except as noted.
[@] From 1974Ro10.
[&] Based on γ(θ) and reported δ, by the evaluators.
[a] From 1975Bu14 except as noted.
[b] From 1974Ro10.
[c] From 1972Ke13.

$^{22}Ne(\alpha,n\gamma)$ 1976Ch29,1975Bu14,1974Ro10

Level Scheme

Intensities: % photon branching from each level

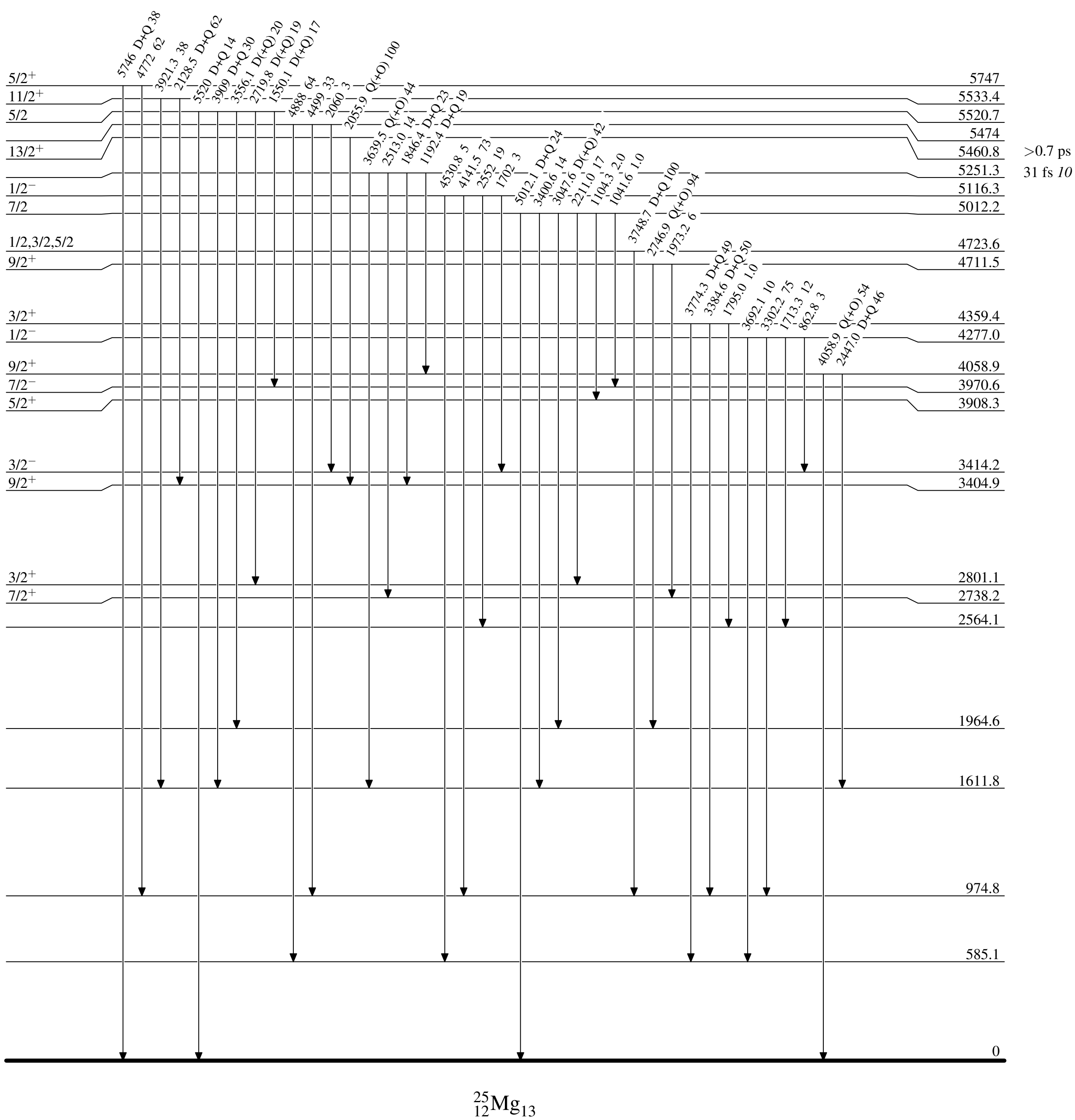


$^{25}_{12}Mg_{13}$

$^{22}Ne(\alpha,n\gamma)$ 1976Ch29,1975Bu14,1974Ro10

Level Scheme (continued)

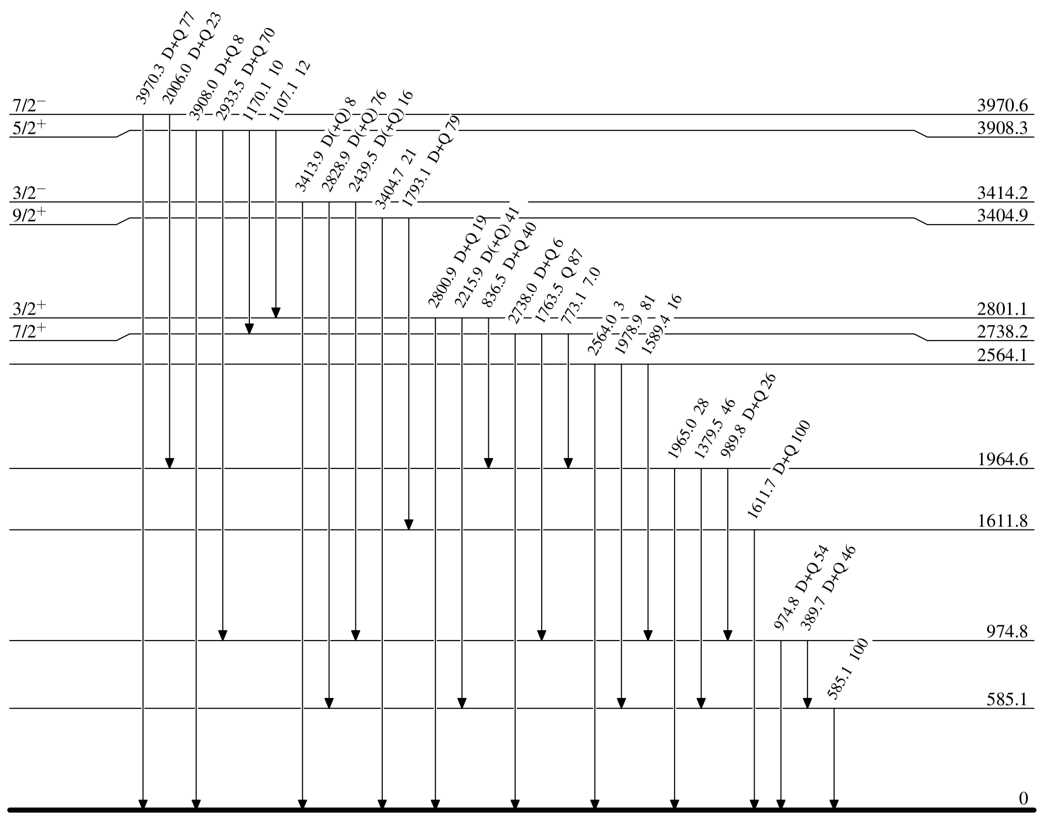
Intensities: % photon branching from each level



^{22}Ne(α,nγ) 1976Ch29,1975Bu14,1974Ro10

Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

^{23}Na(^{3}He,p) 1970Ro19

Target: Na_2WO_4 (thickness 20 μg/cm^2) on 100 nm carbon foil; E=7.5- and 8.0-MeV; four surface barrier Si detectors; measured proton spectra, angular distribution; deduced excited levels, L.

^{25}Mg Levels

E(level)	J^{π} †	Comments
4351	$3/2^+$	E(level): 4359.62 in Adopted Levels.
4712	$5/2^+$	E(level): 4722.1 in Adopted Levels.

† From 1970Ro19, based on the consideration of line shapes and the forward maximum of the angular distribution.

^{24}Mg(n,γ) E=thermal 1992Wa06,1990Pr02,2007ChZX

1992Wa06: Measured Eγ, Iγ with a Ge(Li)-NaI(Tl) in Compton suppressed and pair spectrometer modes.
1990Pr02: Natural Mg target, measured Eγ, Iγ with a Compton suppressed HPGe detector. Deduced levels.
2007ChZX: Measured Eγ, partial Iγ cross section with a Compton suppressed HPGe detector. Thermal neutron beam, internal calibration standard.
Others: 1965Ja09, 1967Sp05, 1969HaZC, 1970Lu15, 1970Or05, 1980Is02, 1982Hu02, 1990Ko43, 1990KoZT, 1991MiZQ.

^{25}Mg Levels

E(level)[†]	J$^\pi$	$T_{1/2}$[‡]	Comments
0.0	5/2$^+$	stable	
585.04 *3*	1/2$^+$		E(level): other: 585.15 *22* (1982Hu02).
974.71 *3*	3/2$^+$		E(level): other: 974.696 *49* (1982Hu02).
1964.35 *10*	5/2$^+$		
2563.38 *4*	1/2$^+$		
2801.49 *8*	3/2$^+$		
3413.38 *4*	3/2$^-$	2.8 fs *14*	E(level): other: 3413.97 *14* (1982Hu02). $T_{1/2}$: from τ=4 fs *2* (1990KoZT).
3908.08 *19*	5/2$^+$		
4276.39 *4*	1/2$^-$	<4 fs	E(level): other: 4276.64 *17* (1982Hu02). $T_{1/2}$: from τ < 5 fs (1990KoZT).
4359.62 *15*	3/2$^+$		E(level): from Adopted Levels.
5116.66 *10*	1/2$^-$		
5474.37 *19*	1/2$^+$		
7042.44 *22*	5/2		
7330.57 *4*	1/2$^+$		

† From a least-squares fit to γ-ray energies, except where otherwise noted.
‡ From 1990Ko43.

γ(^{25}Mg)

Iγ normalization: normalized assuming ΣIγ(gs)+ΣIγ(primary)=200 to obtain Iγ per 100 neutron captures (see the footnote).

E_γ[†]	I_γ[@a]	E_i(level)	J^π_i	E_f	J^π_f	Comments
389.67[‡] *2*	7.4[‡] *3*	974.71	3/2$^+$	585.04	1/2$^+$	E_γ: other: 389.69 *5* (1992Wa06). I_γ: other: 7.5 *4* (1992Wa06).
585.03 *3*	39.8 *12*	585.04	1/2$^+$	0.0	5/2$^+$	E_γ: weighted average of 585.00 *3* (2007ChZX) and 585.06 *3* (1992Wa06). I_γ: other: 39.8 *14* (2007ChZX).
836.95 *10*	0.21 *3*	2801.49	3/2$^+$	1964.35	5/2$^+$	
849.9 *3*	0.07 *2*	3413.38	3/2$^-$	2563.38	1/2$^+$	
863.03 *7*	0.53[‡] *3*	4276.39	1/2$^-$	3413.38	3/2$^-$	E_γ: unweighted average of 862.96 *3* (2007ChZX) and 863.09 *3* (1992Wa06). I_γ: other: 0.52 *5* (1992Wa06).
974.75 *9*	8.4[&] *3*	974.71	3/2$^+$	0.0	5/2$^+$	E_γ: unweighted average of 974.66 *3* (2007ChZX) and 974.84 *5* (1992Wa06). I_γ: other: 8.3 *4* (1992Wa06).
989.7 *4*	0.05 *1*	1964.35	5/2$^+$	974.71	3/2$^+$	
1379.7 *3*	0.10 *2*	1964.35	5/2$^+$	585.04	1/2$^+$	
1588.65 *9*	0.37 *4*	2563.38	1/2$^+$	974.71	3/2$^+$	
1702.6 *7*	0.04 *1*	5116.66	1/2$^-$	3413.38	3/2$^-$	
1712.94 *4*	1.46 *20*	4276.39	1/2$^-$	2563.38	1/2$^+$	E_γ: weighted average of 1712.92 *4* (2007ChZX), 1713.05 *16* (1992Wa06), and 1713.02 *12* (1990Pr02).

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$^{24}Mg(n,\gamma)$ E=thermal 1992Wa06,1990Pr02,2007ChZX (continued)

$\gamma(^{25}Mg)$ (continued)

E_γ[†]	I_γ[@a]	E_i(level)	J^π_i	E_f	J^π_f	Comments
						I_γ: unweighted average of 1.8 *3* (1992Wa06), 1.49 *9* (2007ChZX), and 1.10 *6* (from 20.57 *92* for 1000 n capture 1990Pr02).
1963.63[#] *17*	0.06 *2*	1964.35	5/2+	0.0	5/2+	E_γ: other: 1964.7 *4* (1992Wa06).
1978.25[‡] *3*	1.41[‡] *6*	2563.38	1/2+	585.04	1/2+	E_γ: others: 1978.25 *5* (1992Wa06), 1978.27 *11* (1990Pr02). I_γ: other: 1.42 *11* (1992Wa06).
2213.98[#] *14*	0.34 *7*	7330.57	1/2+	5116.66	1/2−	E_γ: other: 2213.8 *5* (1992Wa06). I_γ: unweighted average of 0.40 *5* (1992Wa06) and 0.27 *4* (from 5.01 *64* for 1000 n capture 1990Pr02).
2216.5 *6*	0.25 *4*	2801.49	3/2+	585.04	1/2+	
2438.53 *3*	6.1 *2*	3413.38	3/2−	974.71	3/2+	E_γ: weighted average of 2438.54 *3* (2007ChZX), 2438.48 *4* (1992Wa06), 2438.67 *9* (1990Pr02). I_γ: weighted average of 6.3 *4* (1992Wa06) and 5.95 *29* (from 111.33 *364* for 1000 n capture 1990Pr02).
2553.7 *8*	0.03 *1*	5116.66	1/2−	2563.38	1/2+	
2563.6 *5*	0.07 *2*	2563.38	1/2+	0.0	5/2+	
2801.50[#] *25*	0.13 *4*	2801.49	3/2+	0.0	5/2+	E_γ: weighted average of 2801.0 *3* (1992Wa06) and 2801.62 *15* (1990Pr02). I_γ: unweighted average of 0.17 *2* (1992Wa06) and 0.098 *6* (from 1.84 *10* for 1000 n capture (1990Pr02)).
2828.27 *9*	30.5 *10*	3413.38	3/2−	585.04	1/2+	E_γ: unweighted average of 2828.17 *3* (2007ChZX) and 2828.21 *4* (1992Wa06), 2828.44 *8* (1990Pr02). I_γ: other: 30.4 *10* (2007ChZX), 30.4 *15* (from 568.79 *1758* for 1000 n capture 1990Pr02).
2933.18[#] *18*	0.108[#] *18*	3908.08	5/2+	974.71	3/2+	I_γ: from 2.02 *32*/1000 n capture.
2972.4 *8*	0.09 *2*	7330.57	1/2+	4359.62	3/2+	
3054.01 *4*	10.6 *3*	7330.57	1/2+	4276.39	1/2−	E_γ: weighted average of 3054.00 *3* (2007ChZX), 3053.99 *4* (1992Wa06), and 3054.24 *9* (1990Pr02). I_γ: weighted average of 10.4 *5* (1992Wa06), 10.5 *4* (2007ChZX), and 10.8 *5* (from 201.98 *634* for 1000 n capture 1990Pr02).
3301.52 *10*	7.8 *2*	4276.39	1/2−	974.71	3/2+	E_γ: unweighted average of 3301.41 *3* (2007ChZX), 3301.42 *5* (1992Wa06), and 3301.72 *9* (1990Pr02). I_γ: weighted average of 7.7 *4* (1992Wa06), 7.85 *30* (2007ChZX), and 7.8 *4* (from 146.70 *461* for 1000 n capture 1990Pr02).
3413.25 *12*	5.08[‡] *20*	3413.38	3/2−	0.0	5/2+	E_γ: unweighted average of 3413.10 *3* (2007ChZX) and 3413.15 *5* (1992Wa06), and 3413.49 *9* (1990Pr02). I_γ: others: 5.1 *3* (1992Wa06), 5.1 *3* (from 95.33 *392* for 1000 n capture 1990Pr02).
[x]3659.6 *7*						
3691.17 *13*	0.88 *3*	4276.39	1/2−	585.04	1/2+	E_γ: unweighted average of 3691.02 *3* (2007ChZX) and 3691.07 *16* (1992Wa06), and 3691.43 *11* (1990Pr02). I_γ: weighted average of 0.90 *8* (1992Wa06), 0.86 *5* (2007ChZX), and 0.88 *5* (from 16.40 *78* for 1000 n capture 1990Pr02).
3916.86 *4*	40.6 *3*	7330.57	1/2+	3413.38	3/2−	E_γ: other: 3917.19 *8* (1990Pr02). I_γ: weighted average of 41.0 *13* (1992Wa06), 40.5 *14* (2007ChZX), and 40.1 *19* (from 749.97 *2291* for 1000 n capture 1990Pr02).
4141.70 *12*	0.192 *10*	5116.66	1/2−	974.71	3/2+	E_γ: weighted average of 4141.4 *3* (1992Wa06) and 4141.75 *12* (1990Pr02). I_γ: weighted average of 0.21 *3* (1992Wa06) and 0.190 *10* (from 3.56 *13* for 1000 n capture 1990Pr02).

Continued on next page (footnotes at end of table)

^{24}Mg(n,γ) E=thermal 1992Wa06,1990Pr02,2007ChZX (continued)

γ(^{25}Mg) (continued)

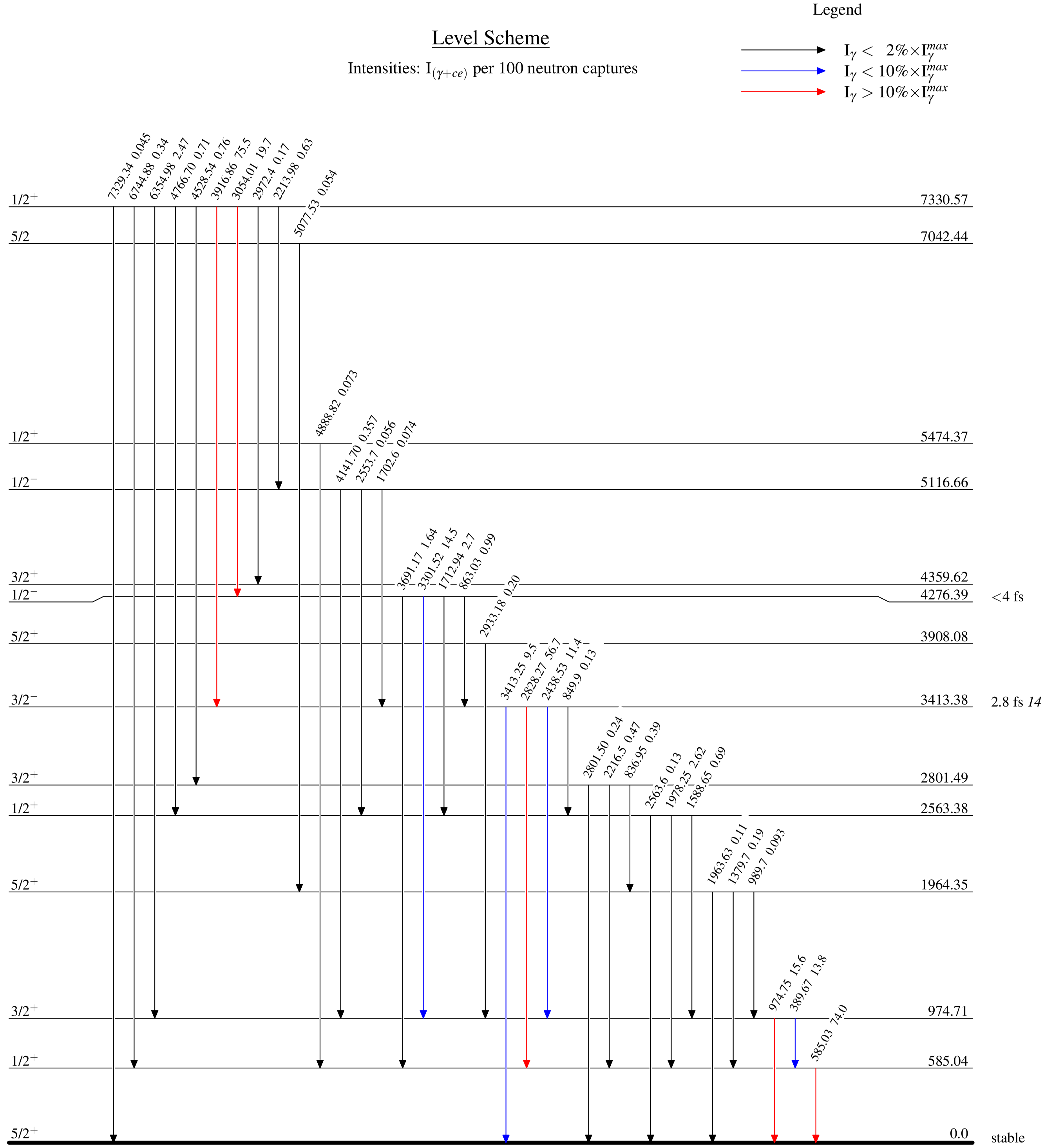
E_γ[†]	I_γ[@a]	E_i(level)	J_i^π	E_f	J_f^π	Comments
4528.54 *9*	0.41 *2*	7330.57	1/2+	2801.49	3/2+	E_γ: weighted average of 4528.55 *9* (2007ChZX) and 4528.47 *20* (1992Wa06). Other: 4529.12 *11* (1990Pr02). I_γ: weighted average of 0.46 *4* (1992Wa06), 0.44 *4* (2007ChZX), and 0.39 *2* (from 7.31 *26* for 1000 n capture 1990Pr02).
4766.70 *4*	0.38 *2*	7330.57	1/2+	2563.38	1/2+	E_γ: weighted average of 4766.69 *4* (2007ChZX) and 4766.86 *23* (1992Wa06). Other: 4767.12 *11* (1990Pr02). I_γ: weighted average of 0.41 *4* (1992Wa06), 0.41 *3* (2007ChZX), and 0.35 *2* (from 6.61 *24* for 1000 n capture 1990Pr02).
4888.82[#] *18*	0.039[#] *4*	5474.37	1/2+	585.04	1/2+	I_γ: from 0.73 *7*/1000 n capture (1990Pr02).
5077.53[#] *19*	0.029[#] *3*	7042.44	5/2	1964.35	5/2+	I_γ: from 0.54 *6*/1000 n capture (1990Pr02).
6354.98 *3*	1.33 *8*	7330.57	1/2+	974.71	3/2+	E_γ: weighted average of 6354.98 *3* (2007ChZX) and 6355.02 *10* (1992Wa06). Other: 6355.72 *10* (1990Pr02). I_γ: weighted average of 1.31 *9* (1992Wa06), 1.34 *8* (2007ChZX), and 1.33 *7* (from 24.79 *81* for 1000 n capture 1990Pr02).
6744.88 *28*	0.18 *3*	7330.57	1/2+	585.04	1/2+	
7329.34 *31*	0.024 *6*	7330.57	1/2+	0.0	5/2+	E_γ: weighted average of 7329.26 *22* (1991Pr02) and 7330.6 *9* (1992Wa06). I_γ: unweighted average of 0.018 *4* (1992Wa06) and 0.029 *2* (from 0.54 *3* for 1000 n capture 1990Pr02).

[†] From 1992Wa06, except where otherwise noted.
[‡] From 2007ChZX.
[#] From 1990Pr02.
[@] γ-ray cross section in mb from 1992Wa06, except where otherwise noted. Total thermal radiative ^{24}Mg(n,γ) cross sections are 53.8 mb *13* (2018MuZY – evaluated), 54.1 mb *13* (1992Wa06 – measured), and 53.7 mb *14* (2007ChZX – measured). Intensity balance gives 53.6 mb *13* in this dataset. The values for 2007ChZX are obtained by multiplying the reported γ-ray partial cross section value by 1.2660 *6*, assuming %abundance of ^{24}Mg in natural sample to be 78.99% *4*.
[&] From 1992Wa06.
[a] For intensity per 100 neutron captures, multiply by 1.86 *5*.
[x] γ ray not placed in level scheme.

^{24}Mg(n,γ) E=thermal 1992Wa06,1990Pr02,2007ChZX

Level Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures



$^{25}_{12}Mg_{13}$

^{24}Mg(n,γ) E=resonance 2018MuZY

^{25}Mg Levels

All data from 2018MuZY.

E(level)†	Jπ‡	Γ#	L	Comments
7265.37 *5*	1/2$^+$		0	
7375.00 *5*	3/2$^+$	1.9 eV *2*	2	Γγ=1.2 eV *1*.
7411.07 *5*	3/2$^-$	5.6 keV *8*	1	Γγ=4.1 eV *2*.
7500.09 *5*	(1/2$^-$)	3 eV	(1)	Γγ=3 eV.
7577.32 *5*		31 eV *5*	2	Γγ=1.8 eV *1*.
7587.21 *5*	1/2$^-$	≈79 keV	1	Γγ=5.2 eV *6*.
7743.92 *5*	3/2$^-$	31 keV *5*	1	Γγ=5.4 eV *6*.
7786.70 *5*	5/2$^+$	20.4 eV *20*	2	T=3/2 Γγ=1.02 eV *6*.
7808.70 *5*	3/2$^-$	0.56 keV *14*	1	Γγ=0.38 eV *7*.
7859.32 *7*	3/2$^+$	13 eV *4*	2	T=3/2 Γγ=4.5 eV *10*.
7946.6 *6*	1/2$^-$	0.9 keV *3*	1	Γγ=1.2 eV *2*.
7962.5 *7*	1/2$^+$	21 keV *4*	0	Γγ=7.7 eV *9*.
8140.7 *8*	3/2$^+$	13 keV *7*	2	Γγ=6.0 eV *23*.
8244.1 *10*			(2)	
8311.1 *10*	5/2$^+$		2	
8316.4 *10*			(2)	
8323.9 *10*	1/2$^+$		0	
8351.1 *11*			(2)	
8362.3 *11*	1/2$^+$		0	
8558.6 *13*	5/2$^+$		2	
8569.3 *13*	3/2$^-$		1	
8579.3 *13*	3/2$^+$		2	
8596.5 *13*			(2)	
8834.3 *13*	1/2$^+$		0	T=3/2
8868.8 *16*	3/2$^-$		1	
8893.8 *16*	1/2$^-$		1	
8970.6 *17*	5/2$^+$		2	
9013.7 *18*			1	
9071.5 *7*				
9325.5 *9*				
9501.8 *15*				
10038.5 *15*				
10252.4 *9*				
11045.2 *18*				
11388.8 *14*				
11998.5 *18*				

† Calculated using S(n)=7330.52 *5* in 2021Wa16 (Other: S(n)=7330.67 *4* in 2018MuZY). En(Lab) in 2018MuZY converted to En(c.m.) using m(n)=1.0086649159 a.m.u. and m(^{24}Mg)=23.985041689 a.m.u.

‡ As spin listed in 2018MuZY. Parity from the listed L values.

Deduced using the data in 2018MuZY.

^{24}Mg(d,p),(pol d,p) 1961Hi11,1975Me12,1977Be48

1961Hi11: ^{24}Mg(d,p), E=5.5-6.0 MeV; Ilford C2 nuclear plates were used to record the ejected particles. Deduced excited levels.
1975Me12: ^{24}Mg(d,p), E=12.0 MeV; 99.9% enriched target; measured σ(Ep,θ) in the range 5°- 120° in steps of 5° with seven position sensitive detectors placed in the focal plane of an Enge split-pole magnetic spectrograph. Deduced levels, L, S. FWHM (average)=7 keV.
1977Be48: ^{24}Mg(pol d,p), E=10-12 MeV and 8-13 MeV. 99.96% enriched target; measured iT$_{11}$(E$_d$,E$_p$,θ) in the range 15° to 165° and σ(E,Ep,θ) at 105°, 138°, 160°; deduced excited levels, spin, parity, spectroscopic factor. FWHM=50-200 keV.
1978Bo14 (other): ^{24}Mg(d,p), E=10.5 MeV; measured σ(Ep,θ_p; En,θ_n); deduced levels, spin, parity, Γ. Enriched target.
1976Bo18 (other): ^{24}Mg(d,p), E=12 MeV; 99.9% enriched target; Buechner type magnetic spectrograph loaded with Ilford L4 emulsions; measured σ(Ep,θ) at 10° or 12.5°; Deduced energy levels, spin, parity, L, Γ.
Other references:
(d,p): 1960Ha27, 1961Hi04, 1961Is08, 1961Lu03, 1962Bu04, 1962Is04, 1962Mi03 (also 1961Mi11), 1964Cu05, 1964Da05, 1964Re04, 1966Ga17, 1968Ho23, 1968Le19, 1970Me28, 1971Ho31, 1971Om02, 1973Sc05, 1974Bo34, 1974Sc22, 1974Vo01, 1975To11.
(pol d,p): 1968Yu01, 1972Br12, 1977An31, 1984Ha26.
(^{7}Li,^{6}Li): 1975Mo07.
(^{19}F,^{18}F): 1976Ts03.

^{25}Mg Levels

Γ_n listed in Table 1 (1978Bo14), probably a typo. The evaluators list as Γ_p.

E(level)[†]	J$^\pi$	L[a]	S[d]	Comments
0	5/2+[#]	2	0.220	L: also in 1968Yu01, 1960Ha27, 1962Mi03, 1974Sc22. S: Other: 0.53 (1975Me12), 0.32 (1976Ts03 (^{19}F,^{18}F)).
579 *10*	1/2+[#]	0	0.350	L: also in 1962Mi03, 1968Yu01, 1974Sc22. S: Other: 0.49 (1975Me12), 0.64 (1976Ts03 (^{19}F,^{18}F)).
973 *10*	3/2+[#]	2	0.200	L: also in 1962Mi03, 1968Ho23, 1974Sc22. S: Other: 0.37 (1975Me12).
1609 *10*	7/2+[#]	4[c]		
1962 *10*	5/2+[#]	2	0.074	L: also L=2 in 1960Ha27, 1962Mi03, 1968Ho23, and 1974Sc22. S: Other: 0.10 (1975Me12).
2564 *10*	1/2+[#]	0	0.140	L: also in 1962Mi03, 1974Sc22. S: Other: 0.16 (1975Me12).
2737 *10*	7/2+	4[c]		
2800[‡] *10*	3/2+	2	0.330	J$^\pi$,L: from 1962Mi03, 1968Yu01 (pol d,p). S: Other: 0.31 (1975Me12).
3398 *7*	9/2+			J$^\pi$: from 1961Hi04. Weakly populated in (d,p) and strongly in (d,α). Population cross section ratio of this level to 3407-keV level is 1:2.5 (4) (1961Hi04).
3407 *7*	3/2−[#]	1	0.230	E(level): from 1961Hi04. Other: 3407 *10* (1961Hi11). J$^\pi$: also from L=1 based on polarized p(θ) measurements (1962Is04). L=1 (1962Mi03). S: Other: 0.30 (1975Me12).
3900 *10*	(5/2)+	2	0.017	S: from 1975Me12 for 5/2 and 0.031 for 3/2.
3965[‡] *10*	(7/2)−[#]	3[b]	0.280	L: also 2 or 3 in 1962Mi03, 3 in 1964Cu05. L=2 was not supported in 1977Be48. S: Other: 0.43 (1975Me12).
4054 *10*				
4268 *10*	1/2−[#]	1	0.190	L: from 1962Mi03. S: Other: 0.21 (1975Me12).
4351 *10*	(3/2)+	2	0.011[e]	
4701 *10*				
4711[‡] *10*		1,(2)	0.004	S: from 1975Me12 for 3/2 and 0.008 for 1/2.
5004 *10*				

Continued on next page (footnotes at end of table)

^{24}Mg(d,p),(pol d,p) 1961Hi11,1975Me12,1977Be48 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π	Γ[&]	L[a]	S[d]	Comments
5108 *10*	1/2$^-$[#]		1	0.014	J^π,L: other: 3/2$^+$ and L=2 in 1975Me12, refuted in 1977Be48. S: other: 0.004 for 3/2$^+$ (1975Me12).
5243 *10*					
5454 *10*					
5465 *10*	1/2$^+$[#]		0	0.170	L: also in 1962Mi03. S: also 0.17 in 1975Me12.
5511 *10*			(2)	(0.006)[e]	
5520 *10*					
5738 *10*					
5786 *10*					
5851 *10*				<0.001	
5969 *10*					
6040 *10*					
6074 *10*					
6159 *10*					
6350 *10*			(2)		L: from 1961Hi11.
6409 *10*					
6423 *10*					
6458 *10*					
6668 *10*					
6768 *10*					
6825 *10*					
6871 *10*					
6903 *10*					
6944 *10*					
7026 *10*					
7078 *10*	3/2$^+$,5/2$^+$		2		J^π,L: from 1962Mi03.
7170 *10*					
7215 *10*	3/2$^+$,5/2$^+$		2		J^π,L: from 1962Mi03.
7271 *10*	(7/2)$^-$		3		L: from 1962Mi03.
7364 *10*	(3/2,5/2)$^+$		2		L: from 1962Mi03.
7411 *2*	3/2$^-$	9 keV *2*	1		E(level): from En(c.m.)=80 *2* (1976Bo18). Other: 7399 *10* (1961Hi11). J^π,L: from 1962Mi03. Also 3/2 in 1976Bo18 extracted from total neutron cross section.
7490 *10*					
7513 *10*					
7563 *10*					
7583 *6*	1/2[@]	85 keV *15*			E(level): from En(c.m.)=252 *6* (1976Bo18). Other: 7570 *20* (1961Hi11).
7623 *10*					
7640 *10*					
7748 *5*	(3/2)[@]	30 keV *10*			E(level): from En(c.m.)=417 *5* (1976Bo18).
7782 *5*					E(level): from En(c.m.)=450 *5* (1976Bo18).
7966 *7*	1/2[@]	25 keV *5*			E(level): from En(c.m.)=635 *7* (1976Bo18).
8120[‡] *20*					Γ_p to g.s.=80 keV for 3/2$^-$ and 6 keV for 3/2$^+$ (1978Bo14).
8142 *3*	3/2[@]	13 keV			E(level): from En(c.m.)=810 *3* (1976Bo18).
8260[‡] *20*					Γ_p to g.s.=50 keV for 3/2$^-$ (1978Bo14).
8323 *3*	1/2[@]	14 keV *4*			E(level): from En(c.m.)=992 *3* (1976Bo18).
8340[‡] *20*					
8359 *5*	1/2[@]	18 keV *6*			E(level): from En(c.m.)=1028 *5* (1976Bo18).
8510[‡] *20*					
8551 *3*	1/2[@]	8 keV *4*			E(level): from En(c.m.)=1230 *3* (1976Bo18).

Continued on next page (footnotes at end of table)

^{24}Mg(d,p),(pol d,p) 1961Hi11,1975Me12,1977Be48 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^{π}	Γ[&]	Comments
8573 *4*	(1/2)[@]	7 keV *3*	E(level): from En(c.m.)=1242 *4* (1976Bo18). J^{π}: $3/2^+$ in Adopted Levels.
8581 *4*	(3/2)[@]	12 keV *5*	E(level): from En(c.m.)=1250 *4* (1976Bo18). Other: 8580 *30* (1978Bo14). Γ_p to g.s.=75 keV for $3/2^-$ and 8.5 keV for $3/2^+$ (1978Bo14).
8840 *7*	1/2[@]	50 keV *10*	E(level): from En(c.m.)=1509 *7* (1976Bo18). Other: 8840 *40* (1978Bo14). Γ_p to g.s.=30 keV for $1/2^+$ and 15 keV for $1/2^-$ (1978Bo14).
8899 *4*	1/2[@]	32 keV *8*	E(level): from En(c.m.)=1568 *4* (1976Bo18). Other: 8910 *20* (1978Bo14).
8974 *3*	3/2[@]	16 keV *4*	E(level): from En(c.m.)=1642 *3* (1976Bo18). Other: 8970 *20* (1978Bo14). Γ_p to g.s.=7 keV for $3/2^+$ (probably) and 5 keV for $5/2^+$ (1978Bo14).
9022 *8*	(1/2)[@]	≤10 keV	E(level): from En(c.m.)=1685 *8* (1976Bo18).
9050[‡] *20*			Γ_p to g.s.=4.5 keV for $3/2^+$ (1978Bo14).
9073 *3*	(1/2)[@]	14 keV	E(level): from En(c.m.)=1742 *3* (1976Bo18).
9153 *4*	(3/2)[@]	22 keV	E(level): from En(c.m.)=1825 *4* (1976Bo18). Other: 9120 *20* (1978Bo14). Γ_p to g.s.=35 keV for $3/2^-$ and 6 keV for $3/2^+$ (1978Bo14).
9335 *4*	(3/2)[@]	24 keV	E(level): from En(c.m.)=2004 *4* (1976Bo18). Other: 9350 *50* (1978Bo14).
9500[‡] *20*			
10000[‡] *40*			
10050[‡] *20*			Γ_p to g.s.=20 keV for $5/2^+$ (1978Bo14).
10200[‡] *30*			Γ_p to g.s.=80 keV for $3/2^-$ and 16 keV for $3/2^+$ (1978Bo14).
10270[‡] *40*			Γ_p to g.s.=75 keV for $3/2^-$ and 14 keV for $3/2^+$ (1978Bo14).
10360[‡] *30*			
10520[‡] *40*			
10620[‡] *40*			Γ_p to g.s.=120 keV for $3/2^-$ and 25 keV for $3/2^+$; to exited state: 77 keV for $7/2^-$ and 15 keV for $7/2^+$ (1978Bo14).
10730[‡] *40*			
10860[‡] *40*			
11070[‡] *40*			
11180[‡] *40*			
11350[‡] *30*			Γ_p to g.s.=120 keV for $3/2^-$ and 26 keV for $3/2^+$; to exited state: 160 keV for $7/2^-$ and 35 keV for $7/2^+$ (1978Bo14).
11490[‡] *30*			
11590[‡] *30*			

[†] From 1961Hi11, except where otherwise noted.
[‡] From 1978Bo14.
[#] From vector analyzing power (pol d,p) (1977Be48).
[@] From 1976Bo18, proposed based on the total neutron cross section.
[&] From 1976Bo18.
[a] From 1975Me12, except where otherwise noted. Additional source reference also listed in the comments, if any.
[b] From 1977Be48.
[c] From 1962Bu04, based on DWBA analysis and measured $\sigma(\theta)$ data in 1961Hi11.
[d] From 1977Be48, except where otherwise noted.
[e] From 1975Me12.

^{24}Mg(d,pγ) 1991He05

1991He05: ^{24}Mg(d,pγ), E=6.5 MeV. Measured σ(Ep), pγ coincidences, DSA. Surface barrier proton detector and Ge(Li) detector.

1974Ro39 (other): ^{24}Mg(d,pγ), E=6 MeV. Measured DSA, pγ coincidences. Annular surface barrier detector at 180° and a Ge(Li) detector at 0°, 60°, and 90° with respect to the beam direction.

1976Ch29 (other): E=4.7 MeV; measured pγ, nγ, $\gamma\gamma$-coin. Deduced levels, γ-branching. Annular surface barrier and Ge(Li) detectors.

Others: 1961Mc17, 1969So09, 1971Al29, 1971Do13, 1972Al28, 1973Ro17, 1974Ro10, 1974Vo01.

^{25}Mg Levels

E(level)[†]	J$^\pi$[†]	$T_{1/2}$	Comments
0	5/2$^+$		
585.0[#] *2*	1/2$^+$	3.5 ns *4*	$T_{1/2}$: from τ=5.0 ns *6* (1971Do13). Other: 3.33 ns *7* (τ=4.81 ns *10* from 1961Mc17).
974.6[#] *4*	3/2$^+$	10.1 ps *17*	$T_{1/2}$: from 1972Al28 (also 1971Al29). Other value: 11 ps *4* (from τ=16 ps *4* – 1971Do13).
1611.8[#] *5*	7/2$^+$		
1964.4[#] *3*	5/2$^+$		
2563.6[#] *4*	1/2$^+$	<7[&] fs	
2737.0[#] *7*	7/2$^+$	291[&] fs *+26−29*	$T_{1/2}$: from τ=420 fs *+37−42*. In 1974Ro39, listed as τ=420 fs *+457−378*, implies τ=420 fs *+(420+37)*(upper uncertainty)-*(420-42)* (lower uncertainty).
2801.5[#] *6*	3/2$^+$	26[&] fs *3*	
3405.6[#] *6*	9/2$^+$	21[&] fs *+12−15*	
3413.3[#] *8*	3/2$^-$	11[@] fs *4*	$T_{1/2}$: other: <7 fs (1974Ro39).
3907.6[#] *9*	5/2$^+$	<7[&] fs	γs to 2561 and 1964 keV levels with branching ratios 4 and <3, respectively, are listed in 1973Ro17. These transitions are absent in 1991He05.
3970.4[#] *6*	7/2$^-$	18[&] fs *8*	
4060 *1*	9/2$^+$	34[&] fs *14*	
4277.1[#] *7*	1/2$^-$	<7[&] fs	
4359.3[#] *9*	3/2$^+$	<7[&] fs	
4710.5[#] *11*	9/2$^+$	29[&] fs *3*	
4721.8[#] *13*	5/2$^+$	<7[&] fs	
5011.9[#] *7*	7/2$^+$	<7[&] fs	
5116.4[#] *12*	1/2$^-$	18 fs *4*	$T_{1/2}$: from 1974Ro39, value is inconsistent with the reported limit of <7 fs from (p,p′γ).
5250.3 *12*	11/2$^+$	<13[&] fs	E(level): weighted average of 5251 *1* (1991He05) and 5248.2 *18* (1976Ch29).
5462.8 *13*	13/2$^+$	0.96[&] ps *+46−34*	E(level): weighted average of 5462 *1* (1991He05) and 5464.7 *15* (1976Ch29).
5475.2 *10*	1/2$^+$	<7[&] fs	E(level): weighted average of 5475 *1* (1991He05) and 5476.0 *24* (1976Ch29).
5521.1[#] *6*	5/2$^-$	<7[&] fs	E(level): other: 5511 (1974Ro39).
5533.8[#] *13*	11/2$^+$	<6[@] fs	E(level),$T_{1/2}$: other: 5524 and <7 fs (1974Ro39).
5746.4[#] *14*	7/2,9/2$^+$[‡]	<7[&] fs	
5748 *2*	1/2$^+$,3/2$^+$,5/2$^+$[‡]		
5793.0[#] *5*	11/2$^-$,7/2$^-$	33[@] fs *7*	$T_{1/2}$: other value: 35 fs *11* (1974Ro39).
5862 *2*	5/2$^+$	<7[&] fs	
5972 *2*	9/2$^+$	<18[&] fs	E(level),$T_{1/2}$: other: 5967; two mean lifetime values are listed with this level energy as τ < 26 fs and τ=15 fs *+28−15*.

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^{24}Mg(d,pγ) 1991He05 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^{π}[†]	$T_{1/2}$	Comments
5979.3[#] *21*	7/2$^+$	<7[&] fs	
6041 *2*	11/2$^+$,7/2$^+$	<7[&] fs	J^{π}: proposed in 1974Ro10, based on $\gamma(\theta)$ and p-γ angular correlation measurements.
6082 *1*	5/2$^+$	<7[&] fs	J^{π}: listed in Table 2. In footnote 3/2$^+$,5/2$^+$.
6169 *3*	3/2	<7[&] fs	
6362 *2*	3/2$^+$	<7[&] fs	J^{π}: D+Q 6361γ, ΔJ=1 transition, to 5/2$^+$.
6433 *2*	9/2$^+$	<7[&] fs	
6468 *2*	3/2$^-$	<7[&] fs	
6570 *1*	1/2$^+$,3/2	<7[&] fs	
6678 *1*	5/2	10[&] fs *+30−3*	J^{π}: D+Q 1666γ, ΔJ=1, to 7/2$^+$ and 2770γ D+Q, ΔJ=0, based on A_2 and A_4.
6777 *3*	1/2$^+$	<7[&] fs	
6832 *2*	3/2$^-$,5/2	<28[@] fs	
6839 *2*	5/2$^+$	<7 fs	J^{π}: D+Q 5864γ, ΔJ=1, to 3/2$^+$; D+Q γ to 5/2$^+$; 7/2$^+$.
6885 *3*	7/2,9/2,11/2	97[@] fs *42*	
6914 *2*	3/2$^+$,5/2		
6958 *2*	3/2$^+$,5/2	<7[&] fs	
7038 *2*	5/2	<21[@] fs	
7088 *4*	3/2$^+$,5/2$^+$	<7[&] fs	
7181 *2*	3/2$^+$,7/2	<18[&] fs	$T_{1/2}$: other: < 28 fs (1991He05).
7185 *2*		<14[@] fs	
7228 *3*	3/2$^+$,5/2$^+$	<7[&] fs	
7285 *2*	7/2$^-$	<7[&] fs	
7378 *5*	5/2$^+$		
7493 *3*	11/2	21[@] fs *8*	
7505 *3*	5/2	<10[@] fs	
7524 *2*	7/2,5/2$^+$	<10[@] fs	J^{π}: adopted as 7/2$^+$,5/2.
7551 *1*	13/2$^+$,9/2$^+$	<21[@] fs	
7582 *9*	5/2$^+$	<173[@] fs	
7633 *5*	(7/2$^+$)	<49[@] fs	
7653 *2*	9/2	<21[@] fs	J^{π}: D(+Q) 4915γ ΔJ=1, to 7/2$^+$.
7801 *2*	9/2	<12[@] fs	
7838 *2*	7/2$^+$	<28[@] fs	
7866 *2*	7/2$^+$,11/2$^+$[‡]	<12[@] fs	
7961 *2*	7/2$^+$	<14[@] fs	
8012 *3*	13/2$^+$,9/2	<28[@] fs	
8076 *3*	5/2,7/2,9/2	<14[@] fs	
8119 *3*	(7/2$^+$)	<10[@] fs	
8267 *2*	(7/2$^+$)	<10 fs	J^{π}: expected n_0 decay with l≤3, and spin-parity 7/2$^-$ is highly improbable (1991He05).
8530 *2*	(7/2$^+$)	<10[@] fs	
8544 *3*	(7/2$^+$)	<17[@] fs	
8551	11/2	<5[@] fs	
8656 *2*	7/2	<10[@] fs	
8811 *2*	13/2$^+$,9/2$^+$	<8[@] fs	

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^{24}Mg(d,pγ) 1991He05 (continued)

^{25}Mg Levels (continued)

E(level)†	Jπ†	$T_{1/2}$	Comments
8888 *3*		<17@ fs	Jπ: 11/2,(9/2+,7/2) in Fig 4. (1991He05). However, authors note in the text that the spin-parity was not assigned due to the variance of the expected n_0 decay with l≤4 (implying spin-parity ≠9/2+) and the γ decay to 9/2+. Also it is not predicted by their shell model calculations. The D+Q ΔJ=0 γ to 9/2+, implies 9/2+ for this level from ≠M2 component by RUL.
8896 *1*		17@ fs *8*	Jπ: 15/2− or 11/2,15/2− in 1991He05, based on assignment in band member and 3103γ to 11/2−. A_2, A_4 values of 3103γ support ΔJ=0 transition. In the adopted dataset Jπ=7/2−,9/2−.
9014 *3*	11/2,7/2+,9/2+	<5@ fs	
9410 *3*	13/2,9/2	12@ fs *8*	Jπ: from Fig. 4 (1991He05), in the text 13/2. In Table 2 footnote, 9/2 is highly improbable from expected n_0 decay with l≤4 and n_1 decay with l≤3.
9652 *2*	11/2,7/2	<5@ fs	Jπ: from Fig. 4 (1991He05). In Table 2 footnote, 7/2 is highly improbable from expected n_0 decay with l≤4 and n_1 decay with l≤3.
9686 *3*	11/2,7/2	<5@ fs	
9830 *10*	11/2+,13/2		
9946 *4*	11/2+,15/2		
10136 *10*			
10996 *10*			
11200 *10*			
11409 *10*			

† From 1991He05, except as noted.
‡ Selection/rejection of parity based on the RUL for hypothetical M2 transition rate/s (1991He05).
# From 1976Ch29.
@ From 1991He05, by Doppler Shift Attenuation Method.
& From 1974Ro39. The uncertainty was deduced by the evaluators from the reported upper and lower mean lifetime values in 1974Ro39, for example: for a mean lifetime value of X, it is listed as $X^{X+\text{upper uncertainty}}_{(X-\text{lower uncertainty})}$. For 2734 keV level, a numerical example has been listed.

γ(^{25}Mg)

E_i(level)	J^π_i	Eγ†	Iγ‡	E_f	J^π_f	Mult.#	Comments
585.0	1/2+	585.0	100	0	5/2+		
974.6	3/2+	389.6	49 *5*	585.0	1/2+		
		974.6	51 *5*	0	5/2+		
1611.8	7/2+	1611.8	100	0	5/2+	D+Q	A_2=−0.55 *3*; A_4=+0.01 *5* (1969So09)
1964.4	5/2+	989.8	28 *3*	974.6	3/2+		
		1379.4	41 *4*	585.0	1/2+		A_2=+0.56 *5*; A_4=−0.36 *8* (1969So09)
		1964.4	31 *3*	0	5/2+	D+Q	A_2=+0.00 *7*; A_4=+0.01 *5* (1969So09)
2563.6	1/2+	1589.0	15 *5*	974.6	3/2+		
		1978.6	82 *8*	585.0	1/2+		
		2563.6	3 *1*	0	5/2+		
2737.0	7/2+	772.6	9 *3*	1964.4	5/2+	D+Q	A_2=+0.46 *21*; A_4=−0.34 *35* (1969So09)
		1762.4	82 *8*	974.6	3/2+	Q	A_2=+0.43 *5*; A_4=−0.33 *8* (1969So09)
		2737.0	9 *3*	0	5/2+	D+Q	A_2=−0.42 *15*; A_4=−0.01 *26* (1969So09)
2801.5	3/2+	836.9	43 *4*	1964.4	5/2+	D+Q	A_2=−0.07 *3*; A_4=−0.04 *5* (1969So09)
		2216.5	35 *4*	585.0	1/2+		A_2=−0.30 *5*; A_4=−0.14 *8* (1969So09)
		2801.5	22 *7*	0	5/2+	D+Q	A_2=+0.25 *6*; A_4=+0.08 *8* (1969So09)
3405.6	9/2+	1793.8	83 *8*	1611.8	7/2+		
		3405.6	17 *5*	0	5/2+		
3413.3	3/2−	2438.7	17 *5*	974.6	3/2+		A_2=−0.22 *10*; A_4=−0.30 *17* (1969So09)

Continued on next page (footnotes at end of table)

^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
3413.3	3/2⁻	2828.3	68 *7*	585.0	1/2⁺		A_2=−0.28 *3*; A_4=−0.02 *5* (1969So09)
		3413.3	15 *5*	0	5/2⁺	D+Q	A_2=+0.06 *5*; A_4=+0.18 *9* (1969So09)
3907.6	5/2⁺	1106.1		2801.5	3/2⁺		I_γ: 6 *2* (1973Ro17).
		1170.6		2737.0	7/2⁺		I_γ: 8 *3* (1973Ro17).
		2932.8		974.6	3/2⁺		I_γ: 72 *7* (1973Ro17).
		3907.6		0	5/2⁺		I_γ: 10 *3* (1973Ro17).
3970.4	7/2⁻	1233.4	2 *1*	2737.0	7/2⁺		
		2006.0	15 *1*	1964.4	5/2⁺		
		2358.6	2 *1*	1611.8	7/2⁺		
		3970.4	81 *2*	0	5/2⁺	D+Q	A_2=−0.33 *3*; A_4=−0.07 *4* (1969So09)
4060	9/2⁺	654		3405.6	9/2⁺		E_γ: transition absent in 1973Ro17. In 1991He05, the branching is 1.0 *5* from the literature.
		2448	44 *5*	1611.8	7/2⁺		
		4060	56 *6*	0	5/2⁺		
4277.1	1/2⁻	863.8	4 *2*	3413.3	3/2⁻		
		1713.4	11 *1*	2563.6	1/2⁺		
		3302.5	76 *8*	974.6	3/2⁺		A_2=−0.03 *9*; A_4=−0.23 *16* (1969So09)
		3692.1	9 *3*	585.0	1/2⁺		
4359.3	3/2⁺	1795.7	1.0 *3*	2563.6	1/2⁺		
		3384.4	57 *6*	974.6	3/2⁺		
		3774.3	42 *4*	585.0	1/2⁺	D+Q	A_2=−0.64 *14*; A_4=+0.15 *24* (1969So09)
4710.5	9/2⁺	1973.5		2737.0	7/2⁺		I_γ: This transition feeding 2737.95 keV level is absent in 1973Ro17, instead feeding a level at 3965 (3970 in the adopted) with a weaker branching ratio of 1.
		2746.1	99 *10*	1964.4	5/2⁺		A_2=+0.68 *12*; A_4=+0.13 *18* (1969So09)
4721.8	5/2⁺	2757.4	15 *5*	1964.4	5/2⁺		
		3747.2	84 *4*	974.6	3/2⁺		
		4721.8	1.0 *5*	0	5/2⁺		
5011.9	7/2⁺	1041.5	1.0 *5*	3970.4	7/2⁻		
		1104.3	2 *1*	3907.6	5/2⁺		
		2210.4	8 *2*	2801.5	3/2⁺		
		3047.5	40 *4*	1964.4	5/2⁺		
		3400.1	11 *2*	1611.8	7/2⁺		
		5011.4	38 *4*	0	5/2⁺		
5116.4	1/2⁻	1703.1		3413.3	3/2⁻		
		2552.8		2563.6	1/2⁺		
		4141.8		974.6	3/2⁺		A_2=−0.02 *9*; A_4=−0.19 *15* (1969So09)
		4531.4		585.0	1/2⁺	D+Q	A_2=+0.03 *10*; A_4=−0.08 *17* (1969So09)
5250.3	11/2⁺	1190	23 *8*	4060	9/2⁺		
		1845	34 *4*	3405.6	9/2⁺		
		2513	13 *4*	2737.0	7/2⁺		
		3638	30 *3*	1611.8	7/2⁺		
5462.8	13/2⁺	2057	100	3405.6	9/2⁺		A_2=+0.05 *3*; A_4=−0.03 *5* (1969So09)
5475.2	1/2⁺	2062	5 *2*	3413.3	3/2⁻		
		2911	3 *1*	2563.6	1/2⁺		
		4500	28 *3*	974.6	3/2⁺		
		4890	64 *7*	585.0	1/2⁺		
5521.1	5/2⁻	1550.7	14 *4*	3970.4	7/2⁻		
		2107.8	3 *1*	3413.3	3/2⁻		
		2719.4	11 *4*	2801.5	3/2⁺		
		3556.7	13 *4*	1964.4	5/2⁺		
		3909.3	29 *3*	1611.8	7/2⁺		
		5520.4	30 *3*	0	5/2⁺		
5533.8	11/2⁺	2128.2		3405.6	9/2⁺		
		3922.0		1611.8	7/2⁺		

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^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π	Mult.#	Comments
5746.4	7/2,9/2$^+$	1686.4	3 *2*	4060	9/2$^+$	D+Q	A_2=−0.35 *11*; A_4=+0.00 *11* (1991He05) δ: +0.18 *+7−2* for J^π=7/2; δ< +0.6 or δ > +1 for 9/2$^+$ (1991He05).
		2340.8	5 *2*	3405.6	9/2$^+$		
		3009.4	7 *2*	2737.0	7/2$^+$		
		5745.7	85 *15*	0	5/2$^+$		
5748	1/2$^+$,3/2$^+$,5/2$^+$	1840	2 *1*	3907.6	5/2$^+$		
		2946	5 *2*	2801.5	3/2$^+$		
		3783	14 *3*	1964.4	5/2$^+$		A_2=−0.01 *5*; A_4=+0.05 *5* (1991He05) δ: +0.25 *6* for 5/2$^+$ (1991He05).
		4773	30 *5*	974.6	3/2$^+$		A_2=+0.06 *3*; A_4=+0.07 *4* (1991He05) δ: ∞ for 1/2$^+$; +5.7 *+14−32* for 5/2$^+$ (1991He05).
		5162	4 *2*	585.0	1/2$^+$		
		5747	45 *15*	0	5/2$^+$		
5793.0	11/2$^-$,7/2$^-$	1822.5	39 *4*	3970.4	7/2$^-$		
		2387.3	61 *4*	3405.6	9/2$^+$		
5862	5/2$^+$	3125	19 *4*	2737.0	7/2$^+$		
		4887	16 *4*	974.6	3/2$^+$		
		5861	65 *8*	0	5/2$^+$		
5972	9/2$^+$	1912	39 *4*	4060	9/2$^+$		
		4360	58 *6*	1611.8	7/2$^+$		
		5971	3 *2*	0	5/2$^+$		
5979.3	7/2$^+$	3242.3	30 *3*	2737.0	7/2$^+$		
		4014.9	62 *6*	1964.4	5/2$^+$		
		5978.5	8 *3*	0	5/2$^+$		
6041	11/2$^+$,7/2$^+$	1981	5 *1*	4060	9/2$^+$		
		2635	75 *7*	3405.6	9/2$^+$		
		3304	12 *3*	2737.0	7/2$^+$		
		4429	8 *2*	1611.8	7/2$^+$		
6082	5/2$^+$	1723	2 *1*	4359.3	3/2$^+$		
		2112	4 *1*	3970.4	7/2$^-$		
		2669	6 *1*	3413.3	3/2$^-$	D+Q	A_2=−0.36 *7*; A_4=+0.08 *7* (1991He05) δ: +0.03 *+5−35* or −3.1 *6* for 5/2$^+$ (1991He05).
		3280	3 *1*	2801.5	3/2$^+$		
		4117	25 *4*	1964.4	5/2$^+$		
		4470	46 *5*	1611.8	7/2$^+$	D+Q	A_2=−0.06 *3*; A_4=−0.05 *4* (1991He05) δ: +0.14 *+8−20* or −5.0 *+8−20* for 5/2$^+$ (1991He05).
		5107	4 *1*	974.6	3/2$^+$		
		6081	10 *1*	0	5/2$^+$	D+Q	A_2=−0.31 *8*; A_4=−0.05 *9* (1991He05) δ: −0.97 *14* or −4.0 *+5−16* for 5/2$^+$ (1991He05).
6169	3/2	1892	3 *1*	4277.1	1/2$^-$		A_2=−0.43 *6*; A_4=−0.11 *7* (1991He05) δ: < +0.45 or −2.1 < δ < +0.1 for 3/2 (1991He05).
		2756	2 *1*	3413.3	3/2$^-$		
		3367	8 *2*	2801.5	3/2$^+$		A_2=+0.05 *7*; A_4=+0.10 *7* (1991He05)
		4204	33 *4*	1964.4	5/2$^+$		A_2=−0.08 *3*; A_4=−0.04 *4* (1991He05)
		5194	40 *5*	974.6	3/2$^+$		A_2=−0.01 *3*; A_4=+0.01 *4* (1991He05)
		5583	6 *2*	585.0	1/2$^+$		
		6168	8 *2*	0	5/2$^+$		
6362	3/2$^+$	2003	2 *1*	4359.3	3/2$^+$		
		4397	7 *2*	1964.4	5/2$^+$		
		5387	12 *3*	974.6	3/2$^+$		
		5776	10 *2*	585.0	1/2$^+$		
		6361	69 *7*	0	5/2$^+$	D+Q	A_2=−0.29 *3*; A_4=+0.01 *4* (1991He05) δ: −0.37 < δ < −1.5 or δ < +0.14 for 3/2 (1991He05).

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^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	δ@	Comments
6433	9/2+	899	7 *2*	5533.8	11/2+	D(+Q)	−0.03 *13*	A_2=−0.25 *10*; A_4=+0.03 *1* (1991He05)
		1183	3 *1*	5250.3	11/2+			
		1421	18 *4*	5011.9	7/2+			
		1722	9 *2*	4710.5	9/2+			
		2373	13 *3*	4060	9/2+	D+Q		A_2=+0.08 *8*; A_4=−0.07 *10* (1991He05) δ: +2.5 *5* or −0.5 *1* for 9/2 (1991He05).
		2525	15 *3*	3907.6	5/2+	Q		A_2=+0.41 *9*; A_4=−0.38 *10* (1991He05) δ: ∞ (1991He05).
		3696	8 *2*	2737.0	7/2+			
		4821	27 *6*	1611.8	7/2+	D+Q	1.0 *+15−6*	A_2=+0.75 *10*; A_4=+0.14 *12* (1991He05)
6468	3/2−	1352	11 *3*	5116.4	1/2−			A_2=−0.07 *5*; A_4=−0.12 *5* (1991He05)
		1746	4 *1*	4721.8	5/2+			
		2191	6 *1*	4277.1	1/2−			
		2560	17 *4*	3907.6	5/2+			A_2=−0.06 *5*; A_4=−0.05 *6* (1991He05)
		3054	3 *1*	3413.3	3/2−			
		4503	28 *5*	1964.4	5/2+			A_2=−0.08 *6*; A_4=−0.06 *6* (1991He05)
		5493	14 *3*	974.6	3/2+			
		5882	17 *4*	585.0	1/2+			A_2=−0.35 *10*; A_4=+0.06 *9* (1991He05)
6570	1/2+,3/2	2293	3 *1*	4277.1	1/2−			
		2662	4 *1*	3907.6	5/2+			
		4006	14 *3*	2563.6	1/2+			A_2=+0.02 *6*; A_4=−0.05 *7* (1991He05)
		4605	17 *3*	1964.4	5/2+			A_2=+0.00 *6*; A_4=+0.00 *8* (1991He05)
		5595	29 *4*	974.6	3/2+			A_2=−0.06 *6*; A_4=−0.04 *7* (1991He05)
		5984	33 *4*	585.0	1/2+			A_2=−0.12 *6*; A_4=+0.06 *7* (1991He05)
6678	5/2	1157	1.0 *5*	5521.1	5/2−			
		1666	2 *1*	5011.9	7/2+	D+Q		A_2=−0.57 *9*; A_4=+0.09 *9* (1991He05) δ: +5.7 *+38−20* or +0.29 *8* (1991He05).
		2770	5 *1*	3907.6	5/2+	D+Q	−0.10 *9*	A_2=+0.32 *9*; A_4=+0.00 *10* (1991He05)
		3876	75 *7*	2801.5	3/2+	D+Q	−0.30 *4*	A_2=−0.45 *3*; A_4=+0.04 *3* (1991He05)
		4713	4 *1*	1964.4	5/2+	D(+Q)	+0.4 *+7−4*	A_2=+0.64 *11*; A_4=+0.03 *13* (1991He05)
		6677	13 *3*	0	5/2+	D(+Q)	+0.25 *+12−35*	A_2=+0.43 *9*; A_4=+0.00 *9* (1991He05)
6777	1/2+	2500	1.0 *5*	4277.1	1/2−			
		3363	21 *4*	3413.3	3/2−			
		3975	3 *2*	2801.5	3/2+			
		4213	9 *2*	2563.6	1/2+			
		5802	19 *4*	974.6	3/2+			A_2=−0.05 *7*; A_4=+0.07 *7* (1991He05)
		6191	40 *8*	585.0	1/2+			
		6776	7 *2*	0	5/2+			
6832	3/2−,5/2	2473	20 *4*	4359.3	3/2+			
		2861	22 *4*	3970.4	7/2−			
		3418	22 *6*	3413.3	3/2−			
		4030	36 *6*	2801.5	3/2+	D(+Q)	−0.36 *+46−22*	A_2=−0.21 *10*; A_4=−0.15 *10* (1991He05) δ: for J^π=5/2.
6839	5/2+	4102	41 *10*	2737.0	7/2+	D+Q	+0.07 *8*	A_2=−0.23 *7*; A_4=+0.05 *8* (1991He05)
		5227	17 *4*	1611.8	7/2+			
		5864	26 *6*	974.6	3/2+	D+Q	+0.1 *+1−2*	A_2=−0.36 *7*; A_4=+0.00 *3* (1991He05)
		6838	16 *4*	0	5/2+	D(+Q)	+0.1 *+26−3*	A_2=+0.50 *12*; A_4=+0.50 *12* (1991He05)
6885	7/2,9/2,11/2	3479	16 *4*	3405.6	9/2+	D+Q		A_2=−0.43 *13*; A_4=+0.10 *10* (1991He05) δ: −0.14 *+40−14* for J^π=7/2; >−0.7 for 9/2; −0.04 *12* (1991He05).
		5273	84 *4*	1611.8	7/2+	D(+Q)		A_2=+0.35 *5*; A_4=+0.08 *10* (1991He05) δ: −0.14 *+200−21* for J^π=7/2; +0.40 *+27−15* for 9/2; ∞ for 11/2 (1991He05);
6914	3/2+,5/2	3006	3 *1*	3907.6	5/2+			A_2=+0.23 *8*; A_4=+0.01 *9* (1991He05)

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^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	δ@	Comments
								δ: +2.05 +10−5 or +0.18 41 for 5/2 (1991He05).
6914	3/2$^+$,5/2	4112	15 3	2801.5	3/2$^+$			A_2=−0.15 9; A_4=+0.05 11 (1991He05)
		4177	11 2	2737.0	7/2$^+$			
		4949	8 2	1964.4	5/2$^+$			
		5302	6 2	1611.8	7/2$^+$			
		5939	9 2	974.6	3/2$^+$			
		6913	48 7	0	5/2$^+$			A_2=+0.24 4; A_4=+0.06 4 (1991He05) δ: < +0.07 or −0.25 < δ < 2.0 for 3/2$^+$; +2.25 15 or 0.00 25 for 5/2$^+$ (1991He05).
6958	3/2$^+$,5/2	3544	3 1	3413.3	3/2$^-$			
		4156	8 1	2801.5	3/2$^+$			
		4221	14 2	2737.0	7/2$^+$			
		5983	14 2	974.6	3/2$^+$			
		6957	61 6	0	5/2$^+$			A_2=+0.17 3; A_4=−0.05 4 (1991He05) δ: +2.75 2 or −0.21 +40−5 for 5/2 (1991He05).
7038	5/2	3067	4 1	3970.4	7/2$^-$			
		3624	9 2	3413.3	3/2$^-$	D+Q		A_2=−0.23 9; A_4=−0.13 11 (1991He05) δ: −0.36 +18−10 or −3.5 +5−13 (1991He05).
		4301	6 1	2737.0	7/2$^+$			
		5073	40 6	1964.4	5/2$^+$	D(+Q)	−0.14 +94−28	A_2=+0.18 5; A_4=+0.12 6 (1991He05)
		5426	25 5	1611.8	7/2$^+$			
		6063	16 3	974.6	3/2$^+$			
7088	3/2$^+$,5/2$^+$	6113	12 4	974.6	3/2$^+$			
		7087	88 4	0	5/2$^+$	D+Q		A_2=−0.21 12; A_4=+0.05 18 (1991He05) δ: <−0.05 or >−3.5 for J^π=3/2; δ<+4.5 or >−0.45 for J^π=5/2 (1991He05).
7181	3/2$^+$,7/2	5216	80 4	1964.4	5/2$^+$	D+Q		A_2=−0.47 3; A_4=+0.04 3 (1991He05) δ: <+0.25 for J=3/2; −0.10 12 or 2.75 30 for 7/2 (1991He05).
		7180	20 4	0	5/2$^+$			
7185		4448	8 2	2737.0	7/2$^+$			
		5573	92 2	1611.8	7/2$^+$			A_2=−0.14 2; A_4=−0.01 3 (1991He05)
7228	3/2$^+$,5/2$^+$	6253	18 4	974.6	3/2$^+$	D+Q		A_2=+0.33 7; A_4=+0.09 8 (1991He05) δ: +0.36 +6−2 for J^π=5/2$^+$; +5<δ<−0.07 or −0.5<δ<−5 for 3/2$^+$ (1991He05).
		7227	82 4	0	5/2$^+$	D+Q	−0.53 +10−22	A_2=−0.10 3; A_4=−0.01 4 (1991He05) δ: for J^π=5/2$^+$. No value calculated for J^π=3/2$^+$ (1991He05).
7285	7/2$^-$	5320	35 4	1964.4	5/2$^+$	D+Q		A_2=−0.56 3; A_4=−0.13 7 (1991He05) δ: −0.10 15 or −2.25 3 for J^π=7/2$^-$ (1991He05).
		5673	10 2	1611.8	7/2$^+$	D(+Q)	+0.73 75	A_2=+0.38 10; A_4=+0.20 14 (1991He05) δ: +0.18 +20−45 or −2.75 10 for J^π=7/2 (1991He05).
		7284	55 6	0	5/2$^+$	D+Q		A_2=−0.40 3; A_4=−0.07 3 (1991He05) δ: −0.18 +20−45 or −2.75 10 for J^π=7/2 (1991He05).
7378	5/2$^+$	7377	100	0	5/2$^+$	D+Q		A_2=+0.20 6; A_4=−0.12 7 (1991He05) δ: −0.00 31 or +2.5 5 for 5/2$^+$ (1991He05).
7493	11/2	1521	15 4	5972	9/2$^+$	D(+Q)	+0.00 3	A_2=−0.34 11; A_4=−0.00 16 (1991He05)
		1959	11 3	5533.8	11/2$^+$			
		2030	18 4	5462.8	13/2$^+$	D+Q	+0.07 6	A_2=−0.23 10; A_4=+0.11 15 (1991He05)
		3433	34 6	4060	9/2$^+$	D+Q	−0.07 6	A_2=−0.48 5; A_4=−0.08 8 (1991He05)
		4087	10 3	3405.6	9/2$^+$			

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^{24}Mg(d,pγ) 1991He05 (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@]	Comments
7493	11/2	5880	12 *3*	1611.8	7/2+	Q		A2=+0.26 *19*; A4=−0.07 *27* (1991He05)
7505	5/2	4768	49 *6*	2737.0	7/2+	D+Q		A2=−0.34 *6*; A4=+0.04 *7* (1991He05) δ: −0.33 *+43−20* or −3.0 *+7−20* for Jπ=5/2 (1991He05).
		6529	36 *6*	974.6	3/2+	D+Q	+0.10 *+90−3*	A2=−0.28 *8*; A4=−0.08 *9* (1991He05)
		7504	15 *4*	0	5/2+			
7524	7/2,5/2+	3616	18 *3*	3907.6	5/2+	D+Q		A2=−0.21 *3*; A4=−0.08 *9* (1991He05) δ: >−0.45 for 5/2+; −0.00 *13* for Jπ=7/2 (1991He05).
		4787	41 *6*	2737.0	7/2+	D+Q		A2=+0.44 *6*; A4=+0.07 *7* (1991He05) δ: −0.80 *+23−50* for 5/2+; +0.90 *+15−33* or +0.14 *+10−28* for Jπ=7/2 (1991He05).
		6548	7 *3*	974.6	3/2+			
		7523	34 *5*	0	5/2+	D+Q		A2=−0.47 *9*; A4=−0.04 *9* (1991He05) δ: −1.5 *+6−20* for Jπ=5/2+; −0.07 *+4−25* for Jπ=7/2 (1991He05).
7551	13/2+,9/2+	2017	20 *7*	5533.8	11/2+			
		2088	10 *5*	5462.8	13/2+			
		2301	40 *10*	5250.3	11/2+	D+Q		A2=−0.36 *12*; A4=+0.01 *18* (1991He05) δ: +0.10 *5* for Jπ=9/2+; −0.03 *4* for Jπ=13/2+.
		4145	30 *10*	3405.6	9/2+			
7582	5/2+	5969	100	1611.8	7/2+	D+Q	+2.7 *+50−15*	A2=−0.18 *12*; A4=−0.26 *13* (1991He05) δ: for 5/2+.
7633	(7/2+)	6020	62 *8*	1611.8	7/2+			
		7632	38 *8*	0	5/2+	D+Q		A2=−0.59 *14*; A4=+0.23 *17* (1991He05) δ: −0.10 *+12−25* or −2.4 *40* for 7/2; <+0.18 or +0.8 *+4−7* for 3/2; −1.7 *+10−52* for 5/2+.
7653	9/2	1681	7 2	5972	9/2+	D+Q	+0.5 *4*	A2=+0.59 *11*; A4=−0.22 *14* (1991He05)
		1906	8 *1*	5746.4	7/2,9/2+			
		2119	3 *1*	5533.8	11/2+			
		2641	10 2	5011.9	7/2+	D+Q		A2=−0.62 *10*; A4=+0.07 *9* (1991He05) δ: −0.18 *7* or −2.1 *+3−7*.
		3593	12 *3*	4060	9/2+			
		4915	46 *6*	2737.0	7/2+	D(+Q)	0.00 *5*	A2=−0.45 *8*; A4=+0.18 *8* (1991He05)
		6040	14 *3*	1611.8	7/2+			
7801	9/2	2008	5 2	5793.0	11/2−,7/2−	D+Q	+0.14 *2*	A2=−0.42 *11*; A4=−0.01 *17* (1991He05)
		2267	2 *1*	5533.8	11/2+			
		2551	3 *1*	5250.3	11/2+			
		5063	12 *3*	2737.0	7/2+			
		6188	78 *7*	1611.8	7/2+	D(+Q)	−0.10 *15*	A2=−0.51 *6*; A4=+0.06 *6* (1991He05)
7838	7/2+	2092	3 *1*	5746.4	7/2,9/2+			
		4432	23 *4*	3405.6	9/2+	D(+Q)	+0.07 *7*	A2=−0.13 *8*; A4=−0.12 *9* (1991He05)
		5100	7 2	2737.0	7/2+			
		7837	67 *7*	0	5/2+	D(+Q)	−0.04 *8*	A2=−0.23 *7*; A4=+0.08 *9* (1991He05)
7866	7/2+,11/2+	2332	8 *3*	5533.8	11/2+			
		2616	10 *3*	5250.3	11/2+			
		2854	10 *3*	5011.9	7/2+	D+Q		A2=+0.11 *14*; A4=−0.51 *19* (1991He05) δ: <−0.65 for Jπ=7/2+; ∞ for 11/2+ (1991He05).
		3806	20 *4*	4060	9/2+	D+Q		A2=−0.29 *10*; A4=+0.08 *14* (1991He05) δ: +0.10 *7* for Jπ7/2+; −0.00 *4* for Jπ=11/2+.
		4460	22 *4*	3405.6	9/2+			

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^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@]	Comments
7866	7/2+,11/2+	5128	30 *5*	2737.0	7/2+			
7961	7/2+	3239	4 *2*	4721.8	5/2+			
		3250	7 *3*	4710.5	9/2+	D+Q		A_2=−0.54 *10*; A_4=+0.18 *10* (1991He05) δ: <+3.5 or +0.18 +*50*−*14* (1991He05).
		4555	4 *2*	3405.6	9/2+			
		5996	8 *3*	1964.4	5/2+			
		6348	17 *4*	1611.8	7/2+	D(+Q)	+0.5 *7*	A_2=+0.36 *9*; A_4=+0.05 *11* (1991He05)
		7960	60 *9*	0	5/2+	D+Q		A_2=−0.58 *5*; A_4=−0.08 *5* (1991He05) δ: −0.40 *7* or −1.9 *1* (1991He05).
8012	13/2+,9/2	1971	26 *6*	6041	11/2+,7/2+			
		2762	34 *6*	5250.3	11/2+	D+Q		A_2=−0.62 *12*; A_4=+0.03 *19* (1991He05) δ: −0.18 *1* for J^π=13/2+; +0.27 *3* for J=9/2.
		3301	40 *8*	4710.5	9/2+			
8076	5/2,7/2,9/2	6463	100	1611.8	7/2+	D+Q		A_2=−0.30 *7*; A_4=+0.00 *7* (1991He05) δ: +0.14 *3* for 5/2; −0.62 *9* for 7/2; −0.00 *3* for 9/2 (1991He05).
8119	(7/2+)	4211	13 *5*	3907.6	5/2+			
		8118	87 *5*	0	5/2+	D+Q		A_2=−0.35 *12*; A_4=+0.14 *13* (1991He05) δ: +0.04 ++*5*−*17* or −4.0 *10* for 7/2; −1.9 +*9*−*38* for 5/2 (1991He05).
8267	(7/2+)	4861	17 *5*	3405.6	9/2+	D(+Q)		A_2=−0.14 *11*; A_4=−0.09 *14* (1991He05) δ: +0.00 *6* for 7/2; −0.63 *15* for 9/2 (1991He05).
		6302	10 *4*	1964.4	5/2+			
		6654	49 *10*	1611.8	7/2+	D+Q		A_2=+0.44 *10*; A_4=−0.26 *13* (1991He05) δ: +1.2 +*2*−*3* or −0.14 *15* for 7/2; +0.32 *10* for 9/2 (1991He05).
		8266	24 *8*	0	5/2+			
8530	(7/2+)	3819	21 *8*	4710.5	9/2+	D+Q		A_2=−0.45 *7*; A_4=+0.07 *10* (1991He05) δ: +0.13 +*35*−*10* or +7 +*8*−*4* for 7/2; −0.07 *8* or −3.1 +*5*−*15* for 11/2 (1991He05).
		4470	12 *5*	4060	9/2+			
		5124	67 *13*	3405.6	9/2+	D+Q	+0.10 *6*	A_2=−0.27 *7*; A_4=−0.10 *7* (1991He05) δ: for 7/2; −0.00 *4* for 9/2 (1991He05).
8544	(7/2+)	5138	20 *10*	3405.6	9/2+			
		6931	80 *10*	1611.8	7/2+	D+Q	−1.4 +*6*−*36*	A_2=−0.34 *10*; A_4=−0.09 *15* (1991He05) δ: for 7/2; +0.12 *10* for 5/2 (1991He05).
8551	11/2	2510	13 *3*	6041	11/2+,7/2+			
		3017	14 *3*	5533.8	11/2+	D+Q		A_2=+0.39 *9*; A_4=−0.13 *12* (1991He05) δ: +0.97 *40* or −0.03 *25* (1991He05).
		3300	12 *3*	5250.3	11/2+	D+Q	−0.14 *9*	A_2=+0.38 *10*; A_4=−0.03 *14* (1991He05)
		3840	14 *3*	4710.5	9/2+			
		4491	47 *8*	4060	9/2+	D(+Q)	−0.03 *3*	A_2=−0.35 *6*; A_4=−0.01 *9* (1991He05)
8656	7/2	3945	9 *2*	4710.5	9/2+	D+Q	+0.21 *15*	A_2=−0.36 *10*; A_4=−0.08 *10* (1991He05) δ: +0.21 *15* or +4.7 +*60*−*15* (1991He05).
		5250	15 *3*	3405.6	9/2+			
		5918	26 *6*	2737.0	7/2+			
		6691	12 *3*	1964.4	5/2+			
		7043	14 *3*	1611.8	7/2+			
		8654	24 *6*	0	5/2+	D(+Q)	+0.04 *9*	A_2=−0.20 *8*; A_4=−0.04 *9* (1991He05)
8811	13/2+,9/2+	2770	34 *5*	6041	11/2+,7/2+	D+Q		A_2=−0.38 *9*; A_4=+0.03 *13* (1991He05) δ: −0.03 *4* for 13/2; +0.14 *5* for 9/2 (1991He05).
		3277	35 *5*	5533.8	11/2+	D+Q		A_2=−0.41 *10*; A_4=−0.02 *15* (1991He05)

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^{24}Mg(d,pγ) 1991He05 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	Comments
							δ: −0.04 *4* for 13/2; +0.14 *2* for 9/2 (1991He05).
8811	13/2$^+$,9/2$^+$	4100	31 *8*	4710.5	9/2$^+$		
8888		4828	100	4060	9/2$^+$	D+Q	A_2=−0.28 *10*; A_4=−0.00 *15* (1991He05) δ: +0.00 *3* for 11/2; >−0.67 for 9/2; +0.07 *2* for 7/2 (1991He05).
8896		3103	100	5793.0	11/2$^-$,7/2$^-$		A_2=+0.34 *4*; A_4=−0.19 *6* (1991He05) δ: ∞ for 15/2; +1.04 *18* or −0.18 *15* for 11/2 (1991He05).
9014	11/2,7/2$^+$,9/2$^+$	3763	25 *5*	5250.3	11/2$^+$		
		4303	40 *8*	4710.5	9/2$^+$		
		4953	35 *7*	4060	9/2$^+$	D(+Q)	A_2=−0.19 *14*; A_4=+0.11 *21* (1991He05) δ: +0.03 *5* for 11/2; >−0.49 for 9/2; +0.07 *10* for 7/2 (1991He05).
9410	13/2,9/2	3369	26 *5*	6041	11/2$^+$,7/2$^+$	D(+Q)	A_2=−0.38 *14*; A_4=+0.10 *21* (1991He05) δ: −0.07 *8* for 13/2; +0.14 *14* for J^π=9/2.
		3617	20 *5*	5793.0	11/2$^-$,7/2$^-$		
		4159	54 *8*	5250.3	11/2$^+$	D+Q	A_2=−0.35 *7*; A_4=−0.02 *10* (1991He05) δ: −0.03 *4* for 13/2; +0.10 *10* for J^π=9/2.
9652	11/2,7/2	4189	100	5462.8	13/2$^+$	D+Q	A_2=+0.36 *7*; A_4=−0.17 *10* (1991He05) δ: −0.45 *15* for 11/2; −0.84 *15* or −0.17 *17* for 13/2; +0.40 *12* for 15/2; ∝ for 17/2 (1991He05).
9686	11/2,7/2	6280	100	3405.6	9/2$^+$	D+Q	A_2=−0.61 *17*; A_4=+0.02 *25* (1991He05) δ: −0.14 *7* for 11/2; +0.32 *12* for 7/2 (1991He05).
9830	11/2$^+$,13/2	6424	100	3405.6	9/2$^+$		
9946	11/2$^+$,15/2	2395	35 *10*	7551	13/2$^+$,9/2$^+$		
		4484	55 *15*	5462.8	13/2$^+$		
		4695	10 *5*	5250.3	11/2$^+$		
10136		4602	100	5533.8	11/2$^+$		
10996		5533	100	5462.8	13/2$^+$		
11200		5736	100	5462.8	13/2$^+$		
11409		5945	100	5462.8	13/2$^+$		

† From level energy differences.

‡ From 1973Ro17, for levels up to 5533, except for levels at 3971, 4722, and 5012. For these three levels and above 5433 keV level, the branching ratios are from 1991He05. In 1991He05, the branching ratios up to 5433 keV level are from compilation, except those three levels. In 1973Ro17, authors note that the uncertainty for the branching ratios is 10% and 30% for strong and weaker transitions, respectively. The evaluators consider 10% for Iγ≥25, otherwise 30%.

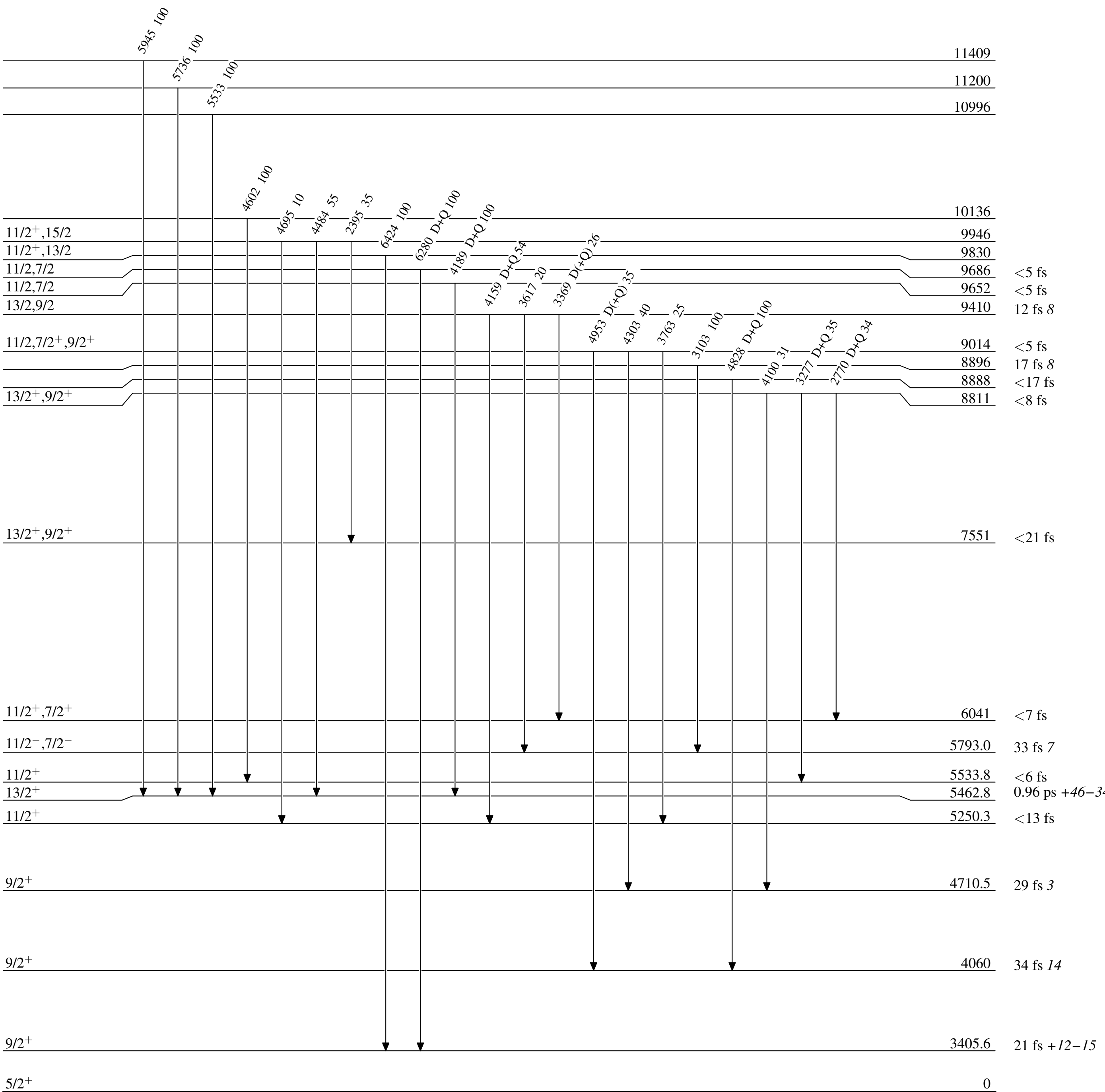
\# Assigned by the evaluators based on the $\gamma(\theta)$ and δ data.

@ From 1991He05, except as noted.

$^{24}Mg(d,p\gamma)$ 1991He05

Level Scheme

Intensities: % photon branching from each level

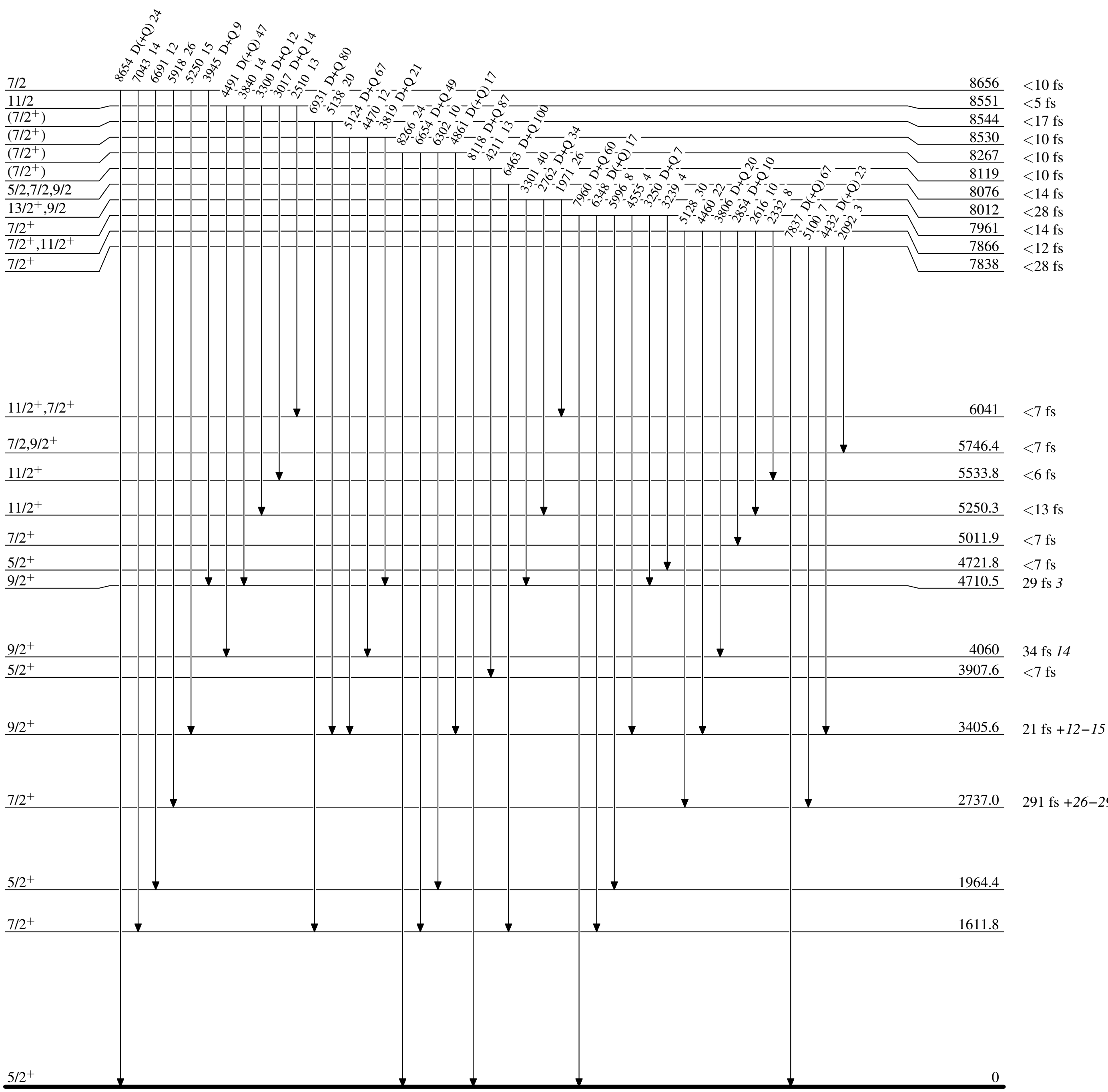


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

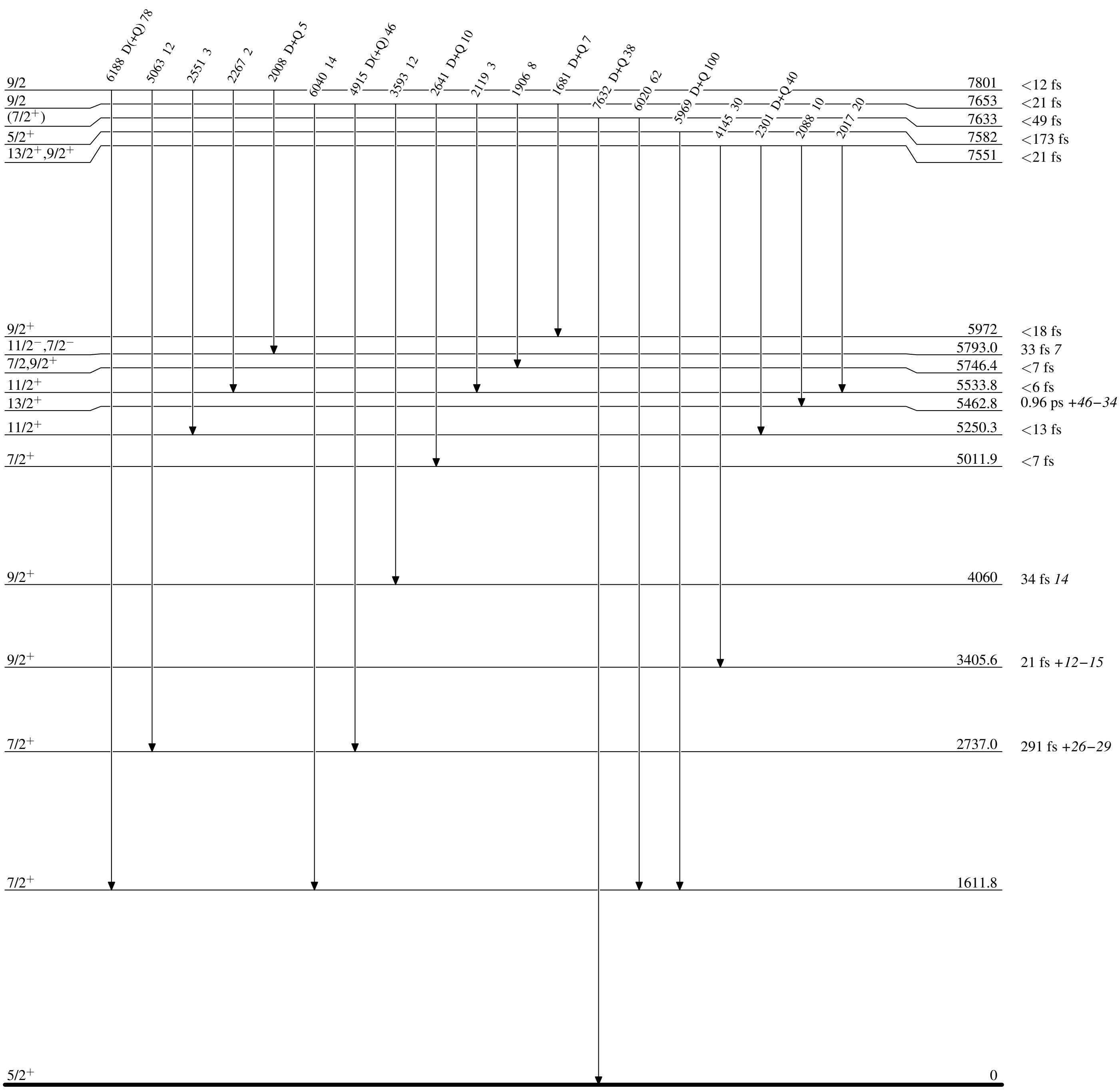


$^{25}_{12}Mg_{13}$

$^{24}Mg(d,p\gamma)$ 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

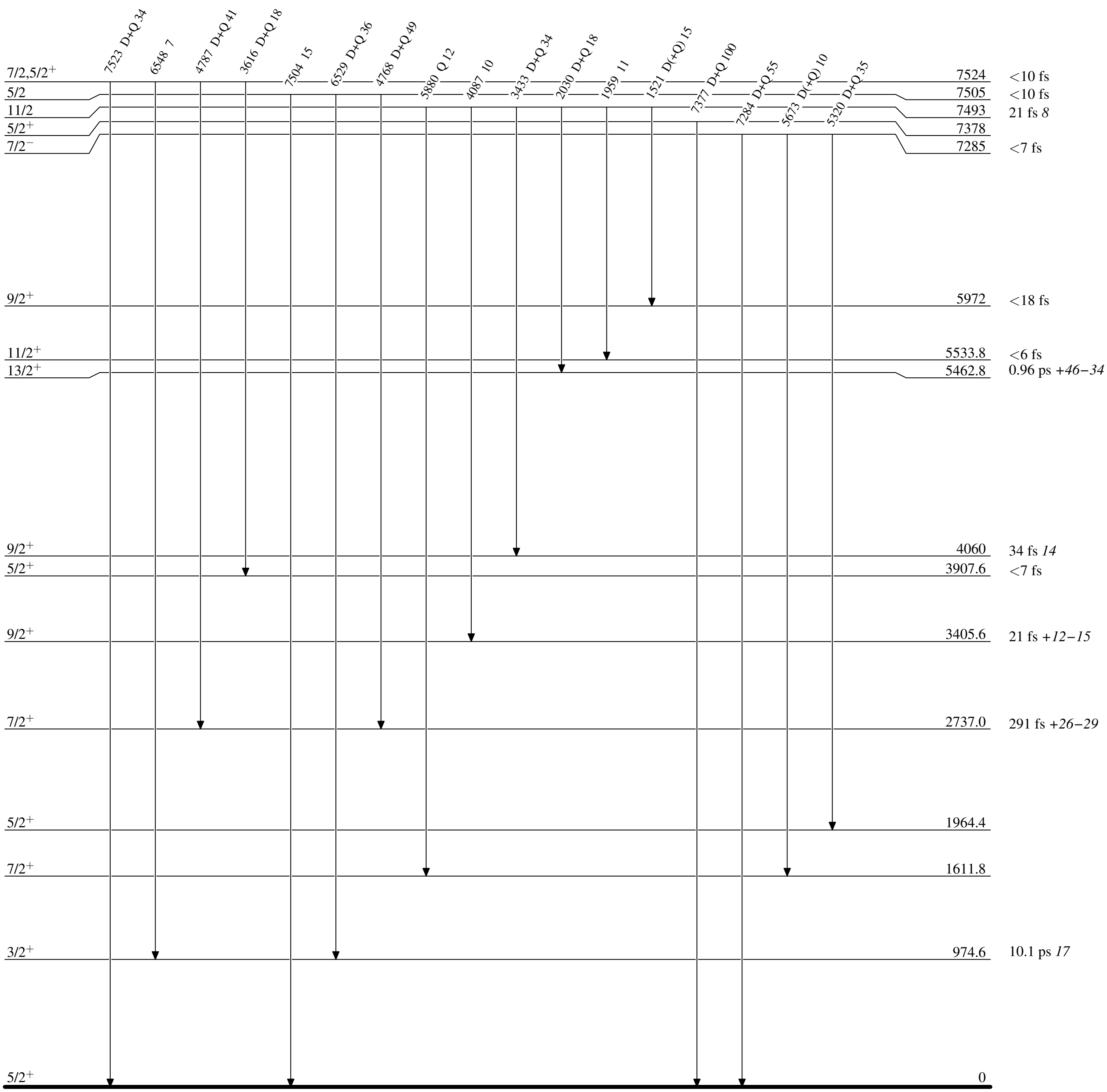


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

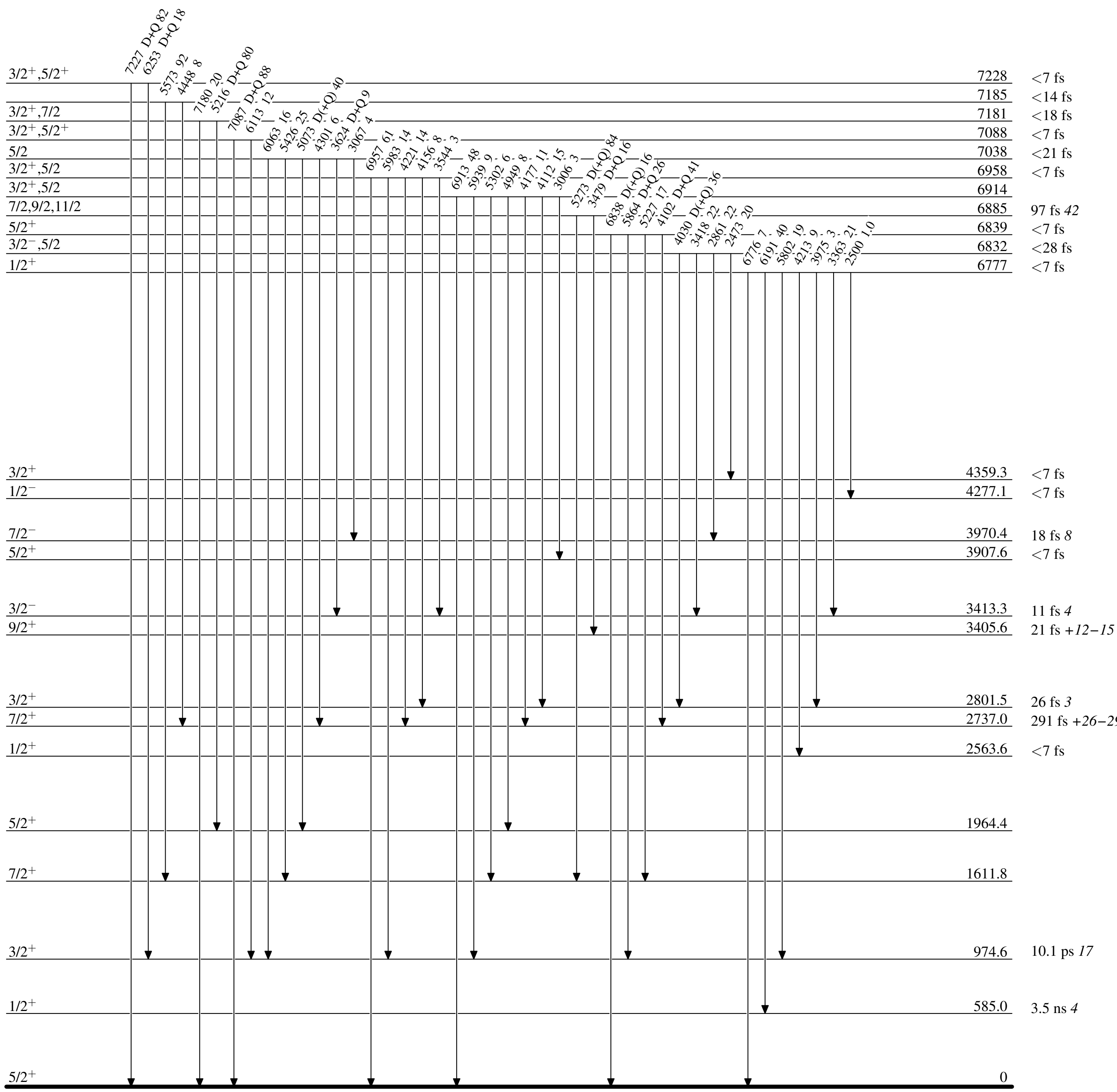


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

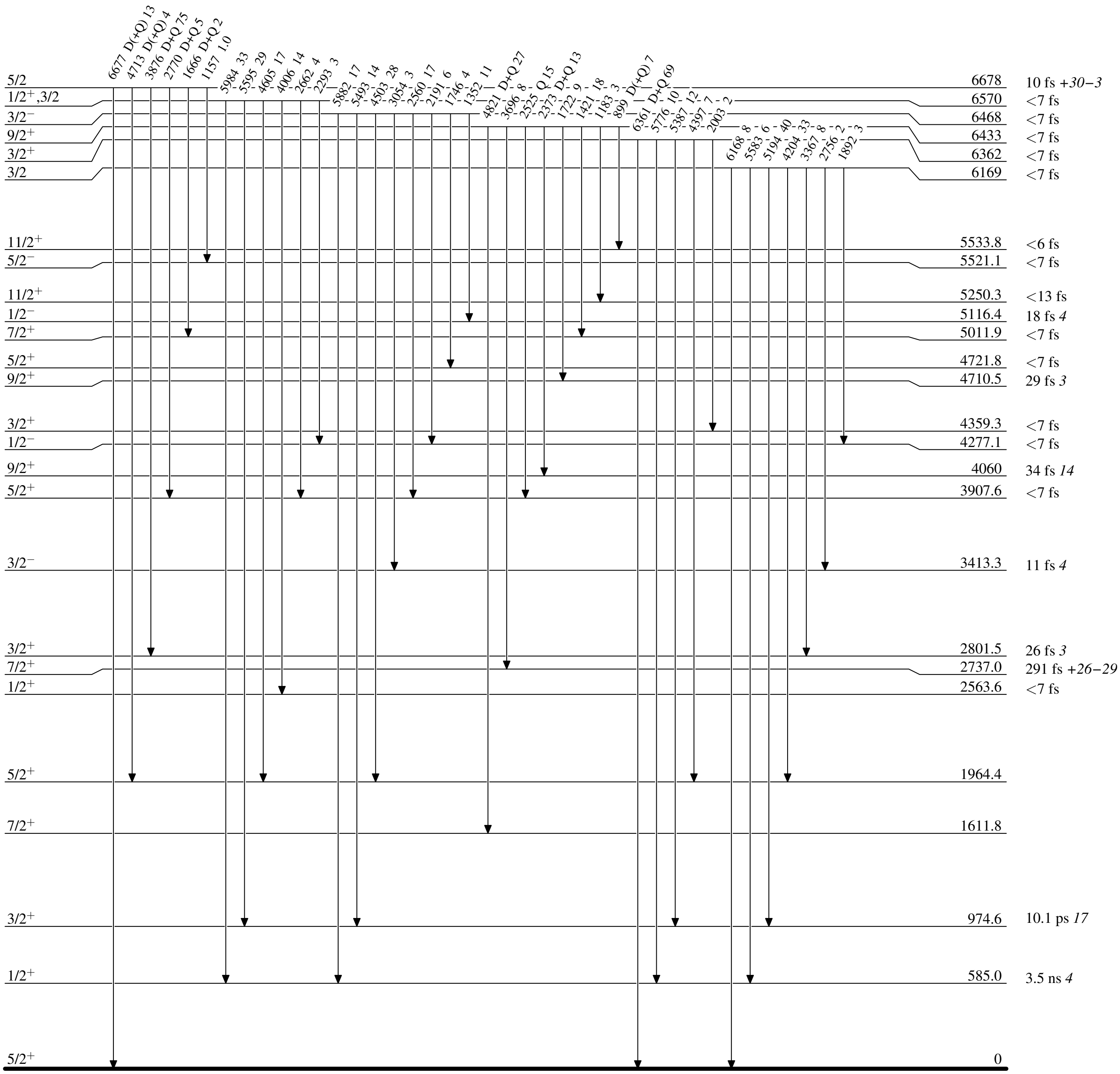


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

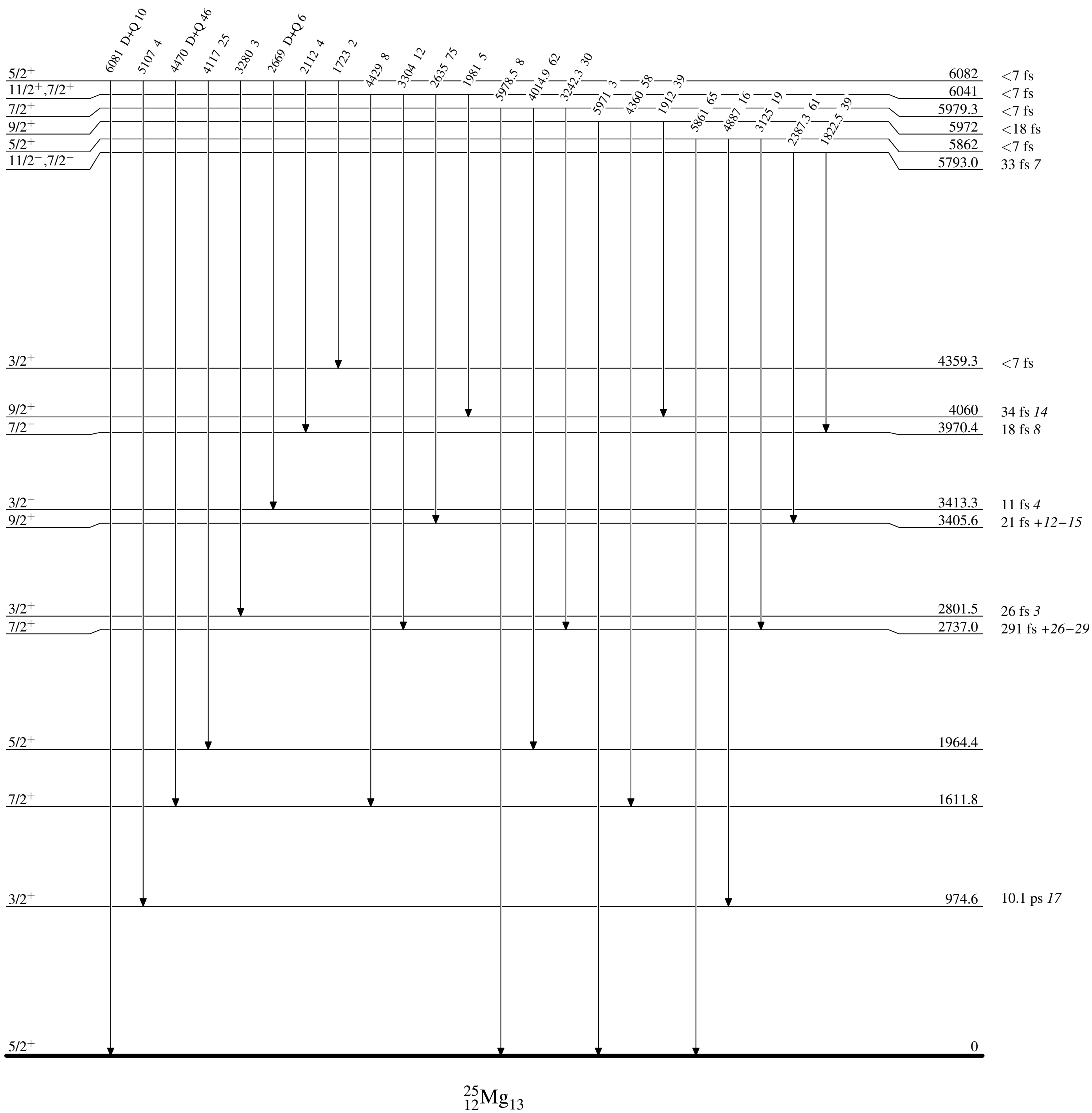
Intensities: % photon branching from each level



^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

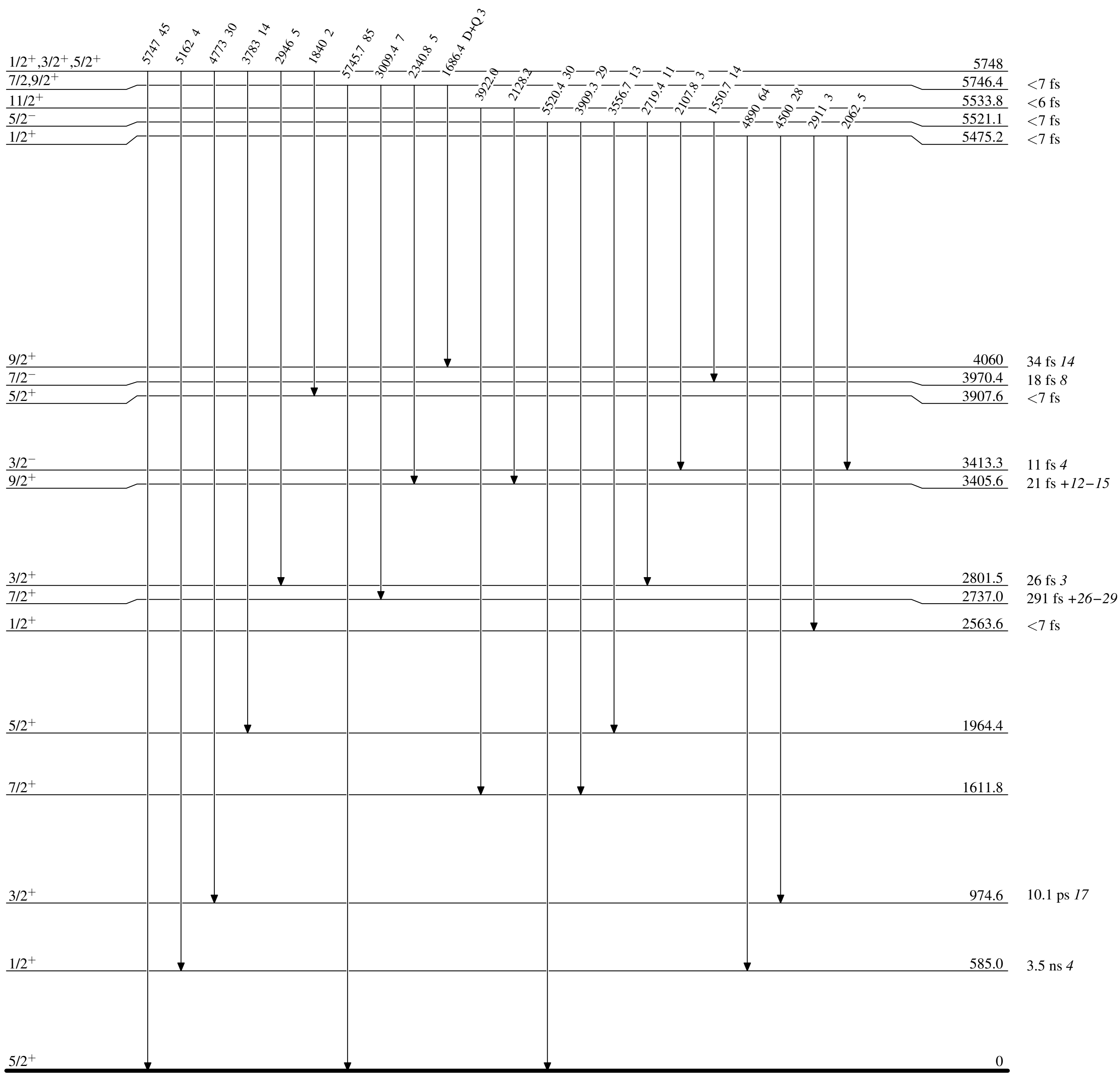
Intensities: % photon branching from each level



$^{24}Mg(d,p\gamma)$ 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

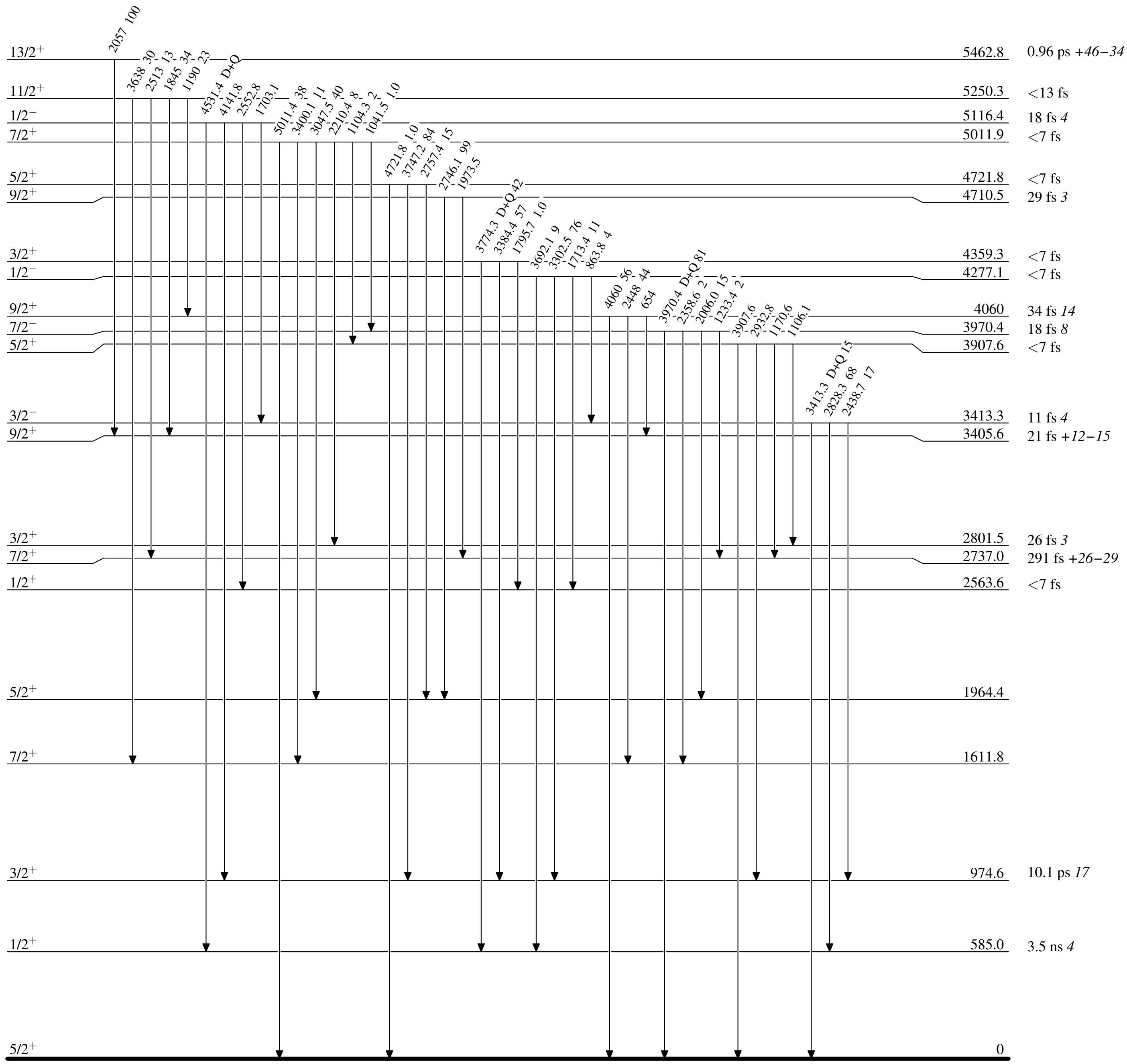


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level

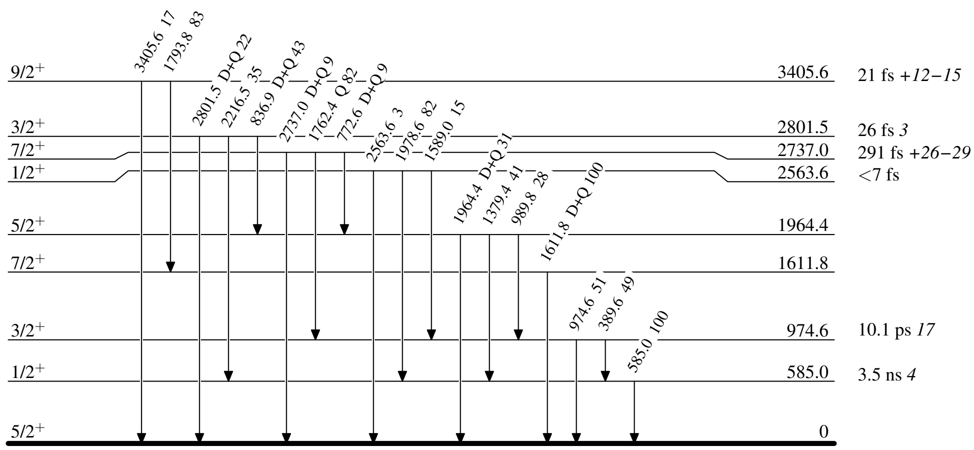


$^{25}_{12}Mg_{13}$

^{24}Mg(d,pγ) 1991He05

Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

^{25}Mg(γ,γ') 1964Bo22

1964Bo22: ^{25}Mg(γ,γ') resonance fluorescence, Eγ=0.5 to 3.0 MeV, deduced level width, mean lifetime.
Others: 1961Ra05, 1961Ra02.

^{25}Mg Levels

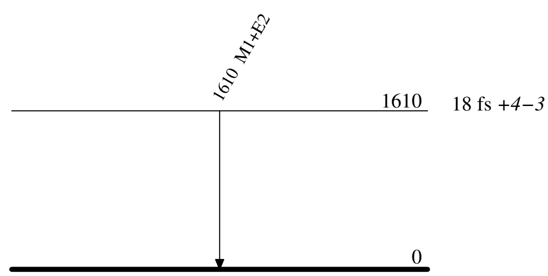
E(level)	$T_{1/2}$	Comments
0		
1610	18 fs *+4−3*	$T_{1/2}$: average of 19 fs *5* (1964Bo22 − from τ=28 fs *7*) and 17 fs *+4−3* (1961Ra05, 1961Ra02 − from τ=25 fs *+6−4*).

γ(^{25}Mg)

E$_\gamma$	E$_i$(level)	E$_f$	Mult.	δ	Comments
1610	1610	0	M1+E2	−0.19 *2*	Mult.,δ: multipolarity from Adopted Gammas, δ from 1961Ra05 for 7/2.

^{25}Mg(γ,γ') 1964Bo22

Level Scheme



$^{25}_{12}Mg_{13}$

^{25}Mg(e,e′) 1975Ok01,1976Le11

1975Ok01: Incident electrons with E_e=120, 150, and 250 MeV on 99.2% isotopically enriched ^{25}Mg target (thickness 55 mg/cm^2) at the electron scattering facility of Tohoku University. Energy spectra of scattered electrons were measured by magnetic spectrometer at scattering angles between 35° and 120°. Deduced E2 and E4 transition strengths. The over-all energy resolution was 0.1%.

1976Le11: E_e=61.9-119.3 MeV, 99.21% enriched target (thickness 54.6 mg/cm^2), measured inelastically scattered electrons in the angular range of 60.0°−151.7°, deduced σ(E,θ), B(E2↑), transition radii and inelastic form factors. Energy resolution 0.16%.

Other references: 1969Fa12, 1975Le02, 1976Le07, 1977Eu02, 1979Yo01, 1992Ma07.

^{25}Mg Levels

E(level)†	J$^\pi$@	T$_{1/2}$&	Comments
0	5/2$^+$		Q=0.244 *+8−40* (1977Eu02)
975‡	3/2$^+$	10 ps *7*	B(E2)↑=0.00023 *6* T$_{1/2}$: from B(E2)↑=0.00023 *6* (1976Le11).
1611 *40*	7/2$^+$	17 fs *3*	B(E2)↑=0.0138 *19* E(level): from 1975Le02. Other: 1600 *20* (1969Fa12). T$_{1/2}$: from B(E2)↑=0.0138 *19*: unweighted average of 0.0119 *6* (1975Ok01) and 0.0156 *7* (1976Le11 − earlier value 0.0158 *7* (1975Le02)).
1965‡	5/2$^+$	0.72 ps *12*	B(E2)↑=0.00030 *5* T$_{1/2}$: from B(E2)↑=0.00030 *5* (1976Le11).
2563‡	1/2$^+$	14 fs *4*	B(E2)↑=0.00039 *4* T$_{1/2}$: from B(E2)↑=0.00039 4: weighted average of 0.00038 *4* (1975Ok01) and 0.00043 *8* (1976Le11).
2738‡	7/2$^+$		B(E2)↑=0.00061 *5* T$_{1/2}$: 0.7 fs *7* from B(E2)↑=0.00061 *5* (1975Ok01) and adopted γ-ray properties, inconsistent with the adopted value of 0.286 ps *+24−25*.
2801‡	3/2$^+$	26 fs *3*	B(E2)↑=0.00053 *4* B(E4)↑=1.5×10^{-7} e^{2}b^4 *4* (1975Ok01). T$_{1/2}$: from B(E2)↑=0.00053 *4* (1976Le11).
3405 *70*	9/2$^+$	7.6 fs *4*	B(E2)↑=0.0052 *5* E(level): from 1975Le02. T$_{1/2}$: from B(E2)↑=0.0052 *5*: unweighted average of 0.0047 *3* (1975Ok01) and 0.0057 *4* (1976Le11,1975Le02).
3908‡	(5/2)$^+$		B(E2)↑=0.00027 *4* (1975Ok01) B(E4)↑=1.9×10^{-7} e^{2}b^4 *4* (1975Ok01).
4059‡	9/2$^+$	54 fs *4*	B(E2)↑=0.00095 *6* (1975Ok01) B(E4)↑=1.3×10^{-7} e^{2}b^4 *4* (1975Ok01). T$_{1/2}$: From B(E2)↑=0.00094 *7* (1975Ok01) and 0.00096 *10* (1976Le11).
5251‡	(11/2)$^+$		B(E4)↑=5.8×10^{-7} e^{2}b^4 *12* (1975Ok01).
5770# *40*			
7030 *50*			
7810# *30*			
10430 *50*			
11370# *70*			
11760# *60*			

† From 1969Fa12, except where otherwise noted. Level energies appear to be systematically lower by about 10 keV.
‡ From Adopted Levels, rounded to the nearest keV.
# Overlaps three or more adopted level energies, not referenced in the Adopted Levels.
@ As listed in 1975Ok01.
& Calculated from B(E2)(↑) and adopted γ transition branching intensities.

^{25}Mg(e,e′) 1975Ok01,1976Le11 (continued)

$\gamma(^{25}Mg)$

E_i(level)	J^π_i	E_γ	I_γ[†]	E_f	J^π_f	Mult.	δ[‡]	Comments
975	3/2$^+$	975	51 *1*	0	5/2$^+$	M1+E2	+0.34 *12*	
1611	7/2$^+$	1611	100	0	5/2$^+$	M1+E2	−0.207 *13*	
1965	5/2$^+$	1965	26 *1*	0	5/2$^+$	M1+E2	−0.58 *7*	
2563	1/2$^+$	2563	3 *1*	0	5/2$^+$	E2		
2738	7/2$^+$	2738	6 *1*	0	5/2$^+$	M1+E2		
2801	3/2$^+$	2801	21.9 *12*	0	5/2$^+$	M1+E2	−0.64 *8*	
3405	9/2$^+$	3405	11.4 *6*	0	5/2$^+$	E2		
3908	(5/2)$^+$	3908	10.9 *9*	0	5/2$^+$	M1+E2	0.56 *14*	δ: calculated from B(E2)↑ and adopted half-life.
4059	9/2$^+$	4060	60 *1*	0	5/2$^+$	E2		
5251	(11/2)$^+$	5252		0	5/2$^+$			

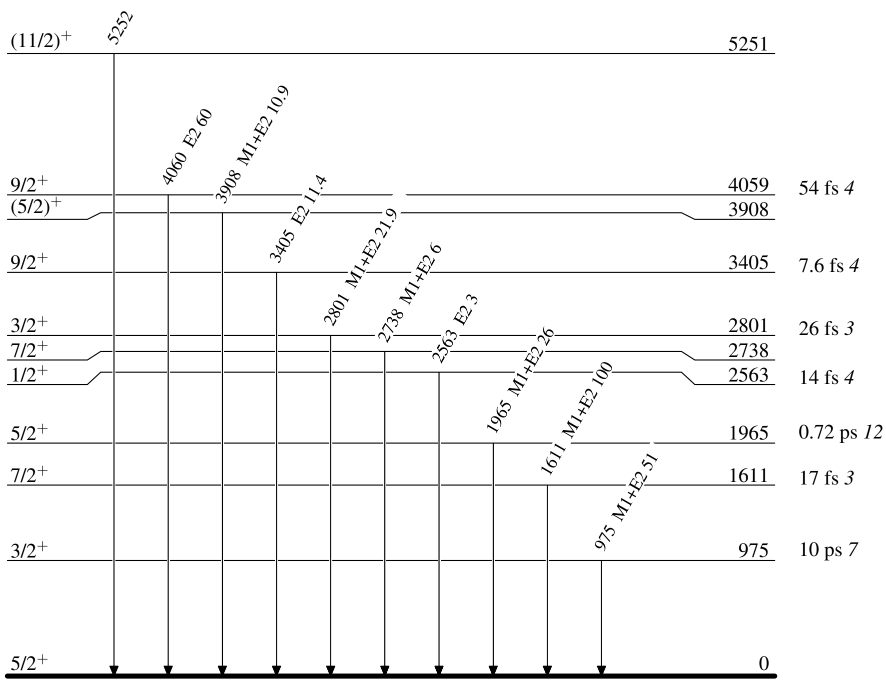
† Branching percentage from Adopted Gammas.

‡ From Adopted Gammas, except where otherwise noted.

^{25}Mg(e,e′) 1975Ok01,1976Le11

Level Scheme

Intensities: Relative photon branching from each level



$^{25}_{12}Mg_{13}$

^{25}Mg(p,p′γ) 1975Ol02,1974Ol07

1975Ol02, 1974Ol07: ^{25}Mg(p,p′γ) E=5.2-6.1 MeV. Ge(Li); measured Ep, γγ-coincidences, DSA.

Others: 1960Fe05, 1962Sc12, 1963Mc07, 1960Fe05, 1966Ga17, 1968Cr03, 1968So03, 1970Ch04, 1976He22, 1979KoZB, 1986En04, 1988Bo37, 1969So09, 1968Sh13, 1967Mc11, 1961Mc08, 1957Go88.

^{25}Mg Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0			
585 *1*	1/2+	3.38 ns *7*	$T_{1/2}$: weighted average of 3.5 ns *2* (1960Fe05), 3.34 ns *7* (1963Mc07 – τ=4.82 ns *10*), and 3.44 ns *10* (1965Bo28 – τ=4.97 ns *15*). Other: > 7 ps (from τ > 10 ps in 1974Ol07).
975 *1*	3/2+	>7 ps	$T_{1/2}$: from 1974Ol07.
1612 *1*	7/2+	15 fs *+5−3*	J^π: 7/2 from γγ(θ) in 1967Mc11, 1968So03. $T_{1/2}$: from 1974Ol07 (τ=21 fs *+7−5*). Other value: 19 fs *+16−11* (1968Sh13 – τ=27 fs *+23−16*).
1965 *1*	5/2+	0.69 ps *27*	$T_{1/2}$: unweighted average of discrepant values of 0.96 ps *8* (1974Ol07 – τ=1.38 ps *12*) and 0.416 ps *+125−69* (1968Sh13 – τ=0.600 ps *180-100*).
2562 *1*	1/2+	8 fs *+5−4*	$T_{1/2}$: from 1974Ol07 (τ=11 fs *+7−6*). Other: 41 fs *18* (1968Sh13 – τ=59 fs *26*).
2739 *1*	7/2+	0.28 ps *8*	J^π: 7/2 from γγ(θ) (1968So03). $T_{1/2}$: unweighted average of discrepant data: 200 fs *14* (1968Sh13 – τ=288 fs *20* in Table II) and 354 fs *28* (1974Ol07 – τ=510 fs *40*).
2801 *1*	3/2+	33 fs *14*	$T_{1/2}$: unweighted average of 46 fs *+4−6* (1974Ol07: τ=66 fs *=+6−8*) and 19 fs *4* (1968Sh13 – τ=27 fs *6* in Table II – the reliable one – noted in the text).
3406 *1*	9/2+	8 fs *+4−3*	J^π: 9/2 from γγ(θ) in 1967Mc11, 1968So03. $T_{1/2}$: weighted average of 7 fs *+4−3* (1974Ol07: τ=10 fs *+6−4*) and 23 fs *13* (1968Sh13 – τ=33 fs *19*).
3414 *1*	3/2−	<7[@] fs	$T_{1/2}$: other: <14 fs (1968Sh13 – τ < 20 fs).
3907 *1*	5/2+	<7[@] fs	J^π: authors in 1974Ol07, supports the 5/2+ assignment from their observations of γ decay to the 7/2 level at 2739. $T_{1/2}$: other: <14 fs (1968Sh13 – τ<20 fs).
3970 *1*	7/2−	20 fs *8*	$T_{1/2}$: weighted average of 32 fs *15* (1974Ol07: τ=46 fs *22*) and 17 fs *8* (1968Sh13: τ=24 fs *11*).
4060 *2*	9/2+	41 fs *+4−5*	$T_{1/2}$: weighted average of 42 fs *+4−5* (1974Ol07: τ=61 fs *+6−7*) and 37 fs *7* (1968Sh13: τ=53 fs *10*).
4277 *2*	(1/2−)	<7[@] fs	
4357 *2*	3/2+	<7[@] fs	
4712 *2*	9/2+	18[@] fs *11*	
4721 *2*	(5/2+)	<7[@] fs	
5011 *2*	(7/2+)	<7[@] fs	$T_{1/2}$: <18 fs (1968Sh13: τ < 26 fs – Table II).
5114 *2*	1/2	<7[@] fs	
5252 *2*	(11/2+)	14[&] fs *+4−3*	
5463 *2*	(13/2+)	3.2[&] ps *4*	
5474 *2*	1/2+	<22[&] fs	J^π: from literature.
5522 *2*	5/2	<7[&] fs	
5535 *2*	(11/2+)	<7[&] fs	
5747 *2*	(5/2+)	<7[&] fs	
5794 *2*	(11/2−)	58[&] fs *+9−5*	
5859 *2*	5/2+	12[&] fs *12*	
5974 *2*	(9/2+)	<7[&] fs	
5978 *2*		<7[&] fs	
6040 *2*	(11/2+)	<27[&] fs	
6082 *2*	(3/2,5/2)+	<8[&] fs	J^π: from literature.

Continued on next page (footnotes at end of table)

^{25}Mg(p,p′γ) 1975Ol02,1974Ol07 (continued)

^{25}Mg Levels (continued)

† From 1974Ol07, for levels up to 5114 and from 1975Ol02, for above.
‡ Up to 5114 from 1974Ol07 and above that from 1975Ol02, except where otherwise noted. The spin-parity assignments in 1974Ol07 appear to be from the literature. In 1975Ol02, the assignments are from their work: γ decay scheme in combination with the angular correlation data of 1974Ro10 (d,pγ). Any arguments when available are listed in the comments.
# By Doppler Shift Attenuation Method (DSAM) in 1968Sh13, 1974Ol07, 1975Ol02.
@ From 1974Ol07.
& From 1975Ol02.

γ(^{25}Mg)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.@	δ	Comments
585	1/2+	585	100	0				
975	3/2+	390	49# 2	585	1/2+	D+Q	+0.15 5	Iγ: 95 3 with respect to Iγ(975)=100 (1957Go88). δ: From 1961Mc08.
		975	51# 2	0		D+Q	+0.34 12	Iγ(975)=100 (1957Go88). Uncertainty as of ΔIγ(390). δ: weighted average of +0.36 12 (1968So03), +0.30 15 (1961Mc08).
1612	7/2+	1612	>99.4	0		M1+E2	−0.23 4	δ: from 1967Mc11, 1968So03.
1965	5/2+	990	27 1	975	3/2+	M1+E2	−0.25 7	Iγ: other: 28 2 (1968So03). δ: from 1968So03, 1967Mc11.
		1380	47 1	585	1/2+			Iγ: other: 42 3 (1968So03).
		1965	26 1	0		M1+E2	−0.56 +5−11	Iγ: others: 30 3 (1968So03). δ: from 1967Mc11,1968So03.
2562	1/2+	1587	19 2	975	3/2+			Iγ: other: 21 2 (1968So03).
		1977	81 2	585	1/2+			Iγ: other: 79 2 (1968So03).
2739	7/2+	774	7 1	1965	5/2+	M1+E2		A_2=+0.22 7; A_4=−0.06 7 (1969So09) Iγ: other: 8 3 (1968So03). δ: +0.47 +20−12 or +4.2 +35−18 (1969So09).
		1764	87 2	975	3/2+	E2		A_2=+0.22 2; A_4=−0.01 2 (1969So09) Iγ: other: 85 3 (1968So03).
		2739	6 1	0		M1+E2	−0.12 6	A_2=−0.25 2; A_4=+0.01 2 (1969So09) Iγ: other: 7 2 (1968So03). δ: −0.12 6 or −2.9 5 (1969So09). 0.12 6 is consistent with the value in (e,e′).
2801	3/2+	836	38 2	1965	5/2+			Iγ: other: 37 7 (1968So03).
		2216	39 2	585	1/2+			Iγ: other: 40 5 (1968So03).
		2801	23 1	0				Iγ: other: 23 5 (1968So03).
3406	9/2+	1794	82 1	1612	7/2+	M1+E2	−0.13 3	δ: from 1967Mc11, 1968So03. Iγ: other: 95 5 (1968So03).
		3406	18 1	0				Iγ: other: 5 5 (1968So03).
3414	3/2−	2439	14 1	975	3/2+			
		2829	75 1	585	1/2+			
		3414	11 1	0				
3907	5/2+	1106	10 1	2801	3/2+			
		1168	13 1	2739	7/2+			
		2932	66 2	975	3/2+			
		3907	11 1	0				
3970	7/2−	2005	20 1	1965	5/2+			
		3970	80 1	0				
4060	9/2+	654	1.0 2	3406	9/2+			
		2448	39 1	1612	7/2+			
		4060	60 1	0				
4277	(1/2−)	863	4 1	3414	3/2−			
		1715	12 1	2562	1/2+			

Continued on next page (footnotes at end of table)

^{25}Mg(p,p′γ) 1975Ol02,1974Ol07 (continued)

γ(^{25}Mg) (continued)

E_i(level)	J^π_i	E_γ †	I_γ ‡	E_f	J^π_f
4277	(1/2$^-$)	3302	79 *2*	975	3/2$^+$
		3692	5 *1*	585	1/2$^+$
4357	3/2$^+$	1795	3 *1*	2562	1/2$^+$
		3382	42 *1*	975	3/2$^+$
		3772	55 *1*	585	1/2$^+$
4712	9/2$^+$	1973	6 *1*	2739	7/2$^+$
		2747	94 *1*	1965	5/2$^+$
4721	(5/2$^+$)	3746	>99	975	3/2$^+$
5011	(7/2$^+$)	2210	13 *1*	2801	3/2$^+$
		3046	43 *1*	1965	5/2$^+$
		3399	12 *1*	1612	7/2$^+$
		5011	32 *1*	0	
5114	1/2	2552		2562	1/2$^+$
		4139		975	3/2$^+$
5252	(11/2$^+$)	1192	24 *1*	4060	9/2$^+$
		1846	26 *1*	3406	9/2$^+$
		2513	12 *1*	2739	7/2$^+$
		3640	38 *1*	1612	7/2$^+$
5463	(13/2$^+$)	2057	100	3406	9/2$^+$
5474	1/2$^+$	4888	100	585	1/2$^+$
5522	5/2	1552	16 *1*	3970	7/2$^-$
		2108	6 *2*	3414	3/2$^-$
		2721	10 *1*	2801	3/2$^+$
		3557	16 *2*	1965	5/2$^+$

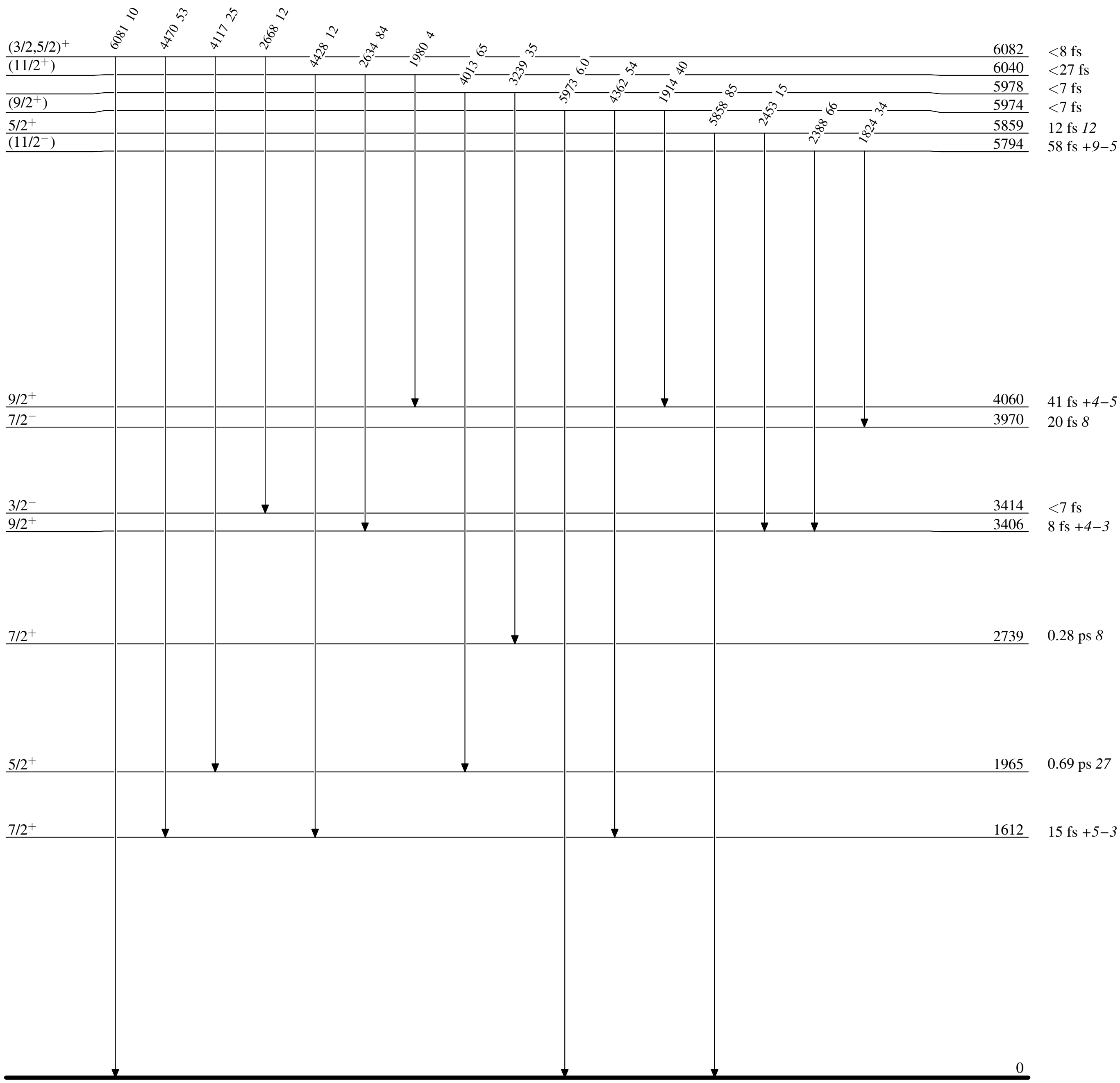
E_i(level)	J^π_i	E_γ †	I_γ ‡	E_f	J^π_f
5522	5/2	3910	30 *3*	1612	7/2$^+$
		5521	22 *1*	0	
5535	(11/2$^+$)	2129	57 *3*	3406	9/2$^+$
		3923	43 *3*	1612	7/2$^+$
5747	(5/2$^+$)	2341	3 *1*	3406	9/2$^+$
		3782	7 *1*	1965	5/2$^+$
		4772	12 *1*	975	3/2$^+$
		5746	78 *1*	0	
5794	(11/2$^-$)	1824	34 *1*	3970	7/2$^-$
		2388	66 *1*	3406	9/2$^+$
5859	5/2$^+$	2453	15 *12*	3406	9/2$^+$
		5858	85 *12*	0	
5974	(9/2$^+$)	1914	40 *2*	4060	9/2$^+$
		4362	54 *2*	1612	7/2$^+$
		5973	6.0 *6*	0	
5978		3239	35 *2*	2739	7/2$^+$
		4013	65 *2*	1965	5/2$^+$
6040	(11/2$^+$)	1980	4 *2*	4060	9/2$^+$
		2634	84 *2*	3406	9/2$^+$
		4428	12 *2*	1612	7/2$^+$
6082	(3/2,5/2)$^+$	2668	12 *2*	3414	3/2$^-$
		4117	25 *2*	1965	5/2$^+$
		4470	53 *2*	1612	7/2$^+$
		6081	10 *1*	0	

† From level energy differences, recoil value subtracted and rounded to the nearest keV.
‡ From 1974Ol07, for levels up to 5114 and from 1975Ol02, for above, except where otherwise noted.
# From 1957Go88, %branching based on the data listed in the comments.
@ Based on the reported δ and $\gamma\gamma(\theta)$ data in 1961Mc08, 1968So03, and 1969So09.

^{25}Mg(p,p$'\gamma$) 1975Ol02,1974Ol07

Level Scheme

Intensities: % photon branching from each level

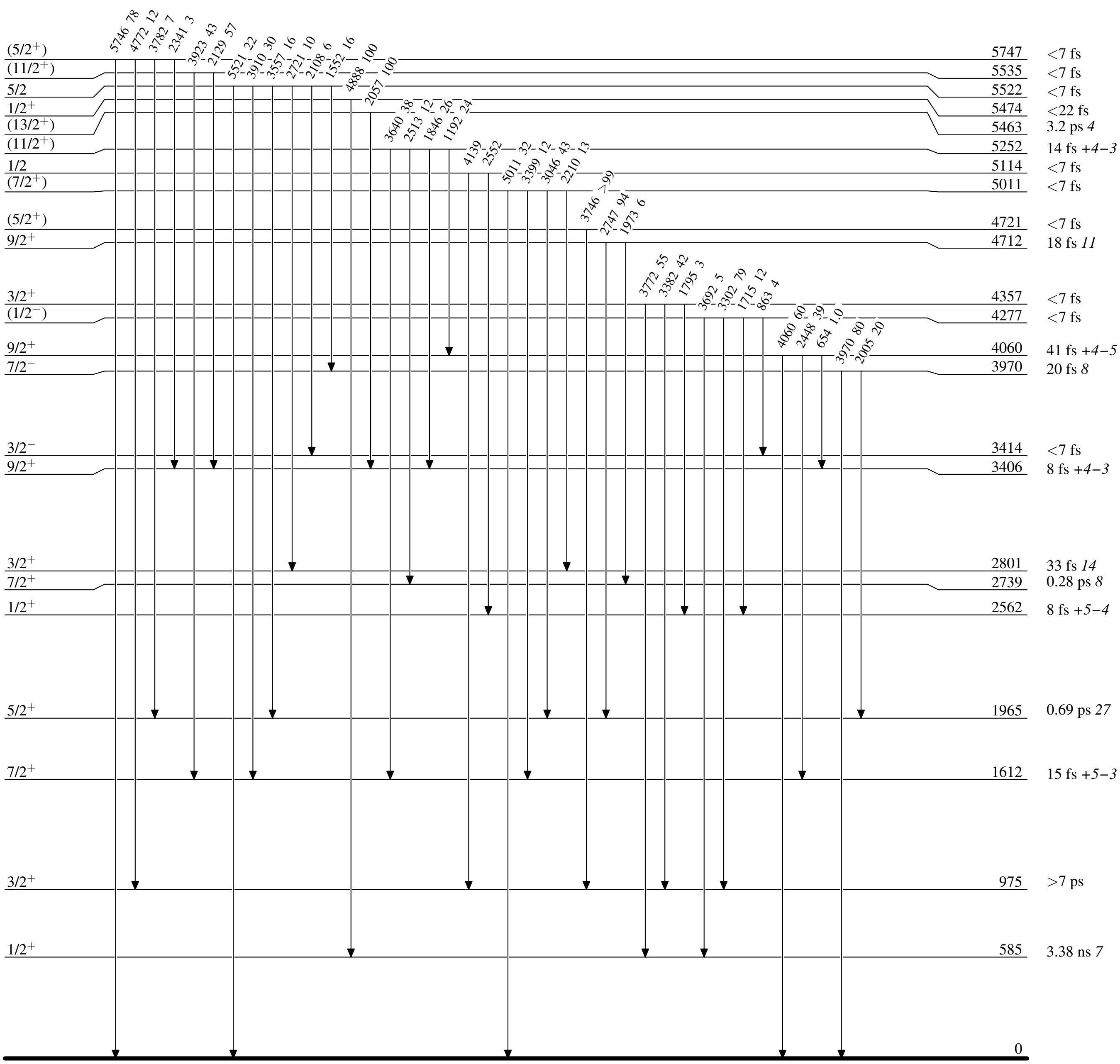


$^{25}_{12}Mg_{13}$

^{25}Mg(p,p′γ) 1975Ol02,1974Ol07

Level Scheme (continued)

Intensities: % photon branching from each level

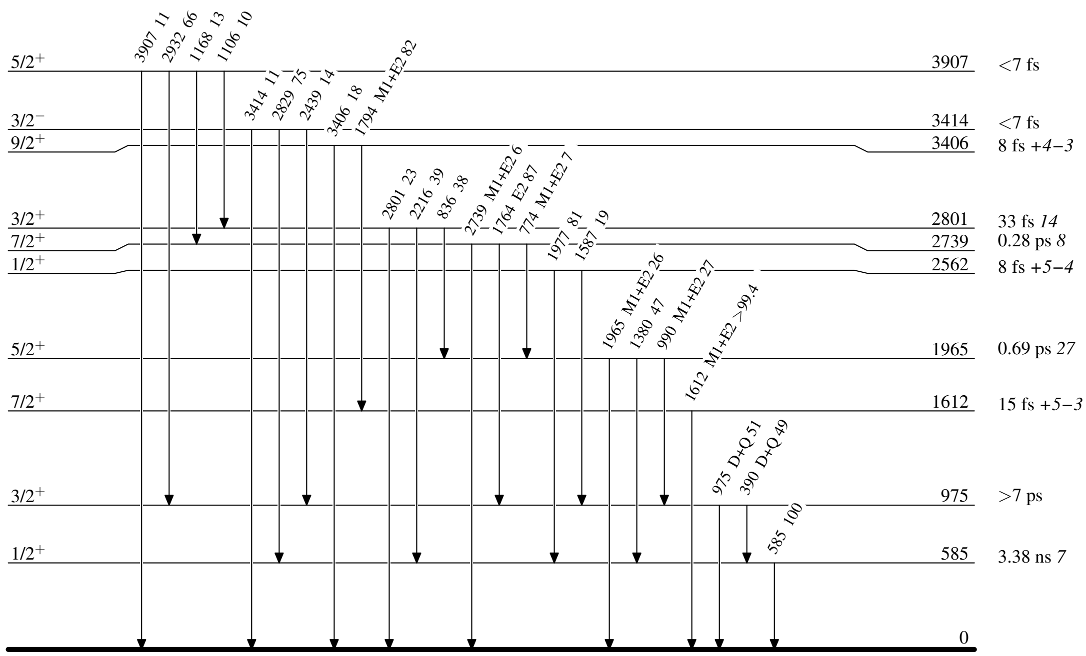


$^{25}_{12}Mg_{13}$

^{25}Mg(p,p′γ) 1975Ol02,1974Ol07

Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

^{25}Mg(n,n′γ) 1960Le04,1962Do12,1979KaYR

1960Le04: Neutrons were produced from D(d,n)^{3}He, En=1-3 MeV, or ^{14}N(d,n)^{15}O, En=4.3 MeV (mean), reactions. NaI(T1) crystal, a one-channel amplitude analyzer, resolving power of the spectrometer for gamma rays from ^{137}Cs was 10%. Measured Eγ.

1962Do12: Fast neutrons from a pool reactor, NaI(Tl) crystal, and the pulses from the photomultiplier were recorded in a 128-channel pulse height analyzer. Measured Eγ.

1979KaYR: Fast neutrons from reactor, enriched target; measured Eγ at 51°, 90°, and 145°. Deduced mean lifetime of excited levels by DSAM.

Other references: 1965EnZZ, 1976Be64 (also 1976BeXX), 1979KaYR.

^{25}Mg Levels

E(level)†	$T_{1/2}$	Comments
0		
585.03 *3*		
974.53 *11*		
1611.27 *6*	16 fs *3*	$T_{1/2}$: from 1976Be64, 1976BeXX. Other: 15.2 fs *+35−55* (from τ=22 fs *+5−8* – 1979KaYR).
1964.24 *9*	0.56 ps *+14−7*	$T_{1/2}$: from τ=0.80 ps *+20−10* (1979KaYR).
2562.95 *17*	54 fs *16*	$T_{1/2}$: from τ=78 fs *23* (1979KaYR).
2737.72 *19*	0.27 ps *6*	$T_{1/2}$: from τ=0.39 ps *9* (1979KaYR).
3403.2 *4*	35 fs *21*	$T_{1/2}$: from τ=50 fs *30* (1979KaYR).

† From a least squares fit to Eγ.

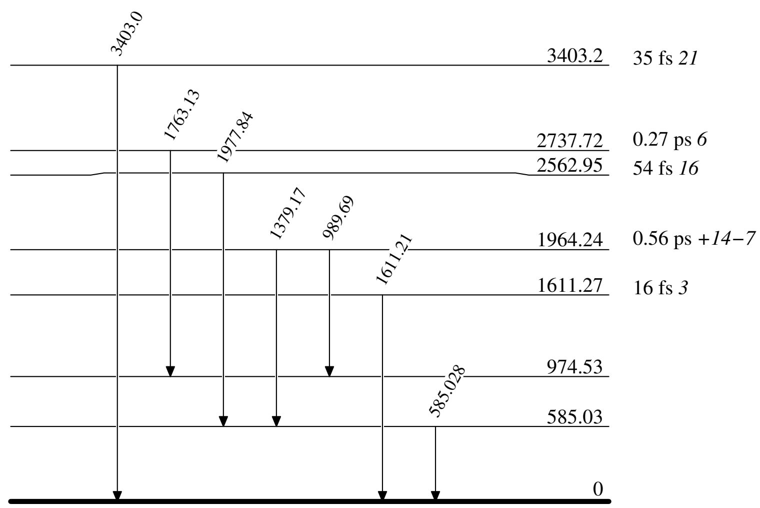
γ(^{25}Mg)

E_γ†	E_i(level)	E_f	Comments
585.028 *30*	585.03	0	E_γ: from Adopted Gammas. Other: 570 *10* (1960Le04).
ˣ630‡ *10*			
ˣ740‡ *10*			
ˣ890‡ *10*			
989.69 *6*	1964.24	974.53	
1379.17 *8*	1964.24	585.03	
1611.21 *6*	1611.27	0	E_γ: other: 1600 (1962Do12, 1965EnZZ).
ˣ1680‡ *20*			
1763.13 *15*	2737.72	974.53	
ˣ1850‡ *20*			
1977.84 *16*	2562.95	585.03	
3403.0 *4*	3403.2	0	

† From 1979KaYR, except otherwise where noted.
‡ From 1960Le04.
ˣ γ ray not placed in level scheme.

^{25}Mg(n,n′γ) 1960Le04,1962Do12,1979KaYR

Level Scheme



$^{25}_{12}Mg_{13}$

^{25}Mg(d,d′) 1961Bl05

E_d ≈14.8 MeV; reaction particles from the target were analyzed by a magnetic spectrometer, detected by CsI(Tl) crystal or a nuclear emulsion system. Measured $\sigma(\theta)$.

^{25}Mg Levels

E(level)†	Jπ‡	Comments
0	5/2+	
580	1/2+	σ <0.22 mb/sr at θ_{lab}=13.5°, 0.14 mb/sr *2* at θ_{lab}=29.7°, and 0.05 mb/sr *2* at θ_{lab}=63.9°.
980	3/2+	σ <0.18 mb/sr at θ_{lab}=13.5°, 0.13 mb/sr *2* at θ_{lab}=29.7°, and 0.04 mb/sr *2* at θ_{lab}=63.9°.
1610	7/2+	σ = 0.92 mb/sr *18* at θ_{lab}=11.2°, 3.75 mb/sr *9* at θ_{lab}=29.7°, and 0.80 mb/sr *4* at θ_{lab}=63.9°.
1960	5/2+	σ <0.15 mb/sr at θ_{lab}=11.2°, 0.23 mb/sr *3* at θ_{lab}=29.7°, and 0.06 mb/sr *2* at θ_{lab}=63.9°.
2560	1/2+	σ <0.13 mb/sr at θ_{lab}=13.5°, 0.22 mb/sr *3* at θ_{lab}=29.7°, and <0.02 mb/sr at θ_{lab}=63.9°.
2740	7/2+	σ <0.13 mb/sr at θ_{lab}=13.5°, 0.11 mb/sr *3* at θ_{lab}=29.7°, and <0.02 mb/sr at θ_{lab}=63.9°.
2800	3/2+	σ = 0.64 mb/sr *13* at θ_{lab}=13.5°, 0.33 mb/sr *7* at θ_{lab}=29.7°, and <0.02 mb/sr at θ_{lab}=63.9°.
3400		σ = 1.02 mb/sr *5* at θ_{lab}=13.5°, 1.52 mb/sr *6* at θ_{lab}=29.7°, and 0.43 mb/sr *3* at θ_{lab}=63.9° − may be for a doublet.
3900	5/2+	σ = 0.47 mb/sr *12* at θ_{lab}=13.5°, and 0.25 mb/sr *3* at θ_{lab}=29.7°.
3970	7/2−	σ <0.09 mb/sr at θ_{lab}=13.5°, and <0.06 mb/sr *3* at θ_{lab}=29.7°.
4050		σ = 0.61 mb/sr *12* at θ_{lab}=13.5°, and 0.62 mb/sr *5* at θ_{lab}=29.7°.

† From 1961Bl05 (most likely from the literature and listed in MeV to two decimal places).
‡ From Adopted Levels.

^{25}**Mg(α,α)** **1971Le18**

1971Le18: Elastic scattering cross sections of 18 to 22 MeV alpha particles by ^{25}Mg were measured at 174° laboratory angle.
Other: 1976Ki05.
All data are from 1971Le18.

^{25}Mg Levels

E(level)	Comments
18.20×10^{3} *23*	$(d\sigma/d\Omega)_{C.M.}$=10.3 mb/sr *4*.
18.55×10^{3} *20*	$(d\sigma/d\Omega)_{C.M.}$=5.25 mb/sr *31*.
19.27×10^{3} *18*	$(d\sigma/d\Omega)_{C.M.}$=5.50 mb/sr *31*.
19.85×10^{3} *18*	$(d\sigma/d\Omega)_{C.M.}$=6.79 mb/sr *31*.
20.34×10^{3} *18*	$(d\sigma/d\Omega)_{C.M.}$=5.85 mb/sr *31*.
20.69×10^{3} *18*	$(d\sigma/d\Omega)_{C.M.}$=8.63 mb/sr *31*.
21.12×10^{3} *15*	$(d\sigma/d\Omega)_{C.M.}$=4.45 mb/sr *21*.
22.02×10^{3} *13*	$(d\sigma/d\Omega)_{C.M.}$=5.12 mb/sr *21*.
22.49×10^{3} *13*	$(d\sigma/d\Omega)_{C.M.}$=2.81 mb/sr *10*.

Coulomb excitation 1961An07

Coulomb excitation was carried out using beams of ^{14}N, E=12-53 MeV, ^{20}Ne, E=16-26 MeV. Deduced B(E2)↑ value with respect to B(E2)↑=0.42 of 560 keV level in ^{76}Se, current value B(E2)↑=0.422 *5* (2024Si02).

^{25}Mg Levels

E(level)†	Jπ†	$T_{1/2}$‡	Comments
0	5/2+	stable	
585.042 *22*	1/2+	4.59 ns	B(E2)↑=0.000060
974.746 *23*	3/2+	7.4 ps	B(E2)↑=0.00036
1611.767 *11*	7/2+	21.8 fs	B(E2)↑=0.011

† From Adopted Levels.
‡ Deduced from B(E2)↑ and adopted γ-ray properties.

$\gamma(^{25}Mg)$

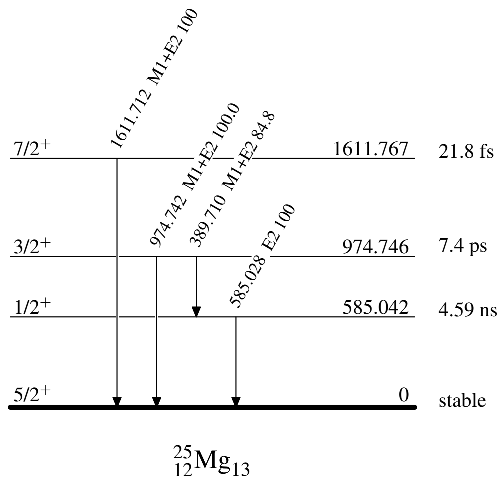
E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.†	δ†	α‡
585.042	1/2+	585.028 *30*	100	0	5/2+	E2		
974.746	3/2+	389.710 *35*	84.8 *15*	585.042	1/2+	M1+E2	+0.13 *3*	
		974.742 *35*	100.0 *15*	0	5/2+	M1+E2	+0.34 *12*	
1611.767	7/2+	1611.712 *11*	100	0	5/2+	M1+E2	−0.207 *13*	1.05×10^{-4} *2*

† From Adopted Gammas.
‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Coulomb excitation 1961An07

Level Scheme

Intensities: Relative photon branching from each level



^{26}Mg(γ,n),(γ,nγ') 1970Wu02,1976Ba14

1970Wu02 (γ,n): $E_{bremstrahlung}$ < 28 MeV; measured σ(E;E_n); deduced giant dipole resonance.
1976Ba14 (γ,nγ'): Metallic Mg (100 mg, purity >99.5%) target, $E_{bremsstrahlung}$=23.5 and 30 MeV, Ge(Li) at 90° with respect to bremsstrahlung beam direction, measured Eγ (not listed), deduced excited levels. FWHM=3 keV at 1.332 MeV Eγ.
Others: 1971Ba07, 1972Be76, 1974Wo03.

^{25}Mg Levels

E(level)†	J^{π}‡	Comments
0	5/2$^+$	
585	1/2$^+$	
974	3/2$^+$	
1611	7/2$^+$	
1965	5/2$^+$	
2564	1/2$^+$	
2801	3/2$^+$	
3901	(3/2,5/2)$^+$	
4354	3/2$^+$	
4715		
7784	(3/2,5/2)$^+$	
7863.4 *5*	(3/2,5/2)$^+$	E(level): from E_n(lab)=512.4 keV *5* (1972Be76), m(^{26}Mg)=25.98259297 a.m.u *3*, m(^{25}Mg)=24.98583697 a.m.u *5*, and S_n=7330.52 keV *5* (2021Wa16). Others: 7864.5 *12* in 1972Be76, 7864 in 1976Ba14.
12810		
12900		
13040		
13330		
13440		
13670		
13830		
14490		
15100		
15590		

† Up to 7784 from 1976Ba14, 12810 and above from 1970Wu02.
‡ As listed in 1976Ba14.

^{26}Mg(^{3}He,α),(d,t),(p,d) 1969Jo15,1988Pe19,1984Ki11

1969Jo15: (^{3}He,α) E=15 MeV. 99.42% enriched target; a 61 cm scattering chamber, four or eight silicon surface-barrier detectors placed 18 to 24 cm from the target; measured σ(Eα,θ); deduced excited levels, L, spectroscopic factor. DWBA calculations. FWHM=not available.

1988Pe19: (^{3}He,α) E=55.22 MeV, (p,d) E=35 MeV; 99.55% enriched target; magnetic spectrometer; measured $\sigma(\theta)$, σ(Eα), σ(Ed); deduced excited levels, spin, parity, spectroscopic factor. DWBA calculations. FWHM=18 keV in (p,d) and 41 keV in (^{3}He,α).

1984Ki11: (d,t) E=52 MeV, 99.7% enriched target; four ΔE-E telescopes, each consisting of a stack of four Si surface barrier counters; measured $\sigma(\theta)$, $\sigma(E_t)$; deduced levels, spin, parity, spectroscopic factor. DWBA calculations. FWHM=100 keV.

1971Kr14 (other): (p,d): E=20.0 MeV; >99% enriched target, Si counter telescope; measured $\sigma(\theta)$; deduced excited levels, S. FWHM=30 keV.

Other neutron pickup reactions:

(^{3}He,α): 1962Bl14, 1965Fi02, 1967De04, 1967De10, 1969Bo18, 1970De40, 1970Nu01, 1970Mc18, 1973No08.

(d,t): 1960Ha27, 1961Ba10, 1967De10, 1984Ki11.

(p,d): 1981Al01.

(^{6}Li,^{7}Li): 1973Sc26.

(^{11}B,^{12}B): 1975Pa14.

(^{16}O,^{17}O): 1976Si05.

^{25}Mg Levels

E(level)[†]	J$^{\pi}$[@]	L[a]	S[a]	Comments
0	5/2$^+$	2	2.24	L: also in 1960Ha27, 1961Ba10, 1967De04, 1969Bo18, 1970Mc18, 1970Nu01. S: from (^{3}He,α) and 2.27 (d,p) (1988Pe19). Others: S=2.5 (^{3}He,α) and (d,t) (1967De10); 1.9 (1969Jo15); 1.56 and 1.82 (1970Mc18); 1.4 and 2.3 (1970Nu01); 2.28 (p,d) (1971Kr14); 2.50 (^{16}O,^{17}O) 1976Si05; 2.00, 2.28, and 2.78 (p,d) (1981Al01). C^{2}S=2.00 (1975Pa14 – (^{11}B,^{12}B)); C^{2}S$_{rel}$=1.00 (1969Bo18); C^{2}S=3.98 (d,t) (1984Ki11).
586[#] *5*	1/2$^+$	0	0.07	L: also in 1960Ha27, 1961Ba10, 1970Mc18, 1970Nu01, 1971Kr14 (p,d). S: others: S=0.17 (^{3}He,α) and 0.18 (d,t) (1967De10); 0.17 and 0.23 (1970Mc18); 0.093 and 0.15 (1970Nu01); 0.13 (p,d) (1971Kr14); 0.13 (^{16}O,^{17}O) (1976Si05); 0.28, 0.23, and 0.17 (p,d) (1981Al01); C^{2}S=0.20 (d,t) (1984Ki11).
975	3/2$^+$	2	0.07	E(level): other: 972 *8* (1984Ki11). L: also in 1960Ha27, 1970Mc18, 1970Nu01. S: others: S=0.11 (^{3}He,α) and 0.12 (d,t) (1967De10); (0.31) and (0.52) (1970Mc18); 0.059, 0.16, 0.098 and 0.26 (1970Nu01); 0.06 (p,d) (1971Kr14); 0.06, 0.07, and 0.07 (p,d) (1981Al01); C^{2}S=0.11 (d,t) (1984Ki11).
1612[#] *5*	7/2$^+$	4	0.25	E(level): strongly populated in (^{3}He,α) (1967De04). L: from 1960Ha27, 1967De04, 1970Mc18, 1970Nu01 – L=(4). S: from (^{3}He,α) and <0.24 (d,t) (1967De10); 0.16 and 0.25 (1970Mc18); 0.140, 0.058, 0.230, and 0.096 (1970Nu01); 0.29 (p,d) (1971Kr14); 0.20 and 0.22 (p,d) (1981Al01).
1965[#] *5*	5/2$^+$	2	0.09	E(level): other: 1965 *10* (1988Pe19). L: also in 1960Ha27, 1970Mc18, 1970Nu01. S: others: 0.066 from (^{3}He,α) and 0.11 (p,d) (1988Pe19); 0.14 (^{3}He,α) and 0.24 (d,t) (1967De10); 0.21 and 0.23 (1970Mc18); 0.076, 0.13, 0.125 and 0.21 (1970Nu01), 0.15 (p,d) (1971Kr14); 0.12, 0.14, and 0.18 (p,d) (1981Al01). C^{2}S=0.23 (d,t) (1984Ki11).
2561[#] *5*	1/2$^+$	0	0.04	L: also in 1960Ha27. S: other: 0.04 (d,t) (1967De10), 0.077 (p,d) (1971Kr14); 0.08 and 0.06 (p,d) (1981Al01). C^{2}S=0.12 (d,t) (1984Ki11).
2740	7/2		0.19	J$^{\pi}$: listed for the S value in 1971Kr14. S: from (p,d) (1971Kr14) for J=7/2. Others: 0.07 and 0.06 (p,d) (1981Al01).
2801[#] *5*	3/2$^+$	(2)	(0.13)	L: from 1960Ha27. Other: (2) for 2740+2803 doublet (1969Jo15). S: for 2740+2803 doublet (1969Jo15). Others: 0.24 (^{3}He,α) and 0.21 (d,t) (1967De10), 0.24 (^{16}O,^{17}O) (1976Si05); 0.16 and 0.15 (p,d) (1981Al01). C^{2}S=0.35 (d,t) (1984Ki11).
3399	9/2$^+$	4		E(level),L: for doublet (1967De04).

Continued on next page (footnotes at end of table)

^{26}Mg(^{3}He,α),(d,t),(p,d) 1969Jo15,1988Pe19,1984Ki11 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π[@]	L[a]	S[a]	Comments
				S≤0.075 (^{3}He,α), <0.67 (d,t) (1967De10), <0.3 (p,d) (1971Kr14) for unresolved doublet.
3413	3/2$^-$			E(level): from 1967De10. Other: 3410 *20* (1984Ki11). J^π: from Adopted Levels. S≤0.075 (^{3}He,α) (1967De10); <0.22 and <0.29 (p,d) (1981Al01). C^{2}S=0.07 (d,t) (1984Ki11).
3908[‡] *10*	5/2$^+$[&]	(2)	(0.18)	J^π: other: (5/2$^+$) in 1967De10. L,S: For doublet (1969Jo15). Others: S=0.19 (^{3}He,α) and 0.28 (d,t) (1967De10); 0.22 (p,d) (1971Kr14); 0.08 and 0.10 (p,d) (1981Al01).
3971[‡] *10*	7/2$^-$[&]		0.012	E(level): other: 3962 *10* (1984Ki11: 3926 *10* is listed on the same row in Table 3 with 7/2$^-$ and 3971, this is probably a typo for 3662, otherwise 3926 *10* is closer to the 3908 keV level). J^π: other:(7/2$^-$) in 1969Jo15. S: from (^{3}He,α) and 0.022 from (p,d) (1988Pe19). Others: (0.18) for doublet (1969Jo15); <0.2 (^{3}He,α) and 0.4 (d,t) (1967De10); 0.07 and 0.06 (p,d) (1981Al01). C^{2}S=0.18 (d,t) (1984Ki11).
4060	9/2$^+$			E(level),J^π: from 1981Al01. S: 0.07 and 0.08 (p,d) for 9/2$^+$ (1981Al01).
4277	1/2$^-$			E(level),J^π: from 1981Al01, spin-parity listed for the S value. S: 0.004 and 0.002 (p,d) for 1/2$^-$ (1981Al01).
4351[#] *15*	3/2$^+$	2	0.08	J^π: used for the S value in 1981Al01. S: other: 0.03 (p,d) for 3/2$^+$ (1981Al01). C^{2}S=0.09 (d,t) (1984Ki11).
4728[#] *5*	5/2$^+$,3/2,1/2	2	0.21	J^π: 5/2$^+$ from 1967De10, 3/2 and 1/2 from 1984Ki11, listed for the S value. others: S=0.17 (^{3}He,α) and 0.73 (d,t) for 5/2$^+$ (1967De10); C^{2}S=0.30 for 3/2 and 0.34 for 1/2 (d,t) (1984Ki11).
5118[#] *5*	(1/2,3/2)$^-$[#]			E(level): others: 5110 (1967De10), 5080 *50* (1969Jo15), 5150 (1976Si05). S=0.32 (^{3}He,α) and 0.16 (d,t) for 1/2$^-$ (1967De10); S=0.50 for 1/2$^-$ and 0.26 for 3/2$^-$ (1976Si05). C^{2}S=0.87 for 3/2 and 1.06 for 1/2 (d,t) (1984Ki11).
5473[#] *8*	1/2		0.08	J^π: used for the S value in in 1984Ki11. S: from 1984Ki11 for 1/2.
5794	7/2$^-$	(3)	0.004	E(level),L,S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2$^-$. Measured $\sigma(\theta)$ did not fit well for L=3. J^π: used for the S value in 1988Pe19.
5866[#] *20*	5/2$^+$[#]		0.032	E(level): other: 5858 (1988Pe19). S: from (^{3}He,α) and 0.031 from (p,d) (1988Pe19). Other: C^{2}S=0.12 (d,t) (1984Ki11).
6092[#] *10*	5/2$^+$[&]	2	0.12	E(level): others: 6083 (1988Pe19), 6080 *10* (1969Bo18), 6080 *50* (1969Jo15). L: from 1969Bo18. S: from (^{3}He,α) and 0.11 from (p,d) (1988Pe19). Others: C^{2}S$_{rel}$=0.26 (1969Bo18); C^{2}S=0.73 for 3/2 and 0.49 for 5/2 (d,t) (1984Ki11).
6466[#] *10*	(1/2,3/2)$^-$[#]		0.70	E(level): other: 6460 *50* (1969Jo15). S: 0.70 for 3/2$^-$ and 0.82 for 1/2$^-$ (d,t) (1984Ki11).
6790[#] *10*	1/2$^+$		0.19	S: spectroscopic factor for 2S$_{1/2}$ (d,t) (1984Ki11).
6840 *50*				
6919	7/2$^-$	3	0.013	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2$^-$. L,J^π: L=3 (p,d) 1988Pe19. Authors propose 7/2$^-$ based on $\sigma(\theta)$ and DWBA calculations. 5/2$^-$ in the Adopted Levels.
6951	7/2$^-$	3	0.013	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2$^-$. L,J^π: L=3 (p,d) 1988Pe19. Authors propose 7/2$^-$ based on $\sigma(\theta)$ and DWBA calculations. 5/2$^-$ in the Adopted Levels.
7084	5/2$^+$		0.0095	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 5/2$^+$. J^π: used for the S value in 1988Pe19.
7222	5/2$^+$		0.0064	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 5/2$^+$.

Continued on next page (footnotes at end of table)

^{26}Mg(^{3}He,α),(d,t),(p,d) 1969Jo15,1988Pe19,1984Ki11 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^{π}[@]	L[a]	S[a]	Comments
				J^{π}: used for the S value in 1988Pe19.
7282 *7*	7/2^{-}[&]		0.010	E(level): other: 7283 (1988Pe19). S: from (^{3}He,α) and 0.032 from (p,d) (1988Pe19).
7782 *7*	5/2^{+}	2[b]	1.2	E(level): other: 7790 (1967De10), 7788 (1984Ki11 − calibration points), 7820 *10* (1969Bo18), 7820 *50* (1969Jo15). S: from 1967De10. Others: S=1.95 (1984Ki11), 1.5 (1969Jo15), C^2S=0.77 (1970De40), C^2S_{rel}=0.54 (1969Bo18).
7863 *7*	5/2		1.21	J^{π}: used for the S values in 1988Pe19. S: from (^{3}He,α) and 3.50 from (p,d) for 5/2 (1988Pe19). Others: S=(0.09) (1970De40), 1.15 (1976Si05).
8791 *7*	1/2^{+}	0[b]		C^2S=0.079 (1970De40).
8831[#] *20*	1/2^{+}		0.24	J^{π}: used for the S value in 1984Ki11. S: for 1/2^{+} (d,t) (1984Ki11).
10618 *8*	3/2^{+},5/2^{+}	2[b]		C^2S=0.1 (1970De40).
11725 *5*	1/2^{-}	1[b]	0.79	E(level): other: 11705 *30* (1984Ki11). J^{π}: also assignment in 1984Ki11. S: from 1984Ki11. Other: C^2S=0.27 (1970De40).
11747 *10*		(1)[b]		C^2S=(0.15) (1970De40).
11775 *10*		(1)[b]		C^2S=(0.02) (1970De40).
12898 *10*	3/2^{-},1/2^{-}	1[b]	0.45	E(level): other: 12856 *30* (1984Ki11). J^{π}: 3/2^{-} assigned in 1984Ki11. S: from (d,t) for 3/2 (1984Ki11). Other: C^2S=0.155 and (0.18) (1970De40).

[†] From 1969Jo15 for levels below 7 MeV and from 1970De40 for levels above 7 MeV, except where otherwise noted.
[‡] From 1988Pe19.
[#] From 1984Ki11.
[@] From 1967De10, based on $\sigma(\theta)$, DWBA, and spectroscopic factor calculations, except otherwise noted.
[&] From 1988Pe19, based on $\sigma(\theta)$, DWBA, and spectroscopic factor calculations.
[a] From 1969Jo15, except where otherwise noted.
[b] From 1970De40.

^{27}Al(μ^-,ν2nγ) 2007Me18

Adapted/Edited the XUNDL dataset compiled by S. Geraedts and B. Singh (McMaster): Oct 10, 2007.
The μ^- beam obtained from decay of π^- beam at 90 MeV/c. Measured γ-ray yields using two HPGe detectors at TRIUMF facility.

Muonic Lyman (or K) series for Aluminum

μ x-ray	Energy	Intensity (in% per capture)
2p-1s	346.828 a)	79.8 *8*
3p-1s	412.87 *5*	7.62 *15*
4p-1s	435.96 *10*	4.87 *10*
5p-1s	446.61 *10*	3.86 *10*
6p-1s	452.38 *10*	2.20 *10*
(7 to ∞)p-1s		1.63 *15*

a) 346.828 x-ray energy was used for calibration

^{25}Mg Levels

E(level)†	J$^\pi$†	Percent direct yield/muon capture	Comments
0.0	5/2$^+$	3 *1*	Percent direct yield/muon capture: estimated from (d,α) reaction.
585.042	1/2$^+$	1.37 *35*	
974.746	3/2$^+$	2.09 *22*	
1611.767	7/2$^+$	2.2 *6*	
1964.615	5/2$^+$	1.33 *11*	
2563.40	1/2$^+$	<0.25	
2737.95	7/2$^+$	0.28 *11*	

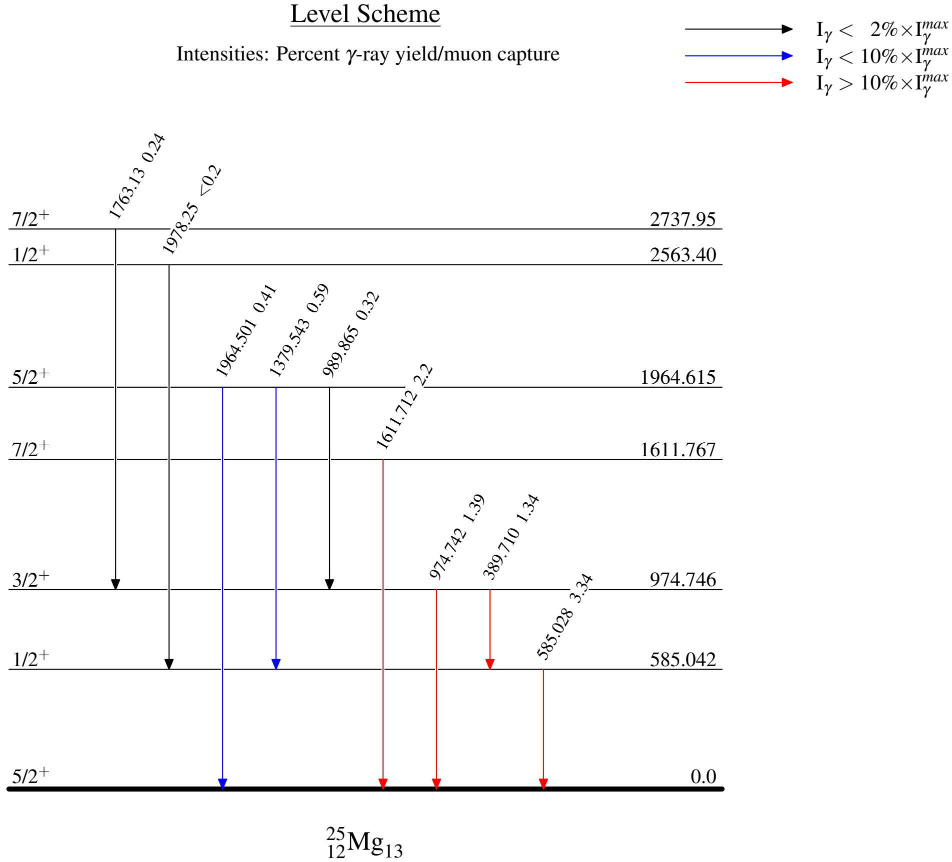
† From Adopted Levels.

γ(^{25}Mg)

E$_\gamma$†	I$_\gamma$‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
389.710	1.34 *13*	974.746	3/2$^+$	585.042	1/2$^+$
585.028	3.34 *34*	585.042	1/2$^+$	0.0	5/2$^+$
974.742	1.39 *14*	974.746	3/2$^+$	0.0	5/2$^+$
989.865	0.32 *17*	1964.615	5/2$^+$	974.746	3/2$^+$
1379.543	0.59 *6*	1964.615	5/2$^+$	585.042	1/2$^+$
1611.712	2.2 *6*	1611.767	7/2$^+$	0.0	5/2$^+$
1763.13	0.24 *10*	2737.95	7/2$^+$	974.746	3/2$^+$
1964.501	0.41 *7*	1964.615	5/2$^+$	0.0	5/2$^+$
1978.25	<0.2	2563.40	1/2$^+$	585.042	1/2$^+$

† From Adopted Gammas.
‡ Percent yield per muon capture.

^{27}Al(μ^-,ν2nγ) 2007Me18



^{27}Al(d,α),(d,$\alpha\gamma$) 1989Li13,1971Di20,1962Sh01

Includes (p,^{3}He) (1973Gr02).

1989Li13: ^{27}Al(d,α) E=7.5, 8.0, 8.5 MeV. Measured $\alpha(\theta)$, $\alpha(E_\alpha)$. Multi-angle spectrograph, emulsion plates, deduced excited levels. Hauser-Feshbach analysis.

1971Di20: ^{27}Al(d,$\alpha\gamma$) E=1.8, 1.9 MeV. Annular surface barrier α particle detector, NaI(Tl). Measured $\sigma(E\alpha,E\gamma)$, Iγ.

1962Sh01: ^{27}Al(d,α) E=12.5 MeV. Magnetic spectrometer, nuclear track plates. Deduced excited levels.

Others: 1960Hi19, 1961Ci02, 1961Hi04, 1961Hi11, 1961Sh05 (superseded by 1962Sh01), 1962Ya05, 1963Ca11 (superseded by 1963Ca15), 1964Ga05, 1965Co11, 1965Ga04, 1965Wi11, 1966Pr09, 1968Ho04, 1968Ho14, 1969Bo30, 1971Hu09, 1971Li16, 1974Ta03, 1975Ko20.

^{25}Mg Levels

E(level)[†]	J$^\pi$	Comments
0	5/2$^+$[@]	
584 *6*	1/2$^+$[@]	E(level): weighted average of 586 *6* (1962Sh01), 582 *8* (1989Li13), 583 *10* (1961Hi11). Other: 580 (1964Ga05).
974 *3*	3/2$^+$[@]	E(level): others: 973 *8* (1989Li13), 979 *10* (1961Hi11), 980 (1964Ga05).
1608 *2*	7/2$^+$[@]	E(level): others: 1616 *7* (1989Li13), 1609 *10* (1961Hi11), 1610 (1964Ga05).
1963 *7*		E(level): weighted average of 1962 *8* (1962Sh01), 1967 *7* (1989Li13), 1958 *10* (1961Hi11). Other: 1960 (1964Ga05).
2564 *5*		E(level): weighted average of 2566 *5* (1962Sh01), 2561 *7* (1989Li13), 2564 *10* (1961Hi11).
2735 *7*		E(level): weighted average of 2740 *8* (1962Sh01), 2732 *7* (1989Li13), 2731 *10* (1961Hi11).
2801 *6*		E(level): weighted average of 2805 *6* (1962Sh01), 2798 *7* (1989Li13), 2795 *10* (1961Hi11). Other: 2903 (1960Hi19 – possibly a misprint for 2803).
3403 *5*	(9/2$^+$)	E(level): other: 3405 *8* (1989Li13), 3398 *10* (1961Hi11). J$^\pi$: from 1960Hi19, based on the Iα ratio of the 3398 (here 3404) over 3407 (here 3412) groups.
3412 *6*	(3/2$^-$)	J$^\pi$: from 1960Hi19, based on the Iα ratio of the 3398 (here 3404) over 3407 (here 3412) groups. Also in 1961Hi04.
3906 *6*	5/2[&]	E(level): weighted average of 3909 *6* (1962Sh01), 3904 *7* (1989Li13), 3902 *10* (1961Hi11). J$^\pi$: other: 3/2,5/2,7/2,9/2 (1971Li16).
3967 *7*	7/2[&]	E(level): weighted average of 3971 *8* (1962Sh01), 3964 *7* (1989Li13), 3966 *10* (1961Hi11).
4058 *7*	7/2,9/2[&]	E(level): others: 4057 *9* (1989Li13), 4057 *10* (1961Hi11). J$^\pi$: other: 5/2,7/2,9/2 (1971Li16).
4273 *7*	1/2[#]	E(level): weighted average of 4273 *8* (1962Sh01), 4275 *7* (1989Li13), 4269 *10* (1961Hi11). J$^\pi$: also in 1975Ko20.
4356 *7*		E(level): weighted average of 4358 *7* (1962Sh01), 4356 *7* (1989Li13), 4350 *10* (1961Hi11).
4712 *8*		E(level): from 1961Hi11, 1989Li13.
4718 *6*		E(level): other: 4714 *10* (1961Hi11).
5007 *5*		E(level): weighted average of 5005 *5* (1962Sh01), 5011 *7* (1989Li13), 5006 *10* (1961Hi11).
5109 *9*		E(level): weighted average of 5107 *10* (1962Sh01), 5112 *9* (1989Li13), 5108 *10* (1961Hi11).
5247 *5*		E(level): weighted average of 5246 *5* (1962Sh01), 5250 *7* (1989Li13), 5245 *10* (1961Hi11).
5456 *3*		E(level): other: 5453 *10* (1961Hi11).
5465 *6*		E(level): other: 5464 *9* (1989Li13), 5470 *30* (1966Pr09). J$^\pi$: 11/2 in 1966Pr09. 13/2$^+$ in Adopted Levels.
5519 *3*		E(level): others: 5514 *10* and 5510 (1961Hi11).
5526 *6*		E(level): weighted average of 5528 *6* (1962Sh01), 5524 *10* (1989Li13), 5523 *10* (1961Hi11).
5746 *6*		E(level): other: 5756 *11* (1989Li13), 5738 *10* (1961Hi11).
5790 *5*		E(level): weighted average of 5787 *5* (1962Sh01), 5795 *6* (1989Li13), 5785 *10* (1961Hi11).
5854 *5*		E(level): weighted average of 5855 *5* (1962Sh01), 5852 *13* (1989Li13), 5851 *10* (1961Hi11).
5972 *6*		E(level): weighted average of 5969 *6* (1962Sh01), 5977 *6* (1989Li13), 5965 *10* (1961Hi11).
6037 *5*		E(level): other: 6038 *6* (1989Li13), 6032 *10* (1961Hi11).
6077 *6*		E(level): other: 6079 *6* (1989Li13), 6073 *10* (1961Hi11).
6167 *5*		E(level): weighted average of 6165 *5* (1962Sh01), 6171 *5* (1989Li13), 6159 *10* (1961Hi11).
6358 *5*		E(level): other: 6362 *6* (1989Li13), 6349 *10* (1961Hi11).
6434 *6*		E(level): weighted average of 6430 *6* (1962Sh01), 6442 *6* (1989Li13), 6423 *10* (1961Hi11).
6456 *10*		E(level): from 1961Hi11.

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^{27}Al(d,α),(d,$\alpha\gamma$) 1989Li13,1971Di20,1962Sh01 (continued)

^{25}Mg Levels (continued)

E(level)†	Comments
6564 *4*	E(level): weighted average of 6564 *4* (1962Sh01), 6573 *6* (1989Li13), 6558 *10* (1961Hi11).
6676 *5*	E(level): weighted average of 6673 *5* (1962Sh01), 6682 *6* (1989Li13), 6669 *10* (1961Hi11).
6766 *5*	E(level): weighted average of 6765 *5* (1962Sh01) and 6769 *10* (1961Hi11).
6784‡ *8*	
6837 *6*	E(level): weighted average of 6832 *6* (1962Sh01), 6847 *6* (1989Li13), 6826 *10* (1961Hi11).
6876 *4*	E(level): weighted average of 4058 *7* (1962Sh01) and 6872 *10* (1961Hi11).
6905 *6*	E(level): weighted average of 6913 *6* (1962Sh01), 6896 *8* (1989Li13), 6899 *10* (1961Hi11).
6948 *4*	E(level): other: 6952 *11* (1989Li13), 6944 *10* (1961Hi11).
7032 *4*	E(level): other: 7037 *7* (1989Li13), 7023 *10* (1961Hi11).
7082 *7*	E(level): weighted average of 7083 *7* (1962Sh01), 7085 *7* (1989Li13), 7075 *10* (1961Hi11).
7178 *6*	E(level): weighted average of 7180 *6* (1962Sh01), 7179 *6* (1989Li13), and 7172 *10* (1961Hi11).
7218 *10*	E(level): weighted average of 7224 *13* (1989Li13), 7214 *10* (1961Hi11). Other: 7214 (1962Sh01).
7278 *5*	E(level): weighted average of 7277 *5* (1962Sh01), 7284 *7* (1989Li13), 7270 *10* (1961Hi11).
7370 *6*	E(level): weighted average of 7372 *6* (1962Sh01) and 7365 *10* (1961Hi11).
7404 *5*	E(level): weighted average of 7408 *5* (1962Sh01), 7393 *9* (1989Li13), 7400 *10* (1961Hi11).
7491 *6*	E(level): weighted average of 7490 *6* (1962Sh01), 7509 *13* (1989Li13), 7482 *10* (1961Hi11).
7520 *9*	E(level): weighted average of 7528 *9* (1962Sh01) and 7510 *10* (1961Hi11).
7552‡ *4*	E(level): other: (7538 *15*) (1961Hi11).
7571 *5*	E(level): weighted average of 7573 *5* (1962Sh01) and 7564 *10* (1961Hi11).
7629 *6*	E(level): weighted average of 7631 *6* (1962Sh01) and 7623 *10* (1961Hi11).
7644 *7*	E(level): weighted average of 7646 *7* (1962Sh01) and 7640 *10* (1961Hi11).
7791 *7*	E(level): weighted average of 7794 *5* (1962Sh01), 7777 *10* (1989Li13).
7853 *5*	E(level): weighted average of 7853 *5* (1962Sh01) and 7855 *7* (1989Li13).
7943	
7962‡ *7*	
8009‡ *5*	E(level): other: 8008 *10* (1962Sh01).
8075 *8*	
8111 *6*	E(level): weighted average of 8112 *6* (1962Sh01), 8109 *6* (1989Li13).
8256‡ *6*	E(level): other: 8256 *9* (1962Sh01).
8310 *5*	E(level): weighted average of 8314 *5* (1962Sh01), 8306 *5* (1989Li13 − 8306.5 *5* − probably a typo).
8355 *5*	E(level): weighted average of 8356 *5* (1962Sh01) and 8349 *12* (1989Li13).
8400	
8445‡ *6*	E(level): other: 8447 (1962Sh01).
8526	
8552‡ *3*	
8576	
8649 *5*	E(level): same in 1989Li13. Other: 8646 (1989Li13).
8720 *15*	E(level): unweighted average of 8705 *6* (1962Sh01) and 8734 *14* (1989Li13).
8822‡ *19*	
8985‡ *16*	

† From 1962Sh01, except where otherwise noted. For weighted average, the uncertainty is the lowest input value for cases when the uncertainty of the weighted average is lower than the input value. In some cases, when the weighted average yields one of the input values, source of the level energy quoted from that single reference.
‡ From 1989Li13.
# Proposed in 1971Li16, based on the measured integral cross sections and calculations.
@ From 1973Gr02 (p,^{3}He), based on $\sigma(\theta)$ and DWBA calculations.
& Proposed in 1975Ko20, based on the measured $\sigma(\theta)$ and the 2J+1 rule.

^{27}Al(d,α),(d,$\alpha\gamma$) 1989Li13,1971Di20,1962Sh01 (continued)

$\gamma(^{25}Mg)$

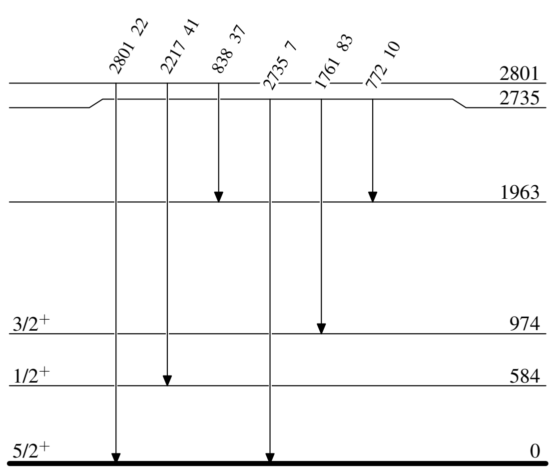
E_i(level)	E_γ †	I_γ ‡	E_f	J^π_f
2735	772	10 *2*	1963	
	1761	83 *5*	974	$3/2^+$
	2735	7 *6*	0	$5/2^+$
2801	838	37 *4*	1963	
	2217	41 *6*	584	$1/2^+$
	2801	22 *6*	0	$5/2^+$

† From level energy differences, recoil energy subtracted. Value rounded to the nearest keV.
‡ From 1971Di20.

^{27}Al(d,α),(d,$\alpha\gamma$) 1989Li13,1971Di20,1962Sh01

Level Scheme

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

^{28}Si(μ^-,νp2nγ) 2007Me18

Adapted/Edited the XUNDL dataset compiled by S. Geraedts and B. Singh (McMaster): Oct 10, 2007.
The μ^- beam obtained from decay of π^- beam at 90 MeV/c. Measured γ-ray yields using two HPGe detectors at TRIUMF facility.

```
-----------------------------------------------------------------------
             Muonic Lyman (or K) series for Silicon

  μ x-ray         Energy                Intensity (in% per capture)

  2p-1s            400.177 a)            80.3 8
  3p-1s            476.80 5              7.40 20
  4p-1s            503.58 10             4.27 20
  5p-1s            515.97 10             3.83 20
  6p-1s            522.74 10             2.29 10
  (7p to ∞p)-1s                           1.87 20
 a): 400.177-keV x ray used for calibration
-----------------------------------------------------------------------
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^{25}Mg Levels

E(level)†	J^{π}†
0.0	5/2+
585.042	1/2+
974.746	3/2+
1611.767	7/2+
1964.615	5/2+
2563.40	1/2+

† From Adopted Levels.

γ(^{25}Mg)

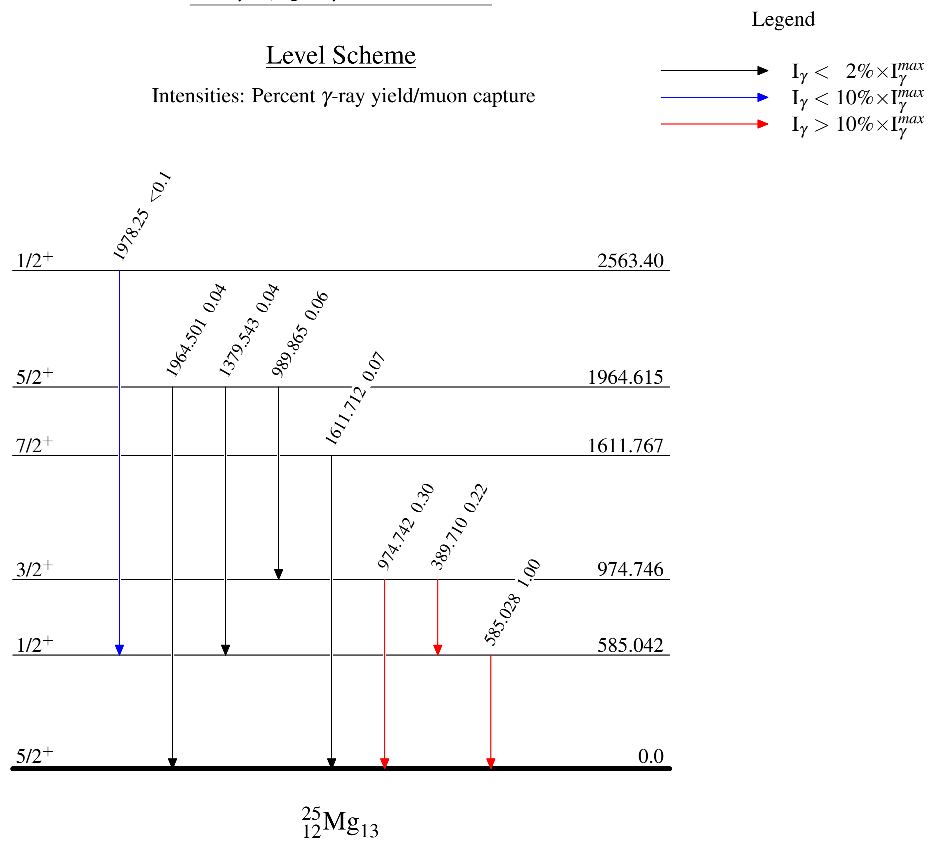
E_{γ}†	I_{γ}‡	E_i(level)	J^{π}_i	E_f	J^{π}_f
389.710	0.22 *6*	974.746	3/2+	585.042	1/2+
585.028	1.00 *8*	585.042	1/2+	0.0	5/2+
974.742	0.30 *6*	974.746	3/2+	0.0	5/2+
989.865	0.06 *6*	1964.615	5/2+	974.746	3/2+
1379.543	0.04 *4*	1964.615	5/2+	585.042	1/2+
1611.712	0.07 *7*	1611.767	7/2+	0.0	5/2+
1964.501	0.04 *4*	1964.615	5/2+	0.0	5/2+
1978.25	<0.1	2563.40	1/2+	585.042	1/2+

† From Adopted Gammas.
‡ Percent yield per muon capture.

^{28}Si(μ^-,νp2nγ) 2007Me18

Level Scheme

Intensities: Percent γ-ray yield/muon capture



Adopted Levels, Gammas

Q(β^-)=−12743 *10*; S(n)=16938.48 *24*; S(p)=2271.37 *6*; Q(α)=−9156.03 *8* 2021Wa16
S(2n)=31806.7 *4*, S(2p)=13964.06 *6* (2021Wa16).
Other reactions:
^{22}Mg(α,p): 2023Ja08 – reported a direct measurement of the energy- and angle-integrated cross sections for $E_{c.m.}$=3.3-6.9 MeV.
^{25}Mg(^{6}Li,^{6}He): 1976Ci02 and 1982Ci01 – listed in the (^{3}He,t) dataset.
^{24}Mg(^{19}F,^{18}O): 1976Ts03 – listed in the (d,n) dataset.
^{24}Mg(^{7}Li,^{6}He): 1974Ke15 and 1975Mo07 – listed in the (d,n).

^{25}Al Levels

Cross Reference (XREF) Flags

A	^{25}Si ε decay (218.7 ms)	E	^{24}Mg(pol p,p),(pol p,p′)	I	^{27}Al(p,t)
B	^{26}P εp decay (43.6 ms)	F	^{24}Mg(d,n)	J	^{28}Si(p,α)
C	^{27}S ε2p decay (15.9 ms)	G	^{24}Mg(^{3}He,d),(pol ^{3}He,d)		
D	^{24}Mg(p,γ),(p,p′γ)	H	^{25}Mg(^{3}He,t)		

E(level)[†]	J$^\pi$	$T_{1/2}$ or Γ[f]	XREF	Comments
0[a]	5/2$^+$	7.168 s *4*	ABCD FGHIJ	%ε+%β^+=100 μ=3.6447 *12*; Q=0.24 *2* J$^\pi$: L=2 in (d,n) and (^{3}He,d), 5/2 from γ-p correlation measurements (p,γ) (1956Li46). Superallowed beta decay to mirror nucleus ^{25}Mg with log *ft*=3.57. $T_{1/2}$: weighted average of 7.24 s *3* (1958Mu05), 7.23 s *2* (1971Ju03), 7.177 s *23* (1973Ta04), 7.174 s *7* (1975Az01), and 7.18 s *9* (1960Ja12), 7.15 s *12* (1958Ar15), 7.3 s *3* (1960Wa04), 7.1657 s *24* (2017Lo09 – from β-decay curves). Other: 7.3 s (1948Br21). μ: from 2019StZV, 1976Mi11 (nuclear magnetic resonance destruction of the polarization). Q: from 2021StZZ, 2007Ma94 (β-Nuclear Magnetic Resonance).
451.8[b] *4*	1/2$^+$	2.29 ns *5*	AB D FG IJ	J$^\pi$: L=0 in (^{3}He,d) and in (p,t).
944.9[b] *4*	3/2$^+$	4.3 ps *11*	AB D FG IJ	J$^\pi$: L=2 in (d,n), (^{3}He,d); M1+E2 γ, ΔJ=1, to 1/2$^+$. $T_{1/2}$: From 1972Al28 (p,γ).
1612.9[a] *5*	(7/2)$^+$	11 fs *2*	AB D FGHIJ	J$^\pi$: M1+E2 to 5/2$^+$, band assignment. M1+E2 from (9/2)$^+$ at 3424.7, no feeding to 1/2$^+$. 3/2$^+$,5/2$^+$ is also possible.
1789.7[b] *4*	5/2$^+$	390 fs *+40−30*	AB D FG IJ	XREF: F(1810) J$^\pi$: L=2 in (^{3}He,d) and the strength of the γ-ray feeding from the 3700 level 7/2$^-$ excludes 3/2$^+$.
2485.4[c] *23*	1/2$^+$	3.9 fs *+20−17*	D FG IJ	E(level): weighted average of 2485 *3* from (^{3}He,d) and 2480.0 *19* from (p,α). J$^\pi$: L=0 in (^{3}He,d). Γ_γ/Γ=0.91 *4* (p,γ).
2673.6[c] *4*	3/2$^+$	4 fs *3*	A D FG IJ	XREF: F(2690) J$^\pi$: L=2 in (d,n) and in (^{3}He,d); M1(+E2) γ to 1/2$^+$. Γ_γ/Γ=0.125 *9* (p,γ).
2720.4[b] *6*	7/2$^+$	223 fs *31*	B D FG IJ	J$^\pi$: 7/2 from $\gamma(\theta)$ in (p,γ); E2+(M3) γ to 3/2$^+$; M1+E2 γ to 5/2$^+$.
3061.9 *7*	3/2$^-$	1.3 keV *4*	D FG IJ	XREF: F(3080) E(level): weighted average of 3062.0 *7* from (p,γ), 3061.5 *15* from (^{3}He,d), and 3061.5 *15* from (p,α). J$^\pi$: L=1 in (d,n) and in (^{3}He,d); D(+Q) γ to 5/2$^+$. $\Gamma_p\Gamma_\gamma/\Gamma$=121 *18* (p,$\gamma$).
3410 *5*	(5/2$^+$)		f J	J$^\pi$: from (p,α) dσ/dΩ and DWBA fit. 9/2$^+$ is poorly fitted at the most forward angles (2009Pi13).
3424.7[a] *7*	(9/2)$^+$	9.0 fs *14*	D fG IJ	J$^\pi$: from γp(θ) in (p,γ) consistent with 9/2$^+$,5/2$^+$, E2(+M3) to 5/2$^+$

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{25}Al Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[f]	XREF	Comments
				and M1+E2 to $(7/2)^+$ favors $9/2^+$ assignment. Band assignment. Not populated in ^{25}Si beta decay. $\Gamma_p\Gamma_\gamma/\Gamma$=6.5 meV *13* (p,$\gamma$).
3695.5 *5*	$7/2^-$	0.3 keV	D FG IJ	J^π: L=3 in (d,n) and in (^{3}He,d); 3695.6γ D(+Q), ΔJ=1, to $5/2^+$; $\Gamma_p\Gamma_\gamma/\Gamma$=17.5 *25* (1975Tr04 – (p,γ)).
3823.0[‡] *20*	$1/2^-$	36[@] keV *7*	D FG J	XREF: F(3840)J(3848) J^π: L=1 in (^{3}He,d); 1/2 in 1952Ko33, based on the dσ/dΩ and calculations, $p_{1/2}$ in (p,γ) dataset. $\Gamma_p\Gamma_\gamma/\Gamma$=350 meV *50* (1975Tr04 – (p,γ)).
3858.9[c] *8*	$5/2^+$	0.1 keV	A D FG I	E(level): weighted average of 3859 *2* from ^{25}Si ε decay, 3859.1 *8* from (p,γ), and 3856.4 *25* from (^{3}He,d). J^π: L=2 in (^{3}He,d); D(+Q) γ to $7/2^+$. (2J+1)$\Gamma_p\Gamma_\gamma/\Gamma$=190 meV *30* (1975Tr04 – (p,γ)).
4025 *3*	$(9/2,5/2)^+$	18 fs *3*	D FG J	XREF: J(4021) E(level): weighted average of 4025 *4* from (p,γ), 4027 *3* from (^{3}He,d), and 4021 *5* from (p,α). J^π: From $\gamma\gamma(\theta)$ in (p,γ). Mirror state of 4059.2, J^π=$9/2^+$, ^{25}Mg. Γ<10 keV (1959Li52 – (p,γ)).
4197 *2*	$3/2^+$	0.15 keV	A D FG IJ	XREF: I(4220)J(4205) E(level): weighted average of 4191 *3* from ^{25}Si ε decay, 4199 *2* from (p,γ), and 4196 *3* from (^{3}He,d). Other: 4205 *19* from (p,α). J^π: $3/2^+$,$5/2^+$ in (p,p_0) from L=2 (1952Ko33); D+Q to $1/2^+$. $\Gamma_p\Gamma_\gamma/\Gamma$=130 meV *20* (1975Tr04 – (p,γ)).
4520[b] *4*	$(9/2)^+$		D G J	E(level): weighted average of 4518 *4* from (^{3}He,d) and 4525 *7* from (p,α). Band member assigned by the evaluators based on the rotational bands of Fig. 2 (2004Fu02 – (^{3}He,t)). In (p,t) a doublet at 4590 is available without band assignment. J^π: $9/2^+$,(7/2,5/2) from $\gamma(\theta)$ in (p,γ), band assignment.
4582[#] *2*	$5/2^+$	0.3 keV	A D F I	XREF: F(4620)I(4590) J^π: $3/2^+$,$5/2^+$ in (p,p_0) from L=2 (1952Ko33); 5/2 from $\gamma(\theta)$ (p,p′γ).
4852 *4*			FG	E(level): weighted average of 4820 *30* from (d,n) and 4853 *4* from (^{3}He,d).
4906[#c] *4*			A D FG IJ	XREF: D(4882)F(4920)J(4921) J^π: $\geq5/2^+$ from $\gamma\gamma(\theta)$ in (p,γ). DWBA fits $3/2^+$ or $5/2^+$ (2009Pi13) (p,α).
5068[@] *5*		<4 keV	D FG J	XREF: F(4990)J(5050)
5083[‡]			D I	
5101 *10*		<4 keV	G	
5116 *7*		47 keV *5*	FG	XREF: F(5120)
5232 *4*			FG	XREF: F(5250)
5285	$1/2^+$	185 keV	D F I	XREF: F(5340)I(5300) J^π: In (p,γ) – based on p,p′ scattering data – 1972Du11.
5526 *7*		≈18 keV	FG	XREF: F(5470)
5597[#] *5*	$(3/2,5/2,7/2)^+$	56[#] keV *20*	A D F I	XREF: F(5560) J^π: Log *ft*=5.5 from $5/2^+$. ≥5/2 in (p,γ) (1972Du11). Γ: From 1992Ha28.
5686 *7*			G J	XREF: J(5722)
5785 *7*	$1/2^+$	≈20 keV	D G	XREF: D(5764) J^π: In (p,γ) – 1/2 from triple correlation, $1/2^+$ from scattering

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Adopted Levels, Gammas (continued)

^{25}Al Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[f]	XREF	Comments
				(p,p′) data. Γ: From 28 keV (p,γ) and ≈15 keV (^{3}He,d).
5804 *4*	(3/2,5/2,7/2)$^+$		A D FG I	XREF: F(5840) J^π: Log *ft*=5.0 from 5/2$^+$.
6069 *9*			A fG J	E(level): weighted average of 6092 *25* from ^{25}Si ε decay, 6063 *7* from (^{3}He,d), and 6095 *18* from (p,α).
6121[d] *3*	3/2$^+$[e]	53 keV *2*	A DEfGHI	E(level): weighted average of 6123 *7* from ^{25}Si ε decay, 6122 *3* from (pol p,p), 6123 *7* from (^{3}He,d), and 6117 *5* from (^{3}He,t). Γ: weighted average of 89 keV *36* from ^{25}Si ε decay, 51 keV *2* from (pol p,p), 61 keV *7* from (^{3}He,d), 51 keV *2* from (^{3}He,t), and 56 keV *2* (p,γ).
6170 *2*	(3/2,5/2,7/2)$^+$		A F	XREF: F(6190) J^π: Log *ft*=5.6 from 5/2$^+$.
6327 *2*	7/2	>0.4 keV	D G	E(level): weighted average of 6328 *2* from (p,γ) and 6322 *5* from (^{3}He,d). J^π: From based on inelastic scattered p(θ) (1970Ro19) (p,p′γ). Γ: $\Gamma_p\Gamma_\gamma/\Gamma$<3 (1975Tr04).
6385 *3*	3/2$^-$	<15[&] keV	DEF	XREF: D(6407)F(6370) Γ: Γ_p/Γtot=0.10 keV. J^π: From (pol p,p′), based on phase shift analysis (1991Pr06). 3/2 from triple correlation and 3/2$^-$ from scattering data (1972Du11) (p,p′γ).
6409 *10*		58[@] keV *7*	FG J	XREF: F(6450)J(6439)
6518 *7*	3/2$^+$[e]	59 keV *13*	DE G	E(level): weighted average of 6520 *9* from (pol p,p) and 6517 *7* from (^{3}He,d). Γ: weighted average of 64 keV *16* from (pol p,p) and 56 keV *13* from (^{3}He,d). Γ_p=5 keV *1* (pol p,p).
6620[#] *9*	3/2$^+$,5/2$^+$,7/2$^+$		A F	J^π: Log *ft*=5.7 from 5/2$^+$.
6649[d] *5*	5/2$^+$[e]	58[&] keV *9*	A DE GH	XREF: D(6676) E(level): weighted average of 6651 *7* from ^{25}Si ε decay, 6645 *5* from (pol p,p), 6644 *7* from (^{3}He,d), and 6655 *5* from (^{3}He,t).
6734[‡] *22*	7/2$^-$[e]	197[&] keV *39*	EF	Γ: Γ_p=18 keV *2* (pol p,p).
6740 *5*	1/2$^+$[e]	152[&] keV *11*	E	Γ: Γ_p=137 keV *7* (pol p,p).
6770[@] *7*			D FG	
6879 *7*	(3/2,5/2,7/2)$^+$		A G	E(level): weighted average of 6877 *8* from ^{25}Si ε decay and 6881 *7* from (^{3}He,d). J^π: Log *ft*=5.1 from 5/2$^+$.
6895 *3*	7/2$^-$[e]	53[&] keV *4*	E	Γ: Γ_p=17 keV *1* (pol p,p).
6909 *10*			d G	J^π: 3/2 from pγ(θ) in (p,γ) for doublet.
6944 *10*		104[@] keV *10*	A d G	XREF: A(6982)
7022			D F	XREF: F(6990)
7055 *9*	3/2$^-$[e]	616[&] keV *20*	EF	XREF: F(7090) Γ: Γ_p=449 keV *12* (pol p,p′).
7112 *4*	3/2$^+$[e]	117[&] keV *4*	A DE GH	E(level): weighted average of 7108 *3* from ^{25}Si ε decay, 7090 *40* from (d,n), 7112 *10* from (^{3}He,d), and 7125 *5* from (^{3}He,t). Γ_p=88 keV *3* (pol p,p).

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Adopted Levels, Gammas (continued)

^{25}Al Levels (continued)

E(level)[†]	J^π	$T_{1/2}$ or Γ[f]	XREF	Comments
7150 *7*	5/2−[e]	20[&] keV *6*	Ef	Γ_p=1.4 keV *1* (pol p,p).
7183[@] *7*			fG J	
7242 *3*	5/2+[e]	19[&] keV *4*	A DE GH	E(level): weighted average of 7249 *5* from ^{25}Si ε decay, 7240 *3* from (pol p,p), 7290 *30* from (d,n), 7240 *7* from (^{3}He,d), and 7239 *5* from (^{3}He,t). Γ_p=5 keV *1* (pol p,p).
7297[‡] *3*	3/2−[e]	69 keV *9*	DEF	Γ: weighted average of 100 keV *20* from (p,γ) and 66 keV *6* from (pol p,p). Γ_p=51 keV *3* (pol p,p).
7409 *4*	5/2−[e]	<12[&] keV	E	E(level): weighted average of 7408 *3* from (pol p,p) and 7417 *7* from (^{3}He,d). Other: 7434 *20* from ^{25}Si ε decay. Γ: Γ_p/Γ_{tot}=0.06 keV.
7421[d] *5*	(7/2)+		D GH	E(level): weighted average of 7434 *20* from ^{25}Si ε decay, 7417 *7* from (^{3}He,d), and 7422 *5* from (^{3}He,t). J^π: (3/2,5/2,7/2)+ in (^{3}He,t); (7/2)+ from band assignment.
7480 *30*			F j	
7588			D G j	XREF: G(?)
7646		50 keV *15*	D	J^π: Log *ft*=4.9 from 5/2+.
7684[‡] *3*	7/2−[e]	21[&] keV *3*	A E	Γ: Γ_p=1.5 keV *2* (pol p,p).
7716 *10*	3/2+[e]	230[&] keV *20*	E	Γ: Γ_p=103 keV 7.
7770		340 keV *15*	D	
7820[#] *15*		209[@] keV *20*	A G	XREF: G(?)
7848		20 keV *8*	D	
7892 *8*	5/2−[e]	94[&] keV *15*	E	Γ_p=3.6 keV *15* (pol p,p).
7903.0 *22*	5/2+	0.111 keV *18*	A DE I	T=3/2 J^π: Log *ft*=3.25 from 5/2+ isobaric analog state. Γ: weighted average of 0.16 keV *5* from (p,γ) and 0.105 keV *18* from (pol p,p). Γ_p=18 eV *4* (pol p,p).
7943[#] *20*		35 keV *10*	A D	
7971 *3*	3/2+[e]	1.30[&] keV *14*	DE	T=3/2 E(level): weighted average of 7968 *2* from (p,γ) and 7974 *2* from (pol p,p). other: Γ=0.36 keV *5* (p,γ) – authors of 1992Wi13 – (pol p,p) note that polarized beam datum is superior than unpolarized beam. Γ_p=232 eV *12* – (pol p,p).
8025		20 keV *10*	D	
8077	(7/2,9/2)+	15 keV *7*	D	J^π: from γγ(θ) in (p,γ).
8089[&] *3*	5/2−[e]	40[&] keV *9*	DEF I	XREF: F(8100) Γ: Γ_p=4.9 keV *1*.
8189 *3*	(3/2,5/2,7/2)+	40 keV *10*	A D H	E(level): weighted average of 8188 *3* from ^{25}Si ε decay and 8192 *5* from (^{3}He,t). J^π: Log *ft*=4.1 from 5/2+. Γ: other: 20 keV *20* (^{25}Si ε+β+ decay (219.2 ms)).
8300 *30*			F	
8600 *30*			F	
8670 *30*			F	
8820 *30*			F	
9000 *30*			F	
9068 *7*	(3/2,5/2,7/2)+		A	J^π: Log *ft*=4.3 from 5/2+.
9210 *30*			F	
9275 *25*			A	

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Adopted Levels, Gammas (continued)

^{25}Al Levels (continued)

† From a least-squares fit to the γ-ray energies, except where.
‡ From (p,γ),(p,p′γ).
# From ^{25}Si ε decay (219.2 ms).
@ From (^{3}He,d),(pol ^{3}He,d).
& From (pol p,p′).
[a] Band(A): 5/2[202].
[b] Band(B): 1/2[211].
[c] Band(C): 1/2[200].
[d] Band(D): 3/2[202].
[e] From (pol p,p′), based on phase shift analysis (1991Pr06).
[f] From (p,γ),(p,p′γ), except where otherwise noted.

Adopted Levels, Gammas (continued)

$\gamma(^{25}Al)$

E_i(level)	J_i^π	E_γ[†]	I_γ[&]	E_f	J_f^π	Mult.[a]	δ	α[b]	Comments
451.8	1/2$^+$	451.9[‡] *6*	100	0	5/2$^+$	[E2]		2.79×10^{-4} *4*	B(E2)(W.u.)=3.02 *7*
944.9	3/2$^+$	493.1[‡] *6*	100 *4*	451.8	1/2$^+$	(M1+E2)	−0.09 *6*	7.32×10^{-5} *22*	B(M1)(W.u.)=0.025 *+9−5*; B(E2)(W.u.)=5 *+10−4* δ: based on RUL from the reported values in 1972Pi07, 1969An22, 1971Mc06: −0.09 *6* or −1.70 *40* (1972Pi07), +0.15 *5* or −2.6 *4* (1969An22), −0.03 *5* (1971Mc06). All from (p,γ). Weighted average of −0.09 *6* (1972Pi07) and −0.03 *5* (1971Mc06) yields a δ value of −0.06 *5* considering the +0.15 *5* (1969An22) value as discrepant.
		944.4[#] *5*	71[#] *3*	0	5/2$^+$	M1+E2		2.5×10^{-5} *5*	I_γ: others: 50 *4* from ^{26}P εp decay, and 75 *4* from (p,γ). δ: −0.38 *15* or 1.40 *20* (1972Pi07). Other: −0.35 *10* or −1.7 *2* (1969An22), −0.34 *4* or −1.64 *14* (1971Mc06). All in (p,γ). B(M1)(W.u.)=0.0025 *+9−5* if M1, B(E2)(W.u.)=17 *+6−4* if E2.
1612.9	(7/2)$^+$	1612.8 *5*	100	0	5/2$^+$	M1+E2	+0.17 *4*	1.07×10^{-4} *2*	B(M1)(W.u.)=0.46 *+10−7*; B(E2)(W.u.)=31 *+18−13* E_γ: weighted average of 1613.1 *6* from ^{26}P εp decay and 1612.5 *5* from (p,γ).
1789.7	5/2$^+$	844.0 *6*	100 *5*	944.9	3/2$^+$	M1+E2	+0.17 *2*	2.48×10^{-5} *4*	B(M1)(W.u.)=0.038 *4*; B(E2)(W.u.)=9.0 *+23−22* E_γ: weighted average of 844.6 *7* from ^{25}Si ε decay and 843.5 *6* from ^{26}P εp decay.
		1338.0[‡] *5*	88 *10*	451.8	1/2$^+$	E2(+M3)	−0.1 *3*	5.15×10^{-5} *19*	B(E2)(W.u.)=28 *+6−9* I_γ: unweighted average of 68 *4* from ^{25}Si ε decay, 100 *13* from ^{26}P εp decay, and 95 *5* from (p,γ).
		1789.9 *6*	55 *5*	0	5/2$^+$	M1+E2	+0.56 *3*	1.80×10^{-4} *3*	B(M1)(W.u.)=0.00169 *21*; B(E2)(W.u.)=0.98 *+14−15* I_γ: others: 57 *4* from ^{25}Si ε decay, 100 *38* from ^{26}P εp decay. E_γ: weighted average of 1789.4 *9* from ^{25}Si ε decay, 1790.2 *6* from ^{26}P εp decay, and 1789.6 *13* from (p,γ).
2485.4	1/2$^+$	1540.2	19.2 *3*	944.9	3/2$^+$				
		2033.4	100.0 *11*	451.8	1/2$^+$				
		2485.1	3.31 *12*	0	5/2$^+$	[E2]		5.54×10^{-4} *8*	B(E2)(W.u.)=10 *+8−3*
2673.6	3/2$^+$	883.8[#] *6*	100.0 *19*	1789.7	5/2$^+$				
		1728.3[#] *8*	1.2 *5*	944.9	3/2$^+$				
		2221.4[#] *18*	73.4 *16*	451.8	1/2$^+$	M1(+E2)	+0.05 *5*	3.41×10^{-4} *5*	B(M1)(W.u.)=0.2 *+5−1*
		2673.6[#] *6*	59.1 *12*	0	5/2$^+$	M1+E2	+0.36 *11*	5.42×10^{-4} *11*	B(M1)(W.u.)=0.06 *+8−3*; B(E2)(W.u.)=7 *+10−4*
2720.4	7/2$^+$	930.4[‡] *7*	23.9 *27*	1789.7	5/2$^+$	M1+E2	+0.18 *+15−13*	2.05×10^{-5} *8*	B(M1)(W.u.)=0.021 *4*; B(E2)(W.u.)=5 *+11−4*

Adopted Levels, Gammas (continued)

$\gamma(^{25}Al)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[&]	E_f	J^π_f	Mult.[a]	δ	α[b]	Comments
									Mult.: D+Q in (p,γ),(p,p′γ), M1+E2 from RUL, since M2 component strength exceeds RUL.
2720.4	7/2+	1775.5[‡] *6*	100 *5*	944.9	3/2+	E2(+M3)	−0.08 *15*	2.13×10^{-4} *8*	B(E2)(W.u.)=25 *+6−5* Mult.: Q(+O) in (p,γ),(p,p′γ), E2(+M3) from RUL, since M2 component strength exceeds RUL.
		2720.0	8.9 *20*	0	5/2+				
3061.9	3/2−	2117.0	15.1 *7*	944.9	3/2+	(E1+M2)	+0.06 *4*		Mult.: D+Q in (p,γ),(p,p′γ), (E1+M2) from ΔJ^π.
		2610.2	100.0 *16*	451.8	1/2+	D(+Q)	0.00 *2*		
		3061.8	17.2 *8*	0	5/2+	D(+Q)	−0.03 *6*		
3424.7	(9/2)+	1811.8[@] *4*	100 *5*	1612.9	(7/2)+	M1+E2	+0.14 *4*	1.77×10^{-4} *3*	B(M1)(W.u.)=0.34 *+7−5*; B(E2)(W.u.)=12 *+9−6*
		3424.5	19 *5*	0	5/2+	E2(+M3)	−0.13 *16*	9.55×10^{-4} *34*	B(E2)(W.u.)=4.8 *+25−20*
3695.5	7/2−	975.3	2.8 *4*	2720.4	7/2+	D(+Q)	−0.20 *25*		
		1905.6[@] *4*	100 *4*	1789.7	5/2+	D(+Q)	−0.01 *2*	5.80×10^{-4} *8*	
		3695.6[@] *7*	38 *3*	0	5/2+	D(+Q)	−0.02 *2*	1.56×10^{-3} *2*	
3823.0	1/2−	1337.7	8.2 *4*	2485.4	1/2+				
		2877.9	100 *3*	944.9	3/2+				
		3371.1	35.1 *13*	451.8	1/2+				
3858.9	5/2+	797.1	0.60 *6*	3061.9	3/2−				
		1138.9	14.7 *5*	2720.4	7/2+	D(+Q)	−0.01 *6*		
		1185.3	12.3 *3*	2673.6	3/2+	D+Q	+0.11 *5*		
		2069.5	9.5 *3*	1789.7	5/2+	D(+Q)	0.00 *5*		
		2245.9	3.03 *11*	1612.9	(7/2)+				
		2914.0	100 *3*	944.9	3/2+	D(+Q)	+0.03 *3*		
		3407.2	0.62 *6*	451.8	1/2+				
		3858.8	15.5 *5*	0	5/2+	D+Q	+0.07 *4*		
4025	(9/2,5/2)+	600	2.0 *10*	3424.7	(9/2)+				
		2412	98 *6*	1612.9	(7/2)+				
		4025	100 *6*	0	5/2+				
4197	3/2+	3252	100	944.9	3/2+	D+Q	−0.07 *3*		
		3745	100	451.8	1/2+	D+Q	+0.18 *1*		
4582	5/2+	3637	100	944.9	3/2+				
7903.0	5/2+	6289[#] *3*	74 *6*	1612.9	(7/2)+	D+Q	+0.08 *6*		
		6957	26 *4*	944.9	3/2+	D(+Q)	+0.07 *6*		
		7902[#] *3*	100 *6*	0	5/2+	D(+Q)	+0.02 *3*		
7971	3/2+	7025	21 *7*	944.9	3/2+				
		7518	20 *6*	451.8	1/2+				
		7970	100 *10*	0	5/2+	D+Q	+0.11 *2*		

[†] From level energy differences corrected for recoil energy, except.

Adopted Levels, Gammas (continued)

$\gamma(^{25}$Al) (continued)

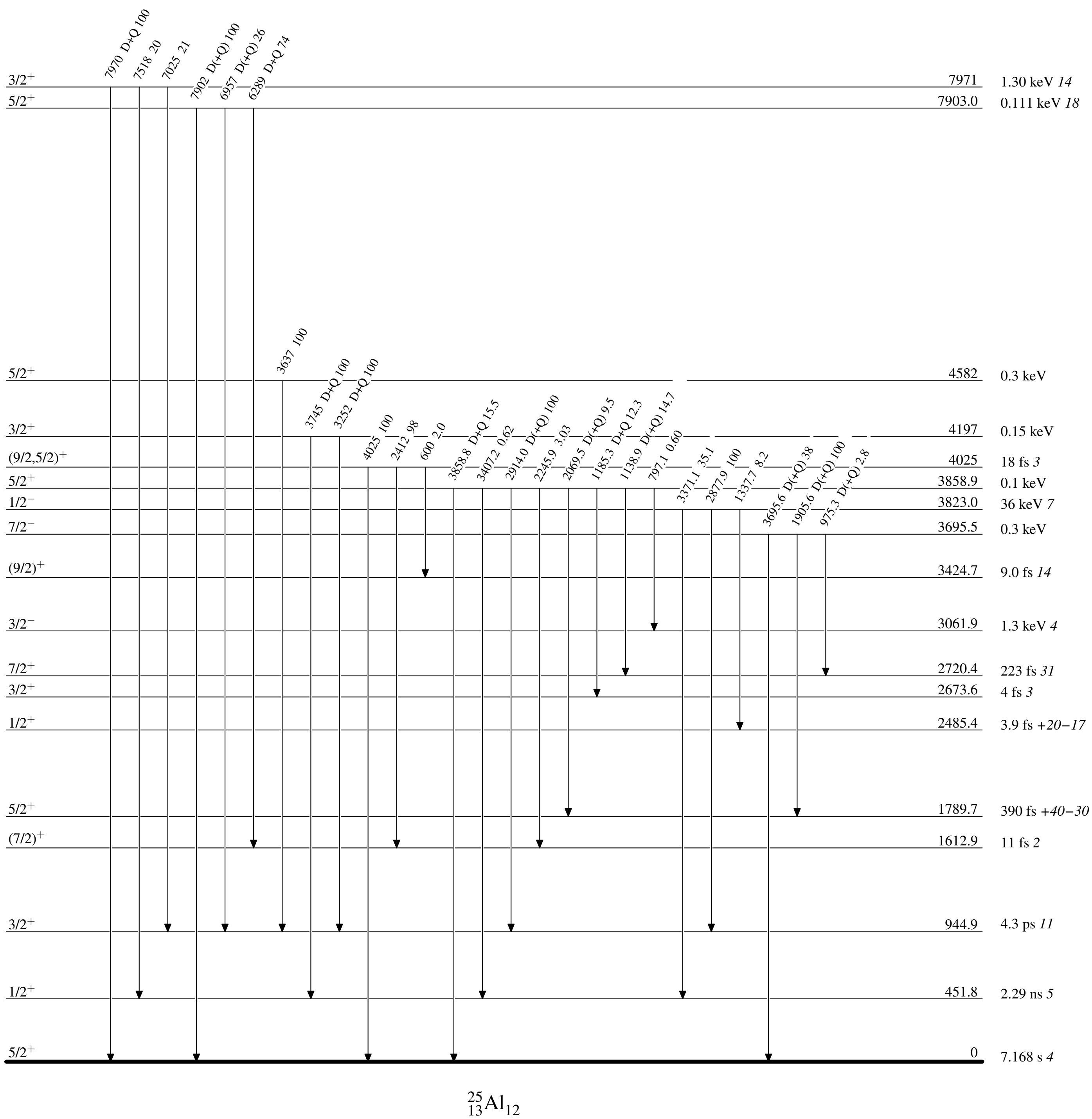
‡ From ^{26}P εp decay (43.6 ms).
# From ^{25}Si ε decay (219.2 ms).
@ From (p,γ),(p,p$'\gamma$).
& From (p,γ),(p,p$'\gamma$), except where otherwise noted.
[a] From (p,γ),(p,p$'\gamma$), except where otherwise noted. Electric and/or.
[b] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{25}_{13}$Al$_{12}$-8

Adopted Levels, Gammas

Level Scheme

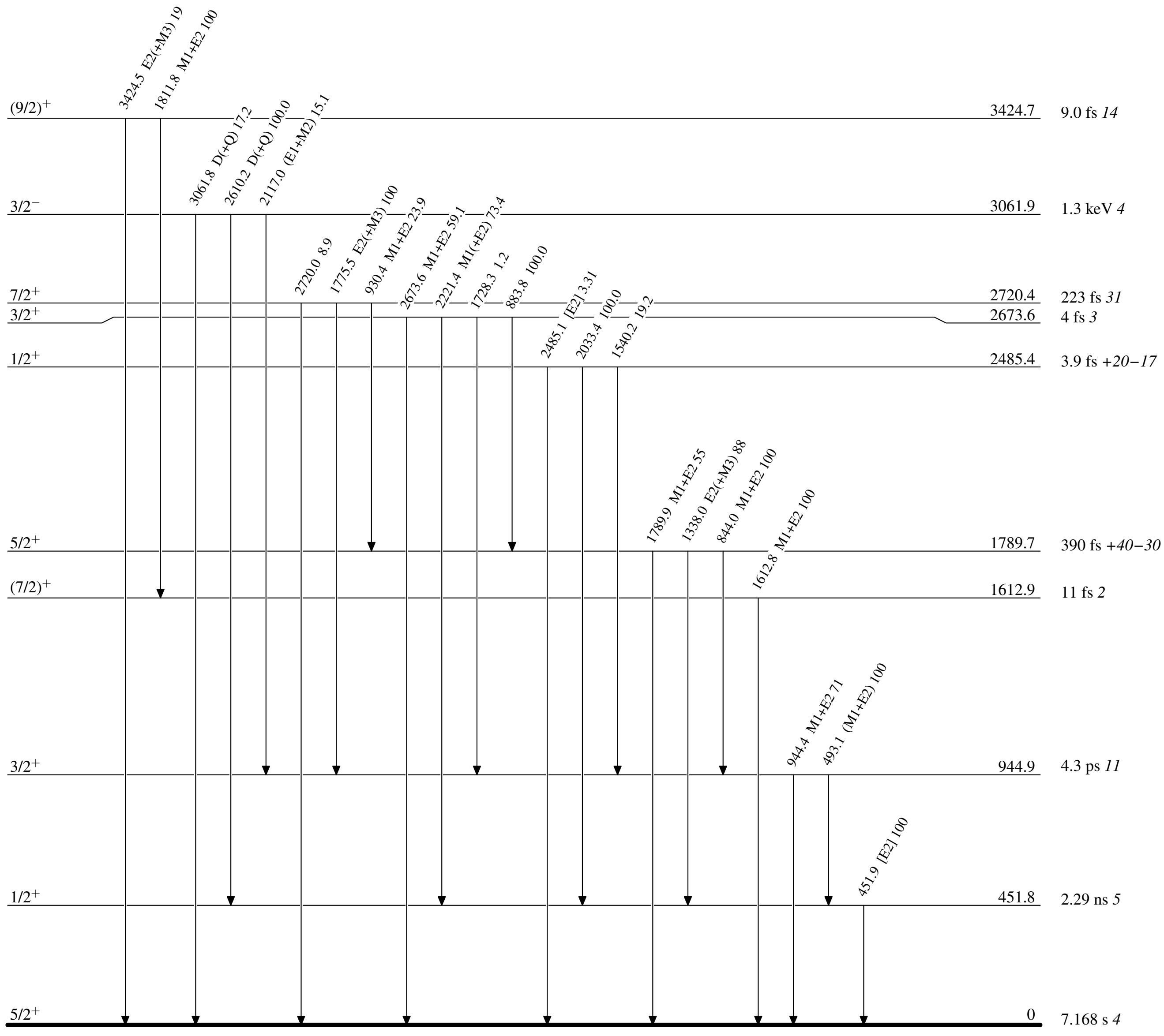
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

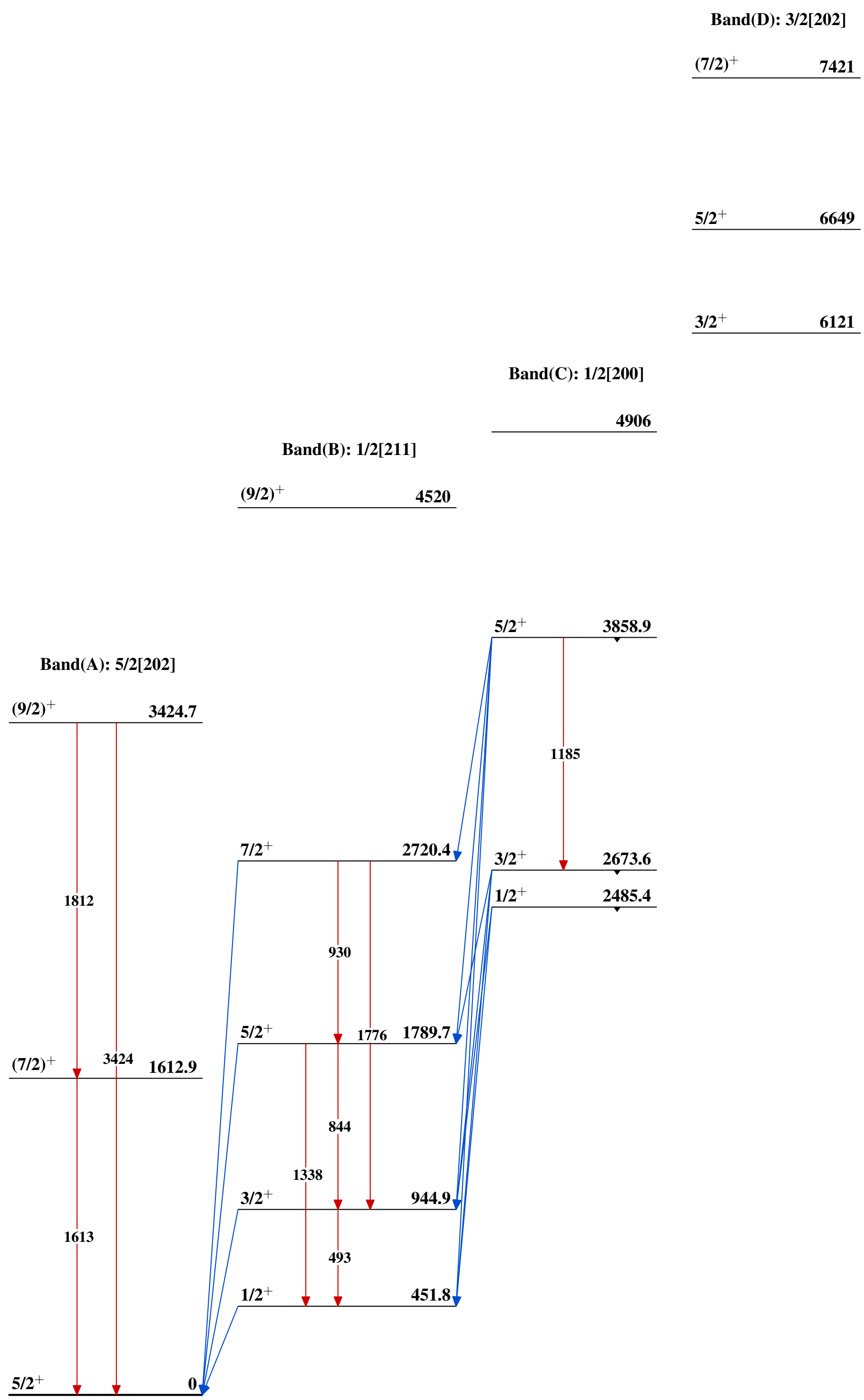
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{25}_{13}Al_{12}$

Adopted Levels, Gammas



$^{25}_{13}Al_{12}$

^{25}Si $\varepsilon+\beta^+$ decay (218.7 ms) 2004Th09,2021Su03,1993Ro06

Parent: ^{25}Si: E=0.0; J$^\pi$=(5/2$^+$); T$_{1/2}$=218.7 ms *+10−14*; Q(ε)=12743 *10*; %ε+%β^+ decay=100
^{25}Si-T$_{1/2}$: from ^{25}Si Adopted Levels.
^{25}Si-Q($\varepsilon+\beta^+$): from 2021Wa16.
2004Th09: Source produced by projectile fragmentation of a 95 MeV/A ^{36}Ar beam on a ^{12}C target. Mass separation ΔE(Si)-tof.
2021Su03: ^{25}Si was obtained from ^{9}Be(^{36}Ar,X), E=150 MeV/nucleon, fragmentation reaction. Fragments were separated by A1900 fragment separator; measured Eγ, Iγ, $\gamma\gamma$, and pγ-coin, E(p), I(p) using the Gaseous Detector with Germanium Tagging (GADGET) system of a proton detector and the SeGA array; deduced %Iγ, γ branching ratios, half-life of ^{25}Si. 3×10^7 ions were implanted and studied.
1993Ro06: ^{25}Si was produced from ^{24}Mg(^{3}He,2n), E=40 MeV; measured β-delayed Ep, Ip; deduced levels, spin, parity.
Other references: 1966Re07, 1985Zh05, 1990Ga17, 1992Ha28, 1996Og01.
^{25}Si also decays to ^{24}Mg by εp.

^{25}Al Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$ or Γ[#]	Comments
0	5/2$^+$	7.168 s *4*	T$_{1/2}$: from Adopted Levels.
452.1 *7*	1/2$^+$	2.29 ns *5*	
945.1 *6*	3/2$^+$	4.3 ps *11*	
1612.1 *10*	(7/2)$^+$	11 fs *2*	
1789.7 *6*	5/2$^+$	390 fs *+40−30*	
2673.6 *5*	3/2$^+$	4 fs *3*	E(level): others: 2674 *1* (1992Ha28), 2653 *20* (1993Ro06).
3859 *2*	5/2$^+$		E(level): weighted average of 3844 *7* (2004Th09), 3859 *1* (1992Ha28), 3863 *20* (1993Ro06).
4191 *3*	3/2$^+$		E(level): weighted average of 4189 *2* (2004Th09), 4196 *3* (1992Ha28), 4190 *25* (1993Ro06).
4582 *2*	5/2$^+$		E(level): from 2004Th09. Others: 4583 *4* (1992Ha28), 4583 (1993Ro06).
4906 *4*			E(level): from 1992Ha28. Others: 4908 *6* (2004Th09), 4899 *16* (1993Ro06).
5597 *5*	(3/2,5/2,7/2)$^+$	56 keV *20*	E(level): from 1992Ha28. Other: 5597 *6* (2004Th09),
5804 *4*	(3/2,5/2,7/2)$^+$		E(level): weighted average of 5802 *4* (2004Th09), 5809 *7* (1992Ha28), 5805 *10* (1993Ro06).
6092 *25*			E(level): from 1993Ro06.
6123 *7*	3/2$^+$	89 keV *36*	E(level): from 1992Ha28. J$^\pi$=5/2$^+$ in 1992Ha28, 3/2$^+$ in the Adopted Levels. Other: 6131 *16* (1993Ro06).
6170 *2*	(3/2,5/2,7/2)$^+$		E(level): from 2004Th09.
6620 *9*	3/2$^+$,5/2$^+$,7/2$^+$		E(level): from 2004Th09.
6651 *7*	5/2$^+$	76 keV *28*	E(level): from 1992Ha28. J$^\pi$=(5/2,7/2)$^+$ in 1992Ha28. Other: 6660 *15* (1993Ro06).
6877 *8*	(3/2,5/2,7/2)$^+$		E(level): weighted average of 6871 *8* (2004Th09), 6920 *40* (1966Re07), 6883 *10* (1992Ha28), 6877 *15* (1993Ro06). J$^\pi$: 3/2$^+$ in 1992Ha28.
6982 *15*		147 keV *44*	E(level): from 1993Ro06. Authors list the level as the same level at 7022 in the adopted dataset. The energy is comparable as a doublet of 6944 and 7022 levels. The evaluators list only with the 6909 level, based on closer Γ of the 6944 level.
7108 *3*	3/2$^+$		E(level): weighted average of 7107 *3* (2004Th09), 7112 *10* (1992Ha28), 7112 *8* (1993Ro06). J$^\pi$=(3/2,5/2)$^+$ in 1992Ha28. Γ=27 keV *5* assuming the presence of 6996 *30* level (6982 *15* – in this data set). The Γ is significantly different compared to Γ=117 keV *4* for an adopted level at 7112 *4*, but closer to Γ=20 keV *6* for the 7150 keV level.
7249 *5*	5/2$^+$		E(level): weighted average of 7255 *7* (2004Th09), 7250 *30* (1966Re07), 7248 *5* (1992Ha28), 7245 *8* (1993Ro06). J$^\pi$=(3/2,5/2)$^+$ in 1992Ha28.
7434 *20*	(7/2)$^+$		E(level): from 1993Ro06.
7678 *7*	7/2$^-$		E(level): from 2004Th09. Others: 7665 *20* (1993Ro06), 7637 *6* (1992Ha28). J$^\pi$=(3/2,5/2,7/2)$^+$ in 1992Ha28.
7820 *15*			E(level): from 1993Ro06.
7902.7 *22*	5/2$^+$		T=3/2 E(level): others: 7900 *20* (1966Re07), 7901 *2* (1992Ha28), 7896 *6* (1993Ro06),

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^{25}Si $\varepsilon+\beta^+$ decay (218.7 ms) 2004Th09,2021Su03,1993Ro06 (continued)

^{25}Al Levels (continued)

E(level)†	J$^\pi$‡	$T_{1/2}$ or Γ#	Comments
			7892 *2* (2004Th09).
7943 *20*			E(level): from 1993Ro06.
8188 *3*	(3/2,5/2,7/2)$^+$	20 keV *20*	E(level): weighted average of 8193 *6* (2004Th09), 8200 *30* (1966Re07), 8186 *3* (1992Ha28), 8197 *10* (1993Ro06). J$^\pi$: (3/2,5/2,7/2)$^+$ in 1992Ha28.
9068 *7*	(3/2,5/2,7/2)$^+$		E(level): weighted average of 9073 *7* (2004Th09), 8970 *40* (1966Re07), 9065 *10* (1985Zh05), 9065 *10* (1992Ha28). J$^\pi$: (3/2,5/2,7/2)$^+$ in 1992Ha28.
9275 *25*			E(level): from 1985Zh05. Same in 1992Ha28. J$^\pi$: (3/2,5/2,7/2)$^+$ in 1992Ha28.

† From a least-squares fit to the γ-ray energies, except where otherwise noted. ΔEγ=1 keV assumed, if missing.
‡ From Adopted Levels.
# From 1992Ha28.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ #	Iε#	Log *ft*	I($\varepsilon+\beta^+$)†#	Comments
(3468 *27*)	9275	0.012 *4*	2.8×10^{-5} *9*	5.41 *15*	0.012 *4*	I($\varepsilon+\beta^+$): from 1985Zh05: 0.12(2)*[%I$_p$(4252)=10.2(32)/100 (2022Ba40)].
(3675 *12*)	9068	0.21 *4*	3.8×10^{-4} *7*	4.33 *8*	0.21‡ *4*	I($\varepsilon+\beta^+$): other: 0.07 *2* (1985Zh05 − 0.72(4)*[%I$_p$(4252)=10.2(32)/100 (2022Ba40)]).
(4555 *11*)	8188	1.2 *2*	9.4×10^{-4} *16*	4.13 *7*	1.2‡ *2*	
(4840 *10*)	7902.7	12.9 *8*	0.0080 *5*	3.248 *28*	12.9 *8*	I($\varepsilon+\beta^+$): weighted average of 13.4 *16* (2021Su03) and 12.8 *8* (2004Th09).
(5065 *12*)	7678	0.34 *6*	1.78×10^{-4} *32*	4.94 *8*	0.34‡ *6*	
(5494 *11*)	7249	1.2 *5*	4.7×10^{-4} *20*	4.59 *18*	1.2 *5*	I($\varepsilon+\beta^+$): weighted average of 1.3 *5* (2021Su03) and 1.0 *6* (2004Th09).
(5635 *11*)	7108	3.7 *2*	0.00132 *8*	4.166 *24*	3.7‡ *2*	
(5866 *13*)	6877	0.5 *1*	1.55×10^{-4} *31*	5.13 *9*	0.5‡ *1*	
(6123 *14*)	6620	0.16 *7*	4.3×10^{-5} *19*	5.73 *19*	0.16‡ *7*	
(6573 *10*)	6170	0.32 *6*	6.7×10^{-5} *13*	5.60 *8*	0.32‡ *6*	
(6939 *11*)	5804	1.7 *2*	2.94×10^{-4} *35*	5.00 *5*	1.7‡ *2*	
(7146 *11*)	5597	0.6 *1*	9.4×10^{-5} *16*	5.53 *7*	0.6‡ *1*	
(7837 *11*)	4906	0.6 *2*	6.9×10^{-5} *23*	5.74 *14*	0.6‡ *2*	
(8161 *10*)	4582	3.2 *3*	3.21×10^{-4} *31*	5.112 *41*	3.2‡ *3*	
(8552 *11*)	4191	2.9 *3*	2.50×10^{-4} *26*	5.264 *45*	2.9‡ *3*	
(8884 *10*)	3859	0.4 *1*	3.0×10^{-5} *8*	6.21 *11*	0.4‡ *1*	
(10069 *10*)	2673.6	4.9 *4*	2.50×10^{-4} *21*	5.414 *36*	4.9 *4*	I($\varepsilon+\beta^+$): weighted average of 6.8 *15* (2021Su03) and 4.8 *3* (2004Th09).
(10953 *10*)	1789.7	1.46 *7*	5.71×10^{-5} *29*	6.133 *21*	1.46 *7*	
(11131 *10*)	1612.1	15.2 *9*	5.66×10^{-4} *35*	5.152 *26*	15.2 *9*	I($\varepsilon+\beta^+$): other: 15 *3* (2004Th09).
(11798 *10*)	945.1	22.6 *7*	7.03×10^{-4} *25*	5.113 *14*	22.6 *7*	I($\varepsilon+\beta^+$): other: 26 *4* (2004Th09).
(12743 *10*)	0	21.5 *12*	5.29×10^{-4} *31*	5.310 *24*	21.5 *12*	I($\varepsilon+\beta^+$): other: 25 *7* (2004Th09).

† From 2021Su03, except where otherwise noted. In 2021Su03, one new level at 1789.7 and new depopulating gammas are reported for 1789.7, 2673.6, and 7902.7 keV levels, resulted slight variation of the central I_β data for one or more levels, although statistically consistent with the data of 2004Th09. In 2004Th09, for unbound states the I_β feeding intensities are from their I_p

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^{25}Si $\varepsilon+\beta^+$ decay (218.7 ms) 2004Th09,2021Su03,1993Ro06 (continued)

ε,β^+ radiations (continued)

measurements. In 2021Su03, for three unbound states at 2673.6, 7240, and 7902.7, the I_β data are from measured I_p and $I\gamma$. The total I_β in 2004Th09 is ΣI_β=100 and 82 *3* in 2021Su03. Combining these data yields ΣI_β=95.6 *21* in this dataset, which is expected to be 100. Additional measurement for I_p of the proton unbound states may resolve this discrepancy.

‡ from 2004Th09.
\# Absolute intensity per 100 decays.

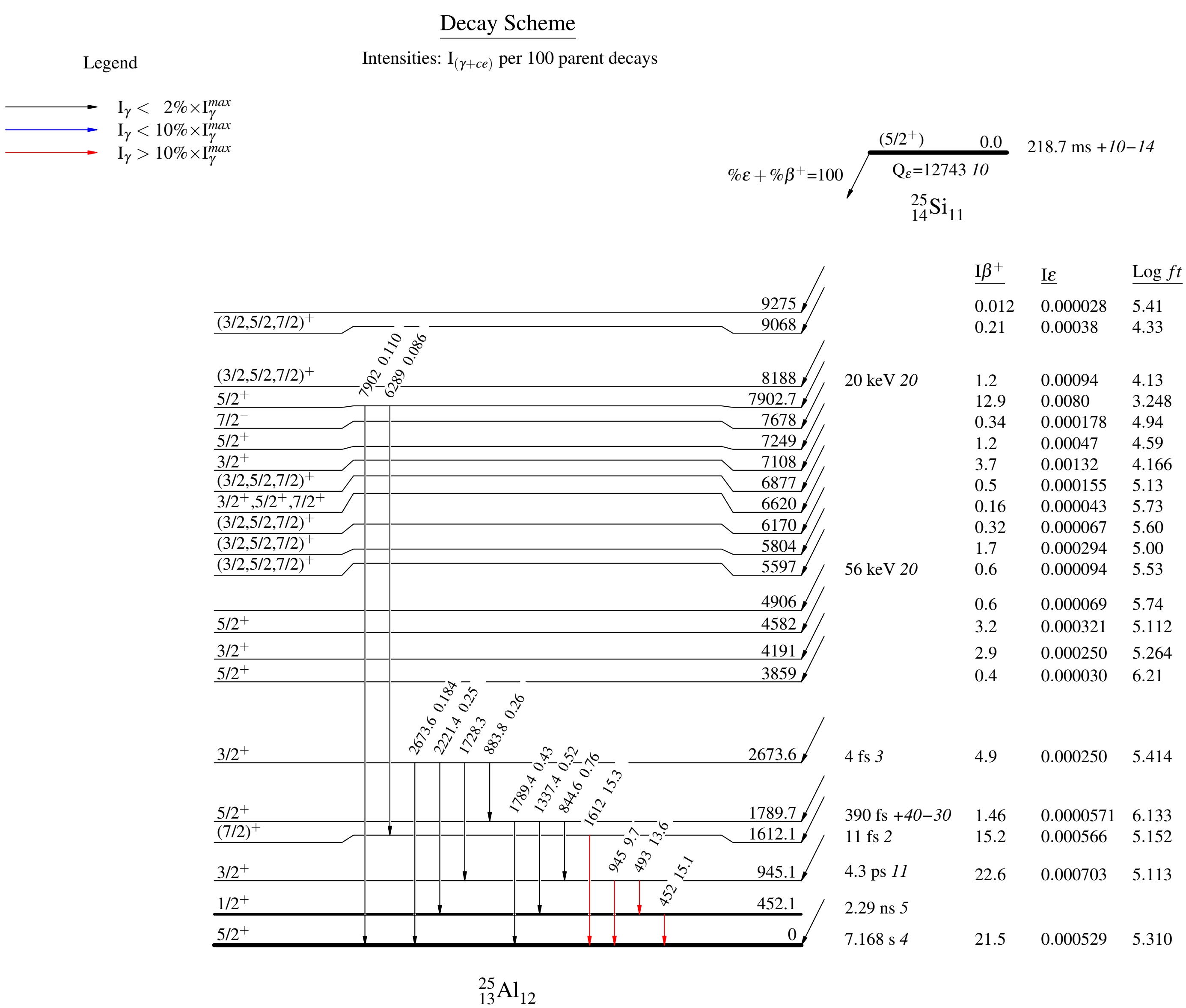
$\gamma(^{25}Al)$

E_γ†	I_γ#@	E_i(level)	J_i^π	E_f	J_f^π	Comments
452	15.1 *6*	452.1	1/2+	0	5/2+	I_γ: weighted average of 15.0 *6* (2021Su03) and 18.4 *42* (2004Th09).
493	13.6 *5*	945.1	3/2+	452.1	1/2+	I_γ: from 2021Su03. Other: %I_γ=15.3 *34* (2004Th09). Branching ratio from the level=48.4 *16* (2021Su03).
844.6‡ *7*	0.76 *4*	1789.7	5/2+	945.1	3/2+	I_γ: branching ratio from the level=44 *3* (2021Su03).
883.8‡ *6*	0.26 *3*	2673.6	3/2+	1789.7	5/2+	I_γ: branching ratio from the level=37 *5* (2021Su03).
945	9.7 *4*	945.1	3/2+	0	5/2+	I_γ: from 2021Su03. Other: %I_γ=10.4 *23* (2004Th09). Branching ratio from the level=41.6 *16* (2021Su03).
1337.4‡ *16*	0.52 *3*	1789.7	5/2+	452.1	1/2+	I_γ: branching ratio from the level=30.6 *20* (2021Su03).
1612	15.3 *9*	1612.1	(7/2)+	0	5/2+	I_γ: from 2021Su03. Other: %I_γ=14.7 *32* (2004Th09), corrected for intensity of 1611.7-keV impurity from ^{25}Mg.
1728.3 *8*		2673.6	3/2+	945.1	3/2+	E_γ: from Adopted Gammas.
1789.4‡ *9*	0.43 *3*	1789.7	5/2+	0	5/2+	I_γ: branching ratio from the level=25.2 *19* (2021Su03).
2221.4‡ *18*	0.25 *3*	2673.6	3/2+	452.1	1/2+	I_γ: branching ratio from the level=36 *4* (2021Su03).
2673.6‡ *6*	0.184 *17*	2673.6	3/2+	0	5/2+	I_γ: branching ratio from the level=26 *3* (2021Su03).
6289‡ *3*	0.086 *20*	7902.7	5/2+	1612.1	(7/2)+	I_γ: branching ratio from the level=36 *10* (2021Su03).
7902‡ *3*	0.110 *19*	7902.7	5/2+	0	5/2+	I_γ: branching ratio from the level=45 *10* (2021Su03).

† From 2004Th09, except where otherwise noted.
‡ From 2021Su03.
\# The data of 2021Su03 are more precise but consistent with the data of 2004Th09.
@ Absolute intensity per 100 decays.

^{25}Si $\varepsilon+\beta^+$ decay (218.7 ms) 2004Th09,2021Su03,1993Ro06

Decay Scheme



^{26}P εp decay (43.6 ms) 2004Th09,1983Ca06,2017Ja05

Parent: ^{26}P: E=0.0; $J^\pi=(3)^+$; $T_{1/2}$=43.6 ms *3*; Q(εp)=12600 *syst*; %εp decay=35.0 *20*

^{26}P-J^π: from 2016Ba18 and in the ENSDF database.

^{26}P-$T_{1/2}$: from 2020Li06 – ^{26}P-β-p(t) analysis. Others: 43.7 ms *6* (2004Th09, time correlations of ^{26}P ions and β or β-2p decay events), 20 ms *+35−15* (1984Ca29, 1983Ca06, 1983Ho23, 1984CaZV thesis), 50 ms *+23−12* (2017Ja05).

^{26}P-Q(εp): 12600 *200*(SY) (2021Wa16).

^{26}P-%εp decay: weighted average of 36.8 *22* (2004Th09) and 33.5 *20* (2017Ja05). In 2004Th09, 2017Ja05: total branch for the proton-unbound levels are measured as 39% *2*, 35% *2* and %ε2p as 2.16 *24*, 1.5% *4*, respectively. Other measurement: %εp branch to T=2 analog state ≈1.9% (1984Ca29, 1983Ca06, 1983Ho23, 1984CaZV thesis); also estimated 2p/1p ratio for the decay of IAS as ≈1. Corresponding εp branch in 2004Th09 is 5.3% *4*, and 2p/1p=0.69 *9*.

2004Th09: ^{26}P isotope produced in fragmentation of $^{36}Ar^{18+}$ ions at E=95 MeV/nucleon on a ^{12}C production target. Fragment separation with LISE3 spectrometer at GANIL. Measured Eγ, E(proton), Iγ, γγ, γβ coin, pβ coin, pγβ coin, half-life with one segmented Ge clover detector and five Si detectors.

1983Ca06 (also 1983Ho23, 1984Ca29, 1984CaZV thesis): ^{26}P produced and identified in ^{28}Si(^{3}He,p4n) reaction at E=110-130 MeV at LBNL facility. Measured beta-delayed two-proton pp-coin, E(p), half-life, %εp, %ε2p.

2017Ja05: ^{26}P obtained from ^{32}S fragmentation from Be(^{32}S,X), E=51.3 MeV/nucleon, reaction; isotopes were separated using fragment separator at JINR, Dubna, Russia facility. Fragments were identified by time-of-flight (tof) and energy-loss technique using plastic scintillator and a silicon detector, respectively. Selected fragments were analyzed by Optical Time Projection Chamber (OTPC), filled with 49.5% Ar, 49.5% He, and 1% CO_2 at atmospheric pressure. Light produced in the gas was recorded by a digital camera (CCD) and a photomultiplier (PMT) connected to an oscilloscope; the combination of data from the CCD and the PMT was used to reconstruct particle tracks in three dimensions. Setup was tuned for ^{27}S ions, but ^{26}P was also accepted. In total 2497 events of ^{26}P were identified, of which 2463 events based on depth profile were inspected to select decay events. 141 cases of βp emission is used to reconstruct the emitted proton energy.

2022Li66: ^{26}P were produced from projectile fragmentation of a 80.6-MeV/A $^{32}S^{-16+}$ primary beam on ^{9}Be target. The projectile fragments were separated using the Radioactive Ion Beam Line in Lanzhou, identified by energy loss and time of flight. Ions were implanted into a silicon array consisting of three DSSD detectors; measured E_p, I_p, Eγ; deduced proton energies and relative intensities.

2020Li06: ^{26}P from fragmentation of ^{32}S with E=80.6 MeV/nucleon. Reaction products separated and purified by RIBLL1 in Lanzhou. Ions identified by time-of-flight and energy loss. Detection system consisted of three double sided-silicon strip detectors, five Clover-type HPGe detectors, and five quadrant silicon detectors.

2015Sc16: ^{26}P isotope produced in fragmentation of ^{36}Ar primary beam, E=150 MeV/nucleon, on a ^{9}Be production target. Fragments were separated with A1900 fragment separator at NSCL; implanted in a planar germanium double-sided strip detector (GeDSSD) and surrounded by SeGA array of high purity germanium detectors. Measured Eγ, Iγ, γγ, γγ and γβ coin, deduced proton feedings to ^{25}Al levels, excitation energy of proton emission level in ^{26}Si from Doppler broadening of γ-ray peaks.

^{25}Al Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	5/2+	7.168 s *4*	$T_{1/2}$: from Adopted Levels.
451.8 *4*	1/2+		
945.0 *4*	3/2+		
1613.2 *6*	(7/2)+		
1789.6 *4*	5/2+		
2720.3 *6*	7/2+		E(level): authors (2015Sc16) found no evidence of multiple proton transitions feeding this state.

† From a least squares fit to the γ ray energies.

‡ From Adopted Levels.

^{26}P εp decay (43.6 ms) 2004Th09,1983Ca06,2017Ja05 (continued)

γ(^{25}Al)

E_γ [†]	I_γ [†‡]	E_i(level)	J^π_i	E_f	J^π_f	Comments
451.9 *6*	2.6 *3*	451.8	1/2+	0.0	5/2+	E_γ: other: 452 (2004Th09, 2022Li66).
493.1 *6*	2.4 *3*	945.0	3/2+	451.8	1/2+	E_γ: other: 493 (2004Th09,2022Li66).
843.5 *6*	0.8 *2*	1789.6	5/2+	945.0	3/2+	E_γ: other: 845 (2004Th09,2022Li66).
930.4 *7*	0.09 *5*	2720.3	7/2+	1789.6	5/2+	
944.4 *5*	1.2 *1*	945.0	3/2+	0.0	5/2+	E_γ: other: 445 (2004Th09,2022Li66).
1338.0 *5*	0.8 *1*	1789.6	5/2+	451.8	1/2+	E_γ: other: 1338 (2022Li66).
1613.1 *6*	2.2 *2*	1613.2	(7/2)+	0.0	5/2+	E_γ: other: 1612 (2004Th09,2022Li66).
1775.5 *6*	1.2 *1*	2720.3	7/2+	945.0	3/2+	
1790.2 *6*	0.8 *3*	1789.6	5/2+	0.0	5/2+	E_γ: others: 1790 (2004Th09), 1789 (2022Li66).

† From 2015Sc16. For E_γ, authors mention systematic uncertainty=0.5 keV, this uncertainty added in quadrature with the statistical uncertainties given in Table I.

‡ Absolute intensity per 100 decays.

Delayed Protons (^{25}Al)

E(p) [†‡]	E(^{25}Al)	I(p) [†#@]	E(^{26}Si) [†]	Comments
2541 *6*		0.25 *10*		
2855 *17*		0.40 *10*		
4097 *5*		1.05 *15*		
412 *2*	0.0	48.9 *35*	5929	E(p): other: 418 *8* (2020Li06). I(p): 17.96% *90* (2004Th09) is inconsistent with 11.1% *12* (2020Li06) and 10.4% *9* < I_p < 13.8% *10* deduced from counts larger than 140 and smaller than 186 in PMT+CCD and also 7.4% *7* was deduced in 2017Ja05 from 99 counts in CCD image (Digital camera). Total I_p feeding to this state is 2.1% *1* in 2004Th09, in 2015Sc16 it is <0.34%. The difference is attributed to significant γ feeding from newly established level at 2720 keV.
778 *3*	0.0	2.10 *24*	6295	E(p),I(p): doublet of 778 and 866 keV proton groups (weaker lines in the literature), noted in 2017Ja05. I_p=1.1% *3* deduced in 2017Ja05 from 15 counts. 787 *8* and 0.74% *17* (2020Li06).
866 *2*	0.0	4.6 *5*	6384	E(p),I(p): 870 *8* and 1.44% *30* (2020Li06).
1248 *2*	0.0	4.1 *4*	6765	E(p),I(p): 1256 *8* and 1.45% *21* (2020Li06).
1499 *2*	945.0	2.69 *24*	7962	E(p),I(p): 1507 *9* and 0.80% *18* (2020Li06).
1638 *3*	451.8	1.76 *20*	7606	
1798 *4*	945.0	0.54 *15*	8254	
1983 *2*	0.0	6.5 *5*	7501	
2139 *4*	1789.6	1.5 *4*	9433	
2288 *3*	1613.2	4.0 *4*	9433	
2593 [&] *13*	451.8	0.73 *15*	8563	
2638 *18*	0.0	0.29 *10*	8156	
2732 *4*	0.0	1.27 *20*	8254	
2908 *11*	945.0	0.15 *15*	9370	
2968 *5*	945.0	0.88 *15*	9433	
3097 *6*	1789.6	0.83 *20*	10405	
3258 *4*	945.0	0.93 *10*	9725	
3766 *9*	451.8	0.98 *20*	9725	
3817 *6*	945.0	0.34 *15*	10299	
3920 *5*	0.0	3.3 *4*	9433	
4719 *6*	451.8	0.64 *10*	10688	
4793 *3*	0.0	1.47 *20*	10299	
4858 *4*	451.8	1.22 *15*	10827	
51.0×10^2 *12*	2720.3	1.1 *1*	13300	E(p): 5100 *100* (stat) *60* (syst) (c.m.) extracted from measured ^{25}Al initial recoil kinetic energy of 195 keV *+41−50* (stat) *18* (syst) by finding the minimum value of χ^2 (2015Sc16). Corresponding energy of the proton-emitting level in ^{26}Si is 13300 *100* (stat) *60* (syst).

Continued on next page (footnotes at end of table)

^{26}P εp decay (43.6 ms) 2004Th09,1983Ca06,2017Ja05 (continued)

Delayed Protons (continued)

E(p)[†‡]	E(^{25}Al)	I(p)[†#@]	E(^{26}Si)[†]	Comments
5710 *3*	1789.6	3.8 *3*	13015	E(p),I(p): other: 5751 *3* and %I_p=0.81 *14* (2022Li66).
5893 *4*	1613.2	2.0 *4*	13015	E(p),I(p): other: 5921 *4* and %I_p=0.43 *9* (2022Li66).
6401 *10*	0.0		11912	E(p),I(p): from 2022Li66. I_p(rel) based on %I_p=0.072 *57*.
6401 *10*	451.8		11912	E(p),I(p): from 2022Li66. Relative intensity based on %I_p=0.072 *57* (2022Li66).
6551 *4*	945.0	0.59 *25*	13015	E(p),I(p): other: 6587 *6* and %I_p=0.12 *2* (2022Li66).
7039 *5*	451.8	0.49 *5*	13015	E(p),I(p): other: 7075 *16* and %I_p=0.18 *3* (2022Li66).
7494 *4*	0.0	1.66 *15*	13015	E(p),I(p): other: 7543 *4* and %I_p=0.29 *4* (2022Li66). E(p): 13015 (2004Th09) and 13055 (2022Li66) is $T_{1/2}$=2 IAS in ^{26}Si.
7854 *6*	0.0		13380	E(p),I(p): from 2022Li66. I_p(rel) based on %I_p=0.07 *2*.
7854 *6*	451.8		13380	E(p),I(p): from 2022Li66. Relative intensity based on %I_p=0.07 *2* (2022Li66).

† From 2004Th09.
‡ from 2004Th09 (center-of-mass), except where otherwise noted.
\# Reported relative intensities of 2004Th09 with respect to I_p(412)=100.0 *71* are normalized to ΣI_p=100, except otherwise noted.
@ For absolute intensity per 100 decays, multiply by 0.350 *20*.
& Placement of transition in the level scheme is uncertain.

^{26}P εp decay (43.6 ms) 2004Th09,1983Ca06,2017Ja05

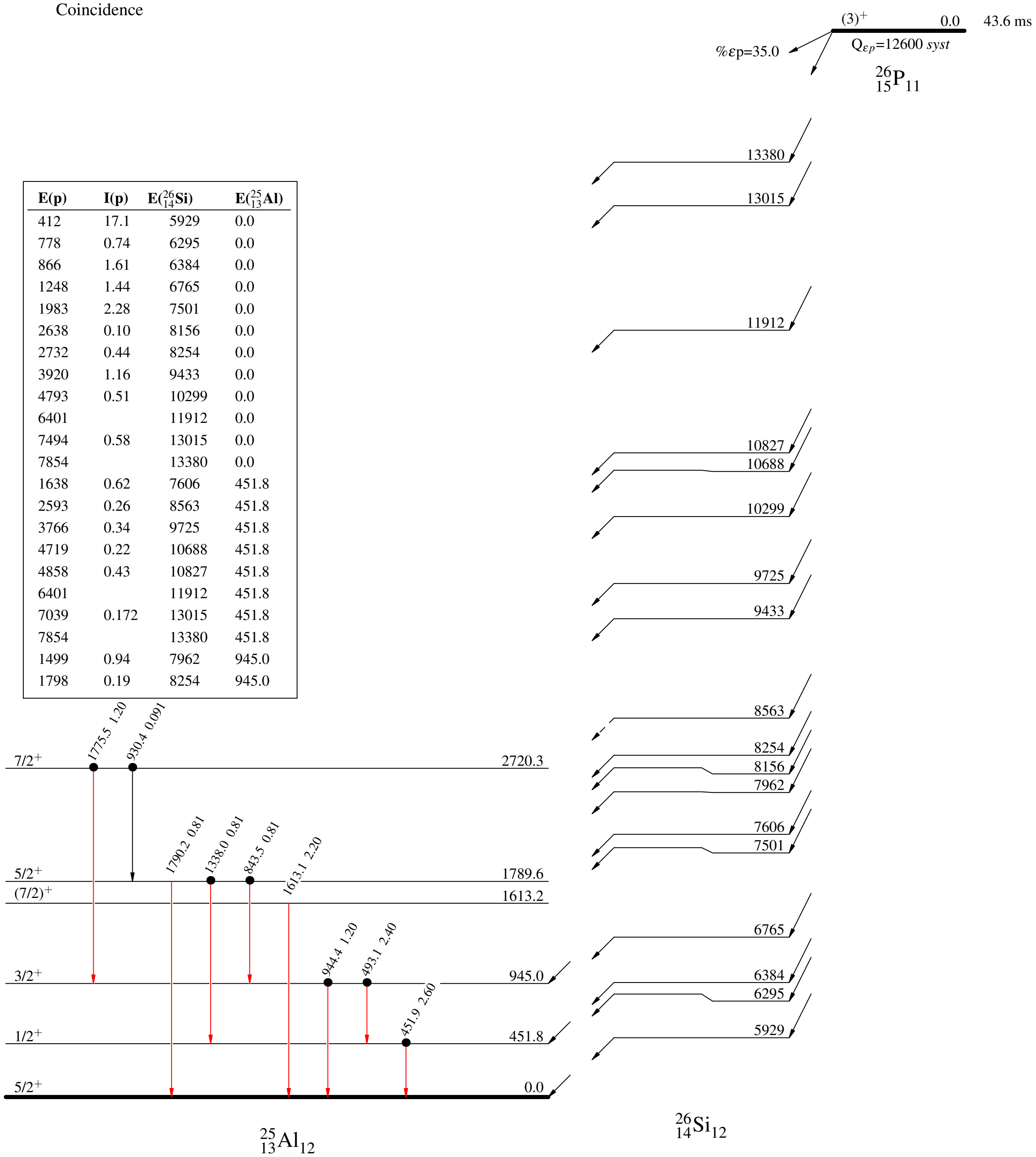
Decay Scheme

Legend

γ Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
I(p) Intensities: I(p) per 100 parent decays

● Coincidence

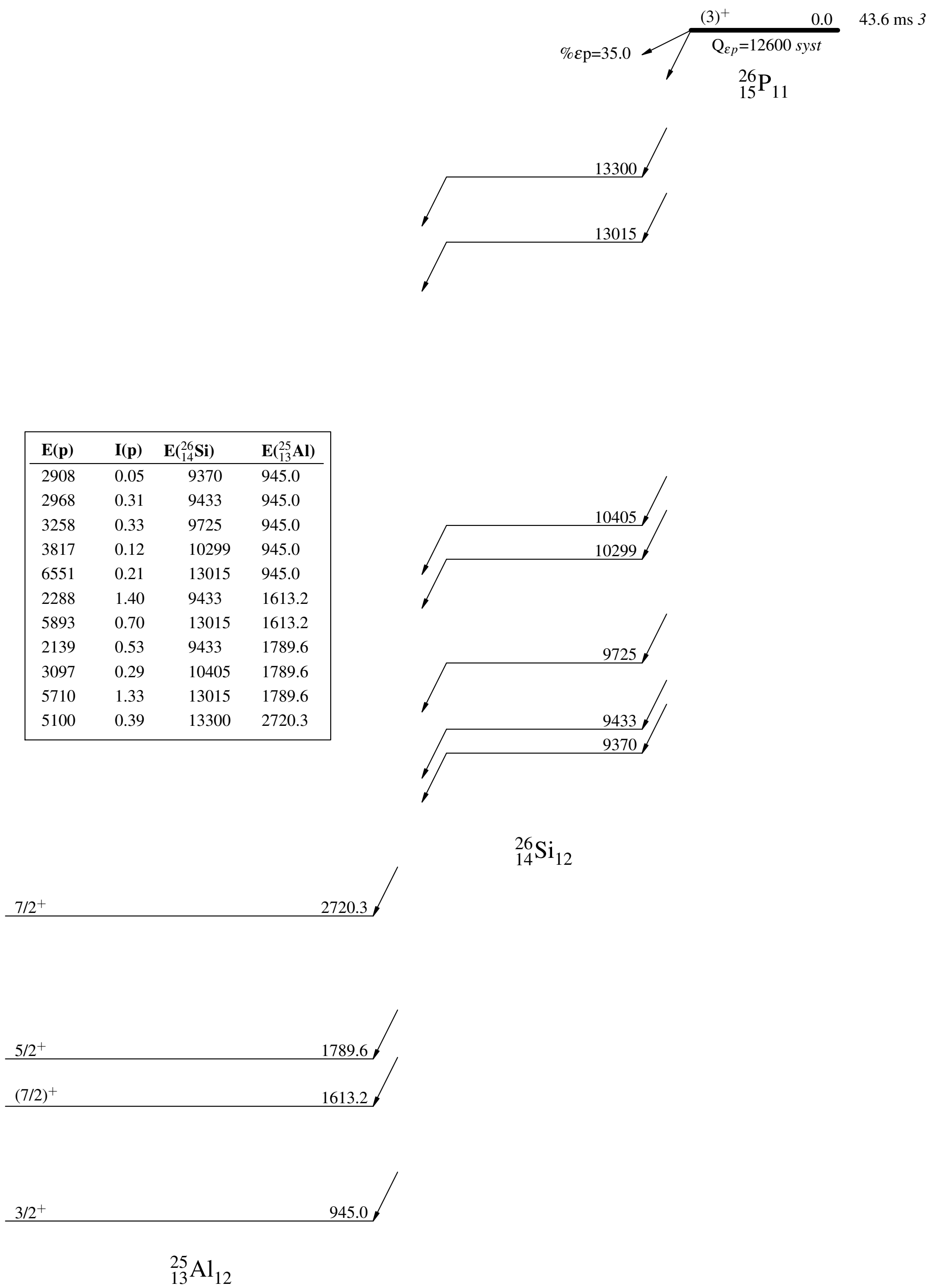
E(p)	I(p)	E($^{26}_{14}$Si)	E($^{25}_{13}$Al)
412	17.1	5929	0.0
778	0.74	6295	0.0
866	1.61	6384	0.0
1248	1.44	6765	0.0
1983	2.28	7501	0.0
2638	0.10	8156	0.0
2732	0.44	8254	0.0
3920	1.16	9433	0.0
4793	0.51	10299	0.0
6401		11912	0.0
7494	0.58	13015	0.0
7854		13380	0.0
1638	0.62	7606	451.8
2593	0.26	8563	451.8
3766	0.34	9725	451.8
4719	0.22	10688	451.8
4858	0.43	10827	451.8
6401		11912	451.8
7039	0.172	13015	451.8
7854		13380	451.8
1499	0.94	7962	945.0
1798	0.19	8254	945.0



^{26}P εp decay (43.6 ms) 2004Th09,1983Ca06,2017Ja05

Decay Scheme (continued)

γ Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
I(p) Intensities: I(p) per 100 parent decays



E(p)	I(p)	E($^{26}_{14}$Si)	E($^{25}_{13}$Al)
2908	0.05	9370	945.0
2968	0.31	9433	945.0
3258	0.33	9725	945.0
3817	0.12	10299	945.0
6551	0.21	13015	945.0
2288	1.40	9433	1613.2
5893	0.70	13015	1613.2
2139	0.53	9433	1789.6
3097	0.29	10405	1789.6
5710	1.33	13015	1789.6
5100	0.39	13300	2720.3

^{27}S ε2p decay (15.9 ms) 1991Bo32,2017Ja05

Parent: ^{27}S: E=0.0; J$^{\pi}$=(5/2$^+$); $T_{1/2}$=15.9 ms *15*; Q(ε2p)=11300 *syst*; %ε2p decay=2.7 *6*

^{27}S-$T_{1/2}$: weighted average of 15.5 ms *15* (2001Ca60), 15.5 ms *16* (2017Ja05), 21 ms *4* (1991Bo32), 16.3 ms *27* (2021Sh23 − also 17 ms *4*).

^{27}S-Q(ε2p): deduced using data from AME2020 (2021Wa16).

^{27}S-%ε2p decay: weighted average of %ε2p=2.4 *5* (2021Sh23), 3.0 *6* (2017Ja05), 2.0 *10* (1991Bo32), and 1.1 *5* (2001Ca60). Other: 1.1 *5* (2011Ba29) in the ENSDF database.

1991Bo32: Produced by Ni(^{36}Ar,x), E(^{36}Ar)=85 MeV/A. Magnetic mass separation, Energy loss, tof, Si EΔE detector telescope.

2017Ja05: ^{27}S obtained from ^{32}S fragmentation from Be(^{32}S,X), E=51.3 MeV/nucleon, reaction; isotopes were separated using the ACCULINNA fragment separator at JINR, Dubna, Russia facility. Fragments were identified by time-of-flight (tof) and energy-loss technique using plastic scintillator and a silicon detector, respectively. Selected fragments were analyzed by Optical Time Projection Chamber (OTPC), filled with 49.5% Ar, 49.5% He, and 1% CO_2 at atmospheric pressure. Light produced in the gas was recorded by a digital camera (CCD) and a photomultiplier (PMT) connected to an oscilloscope; the combination of data from the CCD and the PMT was used to reconstruct particle tracks in three dimensions.

2021Sh23: ^{27}S obtained from ^{32}S fragmentation in Be(^{32}S,X), E=80.6 MeV/nucleon reaction. Fragments were separated using the RIBLL1 and identified by time-of-flight (tof) and energy-loss. Fragments implanted into three W1-type DSSDs each segmented into 16 x 16 strips. Gamma rays were measured with five Clover type HPGe detectors. Measured Ep, Ip, p(t), deduced proton branching ratios.

^{25}Al Levels

E(level)	J$^{\pi}$ †	$T_{1/2}$
0	5/2$^+$	7.168 s *4*

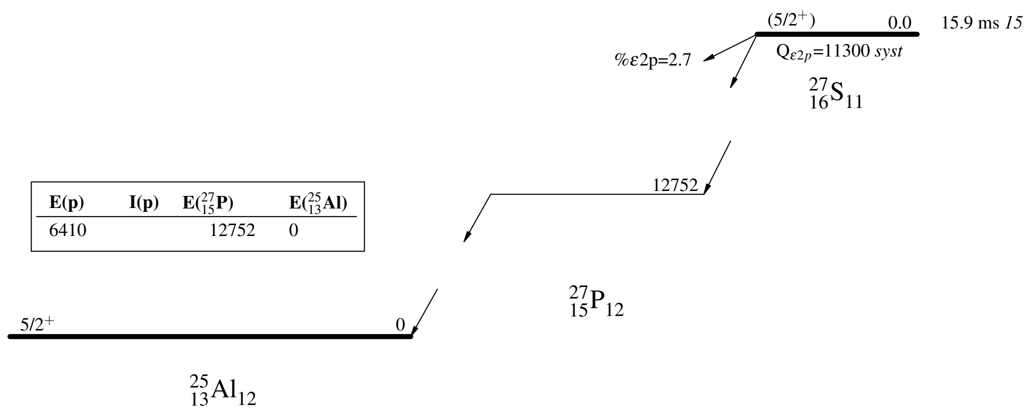
† from Adopted Levels.

Delayed Protons (^{25}Al)

E(p)	E(^{25}Al)	E(^{27}P)	Comments
6410 *45*	0	12752	E(p): from 1991Bo32.

^{27}S ε2p decay (15.9 ms) **1991Bo32,2017Ja05**

Decay Scheme



E(p)	I(p)	E($^{27}_{15}$P)	E($^{25}_{13}$Al)
6410		12752	0

^{24}Mg(p,γ),(p,p′γ)

1972Pi07: ^{24}Mg(p,γ) E=0.2-1.7 MeV. Measured Eγ (not listed), Iγ, $\gamma(\theta)$, DSA. Ge(Li) detectors. Deduced levels, γ-branching, γ mixing ratio, etc.

1999Po25: ^{24}Mg(p,γ) E=0.2-1.7 MeV. Measured Eγ (not listed), Iγ, DSA. HPGe detectors. Deduced partial widths of proton and γ-ray, transition strengths, etc.

Others: 1951Mo45, 1952Ko33, 1956Li46, 1959An32, 1959Li52, 1960Ba19, 1960Fe05, 1961Ri08, 1963Ga07, 1963Mc07, 1963Mc10, 1963Va17, 1964Be34, 1966En04, 1968An06, 1968Mo17, 1968Ro10, 1968Ro17, 1968Te01, 1969An22, 1969Du07, 1969Te02, 1969Va19, 1970Ro19, 1971Ev01, 1971Mc06, 1972Al28, 1972Du11, 1972La04, 1972Pi07, 1975Tr03, 1976Ik03, 1977Fr20, 1977Ro03, 1980Ke03, 1985Uh01, 1987Po09, 1991Ti02, 1998Po20, 1999Po25, 2004Il02, 2010Li22, 2010Sz04, 2020Li31, 2021Zh46, 2024Gu02.

^{25}Al Levels

E(level)†	J$^\pi$	T or Γ	S#	Comments
0	5/2		0.36 *3*	J$^\pi$,S: 5/2 from γ-p correlation measurements in 1956Li46. For spectroscopic factor 5/2$^+$ was used in 2004Il02 from the literature.
451.5 *5*	1/2$^+$	2.29 ns *5*	0.69 *6*	E(level): weighted average of 451.7 *5* (1972Pi07), 451.2 *7* (1971Mc06). S: J$^\pi$=1/2$^+$ was used in 2004Il02 from the literature. T$_{1/2}$: weighted average of 2.25 ns *11* (1963Ga07 − τ=3.25 ns *15*), 2.31 ns *5* (1963Mc07 − τ=3.33 ns *7* and their earlier value τ=3.33 ns *7* in 1961Mc17), 2.27 ns *6* (1964Be34 − τ=3.28 ns *9*), 1.8 ns *3* (1960Fe05), and 1.88 ns *10* (1961Ri08).
944.8 *5*		4.3 ps *11*	0.27 *2*	E(level): weighted average of 944.9 *5* (1972Pi07), 944.5 *7* (1971Mc06). T$_{1/2}$: from 1972Al28 (τ=6.2 ps *16*). Others: ≥4 ps (1969An22 − τ≥6 ps), ≥3.4 ps (1972Pi07 − τ≥5 ps). S: J$^\pi$=3/2$^+$ was used in 2004Il02 from the literature.
1612.5 *5*	(7/2$^+$)	11 fs *2*		E(level): same in 1971Ev01. J$^\pi$: from 1956Li46. T$_{1/2}$: weighted average of 10 fs *+6−3* (1972Pi07 − τ=15 fs *+8−5*), 19 fs *5* (1968An06 − τ=28 fs *7*), and 10 fs *2* (1991Ti02 − τ=14 fs *3*).
1789.5 *5*	5/2$^+$	390 fs *+40−30*		E(level): others: 1789.6 *13* (1971Ev01), 1789.6 *7* (1971Mc06). J$^\pi$: from 1956Li46. T$_{1/2}$: weighted average of 381 fs *+70−49* (1969An22 − τ=550 fs *+100−70*), 347 fs *173* (1971Mc06 − τ=500 fs *250*), 340 fs *+111−62* (1972Pi07 − τ=490 fs *+160−90*), 440 fs *69* (1991Ti02 − τ=635 fs *100*), 347 fs *+208−139* (1971Mc06 − τ=0.5 ps *+3−2*).
2485.4 *4*	(1/2$^+$)	3.9 fs *+20−17*		E$_p$(lab)=223.0 keV *4* (1977Fr20). E(level): others: 2485.3 *9* (1977Fr20), 2485.2 *20* (1972Pi07). J$^\pi$: from 1956Li46. T$_{1/2}$: weighted average of 4.2 fs *+21−18* (from τ=6.04 fs *+303−265* in 2024Gu02), 3.7 fs *+20−17* (from τ=5.3 fs *+29−24* in 1999Po25, also Γ$_\gamma$/Γ=0.91 *4*). $\omega\gamma$=0.0127 eV *9* (1999Po25).
2673.4 *9*	3/2$^+$	4 fs *3*		E$_p$(lab)=419 keV (1998Po20). J$^\pi$: from 1956Li46. Not 5/2$^+$. T$_{1/2}$: from 1999Po25 (τ=6.1 fs *+48−37*) and also Γ$_\gamma$/Γ=0.125 *9*. $\omega\gamma$=0.0416 eV *26* (1998Po20).
2720.5 *8*	7/2	223 fs *31*		J$^\pi$: 7/2 from $\gamma(\theta)$ (1969An22). T$_{1/2}$: weighted average of 187 fs *+90−55* (1972Pi07 − τ=270 fs *+130−80*), 208 fs *31* (1991Ti02 − also 210 fs *31*), and 312 fs *+70−56* (1969An22 − τ=450 fs *+100−80*).
3062.0 *7*	3/2$^-$	1.3 keV *4*		E$_p$(c.m.)=792 keV (1952Ko33), E$_p$(lab)=825 keV *4* (1969Va19), E$_p$(lab)=823 keV (1972Pi07). J$^\pi$: from 1952Ko33, based on the dσ/dΩ and calculations, p$_{3/2}$. Same in 1956Li46. Γ: from 1959An32. Others: <2.0 fs (1969Va19), ≤1.4 fs (1972Pi07 − τ≤2 fs). Γ=1.5 keV (1952Ko33). Γ$_p$Γ$_\gamma$/Γ=130 meV *20* (1966En04 from (2J+1)Γ$_p$Γ$_\gamma$/Γ=0.52 eV *8*), Γ$_p$Γ$_\gamma$/Γ=110 meV *20* (1956Li46).

Continued on next page (footnotes at end of table)

^{24}Mg(p,γ),(p,p′γ) (continued)

^{25}Al Levels (continued)

E(level)†	J^π	T or Γ	Comments
3424.3 *6*	(9/2$^+$)	9.0 fs *14*	E_p(lab)=1200 keV (1968An06), E_p(lab)=1192 keV *4* (1969Va19). E(level): from 1971Ev01. Other: 3424.2 *8* (1972Pi07). J^π: (9/2$^+$) from γp(θ) in 1956Li46. $T_{1/2}$: weighted average of 7 fs *4* (1968An06 – τ=10 fs *6*) and 9.2 fs *14* (1991Ti02 – τ=13.3 fs *20*). Other: ≤7 fs (1972Pi07 – τ≤10 fs). $\Gamma_p\Gamma_\gamma/\Gamma$=6.5 meV *13* (1956Li46 – 5.5 meV and normalized to the strength of 823 keV in 1966En04).
3695.8 *7*	7/2$^-$	0.3 keV	E(level): weighted average of 3695.5 *7* (1972Pi07), 3695.9 *7* (1971Mc06), 3696.3 *11* (1971Ev01), 3695.9 *7* (1971Mc06). E_p(c.m.)=1430 keV (1952Ko33), E_p(lab)=1483 keV *4* (1969Va19), E_p(lab)=1490 keV (1972Pi07). J^π: 7/2 from $\gamma(\theta)$ (1963Mc10), L=3 (1952Ko33), based on the dσ/dΩ and calculations. (7/2)$^-$ in 1956Li46. Γ: from 1952Ko33. Others: <10 fs (1971Mc06), ≤8 fs (1972Pi07 – τ≤11 fs). $\Gamma_p\Gamma_\gamma/\Gamma$=14 meV *2* (1956Li46 – 12 meV *2* and normalized to the strength of 823 keV of 1966En04), 17.5 meV *25* (1975Tr04 – from (2J+1)$\Gamma_p\Gamma_\gamma/\Gamma$=140 meV *20*).
3823.0 *20*	1/2$^-$	36 keV	E_p(c.m.)=1560 keV (1952Ko33), E_p(Lab)=1624 keV (1963Va17), E_p(lab)=1623 keV *4* (1969Va19). J^π: from 1952Ko33, based on the dσ/dΩ and calculations, $p_{1/2}$. Same in 1956Li46. L=1 in 1963Va17. Γ: from 1987Po09 and 1952Ko33. Others: Γ and Γ_p=34 keV (1963Va17). $\Gamma_p\Gamma_\gamma/\Gamma$=350 meV *50* (1975Tr04 – from (2J+1)$\Gamma_p\Gamma_\gamma/\Gamma$=700 meV *100*).
3859.1 *8*	3/2$^+$,5/2$^+$	0.1 keV	E_p(c.m.)=1590 keV (1952Ko33), E_p(lab)=1654 keV *4* (1969Va19), E_p(lab)=1660 keV (1972Pi07). J^π: L=2 (1952Ko33), based on the dσ/dΩ and calculations. 5/2$^+$ in 1956Li46. Γ: from 1987Po09,1952Ko33. Other: ≤5 fs (1972Pi07 – τ≤7 fs). Γ: (2J+1)$\Gamma_p\Gamma_\gamma/\Gamma$=190 meV *30* (1975Tr04).
4025 *4*	9/2$^+$,5/2$^+$	18 fs *3*	E_p(lab)=1827 keV *4* (1969Va19). Others: E_p(lab)=1823 keV (1968An06), 1824 keV (1968Ro17), J^π: from $\gamma\gamma(\theta)$ in 1968Ro17 and based on the particle width and absence of γ to 1/2$^+$ or 3/2$^+$ states, authors propose 9/2$^+$. (9/2$^+$) in 1959Li52. $T_{1/2}$: weighted average of 15 fs *4* (1968Ro17 – τ=22 fs *6*), 22 fs *4* (1991Ti02 – τ=32 fs *6*), 17 fs *3* (1968An06 – τ=24 fs *5*). Γ<10 keV (1959Li52).
4199‡ *2*	3/2$^+$	0.15 keV	E_p(c.m.)=1930 keV (1952Ko33), E_p(c.m.)=1926 keV (E_p(lab)=2007 keV (1970Ro19)), E_p(lab)=2010 keV (1975Tr04). J^π: L=2 (1952Ko33), based on the dσ/dΩ and calculations. 3/2$^+$ in 1956Li46. Γ from 1952Ko33. $\Gamma_p\Gamma_\gamma/\Gamma$=130 meV *20* (1975Tr04 – from (2J+1)$\Gamma_p\Gamma_\gamma/\Gamma$=520 meV *80*).
4507	9/2$^+$,(7/2,5/2)		E_p(lab)=2330 keV (1968Ro10). J^π: from $\gamma(\theta)$ (1968Ro10). (2J+1)$\Gamma_{p1}\Gamma_p/\Gamma$=16 eV *2* (1968Ro10).
4582‡	5/2$^+$	0.3 keV	E_p(c.m.)=2310 keV (1952Ko33), E_p(lab)=2408 keV (1970Ro19). J^π: L=2 (1952Ko33), based on the dσ/dΩ and calculations. 5/2$^+$ in 1956Li46. Γ: from 1952Ko33.
4882			E_p(lab)=2720 keV (1956Li46). J^π: ≥5/2 (1956Li46).
5074		<4 keV	E_p(lab)=2920 keV (1963Va17). Γ from 1963Va17.
5083			E_p(Lab)=2930 keV (1956Li46). J^π: ≥5/2 (1956Li46).
5285	1/2$^+$	185 keV	E_p(Lab)=3140 keV (1963Va17,1972Du11). Other: E_p(c.m.)=3020 keV (1952Ko33). J^π: from 1972Du11 (based on scattering data). L=0 (1963Va17). $p_{3/2}$ (1952Ko33), based on the dσ/dΩ and calculations inconsistent. Γ: from 1972Du11 (also Γ_p=181). Other: 200 keV (1952Ko33 and 1963Va17).

Continued on next page (footnotes at end of table)

^{24}Mg(p,γ),(p,p$'\gamma$) (continued)

^{25}Al Levels (continued)

E(level)[†]	J$^\pi$	T or Γ	L	Comments
5582				E_p(Lab)=3450 keV (1972Du11). J$^\pi$: ≥5/2 (1972Du11).
5764	1/2$^+$	28 keV		E_p(Lab)=3640 keV (1972Du11). J$^\pi$,Γ: from 1972Du11 (1/2 from triple correlation, 1/2$^+$ from scattering data), also Γ_p=0.66 keV.
5793	3/2$^+$,5/2$^+$		2	E_p(Lab)=3670 keV (1972Du11). Others: E_p(Lab)=3669 keV (1963Va17), E_p(c.m.)=3520 keV (1952Ko33). J$^\pi$,L: from 1963Va17.
6129		56 keV	2	E_p(Lab)=4020 keV (1972Du11). J$^\pi$,Γ: 5/2$^+$ in 1972Du11 ((3/2$^+$,5/2$^+$) from triple correlation). 3/2$^+$ in 1963Va17; Γ=45 keV and Γ_p=26 keV (1963Va17, 1972Du11). L: from 1963Va17.
6328[‡] *2*	7/2	>0.4 keV		E_p(lab)=4227 keV *2* (1970Ro19). E(level),J$^\pi$: from 1970Ro19, based on inelastic scattered p(θ).
6407	3/2$^-$	47 keV		E_p(Lab)=4310 keV (1972Du11). J$^\pi$,Γ: from 1972Du11 (3/2 from triple correlation and 3/2$^-$ from scattering data) and also Γ_p=8.8 keV.
6532				E_p(Lab)=4440 keV (1972Du11). J$^\pi$: ≥5/2 (1972Du11).
6676				E_p(Lab)=4590 keV (1972Du11). J$^\pi$: ≥5/2 (1972Du11).
6782				E_p(Lab)=4700 keV (1972Du11).
6926	3/2			E_p(Lab)=4850 keV (1972Du11). J$^\pi$: 3/2 from p$\gamma(\theta)$ correlation measurements (1969Du07,1972Du11).
7022				E_p(Lab)=4950 keV (1972Du11).
7118				E_p(Lab)=5050 keV (1972Du11).
7242				E_p(Lab)=5180 keV (1972Du11).
7300		100 keV *20*		E_p(Lab)=5240 keV (1960Ba19). Γ: From 1960Ba19.
7425				E_p(Lab)=5370 keV (1972Du11).
7588				E_p(Lab)=5540 keV (1972Du11).
7646		50 keV *15*		E_p(Lab)=5601 keV (1969Te02). Γ: from 1969Te02.
7770		340 keV *15*		E_p(Lab)=5730 keV (1972Du11). Other: 5720 keV (1960Ba19). Γ: from 1960Ba19.
7848		20 keV *8*		E_p(Lab)=5811 keV (1969Te02). Γ: from 1969Te02.
7900 *5*	5/2	0.16 keV *5*		T=3/2 E_p(lab)=5865 keV *5*: from 5866 keV *5* (1977Ro03) and 5864 keV *5* (1968Mo17). E(level): 1977Ro03 also list 7901 *2* (lower uncertainty). Others: 7901 (1977Ro03), 7916 *6* (1968Te01). J$^\pi$: 5/2 from $\gamma(\theta)$ (1977Ro03). Γ: from 1976Ik03. Γ_γ=0.50 eV *13* (1977Ro03 − assuming J=5/2), Γ_γ=2.0 eV *10* (1968Mo17), Γ=90 eV *80* (1968Te01).
7936		35 keV *10*		E_p(Lab)=5903 keV (1969Te02). Γ: from 1969Te02.
7968 *2*	3/2	0.36 keV *5*		T=3/2 E_p(lab)=5936 keV *2* (1977Ro03). Other: 5936 keV *5* (1968Mo17). E(level): Also. J$^\pi$: 3/2 from $\gamma(\theta)$ (1977Ro03). Γ: from 1976Ik03. Γ_γ=0.40 eV 12 (1977Ro03 − assuming J=3/2), Γ=210 eV *50* (1968Te01), Γ=168 eV *50* (1969Te02).
8025		20 keV *10*		E_p(Lab)=5996 keV (1969Te02). Γ: from 1969Te02.
8077	7/2$^+$,9/2$^+$			E_p(Lab)=6050 keV (1972La04).

Continued on next page (footnotes at end of table)

^{24}Mg(p,γ),(p,p$'\gamma$) (continued)

^{25}Al Levels (continued)

E(level)[†]	T or Γ	Comments
		$\omega\gamma$=56 eV *5* (1972La04). J$^{\pi}$: from 1972La04.
8083	15 keV *7*	E$_p$(Lab)=6056 keV (1969Te02). Γ: from 1969Te02.
8193	40 keV *10*	E$_p$(Lab)=6171 keV (1969Te02). Γ: from 1969Te02.

[†] From 1972Pi07 for E<4000 keV, and from S(p)=2271.37 *6* (2021Wa16) and E$_p$(c.m.) using E$_p$(lab), m(p)=1007825.031898 a.m.u. and m(^{24}Mg)=23.985041689 a.m.u.
[‡] Lowest members of the K$^{\pi}$=3/2$^+$ band (1970Ro19).
[#] C^{2}S from 2004Il02.

γ(^{25}Al)

E$_i$(level)	J$^{\pi}_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^{\pi}_f$	Mult.[a]	δ[‡]	Comments
451.5	1/2$^+$	451.7	100	0	5/2			
944.8		493.2	57 *2*	451.5	1/2$^+$	D+Q		A$_2$=−0.50 *4*; A$_4$=−0.02 *4* (1972Pi07) I$_\gamma$: weighted average of 61 *4* (1972Pi07) and 56 *2* (1991Ti02). Others: 58 (1961Ri08), 57 (1969An22). δ: −0.09 *6* or −1.70 *40* (1972Pi07), +0.15 *5* or −2.6 *4* (1969An22), −0.03 *5* (1971Mc06).
		944.9	43 *2*	0	5/2	D+Q		A$_2$=+0.21 *4*; A$_4$=+0.02 *4* (1972Pi07) I$_\gamma$: weighted average of 39 *4* (1972Pi07) and 44 *2* (1991Ti02). Others: 42 (1961Ri08), 43 (1969An22). δ: −0.38 *15* or 1.40 *20* (1972Pi07). Other: −0.35 *10* or −1.7 *2* (1969An22), −0.34 *4* or −1.64 *14* (1971Mc06).
1612.5	(7/2$^+$)	1612.5 *5*	100	0	5/2	D+Q	+0.17 *4*	A$_2$=+0.02 *6*; A$_4$=+0.01 *6* (1972Pi07) E$_\gamma$: from 1971Ev01. δ: other: +0.17 *+4−2* (1968Ro17 for J^{π}(initial)=7/2$^+$).
1789.5	5/2$^+$	844.6	40 *2*	944.8		D+Q	+0.17 *2*	A$_2$=−0.05 *4*; A$_4$=+0.04 *4* (1972Pi07) I$_\gamma$: weighted average of 40 *3* (1972Pi07) and 40 *2* (1991Ti02). Others: 30 (1961Ri08), 47 (1969An22). δ: from 1971Mc06. Others: +0.15 *5* (1969An22), +0.17 *2* (1972Pi07).
		1337.8	38 *2*	451.5	1/2$^+$	Q(+O)	−0.1 *3*	A$_2$=+0.50 *9*; A$_4$=−0.35 *10*(1972Pi07) I$_\gamma$: weighted average of 38 *3* (1972Pi07) and 38 *2* (1991Ti02). Others: 50 (1961Ri08), 31 (1969An22).
		1789.6 *13*	22 *2*	0	5/2	D+Q	+0.56 *3*	A$_2$=+0.57 *5*; A$_4$=−0.07 *5* (1972Pi07) E$_\gamma$: from 1971Ev01. I$_\gamma$: weighted average of 22 *3* (1972Pi07) and 22 *2* (1991Ti02). Others: 20 (1961Ri08), 22 (1969An22). δ: weighted average of +1.0 *2* (1972Pi07), +0.55 *2* (1963Mc10), +0.78 *+22−30* (1969An22), +0.63 *22* (1971Mc06).
2485.4	(1/2$^+$)	1540.4	15.7 *2*	944.8				I$_\gamma$: weighted average of 15.6 *11* (1999Po25), 15.6 *3* (2010Li22), and 15.8 *2* (2021Zh46).

Continued on next page (footnotes at end of table)

^{24}Mg(p,γ),(p,p′γ) (continued)

$\gamma(^{25}Al)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[a]	δ[‡]	Comments
2485.4	(1/2$^+$)	2033.6	81.6 *9*	451.5	1/2$^+$			I_γ: weighted average of 81.5 *12* (2021Zh46), 81.7 *34* (1999Po25), and 81.7 *16* (2010Li22).
		2485.3	2.7 *1*	0	5/2			I_γ: weighted average of 2.7 *3* (1999Po25), 2.70 *7* (2010Li22), and 2.77 *6* (2021Zh46).
2673.4	3/2$^+$	883.9	42.8[&] *8*	1789.5	5/2$^+$			
		1728.5	0.5[&] *2*	944.8				
		2221.7	31.4[&] *7*	451.5	1/2$^+$	D(+Q)	+0.05 *5*	δ: from $\gamma(\theta)$ measurements (1956Li46) (see p.127 of 1978En02).
		2673.4	25.3[&] *5*	0	5/2	D+Q	+0.36 *11*	δ: from $\gamma(\theta)$ measurements (1956Li46) (see p.127 of 1978En02).
2720.5	7/2	931.0	18 *2*	1789.5	5/2$^+$	D+Q	+0.18 *+15−13*	δ: from 1969An22. I_γ: from 1991Ti02. Other: 29 *14* (1972Pi07).
		1775.6	75.3 *40*	944.8		Q(+O)	−0.08 *15*	A_2=+0.59 *6*; A_4=−0.18 *6* (1972Pi07) I_γ: from 1991Ti02. Other: 63 *10* (1972Pi07).
		2720.5	6.7 *15*	0	5/2			I_γ: from 1991Ti02. Other: 8 *6* (1972Pi07).
3062.0	3/2$^-$	2117.1	11.4 *5*	944.8		D+Q	+0.06 *4*	A_2=+0.29 *5*; A_4=+0.02 *4* (1972Pi07) E1 Γ_γ=0.084 eV (1956Li46). I_γ: from 1980Ke03. Other: 12 *3* (1972Pi07).
		2610.3	75.6 *12*	451.5	1/2$^+$	D(+Q)	0.00 *2*	A_2=−0.49 *3*; A_4=−0.03 *3* (1972Pi07) E1 Γ_γ=0.010 eV (1956Li46). I_γ: from 1980Ke03. Other: 75 *4* (1972Pi07).
		3062.0	13.0 *6*	0	5/2	D(+Q)	−0.03 *6*	A_2=−0.14 *6*; A_4=−0.04 *6* (1972Pi07) I_γ: from 1980Ke03. Other: 13 *3* (1972Pi07).
3424.3	(9/2$^+$)	1811.8 *4*	84 *4*	1612.5	(7/2$^+$)	D+Q	+0.14 *4*	A_2=−0.02 *6*; A_4=−0.07 *6* (1972Pi07) E_γ: from 1971Ev01. δ: for 9/2$^+$ to 7/2$^+$ transition.
		3424.2	16 *4*	0	5/2	Q(+O)	−0.13 *16*	A_2=+0.43 *9*; A_4=−0.23 *9* (1972Pi07) δ: for J^π(initial)=9/2$^+$.
3695.8	7/2$^-$	975.0	2.0 *3*	2720.5	7/2	D(+Q)	−0.20 *25*	A_2=+0.21 *10*; A_4=+0.06 *11* (1972Pi07) I_γ: from 1991Ti02. Others: 3 *2* (1972Pi07), 2 (1969An22). δ: others: +0.15 *30* (1969An22), +0.02 *1* (1971Mc06).
		1905.6 *4*	71 *3*	1789.5	5/2$^+$	D(+Q)	−0.01 *2*	A_2=−0.39 *3*; A_4=−0.03 *3* (1972Pi07) E_γ: weighted average of 1906.2 *7* (1971Mc06) and 1905.4 *4* (1971Ev01). I_γ: from 1991Ti02. Others: 65 *4* (1972Pi07), 70 (1961Ri08), 68 (1969An22). δ: other: +0.02 *2* (1969An22), −0.02 *14* (1971Mc06). E1 Γ_γ=0.044 eV (1956Li46).
		3695.6 *7*	27 *2*	0	5/2	D(+Q)	−0.02 *2*	A_2=−0.40 *5*; A_4=+0.02 *6* (1972Pi07) E_γ: from 1971Mc06. I_γ: from 1991Ti02. Others: 32 *4* (1972Pi07), 30 (1961Ri08,1969An22). δ: other: 0.00 *2* (1969An22), −0.01 *1* (1971Mc06).

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^{24}Mg(p,γ),(p,p′γ) (continued)

γ(^{25}Al) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[a]	δ[‡]	Comments
3823.0	1/2⁻	1337.7	5.7[@] *3*	2485.4	(1/2⁺)			I_γ: other: 7 *1* (1991Ti02).
		2878.1	69.8[@] *18*	944.8				E1 Γ_γ=0.30 eV (1956Li46). I_γ: other: 68 *3* (1991Ti02).
		3371.3	24.5[@] *9*	451.5	1/2⁺			E1 Γ_γ=0.15 eV (1956Li46). I_γ: other: 25 *2* (1991Ti02).
3859.1	3/2⁺,5/2⁺	797.1	0.36[@] *4*	3062.0	3/2⁻			I_γ: other: 0.7 *1* (1991Ti02),
		1138.6	9.4[@] *3*	2720.5	7/2	D(+Q)	−0.01 *6*	A_2=−0.12 *5*; A_4=+0.03 *6* (1972Pi07) I_γ: others: 9.6 *7* (1991Ti02), 8 *3* (1972Pi07).
		1185.7	7.9[@] *2*	2673.4	3/2⁺	D+Q	+0.11 *5*	A_2=−0.18 *5*; A_4=+0.10 *5* (1972Pi07) I_γ: others: 9.0 *7* (1991Ti02), 9 *3* (1972Pi07).
		2069.6	6.1[@] *2*	1789.5	5/2⁺	D(+Q)	0.00 *5*	A_2=+0.44 *7*; A_4=−0.06 *8* (1972Pi07) I_γ: others: 5.1 *4* (1991Ti02), 6 *3* (1972Pi07).
		2246.5	1.94[@] *7*	1612.5	(7/2⁺)			I_γ: others: 2.4 *3* (1991Ti02), 2 *2* (1972Pi07).
		2914.2	64.0[@] *20*	944.8		D(+Q)	+0.03 *3*	A_2=−0.45 *3*; A_4=+0.00 *3* (1972Pi07) I_γ: others: 63 *4* (1972Pi07), 66.8 *35* (1991Ti02).
		3407.4	0.40[@] *4*	451.5	1/2⁺			I_γ: others: <1 (1972Pi07).
		3859.1	9.9[@] *3*	0	5/2	D+Q	+0.07 *4*	A_2=+0.52 *6*; A_4=−0.03 *6* (1972Pi07) I_γ: others: 6.4 *10* (1991Ti02), 12 *3* (1972Pi07).
4025	9/2⁺,5/2⁺	601	1.0 *5*	3424.3	(9/2⁺)			I_γ: from 1991Ti02.
		2412	49 *3*	1612.5	(7/2⁺)			I_γ: from 1991Ti02. Other: 40 *10* (1968Ro17). δ: −1.63 *35* for J=5/2 or +0.4 *5* for 9/2⁺ (1968Ro17); 0.4 *5* for 9/2⁺ and −1.0 *6* for 5/2⁺ (1959Li52).
		4025	50 *3*	0	5/2			A_2=+0.49 *6*; A_4=−0.33 *8* (1959Li52) I_γ: from 1991Ti02. Other: 60 *10* (1968Ro17). δ: +1.8 *3* for J=5/2 (1968Ro17); ∞ for 9/2⁺ and +1.6 *3* for 5/2⁺ (1959Li52).
4199	3/2⁺	3254	100	944.8		D+Q	−0.07 *3*	δ: from γ(θ) measurements (1956Li46) (see p.127 of 1978En02).
		3747	100	451.5	1/2⁺	D+Q	+0.18 *1*	δ: from γ(θ) measurements (1956Li46) (see p.127 of 1978En02).
4582	5/2⁺	3637	100	944.8				
7900	5/2	6287	37 *3*	1612.5	(7/2⁺)	D+Q	+0.08 *6*	I_γ: from 1977Ro03. Other: 51 *7* (1968Mo17). δ: from 1977Ro03.
		6954	13 *2*	944.8		D(+Q)	+0.07 *6*	I_γ: from 1977Ro03. Other: 8 *5* (1968Mo17). δ: from 1977Ro03.
		7899	50 *3*	0	5/2	D+Q	+0.02 *3*	I_γ: from 1977Ro03. Other: 41 *5* (1968Mo17). δ: from 1977Ro03. Supported pure M1 in 1968Mo17.
7968	3/2	7022	15[#] *5*	944.8				
		7515	14[#] *4*	451.5	1/2⁺			
		7967	71[#] *7*	0	5/2	D+Q	+0.11 *2*	δ: from 1977Ro03. Supported pure M1 in 1968Mo17.

[†] From level energy differences (recoil corrected), except noted otherwise.
[‡] From 1972Pi07, except where otherwise noted.
[#] From 1968Mo17.
[@] From 1999Po25.

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^{24}**Mg(p,γ),(p,p′γ) (continued)**

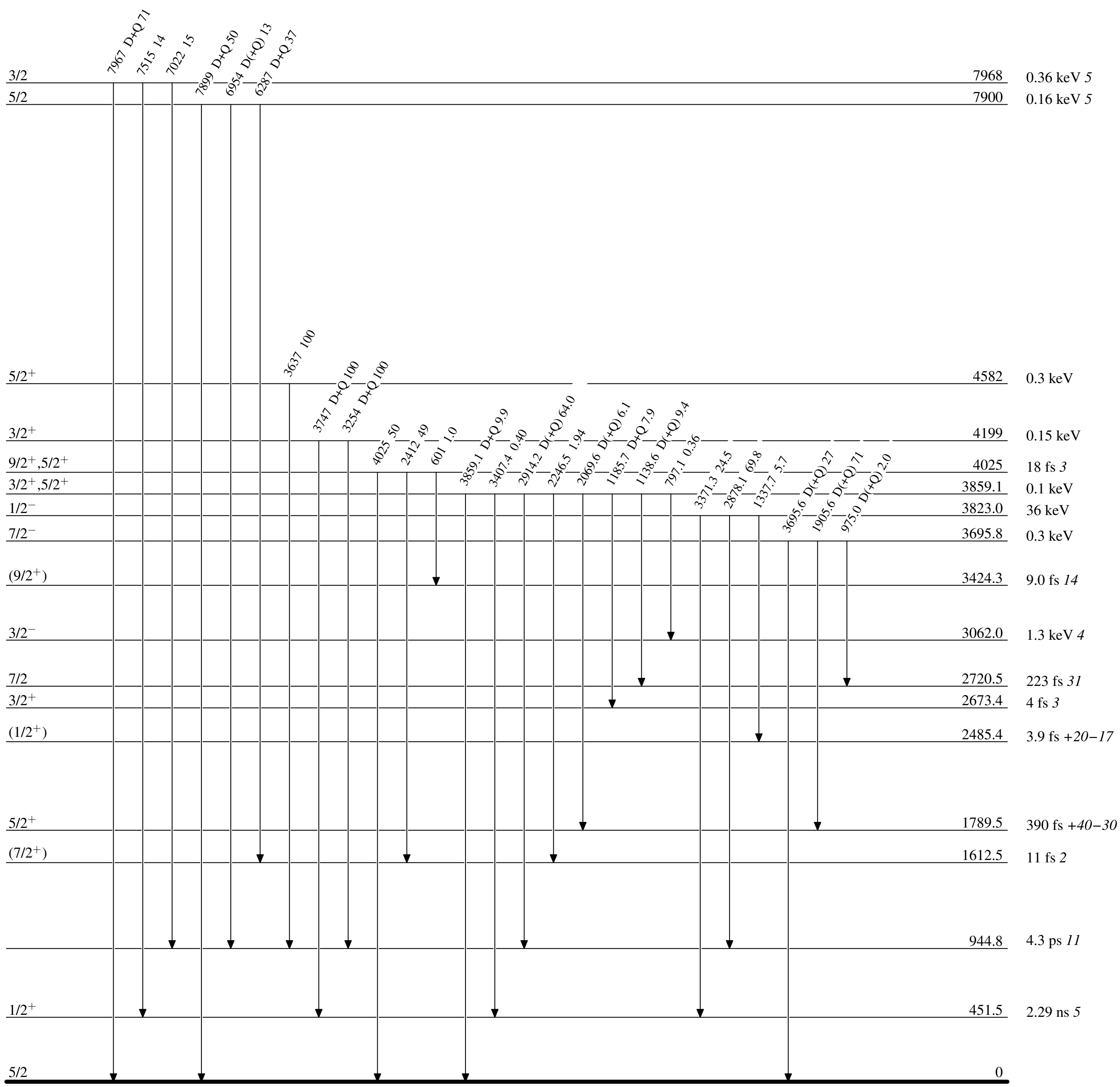
γ(^{25}Al) (continued)

[&] From 1998Po20.
[a] Based on the $\gamma(\theta)$ data, proposed by the evaluators.

^{24}Mg(p,γ),(p,p$'\gamma$)

Level Scheme

Intensities: % photon branching from each level

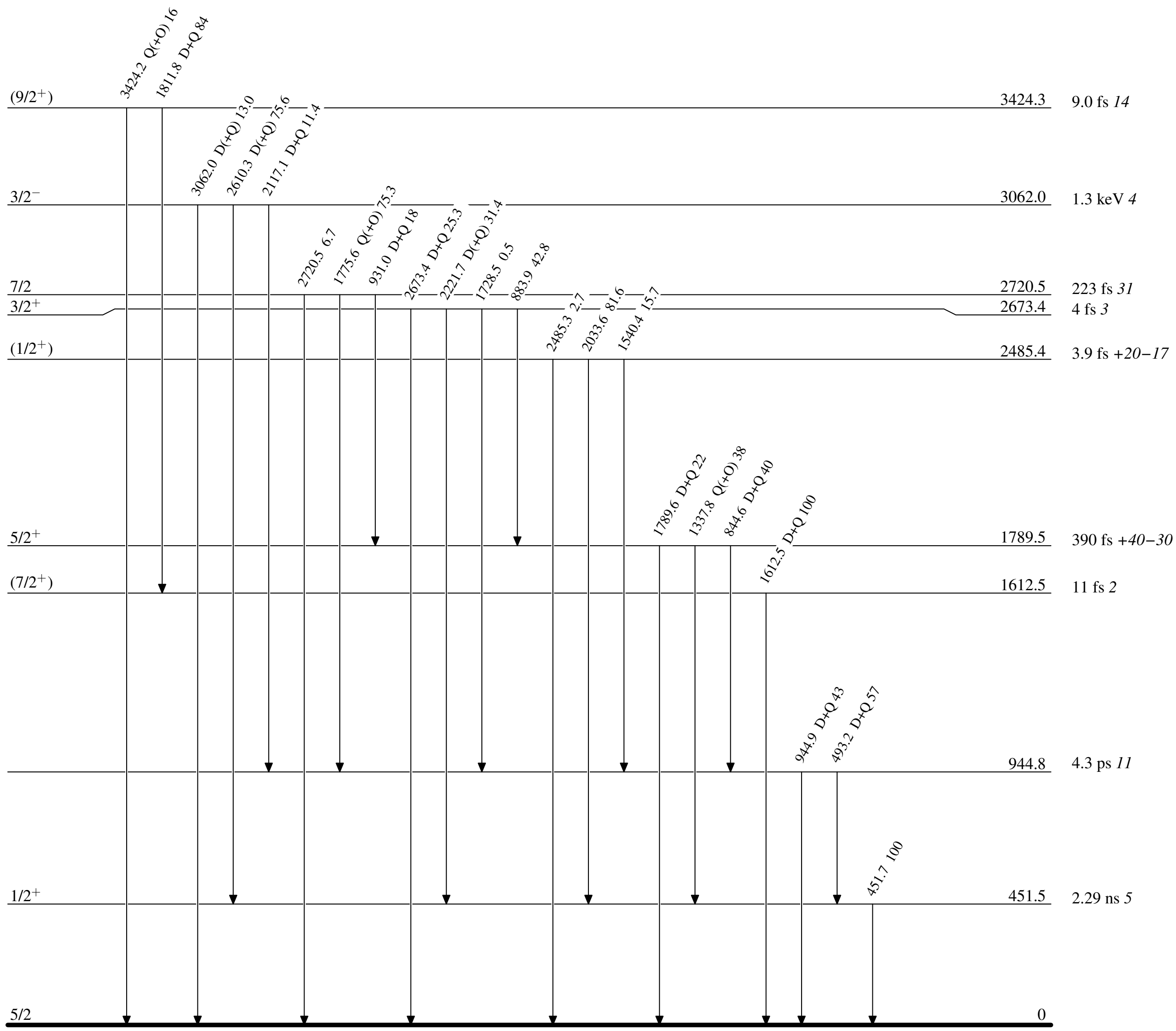


$^{25}_{13}Al_{12}$

^{24}Mg(p,γ),(p,p′γ)

Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{13}Al_{12}$

^{24}Mg(pol p,p),(pol p,p′) 1991Pr06

$J^{\pi}(^{27}Al)=5/2^{+}$.

1991Pr06: ^{25}Al(pol p,p),(pol p,p′), E=4-6.3 MeV, enriched target. Measured $\sigma(E,\theta)$, analyzing power vs. E, θ. Deduced levels, spin, parity, total width, proton width.

Others: 1982Pr03, 1992Wi13 (p,p).

^{25}Al Levels

E(level)†	J^{π}‡	Γ#	Comments
6122 *3*	$3/2^+$	51 keV *2*	Ep=4013 keV *3* (Lab) (1991Pr06). Γp=30 keV *1*.
6385 *3*	$3/2^-$	<15 keV	Ep=4287 keV *3* (Lab) (1991Pr06). Γp/Γtot=0.10 keV.
6520 *9*	$3/2^+$	64 keV *16*	Ep=4427 keV *3* (Lab) (1991Pr06). Γp=5 keV *1*.
6645 *5*	$5/2^+$	58 keV *9*	Ep=4558 keV *4* (Lab) (1991Pr06). E(level): 6829 *4* (1991Pr06) is a typo. Γp=9 keV *1*.
6734 *22*	$7/2^-$	197 keV *39*	Ep=4650 keV *22* (Lab) (1991Pr06). Γp=18 keV *2*.
6740 *5*	$1/2^+$	152 keV *11*	Ep=4657 keV *5* (Lab) (1991Pr06). Γp=137 keV *7*.
6895 *3*	$7/2^-$	53 keV *4*	Ep=4818 keV *3* (Lab) (1991Pr06). Γp=17 keV *1*.
7055 *9*	$3/2^-$	616 keV *20*	Ep=4985 keV *9* (Lab) (1991Pr06). Γp=449 keV *12*.
7125 *3*	$3/2^+$	117 keV *4*	Ep=5058 keV *3* (Lab) (1991Pr06). Γp=88 keV *3*.
7150 *7*	$5/2^-$	20 keV *6*	Ep=5084 keV *7* (Lab) (1991Pr06). Γp=1.4 keV *1*.
7240 *3*	$5/2^+$	19 keV *4*	Ep=5178 keV *3* (Lab) (1991Pr06). Γp=5 keV *1*.
7297 *3*	$3/2^-$	66 keV *6*	Ep=5237 keV *3* (Lab) (1991Pr06). Γp=51 keV *3*.
7408 *3*	$5/2^-$	<12 keV	Ep=5353 keV *3* (Lab) (1991Pr06). Γp/Γtot=0.06 keV.
7684 *3*	$7/2^-$	21 keV *3*	Ep=5640 keV *3* (Lab) (1991Pr06). Γp=1.5 keV *2*.
7716 *10*	$3/2^+$	230 keV *20*	Ep=5674 keV *10* (Lab) (1991Pr06). Γp=103 keV *7*.
7892 *8*	$5/2^-$	94 keV *15*	Ep=5857 keV *8* (Lab) (1991Pr06). Γp=3.6 keV *15*.
7901 *2*		105 eV *18*	Γp=18 eV *4*. Γ: from 1992Wi13.
7974 *2*	$3/2^+$	1.30 keV *14*	Γ: Γp=232 eV *12*. E(level),Γ: from 1992Wi13.
8089 *3*	$5/2^-$	40 keV *9*	Ep=6062 keV *3* (Lab) (1991Pr06). Γp=4.9 keV *1*.

† Calculated using S(p)=2271.37 *6* (2021Wa16) and Ep(c.m.) using Ep(lab), m(p)=1007825.031898 a.m.u. and m(^{24}Mg)=23.985041689 a.m.u.

‡ From 1991Pr06, based on phase shift analysis.

\# From 1991Pr06, except where otherwise noted.

^{24}Mg(d,n) 1978Bo14,1968Fu03,1966Bu07

1978Bo14: ^{24}Mg(d,n), E=10.5 MeV; measured σ(Ep,θ_p; En,θ_n); Deduced levels, spin, parity, Γ. Enriched target.
1968Fu03: ^{24}Mg(d,n) E=5.5-6 MeV. Measured σ(En,θ); deduced level, L, spin, parity, relative spectroscopic factors.
1966Bu07: ^{24}Mg(d,n) E=7,9,10 MeV. Measured σ(En,θ); deduced level, L, relative spectroscopic factors.
1988TaZT (other): E=25 MeV; measured $\sigma(\theta)$. Deduced levels, spin, parity, spectroscopic factors. DWBA analysis.
Others: 1968Di02, 1974Ke15 and 1975Mo07 (^{7}Li,^{6}He), 1976Ts03 (^{19}F,^{18}O).

^{25}Al Levels

E(level)[†]	J^π[@]	L[a]	S[a]	Comments
0	5/2+[&]	2	1.00	L: also in 1966Bu07. S: others: (2J$_f$+1)S=2.9 (1988TaZT); S=0.58 (1976Ts03 (^{19}F,^{18}O)).
450	1/2+	0	0.60	L: also in 1966Bu07. S: others: 1.46 (rel) to g.s. S=1.0 (1966Bu07); (2J$_f$+1)S=1.7 (1988TaZT); S=0.85 (1976Ts03 (^{19}F,^{18}O)).
950	3/2+[&]	2	0.55	L: also in 1966Bu07. S: other: 0.77 (rel) to g.s. S=1.0 (1966Bu07); (2J$_f$+1)S=1.7 (1988TaZT); S=0.45 (1976Ts03 (^{19}F,^{18}O)).
1610				
1810	5/2+	2	0.50 *15*	E(level): other: 1790 (1966Bu07). L: also in 1966Bu07. S: the uncertainty due to oxygen contamination. Others: 0.34 (rel) to g.s. S=1.0 (1966Bu07); (2J$_f$+1)S=0.74 (1988TaZT).
2500	1/2+	0	0.18	E(level): other: 2480 (1966Bu07). S: other: (2J$_f$+1)S=0.40 (1988TaZT).
2690	3/2+	2	0.52	E(level): other: 2680 (1966Bu07). S: other: (2J$_f$+1)S=1.3 (1988TaZT).
2720[#]	7/2+[#]			(2J$_f$+1)S=1.9 (1988TaZT).
3080	3/2−	1		E(level): other: 3060 (1966Bu07). other: (2J$_f$+1)S=2.0 (1988TaZT).
3430[‡] *40*				
3700[‡] *40*	7/2−[#]	3		J^π,L: from 1975Mo07 (^{7}Li,^{6}He) based on measured dσ/dΩ and DWBA analysis. other: (2J$_f$+1)S=3.5 (1988TaZT).
3840[‡] *40*				E(level): other: 3820 (1988TaZT). other: (2J$_f$+1)S=0.70 (1988TaZT).
3860[#]	5/2+[#]			(2J$_f$+1)S << 1 (1988TaZT).
4030[#]	(5/2+)[#]			(2J$_f$+1)S=0.72 (1988TaZT).
4200[#]	3/2+[#]			(2J$_f$+1)S=0.19 (1988TaZT).
4580[#]	(5/2+)[#]			(2J$_f$+1)S=0.09 (1988TaZT).
4620 *20*				Γ_n to g.s.=0.25 keV for 5/2+ and 0.05 for 5/2− (1978Bo14).
4820 *30*				Γ_n=15 keV to g.s. for 5/2+ and 3 for 5/2− (1978Bo14).
4920 *30*				
4990 *30*				
5120 *20*	(9/2+)[#]			E(level): other: 5150 (1988TaZT). (2J$_f$+1)S=0.62 (1988TaZT).
5250 *30*				
5340 *30*				Γ_n to g.s.=0.8 keV for 5/2+ and 0.2 for 5/2− (1978Bo14).
5470 *30*				
5560 *30*				Γ_n to g.s.=1.1 keV for 3/2+ (1978Bo14).
5840 *40*				Γ_n to g.s.=2 keV for 5/2+ (1978Bo14).
6100 *20*				
6190 *30*				Γ_n to g.s.=10 keV for 3/2+ (1978Bo14).
6370 *30*				Γ_n to g.s.=0.05 keV and to exited state 0.2 keV for 7/2+ (1978Bo14).
6450 *30*	(9/2+)[#]			(2J$_f$+1)S=0.27 (1988TaZT).
6600 *30*				Γ_n to g.s.=0.10 keV and to exited state 1.0 keV for 7/2+ (1978Bo14).

Continued on next page (footnotes at end of table)

^{24}Mg(d,n) 1978Bo14,1968Fu03,1966Bu07 (continued)

^{25}Al Levels (continued)

E(level)[†]	J^{π}[@]	Comments
6690 *30*	$(7/2^{-})$[#]	$(2J_f+1)S=0.47$ (1988TaZT).
6800 *20*		
6990 *40*	$(7/2^{-})$[#]	E(level): other: 6940 (1988TaZT). $(2J_f+1)S=0.89$ (1988TaZT). Γ_n to g.s.=2.4 keV for $7/2^{-}$ and 0.8 for $7/2^{+}$; and to exited state: 8.5 keV for $3/2^{-}$ and 3 keV for $3/2^{+}$ (1978Bo14).
7090 *40*		
7190 *40*	$(7/2^{-})$[#]	$(2J_f+1)S=0.40$ (1988TaZT). Γ_n to g.s.=4 keV for $7/2^{-}$ and 1.5 for $7/2^{+}$; and to exited state: 4 keV for $3/2^{-}$ and 1.5 keV for $3/2^{+}$ (1978Bo14).
7290 *30*		
7480 *30*		Γ_n to g.s.=10 keV for $3/2^{+}$; and to exited state: 30 keV for $7/2^{+}$ (1978Bo14).
8100 *30*		
8300 *30*		
8600 *30*		
8670 *30*		
8820 *30*		
9000 *30*		
9210 *30*		

[†] From 1968Fu03 up to 3080 and above 3840 from 1978Bo14, except where otherwise noted.
[‡] From 1966Bu07.
[#] As listed in 1988TaZT.
[@] From 1968Fu03.
[&] Pronounced differences in neutron distributions resulting from L=2 transitions to $5/2^{+}$ and $3/2^{+}$ states were noted in 1966Bu07.
[a] From 1968Fu03. L values are based on measured $d\sigma/d\Omega$ and DWBA analyses. S values are relative to the g.s. spectroscopic factor of 1.00.

^{24}Mg(^{3}He,d),(pol ^{3}He,d) 1973Br27,1975Pe05,1981En04

1973Br27: ^{24}Mg(^{3}He,d),E=16.5, 18, 19.5, 21 MeV; measured Q,σ(Eα,Ed). Deduced levels.
1975Pe05: ^{24}Mg(^{3}He,d),E=38.5 MeV. DWBA, CCBA calculations. Deduced levels, L, spectroscopic factors.
1981En04: ^{24}Mg(pol ^{3}He,d),E=33.3 MeV. DWBA, coupled channels analysis. Deduced levels, L, spectroscopic factors.
Others: 1970Me19, 1973Ab08, 1991Ho09, 1994Ve04.

^{25}Al Levels

E(level)†	J$^{\pi}$	Γ†	L	C^{2}S	Comments
0	5/2+‡		2‡	0.24‡ *3*	C^{2}S: others: 0.24 (1991Ho09), 0.25 (1975Pe05), 0.33 (1994Ve04).
451.9 *5*	1/2+‡		0‡	0.41‡	E(level): used as calibration energy. C^{2}S: others: 0.37 (1991Ho09), 0.37 (1975Pe05), 0.69 (1994Ve04).
944.2 *12*	3/2+‡		2‡	0.19‡ *1*	C^{2}S: others: 0.20 (1991Ho09), 0.32 (1975Pe05), 0.32 (1994Ve04).
1613.9 *14*	7/2+			<0.005	J$^{\pi}$,C^{2}S: from 1975Pe05.
1789.6 *11*	5/2+#		2#	0.10#	C^{2}S: other: 0.052 (1975Pe05).
2485 *3*	1/2+#		0#	0.14#	C^{2}S: other: 0.14 (1975Pe05).
2674.2 *22*	3/2+#		2#	0.18#	C^{2}S: other: 0.34 (1975Pe05).
2720.0 *5*					
3061.5 *15*	3/2−#		1#		E(level): used as calibration energy.
3424.6 *12*					
3697.6 *11*	7/2−#		3#		
3823.0 *25*	1/2−#	36 keV *7*	1#		
3856.4 *25*	5/2+#		2#		
4027 *3*					
4196 *3*					
4518 *4*					
4853 *4*					
4906 *4*					
5068 *5*					
5101 *10*		<4 keV			
5116 *7*		47 keV *5*			
5232 *4*					
5526 *7*		≈18 keV			
5686 *7*					
5785 *7*		≈15 keV			
5809 *7*					
6063 *7*					
6123 *7*		61 keV *7*			
6322 *5*					
6409 *10*		58 keV *7*			
6517 *7*		56 keV *13*			
6564?					E(level): questionable level, not adopted.
6644 *7*					
6770 *7*					
6881 *7*					
6909 *10*					
6944 *10*		104 keV *10*			
7112 *10*		106 keV *20*			
7183 *7*					
7240 *7*					
7417 *7*					
7564?					
7819? *20*		209 keV *20*			

† From 1973Br27.

Continued on next page (footnotes at end of table)

^{24}Mg(^{3}He,d),(pol ^{3}He,d) 1973Br27,1975Pe05,1981En04 (continued)

^{25}Al Levels (continued)

‡ From 1981En04. $d\sigma/d\Omega$ and DWBA analysis.
# From 1991Ho09.

$^{25}Mg(^{3}He,t)$ 2004Fu02,2006Fu15

$J^{\pi}(^{25}Mg)=5/2^{+}$.

2004Fu02,2006Fu15: $^{25}Mg(^{3}He,t)$ E=140 MeV/A, magnetic spectrometer. Rotational band assignment on the basis of transition strengths. FWHM=35 keV.

Other reaction:

1967Wo02 (p,n), 2004Sh02, 2010FuZZ, 1976Ci02 and 1982Ci01 ($^{6}Li,^{6}He$).

1976Ci02,1982Ci01: $^{25}Mg(^{6}Li,^{6}He)$, E=34 MeV; measured $\sigma(E(^{6}He),\theta)$. Studied reaction mechanism.

^{25}Al Levels

E(level)[†]	J^{π}[†]	Γ[‡]	Comments
0[#] *5*	$5/2^{+}$		
1613[#] *5*	$7/2^{+}$		
6117[@] *5*	$3/2^{+}$	51 keV *2*	B(GT)=0.217 *18* (2004Fu02 − their other value 0.235 *29* in 2004Sh02).
6655[@] *5*	$5/2^{+}$	58 keV *9*	B(GT)=0.083 *12* (2004Fu02).
7125 *5*	$3/2^{+}$	117 keV *4*	B(GT)=0.136 *12* (2004Fu02).
7239 *5*	$5/2^{+}$	19 keV *4*	B(GT)=0.056 *5* (2004Fu02).
7422 *5*	$(3/2,5/2,7/2)^{+}$		B(GT)=0.006 *3* (2004Fu02).
8192 *5*	$(3/2,5/2,7/2)^{+}$		E(level): from figure 1 of 2004Fu02.

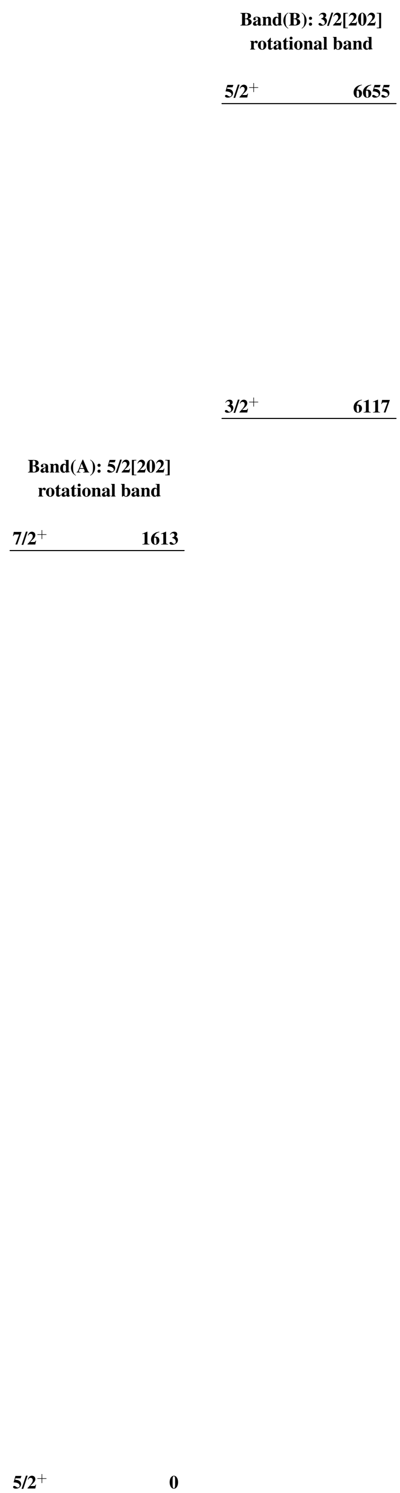
[†] From 2004Fu02.

[‡] From peak widths fitting with the standard shape folded with the Breit-Wigner function representing the decay width.

[#] Band(A): 5/2[202] rotational band.

[@] Band(B): 3/2[202] rotational band.

$^{25}Mg(^{3}He,t)$ 2004Fu02,2006Fu15



$^{25}_{13}Al_{12}$

^{27}Al(p,t) 1973Be14,1973Gr02

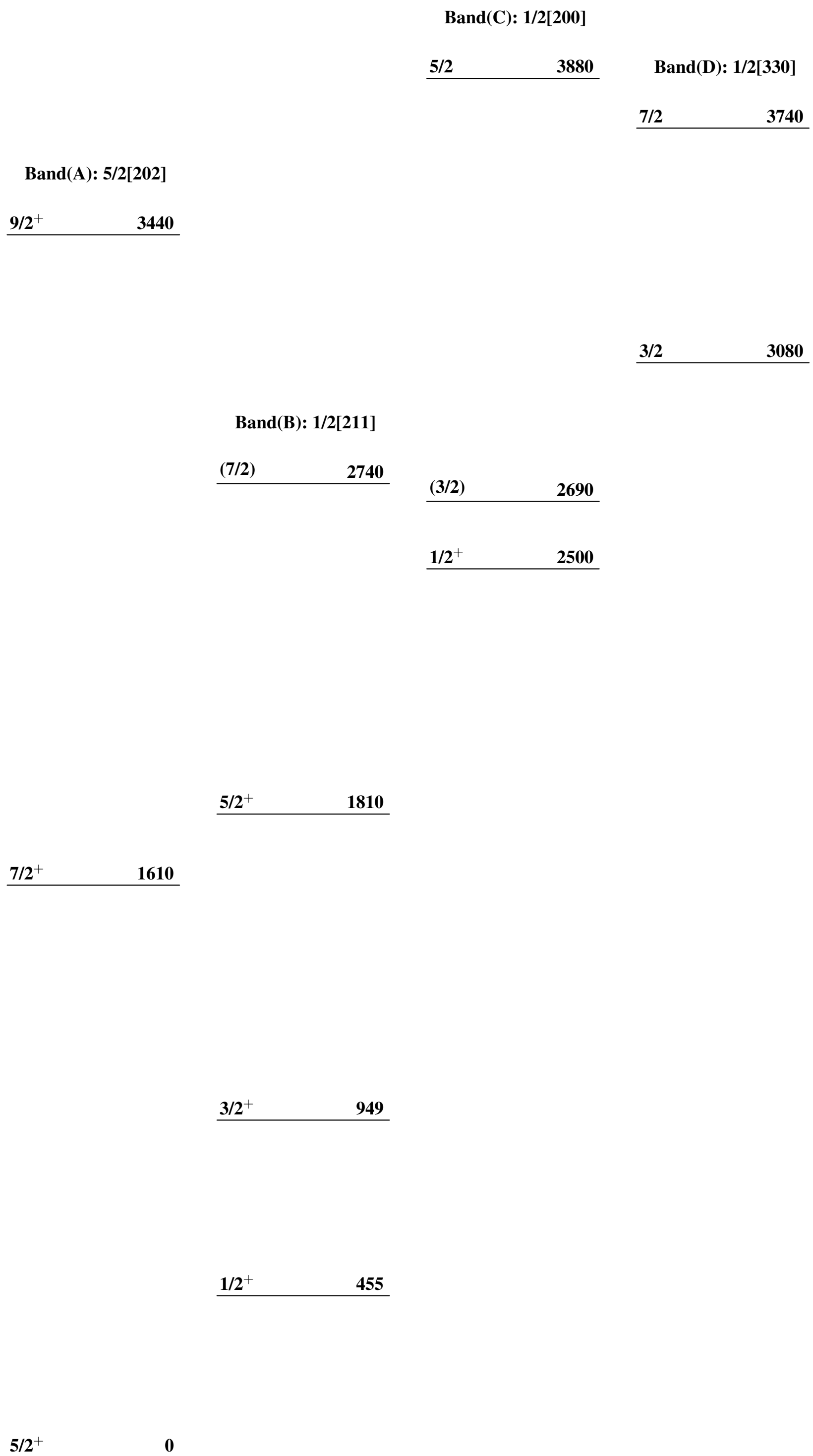
$J^{\pi}(^{27}Al)=5/2^{+}$.
1973Gr02: ^{27}Al(p,t),E=27 MeV. Measured $\sigma(\theta)$, deduced level, assigned rotational bands. FWHM 70 to 120 keV.
1973Be14: ^{27}Al(p,t),E=40 MeV. Measured Q,σ(Et),σ(E(^{3}He)), σ(Ed).
Other: 1976Na18.

^{25}Al Levels

E(level)†	Jπ†	Comments
0#	5/2+	
455@	1/2+	
949@	3/2+	
1610#	7/2+	
1810@	5/2+	
2500&	1/2+	
2690&	(3/2)	
2740@	(7/2)	
3080a	3/2	
3440#	9/2+	
3740a	7/2	
3880&	5/2	
4070‡		E(level): no comparable level in other studies − not adopted.
4220‡		
4590‡		E(level): presented as a doublet of 4590 + 4670, however there is no excited level at 4670 in other studies.
4900‡		
5090‡		
5300‡		
5600‡		
5800‡		
5900‡		E(level): no comparable level in other studies − not adopted.
6130‡		
7905 *5*		T=3/2 E(level): from 1973Be14.

† From figs 2, 3, and 9 in 1973Gr02, except where otherwise noted. The proposed spin-parity assignments in 1973Gr02 are based on triton angular distribution measurements.
‡ From Fig. 4 (1973Gr02).
# Band(A): 5/2[202].
@ Band(B): 1/2[211].
& Band(C): 1/2[200].
a Band(D): 1/2[330].

^{27}Al(p,t) 1973Be14,1973Gr02



$^{25}_{13}Al_{12}$

^{28}Si(p,α) 2009Pi13,1973Br27

2009Pi13: E=40,42 MeV; measured α spectra, angular distributions, and angular momentum transfers using the Silicon Detector Array (SIDAR) at the ORNL Holifield Radioactive Ion Beam Facility. DWBA analysis of $\sigma(\theta)$ data.
1973Br27: ^{28}Si(p,α) E=15, 16 MeV. measured Q,σ(Eα,Ed). Deduced levels. Also studied by ^{24}Mg(^{3}He,d).
Other: 1974Gu18.

^{25}Al Levels

E(level)†	Jπ a	Comments
0@	5/2+	
451.9‡@ *9*	1/2+	E(level): used as calibration energy in 1973Br27. Other: 455 *2* calibration energy (2009Pi13).
944.7‡@ *13*	3/2+	E(level): other: 949 *2* calibration energy (2009Pi13).
1612.5‡ *15*	7/2+	E(level): other: 1611 *3* (2009Pi13).
1789.8‡ *5*	5/2+	E(level): other: 1776 *3* (2009Pi13).
2480.0‡ *19*	1/2+	E(level): other: 2483 *5* (2009Pi13).
2673.0‡ *8*	3/2+	E(level): other: 2663 *5* (2009Pi13).
2718.2‡ *9*		
3061.5‡ *15*		
3410 *5*	(5/2+)	Jπ: DWBA fit for 9/2+ is poor at the most forward angles (2009Pi13).
3430‡ *7*		
3694.5‡ *16*		
3848# *5*	1/2−	DWBA fits 96% of 1/2− and 4% of 5/2+ states (2009Pi13).
4021 *5*	(9/2+)	Jπ: DWBA fits 9/2+ or 7/2+ not 5/2+ (2009Pi13).
4205 *19*	3/2+	Jπ: from previous assignment, not much data available in the present experiment (2009Pi13).
4525# *7*	9/2−&5/2+	Jπ: DWBA fits gives 65% of 9/2− and 35% of 5/2+ (2009Pi13).
4921 *9*	(5/2+)	Jπ: DWBA fits 3/2+ or 5/2+ (2009Pi13).
5050# *15*	1/2−,3/2+,(9/2)	Jπ: DWBA fits 96% of 1/2− and 4% of 9/2+; or 84% of 1/2− and 16% of 9/2−; or 100% of 3/2+ (2009Pi13).
5722# *10*	(7/2,9/2)−	Jπ: DWBA fits 57%, 30% of 1/2+ and (7/2,9/2)−, with slightly better fit for 7/2− (2009Pi13).
6095# *18*	(5/2,7/2)−	Jπ: DWBA fits 17% of 3/2+ and 83% of 5/2− or 25% of 3/2+ and 75% of 7/2− (2009Pi13).
6439# *27*	(5/2,7/2)−	Jπ: DWBA fits 16% of 3/2+ and 84% of 5/2− or 25% of 3/2+ and 75% of 7/2− (2009Pi13).
6838&		
7186&		
7533&		

† From 2009Pi13, except where otherwise noted.
‡ From 1973Br27.
# Unresolved levels (2009Pi13). Not adopted.
@ Calibration points (2009Pi13).
& From spectral figure 1 in 2009Pi13, probably complex unresolved levels. Not adopted if absent in other studies.
a From 2009Pi13, proposed based on the distorted-wave Born approximation analysis of the angular distribution measurements, $\sigma(\theta)$.

Adopted Levels, Gammas

$Q(\beta^-)=-1.64\times10^4$ *syst*; S(n)=14989 *22*; S(p)=3413 *10*; $Q(\alpha)=-9501$ *10* 2021Wa16

^{25}Si Levels

Cross Reference (XREF) Flags

A $^{28}Si(^3He,^6He)$
B $^9Be(^{26}Si,^{25}Si\gamma)$
C $^9Be(^{25}Al,^{25}Si\gamma)$

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	(5/2$^+$)	218.7 ms *+10−14*	ABC	%ε+%β$^+$=100; %β$^+$p=37.0 *11* E(level): estimated root-mean-square (RMS) proton point radius is 3.060 fm *31* (2017Sa16). J$^\pi$: based on the results from shell model calculations (2010Re05,2018Lo10); the mirror nucleus, ^{25}Na has 5/2$^+$ ground state (1975De11). T$_{1/2}$: weighted average of 225 ms *6* (1965Mc01), 218 ms *4* (1966Re07), 232 ms *15* (1992Ha28), 222.6 ms *59* (1993Ro06,1973SeYM), 218.9 ms *+10−14* (2021Su03), and 217 ms *2* (2024Sh34 – p(t)). Others: 300 ms *+200−100* (1963Ba63,1963Mc08), 232 ms *15* (1992Ha28). %β$^+$p: weighted average of 38.2 *11* (2021Su03), 34.5 *18* (2004Th09), and 36.6 *15* (1993Ro06 – without considering the intensity of 2278 keV proton group and assuming an uncertainty of 1.5. Probably the reported uncertainties in Table I are statistical only and yield an uncertainty of 0.1). Others: 41 *1* (1992Ha28), in 2024St06, three proton groups (out of 25 known groups) with their absolute intensities are reported.
45 *6*			A C	
870 *5*			ABC	XREF: A(815)B(821)
1961 *6*			ABC	
2365 *7*			A C	
2380 *8*			A C	XREF: A(2373)
2585 *8*			A C	XREF: A(2606)
3035 *9*			A C	XREF: A(3080)
3160 *50*			C	
3.29×10^3 *30*			A	
3.40×10^3? *30*			A	
3695 *9*			C	
3802 *8*			A C	XREF: A(3820)
4.99×10^3 *25*			A	
5.42×10^3 *40*			A	
5.73×10^3 *50*			A	

† From a least-squares fit to γ-ray energies by the evaluators, wherever possible.

γ(^{25}Si)

E$_i$(level)	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Comments
870	825 *4*	100 *8*	45		E$_\gamma$: other: 821 *15* in (^{26}Si,^{25}Siγ).
	870 *6*	11 *3*	0.0	(5/2$^+$)	
1961	1091 *6*	100 *18*	870		E$_\gamma$: other: 1088 *22* in (^{26}Si,^{25}Siγ).
	1916 *7*	15 *12*	45		
	1961 *8*	32 *13*	0.0	(5/2$^+$)	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{25}Si)$ (continued)

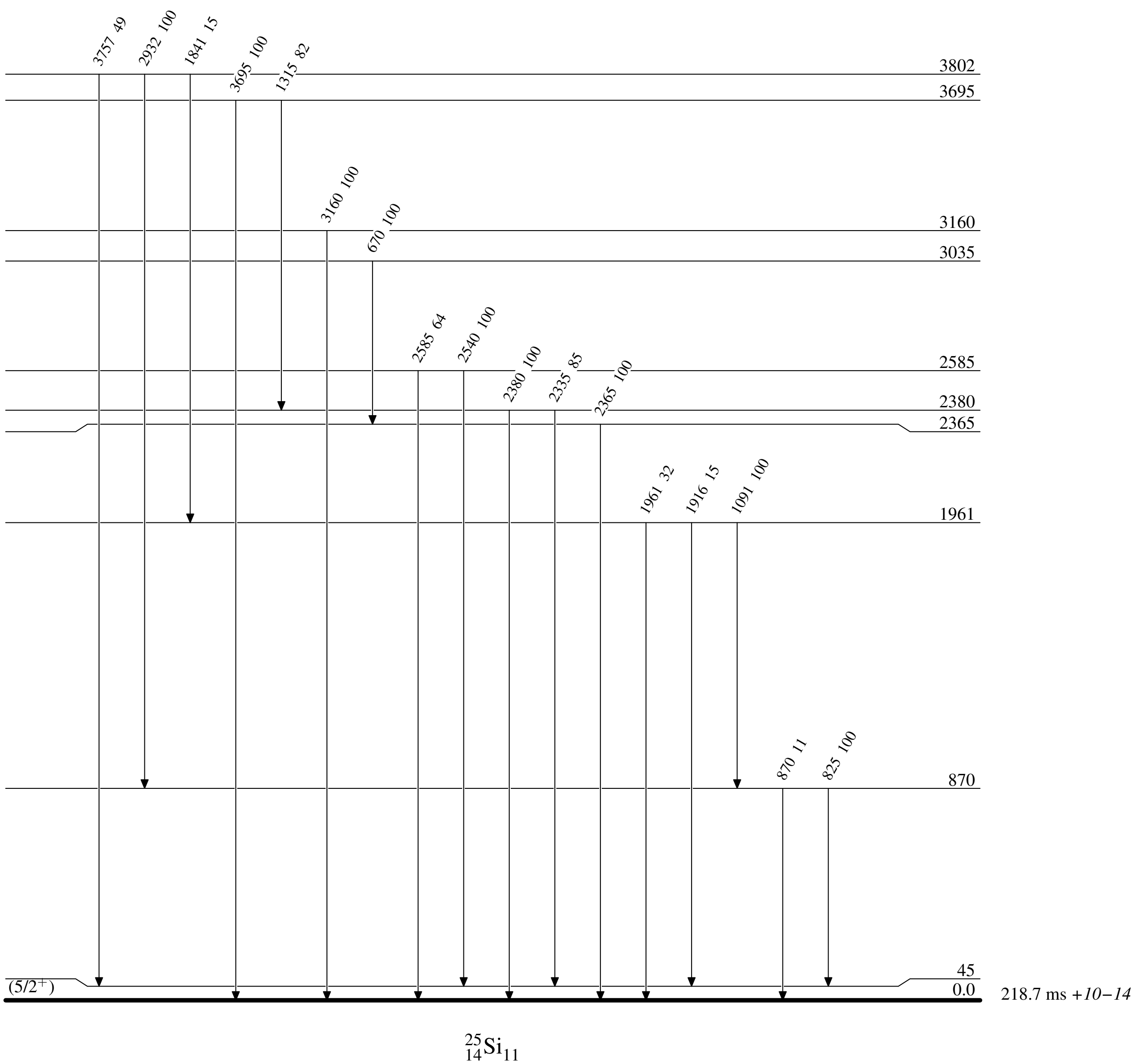
E_i(level)	E_γ †	I_γ †	E_f	J^π_f
2365	2365 *7*	100	0.0	(5/2$^+$)
2380	2335 *12*	85 *33*	45	
	2380 *12*	100 *41*	0.0	(5/2$^+$)
2585	2540 *9*	100 *21*	45	
	2585 *12*	64 *18*	0.0	(5/2$^+$)
3035	670 *5*	100	2365	
3160	3160 *50*	100	0.0	(5/2$^+$)
3695	1315 *7*	82 *15*	2380	
	3695 *14*	100 *25*	0.0	(5/2$^+$)
3802	1841 *11*	15 *3*	1961	
	2932 *9*	100 *8*	870	
	3757 *12*	49 *7*	45	

† From (^{25}Al,^{25}Siγ) (2018Lo10).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



^{28}Si(^{3}He,^{6}He) 1972Be12

^{28}Si(^{3}He,^{6}He), E=70.4 MeV. Mass spectrometer, photographic plates. Data were taken using the natural Si and SiO targets having thickness of 600 μg/cm^2 and 200 μg/cm^2, respectively. The beam energy resolution was 50 keV and 28 keV for the natural Si target and SiO target, respectively. The doublet structure among the first excited state and the ground state could be resolved by using the higher resolution data from the SiO target. A value of 3.824 MeV *10* could be extracted for the mass excess of the ground state of ^{28}Si.

Others: 1971Tr06, 1995HoZN, 1995HoZY.

^{25}Si Levels

E(level)†	Comments
0.0	
40 *5*	
815 *15*	E(level): 1995HoZY suggest a level at 850 keV (no uncertainty was quoted) populated with the transferred angular momentum value of L = 0 in ^{28}Si(^{3}He,^{6}He)^{25}Si.
1963 *15*	
2373 *10*	
2606 *10*	E(level): 1995HoZY suggest a level at 2700 keV populated with the transferred angular momentum value of L = 2 in ^{28}Si(^{3}He,^{6}He)^{25}Si.
3.08×10^3? *30*	
3.29×10^3 *30*	E(level): 1995HoZN suggest a level at 3224 keV (no uncertainty was quoted) populated with the transferred angular momentum value of L = 1 in ^{28}Si(^{3}He,^{6}He)^{25}Si.
3.40×10^3? *30*	E(level): 1995HoZN suggest a new level at 3479 keV *68* populated with the transferred angular momentum value of L = 1 in ^{28}Si(^{3}He,^{6}He)^{25}Si. 1995HoZN suggest a new level at 3696 keV *285* populated with the transferred probable angular momentum value of L = 2,(1) in ^{28}Si(^{3}He,^{6}He)^{25}Si.
3.82×10^3 *20*	E(level): 1995HoZY suggest a level at 3880 keV populated with the transferred angular momentum value of L = 1 in ^{28}Si(^{3}He,^{6}He)^{25}Si. 1995HoZN suggest a new level at 3948 keV *537* populated with the transferred angular momentum value of L = 1 in ^{28}Si(^{3}He,^{6}He)^{25}Si.
4.99×10^3 *25*	E(level): 1995HoZN suggest a new level at 4215 keV *804* populated with the probable transferred angular momentum value of L = 2 in ^{28}Si(^{3}He,^{6}He)^{25}Si.
5.42×10^3 *40*	
5.73×10^3 *50*	

† From 1972Be12.

^{9}Be(^{26}Si,^{25}Siγ) 2010Re05

Adapted/Edited the XUNDL data set compiled by B. Karamy and B. Singh (McMaster), June 23, 2010.

Measured Eγ, Iγ, $\gamma\gamma$, σ using SeGA array comprised of 17 high-purity 32-fold segmented Ge detectors at the National Superconducting Cyclotron Laboratory of Michigan State University (MSU). The ^{36}Ar primary beam at the energy of 150 MeV/nucleon was used. The primary beam impinged on a ^{9}Be production target at the midacceptance position of the A1900 fragment separator. The resulting secondary beam of ^{26}Si was then steered onto a 376 mg/cm^2 thick ^{9}Be secondary target located at the pivot point of the S800 large acceptance magnetic spectrograph. The energy of ^{26}Si at the mid-target position was 109 MeV/nucleon. The secondary target was surrounded by the detector array, SeGA. The experimental results were compared with the USDB shell-model calculations.

^{25}Si Levels

E(level)	J$^{\pi}$†	σ (mb)	Comments
0	(5/2$^+$)	21.0 *35*	σ includes the contributions from both the ground state and the 40 keV state.
821 *15*	(1/2$^+$)	4.1 *6*	
1909 *27*	(3/2$^+$)	1.06 *21*	

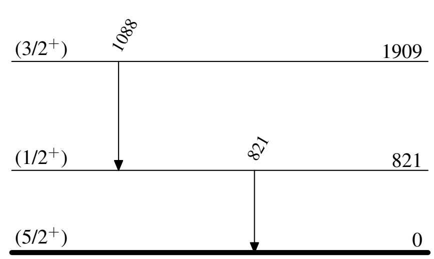
† Tentative assignments from shell-model predictions.

γ(^{25}Si)

E$_\gamma$	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$
821 *15*	821	(1/2$^+$)	0	(5/2$^+$)
1088 *22*	1909	(3/2$^+$)	821	(1/2$^+$)

^{9}Be(^{26}Si,^{25}Siγ) 2010Re05

Level Scheme



$^{25}_{14}Si_{11}$

$^{9}Be(^{25}Al,^{25}Si\gamma)$ 2018Lo10

Adapted/Edited the XUNDL dataset compiled by J. Chen (NSCL, MSU), May 17, 2018.

2018Lo10: E=118 MeV/nucleon ^{26}Si beam was produced by projectile fragmentation on a 550 mg/cm^2 thick ^{9}Be primary target with E=150 MeV/nucleon ^{36}Ar primary beam provided by the NSCL cyclotron. Beam fragments were separated by the A1900 separator. Secondary target was a 287 *3* mg/cm^2 thick ^{9}Be. γ rays were detected with the CAESAR high-efficiency array consisting of 192 CsI(Na) scintillators and in a separate experiment, SeGA array comprised of 32-fold segmented HPGe detectors; the reaction residues were analyzed with the S800 spectrograph and identified according to energy loss versus time-of-flight. Measured Eγ, Iγ, particle-γ-coin, particle-$\gamma\gamma$-coin. Deduced levels, J, π. Comparison with shell-model calculations. Discussed astrophysical implication for $^{24}Al(p,\gamma)^{25}Si$ reaction rate.

^{25}Si Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0	(5/2$^+$)	1961 *6*	(3/2$^+$)	2585 *8*	(5/2$^+$)	3695 *9*	(9/2$^+$)
45 *6*	(3/2$^+$)	2365 *7*	(9/2$^+$)	3035 *9*	(9/2$^+$)	3802 *8*	(1/2$^+$)
870 *5*	(1/2$^+$)	2380 *8*	(7/2$^+$)	3160 *50*	(7/2$^+$)		

† From a least-squares fit to γ-ray energies by the evaluators.

‡ As given in 2018Lo10 on the basis of shell-model predictions.

$\gamma(^{25}Si)$

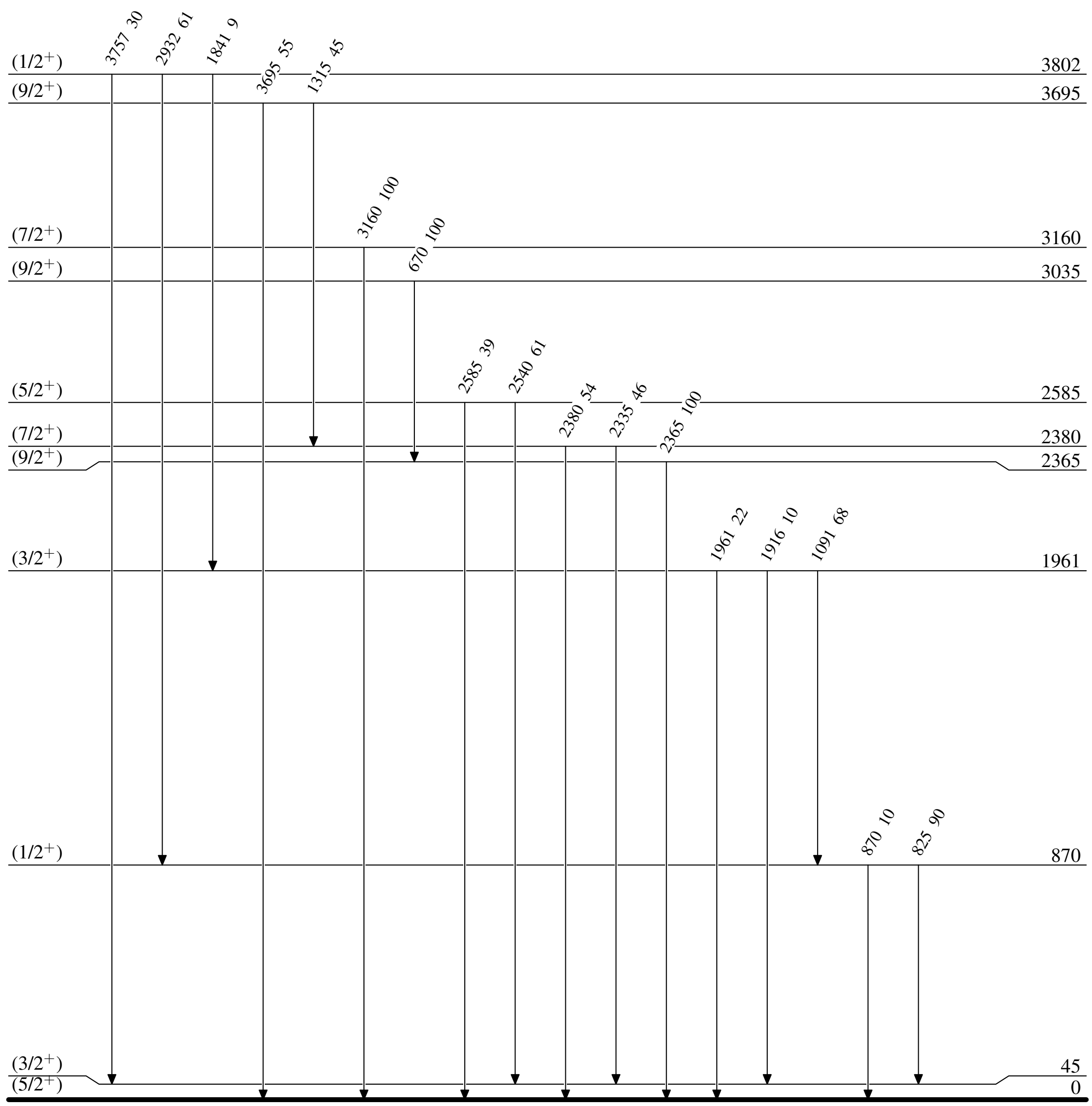
E$_i$(level)	J$_i^\pi$	E$_\gamma$	I$_\gamma$†	E$_f$	J$_f^\pi$
870	(1/2$^+$)	825 *4*	90 *7*	45	(3/2$^+$)
		870 *6*	10 *3*	0	(5/2$^+$)
1961	(3/2$^+$)	1091 *6*	68 *12*	870	(1/2$^+$)
		1916 *7*	10 *8*	45	(3/2$^+$)
		1961 *8*	22 *9*	0	(5/2$^+$)
2365	(9/2$^+$)	2365 *7*	100	0	(5/2$^+$)
2380	(7/2$^+$)	2335 *12*	46 *18*	45	(3/2$^+$)
		2380 *12*	54 *22*	0	(5/2$^+$)
2585	(5/2$^+$)	2540 *9*	61 *13*	45	(3/2$^+$)
		2585 *12*	39 *11*	0	(5/2$^+$)
3035	(9/2$^+$)	670 *5*	100	2365	(9/2$^+$)
3160	(7/2$^+$)	3160 *50*	100	0	(5/2$^+$)
3695	(9/2$^+$)	1315 *7*	45 *8*	2380	(7/2$^+$)
		3695 *14*	55 *14*	0	(5/2$^+$)
3802	(1/2$^+$)	1841 *11*	9 *2*	1961	(3/2$^+$)
		2932 *9*	61 *5*	870	(1/2$^+$)
		3757 *12*	30 *4*	45	(3/2$^+$)

† Relative photon branching from each level.

$^{9}Be(^{25}Al,^{25}Si\gamma)$ 2018Lo10

Level Scheme

Intensities: % photon branching from each level



Adopted Levels

S(n)=2.19×10^4 *syst*; S(p)=-2.16×10^3 *syst*; Q(α)=-9.32×10^3 *syst* 2021Wa16

^{25}P Levels

Cross Reference (XREF) Flags

A ^{9}Be(^{32}S,Xγ)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0?	($1/2^+$)	<38 ns	A	%p=100 $T_{1/2}$: from 2011Fo08. J^π: from mirror analog $1/2^+$ ground state of ^{25}Ne (2010Ca10); predicted result from shell model calculation (2015Fe02).

^{9}Be(^{32}S,Xγ) 2011Fo08

Adapted/Edited the XUNDL data set compiled by B. Singh (McMaster), Oct 20, 2011.

Search for ^{25}P nuclide and its possible proton decay mode was made.

E=50.3 MeV/nucleon ^{32}S beam from U400M cyclotron bombarded a ^{9}Be target of 92.4 mg/cm^2 thickness. Fragments were separated by ACCULINNA fragment separator at JINR, Dubna. Time-of-flight-ΔE and ΔE-E techniques using plastic scintillators and Si strip detectors were used to identify the fragments. The fragment separator was sequentially tuned for optimum transmission of ^{26}S, ^{27}S, ^{28}S, and ^{29}S. Total time of flight through the separator was 314-322 ns. From systematics of fragmentation cross sections, the expected events due to ^{25}P are 360 $+85-70$, but no events could be ascribed to this nuclide in the concerned experiment.

^{25}P Levels

E(level)	$T_{1/2}$	Comments
0?	<38 ns	$T_{1/2}$: from 2011Fo08; estimated (with 63% confidence level) from flight time of 314-322 ns, Poisson statistics of the observed distribution (2011Fo08) of one to four events. At 98% confidence level, the estimation gives $T_{1/2}$<50 ns (2011Fo08). Others: <30 ns (1996PoZZ).

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