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PRODUCTION OF PION PAIRS BY A PHOTON IN THE COULOMB FIELD OF A NUCLEUS

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UNIVERSITY OF CALIFORNIA

Lawrence Radiation Laboratory
Berkeley, California

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RELATIVISTIC SELF-CONSISTENT CALCULATION FOR
THE IRON ATOM

Stanley Cohen

April 21, 1959

Printed for the U. S. Atomic Energy Commission

RELATIVISTIC SELF-CONSISTENT CALCULATION FOR
THE IRON ATOM

Stanley Cohen

RAND Corporation
Santa Monica, California

and

Lawrence Radiation Laboratory
University of California
Berkeley, California

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ABSTRACT

The relativistic self-consistent solution for the normal iron atom is presented. A comparison is made between the energy eigenvalues for each of the subshells with corresponding experimentally determined energy-term values.

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INTRODUCTION

A previous paper¹ described a method for obtaining the relativistic self-consistent solution without exchange for an atom of arbitrary atomic number and electron configuration. This method involved the use of a rather flexible routine programmed for an IBM type-704 computing machine. The routine described therein has been used to obtain the self-consistent solution for the iron atom with an electronic configuration of $(1S^2, 2P^6, 2S^2 3D^6, 3P^6, 3S^2, 4S^2)$. The results of this calculation are presented in this report. For comparison the experimentally determined energy-term values for each of the subshells of the atom has been included. For a complete description of the method by which these results have been obtained the reader is referred to the previous report.

DETAILS OF THE CALCULATIONS

In this calculation 511 grid points were used for the numerical integrations. For reasons mentioned in the previous report the calculation was carried out by using equal grid spaces in the variable ρ defined as $\rho = \ln(1000 r/a_0)$, where a_0 is the Bohr radius in hydrogen and r is the distance from the origin. The grid spacing chosen was $\Delta\rho = 1/30$ with an innermost value of $\rho = \rho_0 = -4$. The range of values of r is therefore from $r_{\min} = r_0 = 1.83156 \times 10^{-4} a_0$ to $r_{\max} = 83.56106 a_0$. The iterations

*Work done under the auspices of the U. S. Atomic Energy Commission.

of the calculation were repeated until successive values of the individual subshell contributions to the potential at the origin were constant to at least 1 part in 10^6 . Six-figure accuracy for all energy eigenvalues was obtained as indicated by their values in successive iterations.

RESULTS FOR THE IRON ATOM

The energy eigenvalues obtained from this calculation are given in Table I. Also included in this table are experimental energy-term values for each of the subshells of the atom.² The Appendix contains the edited tabulations of the various potentials and the individual electronic wave functions for this solution. The relativistic radial wave functions consist of two parts--F, the large component, and G, the small component. These wave functions have been normalized and satisfy the condition

$$\int_0^{\infty} (F^2 + G^2) dr = 1.$$

Included in the tabulations are parameters which define the behavior of the wave function for values of r less than r_0 . The normalized wave functions for this region are expressed as power series of the form

$$F = \left(\frac{r}{r_0} \right)^{\lambda} (a_0 + a_1 r + a_2 r^2 + a_3 r^3 + \dots)$$

and

(1)

$$G = \left(\frac{r}{r_0} \right)^{\lambda} (\beta_0 + \beta_1 r + \beta_2 r^2 + \beta_3 r^3 + \dots).$$

Table I

Comparison of energy eigenvalues with experimentally determined term values for iron		
<u>Subshell</u>	<u>Experimental energy-term value</u>	<u>Calculated eigenvalue</u>
1S	523.9 (Ry)	527.18
2S	62.5	61.30
P _{1/2}	53.2	53.72
P _{3/2}	52.2	52.78
3S	6.95	7.09
P _{1/2}	4.1	4.68
P _{3/2}		4.56
D _{3/2}		0.751
D _{5/2}	0.37	0.736
4S	...	0.489

REFERENCES

1. Stanley Cohen, "Relativistic Self-Consistent Calculation for the Normal Mercury Atom, "UCRL-8389, July 28, 1958.
2. Landolt and Boernstein, Zahlenwerte und Funktionen, Band 1, 6 Auflage (Springer, Berlin, 1950), p. 227.

APPENDIX

This appendix contains edited results of the self-consistent calculation for the iron atom. Because these tabulations were printed by the computing machine, a description of the notation is necessary. All numbers are written in decimal form consisting of two parts: The first seven digits preceded by a decimal point are a decimal number between 0.0 and 1.0. The sign and two-digit number that follow are the power of ten by which this number is multiplied. The sign of the number is to the left of the decimal point; thus $-.9072915-07$ is to be read as $-.9072915 \times 10^{-7}$. Zero is represented as $.0000000-39$.

The first two pages of the tabulation contain information about the atom and its configuration. The entries at the top of the page are as follows: the problem identification number, the atomic number, the number of electrons in the atom, the number of shells in the atom, the values of r_0 , ρ_0 , and $\Delta\rho$, and the number of grid points used. Following this is the electric potential at r_0 due to the electrons of the atom. A tabulation of r , ρ , and r times the total atomic potential follows. Note that in this and other tabulations, values of the functions at every third grid point are given. All potentials and energies are expressed in Rydbergs.

Each electron subshell has a separate tabulation which is identified by the designation in the upper left-hand corner. Following this are the number of electrons in the subshell, the eigenvalue in Rydbergs, the potential contribution at r_0 for one electron of this subshell, and λ , the parameter used in the power series for the wave function at r_0 (see Eq. (1)). The next two lines contain α 's and β 's for this power-series expression, starting with α_0 and followed by $\alpha_1\alpha_2, \dots$ etc. In general, only five values are given and are sufficient to express the wave function to eight significant figures for values of r near r_0 . A tabulation of the quantities $r v_i(r)$, v_i , $\int_0^r (F^2 + G^2) dr$, F , G , and ρ follows. Here v_i is the potential due to one electron in this subshell.

Although eight-figure results are tabulated here, small errors due to rounding may be present. These are sometimes manifested in inconsistencies of the monotonic behavior of some results for large values of r . Because these results are in fact not accurate to eight figures, these variations are not significant.

PROB NO	ATOMIC NO	SUM NO	NO SHELLS
.1831564-04	.4000000 01	.3333333-01	.5110000 03
RHO(0)	RHO(10)	DELTA RHO	GRID PTS.

ELEC. POT. AT ORIGIN .2317003 03

R RHO R TIMES V(R)

.1831564-04	.4000000 01	.5199576 02
.2556153-04	.3666667 01	.5199408 02
.3567399-04	.3333333 01	.5199173 02
.4978707-04	.3000000 01	.5198846 02
.6948345-04	.2666667 01	.5198390 02
.9697197-04	.2333333 01	.5197752 02
.1353353-03	.2000000 01	.5196863 02
.1888756-03	.1666667 01	.5195623 02
.2635971-03	.1333333 01	.5193891 02
.3678794-03	.1000000 01	.5191474 02
.5194171-03	.6666667 00	.5188101 02
.7165313-03	.3333334 00	.5183395 02
.9999999-03	.5960465-07	.5176828 02
.1395612-02	.3333333 00	.5167668 02
.1947734-02	.6666666 00	.5154896 02
.2718281-02	.9999999 00	.5137103 02
.3793667-02	.1333333 01	.5112350 02
.5294489-02	.1666667 01	.5078008 02
.7389055-02	.2000000 01	.5030582 02
.1031226-01	.2333333 01	.4965597 02
.1439191-01	.2666667 01	.4877661 02
.2008553-01	.3000000 01	.4760882 02
.2803162-01	.3333333 01	.4609687 02
.3912128-01	.3666667 01	.4419547 02
.5459814-01	.4000000 01	.4186171 02
.7619784-01	.4333333 01	.3902339 02
.1063427 00	.4666667 01	.3556949 02
.1484131 00	.5000000 01	.3147003 02
.2071272 00	.5333333 01	.2697722 02
.2890693 00	.5666667 01	.2249069 02
.4034287 00	.6000000 01	.1799533 02
.5630301 00	.6333333 01	.1318257 02
.7857717 00	.6666667 01	.8524837 01
.1096633 01	.7000000 01	.5036052 01
.1530474 01	.7333333 01	.2885759 01
.2135949 01	.7666666 01	.1539748 01
.2980957 01	.8000000 01	.6643050 00
.4160260 01	.8333333 01	.1950185 00
.5806111 01	.8666666 01	.3164214-01
.8103081 01	.9000000 01	.2155921-02
.1130876 02	.9333333 01	.4693444-04
.1578265 02	.9666666 01	.1180540-05
.2202646 02	.1000000 02	.3733058-05
.3074040 02	.1033333 02	.9252880-06
.4290168 02	.1066667 02	.6062232-06
.5987412 02	.1100000 02	.6381296-06
.8356106 02	.1133333 02	.6381298-06

DESIGNATION	NP	BIND. ENERGY	V(01)	LAMBDA
1 S 1/2	2000000	01-05271760 03	05204997 02	09810364 00

ALPHA S	05477460-02-	01423348 00	01872361 01-	01641619 02	01002229 03
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39
BETA S	05243799-03	01379446-01-	01814133 00	01594577 01-	01051091 02
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39

R TIMES VIRI	VIRI	INTEGRAL	F	G	RHO
09533212-03	05204997 02	01869835-09	05474854-02-	05241273-03-	04000000 01
01330467-02	05204996 02	05020150-09	07593222-02-	07269246-03-	03666667 01
01856819-02	05204995 02	01347664-08	01053046-01-	01008113-02-	03333333 01
02591393-02	05204991 02	03617254-08	01460237-01-	01397923-02-	03000000 01
03616573-02	05204944 02	09706937-08	02024587-01-	01938178-02-	02666667 01
05047324-02	05204931 02	02604078-07	02806478-01-	02686674-02-	02333333 01
07044074-02	05204906 02	06983002-07	03889234-01-	03723163-02-	02000000 01
09030707-02	05204858 02	01871434-06	05387599-01-	05157458-02-	01666667 01
01371961-01	05204765 02	05011292-06	07459118-01-	07140315-02-	01333333 01
01914660-01	05204586 02	01340376-05	01031920 00-	09877826-02-	01000000 01
02671948-01	05204245 02	03579390-05	01426065 00-	01365004-01-	06666667 00
03728536-01	05203591 02	09537236-05	01967809 00-	01883428-01-	03333334 00
05202345-01	05202345 02	02533294-04	02709693 00-	02593258-01-	05960465-07
07257156-01	05199980 02	06699882-04	03720425 00-	03560095-01	03333333 00
01011947 00	05195511 02	01761284-03	05087453 00-	04867316-01	06666666 00
01410008 00	05187131 02	04591432-03	06917459 00-	06616415-01	09999999 00
01961922 00	05171972 02	01183060-02	09331662 00-	08922266-01	01333333 01
02723002 00	05143087 02	02999513-02	01245039 01-	01189794 00	01666667 01
03762462 00	05091940 02	07437036-02	01635805 01-	01562060 00	02000000 01
05158718 00	05002512 02	01788160-01	02103671 01-	02006722 00	02333333 01
06982607 00	04851757 02	04122548-01	02625852 01-	02501145 00	02666667 01
09259242 00	04609906 02	08978617-01	03144395 01-	02988988 00	03000000 01
01190458 01	04246838 02	01812487 00	03554217 01-	03369433 00	03333333 01
01465993 01	03747305 02	03314334 00	03708030 01-	03503169 00	03666667 01
01710038 01	03132082 02	05356234 00	03461249 01-	03256428 00	04000000 01
01881162 01	02468786 02	07499739 00	02768955 01-	02592410 00	04333333 01
01967397 01	01850055 02	09081543 00	01788800 01-	01664969 00	04666667 01
01994925 01	01344170 02	09006191 00	08600224 00-	07945019-01	05000000 01
01999642 01	09654175 01	09981348 00	02753125 00-	02518757-01	05333333 01
01999991 01	06918727 01	09999401 00	05040477-01-	04559404-02	05666667 01
02000000 01	04957506 01	09999996 00	04273797-02-	03822939-03	06000000 01
02000000 01	03552208 01	01000000 01	01248720-03-	01105849-04	06333333 01
02000000 01	02545269 01	01000000 01	08347166-06-	07322590-07	06666667 01
02000000 01	01823765 01	01000000 01	00000000-39	00000000-39	07000000 01
02000000 01	01306785 01	01000000 01	00000000-39	00000000-39	07333333 01
02000000 01	09363320 00	01000000 01	00000000-39	00000000-39	07666666 01
02000000 01	06709254 00	01000000 01	00000000-39	00000000-39	08000000 01
02000000 01	04807392 00	01000000 01	00000000-39	00000000-39	08333333 01
02000000 01	03444646 00	01000000 01	00000000-39	00000000-39	08666666 01
02000000 01	02468197 00	01000000 01	00000000-39	00000000-39	09000000 01
02000000 01	01768541 00	01000000 01	00000000-39	00000000-39	09333333 01
02000000 01	01267215 00	01000000 01	00000000-39	00000000-39	09666666 01
02000000 01	09079990-01	01000000 01	00000000-39	00000000-39	01000000 02
02000000 01	06506096-01	01000000 01	00000000-39	00000000-39	01033333 02

DESIGNATION	NP	BIND. ENERGY	V(0)	LAMBDA
2 P 3/2	.4000000	01-.5278047	02 .1075823	02
				.1990980 01

ALPHA S	.1853665-06-	.2403711-05	.1753064-04-	.8697430-04	.3320236-03
	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39
BETA S	-.8812235-08	.1284792-06-	.9560048-06	.4865533-05-	.1875649-04
	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39

R.TIMES	V(R)	V(R)	INTEGRAL	F	G	RHO
.1970439-03	.1075823	02	.1265590-18	.1853225-06-	.8809883-08-	.4000000 01
.2749969-03	.1075823	02	.6659460-18	.3598415-06-	.1710599-07-	.3666667 01
.3837891-03	.1075823	02	.3503944-17	.6986799-06-	.3321301-07-	.3333333 01
.5356209-03	.1075823	02	.1843476-16	.1356509-05-	.6448264-07-	.3000000 01
.7475191-03	.1075823	02	.9697623-16	.2633514-05-	.1251820-06-	.2666667 01
.1043247-02	.1075823	02	.5100586-15	.5112165-05-	.2429919-06-	.2333333 01
.1455969-02	.1075823	02	.2682087-14	.9922309-05-	.4715990-06-	.2000000 01
.2031968-02	.1075823	02	.1409884-13	.1925463-04-	.9150774-06-	.1666667 01
.2835839-02	.1075823	02	.7407902-13	.3735412-04-	.1775042-05-	.1333333 01
.3957733-02	.1075823	02	.3889824-12	.7243950-04-	.3441695-05-	.1000000 01
.5523461-02	.1075823	02	.2040696-11	.1404043-03-	.6669218-05-	.6666667 00
.7708610-02	.1075823	02	.1069270-10	.2719328-03-	.1291258-04-	.3333334 00
.1075823-01	.1075823	02	.5593001-10	.5261278-03-	.2497139-04-	.5960465-07
.1501432-01	.1075823	02	.2918465-09	.1016463-02-	.4821288-04	.3333333 00
.2095418-01	.1075823	02	.1517763-08	.1959813-02-	.9287396-04	.6666666 00
.2924390-01	.1075823	02	.7856342-08	.3768041-02-	.1783387-03	.9999999 00
.4081314-01	.1075823	02	.4040255-07	.7216315-02-	.3409379-03	.1333333 01
.5695925-01	.1075822	02	.2059056-06	.1374517-01-	.6477851-03	.1666667 01
.7949265-01	.1075816	02	.1036283-05	.2598367-01-	.1220318-02	.2000000 01
.1109390 00	.1075798	02	.5125675-05	.4860714-01-	.2271831-02	.2333333 01
.1548184 00	.1075732	02	.2475324-04	.8962102-01-	.4161050-02	.2666667 01
.2160215 00	.1075508	02	.1156782-03	.1619778 00-	.7453520-02	.3000000 01
.3012779 00	.1074779	02	.5169061-03	.2848466 00-	.1295488-01	.3333333 01
.4195843 00	.1072522	02	.2173745-02	.4825149 00-	.2162518-01	.3666667 01
.5820308 00	.1066027	02	.8425371-02	.7767011 00-	.3420398-01	.4000000 01
.7993485 00	.1049044	02	.2930213-01	.1166476 01-	.5033167-01	.4333333 01
.1073937 01	.1009883	02	.8844233-01	.1594856 01-	.6717882-01	.4666667 01
.1384708 01	.9330091	01	.2229523 00	.1922518 01-	.7860001-01	.5000000 01
.1676056 01	.8091917	01	.4521533 00	.1961379 01-	.7728335-01	.5333333 01
.1880002 01	.6503640	01	.7205587 00	.1605744 01-	.6072531-01	.5666667 01
.1973439 01	.4891668	01	.9136946 00	.9797179 00-	.3561186-01	.6000000 01
.1997171 01	.3547182	01	.9871620 00	.4015941 00-	.1405679-01	.6333333 01
.1999890 01	.2545128	01	.9993076 00	.9664889-01-	.3246379-02	.6666667 01
.1999999 01	.1823763	01	.9999905 00	.1152571-01-	.3699966-03	.7000000 01
.2000000 01	.1306784	01	.1000000 01	.5401992-03-	.1660703-04	.7333333 01
.2000000 01	.9363519	00	.1000000 01	.7106537-05-	.2106757-06	.7666666 01
.2000000 01	.6709255	00	.1000000 01	.1623897-07-	.4677677-09	.8000000 01
.2000000 01	.4807392	00	.1000000 01	.2900027-11-	.8305333-13	.8333333 01
.2000000 01	.3444646	00	.1000000 01	.0000000-39	.0000000-39	.8666666 01
.2000000 01	.2468197	00	.1000000 01	.0000000-39	.0000000-39	.9000000 01
.2000000 01	.1768541	00	.1000000 01	.0000000-39	.0000000-39	.9333333 01
.2000000 01	.1267215	00	.1000000 01	.0000000-39	.0000000-39	.9666666 01
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.2000000 01	.6506096-01	.1000000 01	.0000000-39	.0000000-39	.0000000-39	.1033333 02

DESIGNATION NP BIND. ENERGY VIOI LAMODA
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 .0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39
 BETA S .1200221-03-.2100515-02 .1922005-01-.1148678 00 .5131242 00
 .0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39

R TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
.2006124-03	.1095306 02	.9102168-13	.1176696-04	.1207837-03-	.4000000 01
.2799771-03	.1095306 02	.2444222-12	.1643280-04	.1675286-03-	.3666667 01
.3907395-03	.1095306 02	.6563277-12	.2300793-04	.2323528-03-	.3333333 01
.5493209-03	.1095306 02	.1762300-11	.3232767-04	.3222380-03-	.3000000 01
.7610366-03	.1095306 02	.4731619-11	.4564056-04	.4468516-03-	.2666667 01
.1062140-02	.1095306 02	.1270284-10	.6405212-04	.6195711-03-	.2333333 01
.1482336-02	.1095306 02	.3409890-10	.9294110-04	.8588888-03-	.2000000 01
.2068766-02	.1095306 02	.9151934-10	.1346871-03	.1190332-02-	.1666667 01
.2087196-02	.1095306 02	.2455851-09	.1979695-03	.1649071-02-	.1333333 01
.4029406-02	.1095306 02	.6588616-09	.2961240-03	.2283430-02-	.1000000 01
.5623489-02	.1095306 02	.1767213-08	.4522728-03	.3159546-02-	.6666667 00
.7848209-02	.1095306 02	.4739367-08	.7073906-03	.4367444-02-	.3333334 00
.1095305-01	.1095309 02	.1271170-07	.1135049-02	.6028706-02-	.5960465-07
.1528620-01	.1095304 02	.3412135-07	.1869673-02	.8305692-02	.3333333 00
.2133356-01	.1095302 02	.9179578-07	.3157898-02	.1141167-01	.6666666 00
.2977327-01	.1095297 02	.2482513-06	.5454183-02	.1561994-01	.9999999 00
.4159161-01	.1095289 02	.6787523-06	.9594223-02	.2126768-01	.1333333 01
.5798909-01	.1095272 02	.1895086-05	.1710333-01	.2874568-01	.1666667 01
.8092764-01	.1095237 02	.5487156-05	.3072594-01	.3845817-01	.2000000 01
.1129359 00	.1095162 02	.1679404-04	.5528596-01	.5072680-01	.2333333 01
.1575902 00	.1094991 02	.5515780-04	.9896056-01	.6560293-01	.2666667 01
.2198508 00	.1094573 02	.1942915-03	.1748557 00	.8255232-01	.3000000 01
.3065214 00	.1093484 02	.7178301-03	.3021716 00	.1000112 00	.3333333 01
.4266476 00	.1090577 02	.2676950-02	.5048984 00	.1149245 00	.3666667 01
.5912628 00	.1082936 02	.9638121-02	.8038098 00	.1226148 00	.4000000 01
.8107771 00	.1064042 02	.3202476-01	.1196075 01	.1176731 00	.4333333 01
.1086809 01	.1021987 02	.9385296-01	.1621998 01	.9667798-01	.4666667 01
.1397105 01	.9413619 01	.2318125 00	.1940134 01	.6234596-01	.5000000 01
.1685393 01	.8136995 01	.4630399 00	.1963739 01	.2543284-01	.5333333 01
.1884870 01	.6520479 01	.7294596 00	.1593796 01-	.5060733-03	.5666667 01
.1974931 01	.4895367 01	.9178302 00	.9626890 00-	.9159626-02	.6000000 01
.1997388 01	.3547569 01	.9880479 00	.3897954 00-	.6167503-02	.6333333 01
.1999901 01	.2545143 01	.9993746 00	.9234752-01-	.1837926-02	.6666667 01
.1999999 01	.1823764 01	.9999918 00	.1078534-01-	.2411166-03	.7000000 01
.2000000 01	.1306784 01	.1000000 01	.4913356-03-	.1170511-04	.7333333 01
.2000000 01	.9363519 00	.1000000 01	.6215362-05-	.1538420-06	.7666666 01
.2000000 01	.6709255 00	.1000000 01	.1345347-07-	.3412217-09	.8000000 01
.2000000 01	.4807392 00	.1000000 01	.2513490-11-	.5047701-13	.8333333 01
.2000000 01	.3444646 00	.1000000 01	.00000000-39	.00000000-39	.8666666 01
.2000000 01	.2468197 00	.1000000 01	.00000000-39	.00000000-39	.9000000 01
.2000000 01	.1768541 00	.1000000 01	.00000000-39	.00000000-39	.9333333 01
.2000000 01	.1267215 00	.1000000 01	.00000000-39	.00000000-39	.9666666 01
.2000000 01	.9079990-01	.1000000 01	.00000000-39	.00000000-39	.1000000 02
.2000000 01	.6506096-01	.1000000 01	.00000000-39	.00000000-39	.1033333 02

DESIGNATION	NP	BIND.	ENERGY	V(0)	LAMBDA
2 3 1/2	2000000	01-	6129649	02	1101984 02
					9818364 00

ALPHA 8	1652464-02-	4335088-01	4554545 00-	2999961 01	1424026 02
	0000000-39	0000000-39	0000000-39	0000000-39	0000000-39
BETA 8	1581972-03	3328675-02-	3290632-01	2083390 00-	9677969 00
	0000000-39	0000000-39	0000000-39	0000000-39	0000000-39

R-TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
2017295-03	1101384 02	1701791-10	1651670-02-	1581362-03-	4000000 01
2819306-03	1101384 02	4568975-10	2290741-02-	2193312-03-	3666667 01
3929076-03	1101384 02	1226542-09	3176846-02-	3041890-03-	3333333 01
5483466-03	1101384 02	3292138-09	4405252-02-	4218420-03-	3000000 01
7652789-03	1101383 02	8834430-09	6107755-02-	5849317-03-	2666667 01
1068032-02	1101382 02	2369990-08	8466495-02-	8109411-03-	2333333 01
1490555-02	1101380 02	6355204-08	1173280-01-	1124020-02-	2000000 01
2080229-02	1101375 02	1703156-07	1625274-01-	1557471-02-	1666667 01
2903171-02	1101367 02	4560565-07	2250140-01-	2157111-02-	1333333 01
4051642-02	1101351 02	1219775-06	3112826-01-	2985757-02-	1000000 01
5654362-02	1101320 02	3257156-06	4301582-01-	4129136-02-	6666667 00
7890872-02	1101260 02	8677939-06	5935289-01-	5703442-02-	3333334 00
1101147-01	1101147 02	2304757-05	8172087-01-	7864649-02-	5960465-07
1936474-01	1100932 02	6094253-05	1121844 00-	1081918-01	3333333 00
2143530-01	1100525 02	1601558-04	1533632 00-	1483455-01	6666666 00
2989466-01	1099763 02	4172804-04	2084332 00-	2024647-01	9999999 00
4166774-01	1098350 02	1074201-03	2809519 00-	2745503-01	1333333 01
5801520-01	1095766 02	2719080-03	3743132 00-	3689570-01	1666667 01
8062464-01	1091136 02	6721905-03	4905014 00-	4896067-01	2000000 01
1116895 00	1083075 02	1607445-02	6276472 00-	6383289-01	2333333 01
1539345 00	1069591 02	3668145-02	7757969 00-	8118721-01	2666667 01
2105313 00	1048274 02	7833792-02	9105892 00-	9973064-01	3000000 01
2851269 00	1017162 02	1522340-01	9858724 00-	1166406 00	3333333 01
3820683 00	9766258 01	2584629-01	9297273 00-	1271697 00	3666667 01
5086592 00	9316421 01	3625665-01	6544231 00-	1250299 00	4000000 01
6791637 00	8913163 01	4030195-01	9645011-01-	1044791 00	4333333 01
9152135 00	8606269 01	4509479-01-	7050322 00-	6472426-01	4666667 01
1226212 01	8262154 01	1033990 00-	1527938 01-	1498970-01	5000000 01
1567067 01	7565722 01	2993388 00-	1998651 01	2592035-01	5333333 01
1834878 01	6347537 01	6171138 00-	1836319 01	4132798-01	5666667 01
1964249 01	4868889 01	8809536 00-	1162716 01	3156965-01	6000000 01
1996524 01	3346034 01	9835394 00-	4660481 00	1374698-01	6333333 01
1999887 01	2545125 01	9992504 00-	1037117 00	3157922-02	6666667 01
1999999 01	1823764 01	9999923 00-	1074090-01	3280663-03	7000000 01
2000000 01	1306784 01	1000000 01-	4041547-03	1223258-04	7333333 01
2000000 01	9363519 00	1000000 01-	3849603-05	1151767-06	7666666 01
2000000 01	6709255 00	1000000 01-	5551071-08	1643197-09	8000000 01
2000000 01	4807391 00	1000000 01-	6057815-12	1777110-13	8333333 01
2000000 01	3444646 00	1000000 01	0000000-39	0000000-39	8666666 01
2000000 01	2468197 00	1000000 01	0000000-39	0000000-39	9000000 01
2000000 01	1768541 00	1000000 01	0000000-39	0000000-39	9333333 01
2000000 01	1267215 00	1000000 01	0000000-39	0000000-39	9666666 01
2000000 01	9079990-01	1000000 01	0000000-39	0000000-39	1000000 02
2000000 01	6506096-01	1000000 01	0000000-39	0000000-39	1033333 02

DESIGNATION	NP	BIND. ENERGY	V(0)	LAMODA
S D 5/2	02000000	01-07355291 00	02223167 01	02993995 01

ALPHA 8	08280949-12-	07149258-11	04004616-10-	01548746-09	04784023-09
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39
BETA 8	02621191-13	02934284-12-	01701921-11	07008379-11-	02210941-10
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39

R TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
04071871-04	02223166 01	01798642-29	08279640-12-	02620654-13-	04000000 01
05682754-04	02223166 01	01847220-28	02245998-11-	07108848-13-	03666667 01
07930922-04	02223166 01	01897003-27	06092514-11-	01928302-12-	03333333 01
01106849-03	02223166 01	01948007-26	01652604-10-	05230360-12-	03000000 01
01544733-03	02223166 01	02000213-25	04482497-10-	01418603-11-	02666667 01
02155848-03	02223167 01	02053577-24	01215744-09-	03847268-11-	02333333 01
03008728-03	02223166 01	02108018-23	03297034-09-	01043256-10-	02000000 01
04199019-03	02223166 01	02163406-22	08940212-09-	02828498-10-	01666667 01
05860203-03	02223166 01	02219540-21	02423779-08-	07666863-10-	01333333 01
08178572-03	02223166 01	02276116-20	06569425-08-	02077475-09-	01000000 01
01141412-02	02223166 01	02332681-19	01779948-07-	05626698-09-	06666667 00
01592968-02	02223166 01	02388579-18	04820279-07-	01522971-08-	03333334 00
02223166-02	02223166 01	02442860-17	01304478-06-	04118501-08-	05960469-07
03102678-02	02223166 01	02494166-16	03526818-06-	01112352-07	03333333 00
04330136-02	02223166 01	02540578-15	09522412-06-	02999069-07	06666666 00
06043192-02	02223166 01	02579414-14	02566258-05-	08066268-07	09999999 00
08433924-02	02223166 01	02606977-13	06898063-05-	02162152-06	01333333 01
01177053-01	02223166 01	02618284-12	01847527-04-	05768373-06	01666667 01
01642710-01	02223166 01	02606794-11	04923690-04-	01528923-05	02000000 01
02292586-01	02223166 01	02564282-10	01303179-03-	04016155-05	02333333 01
03199562-01	02223166 01	02481044-09	03416753-03-	01042059-04	02666667 01
04465348-01	02223166 01	02346784-08	08843280-03-	02659201-04	03000000 01
06231895-01	02223166 01	02152607-07	02249035-02-	06637281-04	03333333 01
08697309-01	02223165 01	01894439-06	05586152-02-	01609197-03	03666667 01
01213002 00	02223156 01	01577635-05	01944327-01-	03756792-03	04000000 01
01693958 00	02223105 01	01221412-04	03102628-01-	08348313-03	04333333 01
02363822 00	02222835 01	08600971-04	06780779-01-	01738489-02	04666667 01
03297103 00	02221572 01	05370349-03	01382779 00-	03328554-02	05000000 01
04590759 00	02216396 01	02892676-02	02508921 00-	05756385-02	05333333 01
06354082 00	02198394 01	01305406-01	04360409 00-	08876101-02	05666667 01
08660785 00	02146795 01	04772424-01	06465764 00-	01196900-01	06000000 01
01142393 01	02029008 01	01363401 00	08163784 00-	01354345-01	06333333 01
01430405 01	01820383 01	02991510 00	00666092 00-	01236315-01	06666667 01
01680890 01	01532774 01	05147703 00	07836232 00-	09179693-02	07000000 01
01856893 01	01213280 01	07275878 00	06131310 00-	05786380-02	07333333 01
01952266 01	09140040 00	08847304 00	04089171 00-	03139869-02	07666666 01
01989275 01	06673277 00	09667774 00	02222268 00-	01412814-02	08000000 01
01998584 01	04803987 00	09942993 00	09247522-01-	04955762-03	08333333 01
01999910 01	03444492 00	09995223 00	02688877-01-	01246164-03	08666666 01
01999990 01	02468194 00	09999857 00	04703408-02-	01948160-04	09000000 01
02000000 01	01768540 00	09999999 00	03943174-03-	01505399-05	09333333 01
02000000 01	01267215 00	01000000 01	01151787-04-	04149949-07	09666666 01
02000000 01	09079989-01	01000000 01	07564892-07-	02616471-09	01000000 02
02000000 01	06506096-01	01000000 01	08080248-10-	02049002-12	01033333 02

DESIGNATION	NP	BIND. ENERGY	V(0)	LAMBDA
3 D 3/2	04000000	01-07907097 00	02299931 01	01990980 01

ALPHA 8	04067208-10	04650007-07-	04026229-06	02259994-09-	00747344-09
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39
BETA 8	08555422-09-	08868243-08	05799209-07-	02564429-06	00919740-06
	00000000-39	00000000-39	00000000-39	00000000-39	00000000-39

R-TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
04102612-04	02239950 01	02696388-23	04152362-10	08553798-09-	04000000 01
05725696-04	02239950 01	01418914-22	08128822-10	01660926-08-	03666667 01
07990796-04	02239950 01	07466429-22	01596248-09	03224992-08-	03333333 01
0119206-03	02239950 01	03928688-21	03147753-09	06261654-08-	03000000 01
01956395-03	02239950 01	02067054-20	06242684-09	01215694-07-	02666667 01
02172124-03	02239950 01	01087463-19	01247504-08	02360068-07-	02333333 01
03031443-03	02239950 01	05720314-19	02517975-08	04581164-07-	02000000 01
04230719-03	02239950 01	03008487-18	05148136-08	08891168-07-	01666667 01
05004444-03	02239950 01	01581877-17	01069692-07	01725228-06-	01333333 01
08240316-03	02239950 01	08314985-17	02266589-07	03346582-06-	01000000 01
01150029-02	02239950 01	04368948-16	04913558-07	06488898-06-	06666667 00
01604994-02	02239950 01	02294470-15	01092524-06	01257425-05-	03333334 00
02099990-02	02239950 01	01204364-14	02494973-06	02434629-05-	05960465-07
03126102-02	02239950 01	06318753-14	05851018-06	04708490-05	03333333 00
04262827-02	02239950 01	03314785-13	01406628-05	09091412-05	06666666 00
06088815-02	02239950 01	01740401-12	03456054-05	01751494-04	09999999 00
08497626-02	02239950 01	09165966-12	08643713-05	03363832-04	01333333 01
01185939-01	02239950 01	04864466-11	02190667-04	06432588-04	01667667 01
01659112-01	02239950 01	02624010-10	05599441-04	01222766-03	02000000 01
02309894-01	02239950 01	01459502-09	01436441-03	02305283-03	02333333 01
03233717-01	02239950 01	08537358-09	03679646-03	04297275-03	02666667 01
04499059-01	02239950 01	05352921-08	09361134-03	07887774-03	03000000 01
06278942-01	02239950 01	03619329-07	02350585-02	01417794-02	03333333 01
08762961-01	02239948 01	02595740-06	05783485-02	02477430-02	03666667 01
01222964 00	02239937 01	01905265-05	01382061-01	04168363-02	04000000 01
01704738 00	02239878 01	01370376-04	03172910-01	06670452-02	04333333 01
02381493 00	02239584 01	09255085-04	06906466-01	09999600-02	04666667 01
03321849 00	02238245 01	05643376-03	01403977 00	01380048-01	05000000 01
04624090 00	02232855 01	02998090-02	02621969 00	01719169-01	05333333 01
06400850 00	02214296 01	01341680-01	04412849 00	01881708-01	05666667 01
08719892 00	02161446 01	04877398-01	06522281 00	01736974-01	06000000 01
01149345 01	02041356 01	01387642 00	08219449 00	01295560-01	06333333 01
01497512 01	01829428 01	03034008 00	08705387 00	07757416-02	06666667 01
01686889 01	01538244 01	09203126 00	07847754 00	03832893-02	07000000 01
01860852 01	01215866 01	07328933 00	06113846 00	01495151-02	07333333 01
01954170 01	09140955 00	08883082 00	04092704 00	03345835-03	07666666 01
01989882 01	06675313 00	09683460 00	02103752 00	05992071-04	08000000 01
01998696 01	04804256 00	09946949 00	08980075-01-	09074682-04	08333333 01
01999920 01	03444508 00	09995697 00	02568455-01-	03926621-04	08666666 01
01999990 01	02468195 00	09999876 00	04391838-02-	08460555-05	09000000 01
02000000 01	01768540 00	09999999 00	05569048-03-	07993255-06	09333333 01
02000000 01	01267215 00	01000000 01	09989983-05-	02478977-07	09666666 01
02000000 01	09079989-01	01000000 01	06190441-07-	01648355-09	01000000 02
02000000 01	06506096-01	01000000 01	00000000-39	00000000-39	01093333 02

DESIGNATION NP BIND. ENERGY V(0)
3 P 3/2 .4000000 01-.4561232 01 .3131520 01

LAMBDA
.1990980 01

ALPHA S .6823486-07-.8856908-06 .6186205-05-.2928950-04 .1056981-03
.0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39
BETA S -.3243852-08 .4530226-07-.3217070-06 .1547841-05-.5628409-05
.0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39

R TIMES-V(R)	V(R)	INTEGRAL	F	G	RHO
.5735578-04	.3131520 01	.1714916-19	.6821864-07-	.3243023-08-	.4000000 01
.8004644-04	.3131520 01	.9023787-19	.1324604-06-	.6296948-08-	.3666667 01
.1117138-03	.3131520 01	.4747958-18	.2571894-06-	.1222624-07-	.3333333 01
.1559092-03	.3131520 01	.2497969-17	.4993412-06-	.2373729-07-	.3000000 01
.2175888-03	.3131520 01	.1314059-16	.9694163-06-	.4808245-07-	.2666667 01
.3036696-03	.3131520 01	.6911452-16	.1881825-05-	.8945255-07-	.2333333 01
.4238051-03	.3131520 01	.3634308-15	.3652473-05-	.1736137-06-	.2000000 01
.5914676-03	.3131520 01	.1910433-14	.7087762-05-	.3368862-06-	.1666667 01
.8254595-03	.3131520 01	.1003790-13	.1375029-04-	.6535126-06-	.1333333 01
.1152022-02	.3131520 01	.5270802-13	.2666540-04-	.1267201-05-	.1000000 01
.1607776-02	.3131520 01	.2765180-12	.5168351-04-	.2455765-05-	.6666667 00
.2243832-02	.3131520 01	.1448873-11	.1000993-03-	.4755312-05-	.3333334 00
.3131519-02	.3131520 01	.7578517-11	.1936685-03-	.9197804-05-	.5960465-07
.4370387-02	.3131520 01	.3954469-10	.3741583-03-	.1776273-04	.3333333 00
.6099366-02	.3131520 01	.2056499-09	.7213933-03-	.3422847-04	.6666666 00
.8512351-02	.3131519 01	.1064461-08	.1386955-02-	.6575726-04	.9999999 00
.1187994-01	.3131519 01	.5473831-08	.2656096-02-	.1257936-03	.1333333 01
.1657978-01	.3131517 01	.2789355-07	.5058777-02-	.2392277-03	.1666667 01
.2313890-01	.3131510 01	.1403554-06	.9561720-02-	.4512383-03	.2000000 01
.3229267-01	.3131485 01	.6939770-06	.1788233-01-	.8415424-03	.2333333 01
.4506677-01	.3131396 01	.3349130-05	.3295514-01-	.1545134-02	.2666667 01
.6288968-01	.3131093 01	.1563118-04	.5950621-01-	.2777102-02	.3000000 01
.8774202-01	.3130109 01	.6967447-04	.1044530 00-	.4849229-02	.3333333 01
.1223352 00	.3127075 01	.2915864-03	.1762896 00-	.8145351-02	.3666667 01
.1702592 00	.3118406 01	.1119429-02	.2816483 00-	.1298938-01	.4000000 01
.2359133 00	.3096063 01	.3819521-02	.4163205 00-	.1931104-01	.4333333 01
.3239199 00	.3046002 01	.1109068-01	.5494543 00-	.2607468-01	.4666667 01
.4383003 00	.2953245 01	.2582567-01	.6081070 00-	.3079849-01	.5000000 01
.5841455 00	.2820226 01	.4457216-01	.4855547 00-	.3010498-01	.5333333 01
.7756400 00	.2683232 01	.5331366-01	.1029758 00-	.2188122-01	.5666667 01
.1039232 01	.2575999 01	.6100259-01-	.4789052 00-	.7798472-02	.6000000 01
.1375584 01	.2443180 01	.1594399 00-	.9934666 00	.5800347-02	.6333333 01
.1702065 01	.2166106 01	.4320092 00-	.1132645 01	.1178343-01	.6666667 01
.1908554 01	.1740377 01	.7554390 00-	.8650748 00	.9694257-02	.7000000 01
.1984506 01	.1296661 01	.9426501 00-	.4515639 00	.4910635-02	.7333333 01
.1998816 01	.9357975 00	.9939830 00-	.1521692 00	.1566199-02	.7666666 01
.1999969 01	.6709151 00	.9997852 00-	.2936047-01	.2852297-03	.8000000 01
.2000000 01	.4807391 00	.9999982 00-	.2705382-02	.2491372-04	.8333333 01
.2000000 01	.3444646 00	.1000000 01-	.9147073-04	.8055177-06	.8666666 01
.2000000 01	.2468197 00	.1000000 01-	.7739713-06	.6587127-08	.9000000 01
.2000000 01	.1768541 00	.1000000 01-	.9546515-09	.7925681-11	.9333333 01
.2000000 01	.1267215 00	.1000000 01	.0000000-39	.0000000-39	.9666666 01
.2000000 01	.9079990-01	.1000000 01	.0000000-39	.0000000-39	.1000000 02
.2000000 01	.6506096-01	.1000000 01	.0000000-39	.0000000-39	.1033333 02

DESIGNATION	NP	RIND.	ENERGY	V(0)	LAMPDA
3 P 1/2	.2000000	01-	.4681075	01 .3179214	01 .9818364 00

ALPHA S	.4263613-05	.4031465-02-	.5287822-01	.3711187 00-	.1762816 01
BETA S	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39
	.4453598-04-	.7753412-03	.6793694-02-	.3870775-01	.1633269 00
	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39

R-TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
.5822934-04	.3179214 01	.1236726-13	.4337434-05	.4452178-04-	.4000000 01
.8126559-04	.3179214 01	.3321003-13	.6057335-05	.6175229-04-	.3666667 01
.1134153-03	.3179214 01	.8917627-13	.8481050-05	.8564697-04-	.3333333 01
.1582838-03	.3179214 01	.2394463-12	.1191652-04	.1187793-03-	.3000000 01
.2209028-03	.3179214 01	.6428919-12	.1682402-04	.1647127-03-	.2666667 01
.3082947-03	.3179214 01	.1725952-11	.2390608-04	.2283782-03-	.2333333 01
.4302598-03	.3179214 01	.4633057-11	.3426090-04	.3165920-03-	.2000000 01
.6004760-03	.3179214 01	.1243482-10	.4965075-04	.4387635-03-	.1666667 01
.8380317-03	.3179214 01	.3336781-10	.7298087-04	.6078563-03-	.1333333 01
.1169568-02	.3179214 01	.8951966-10	.1091685-03	.8416817-03-	.1000000 01
.1632263-02	.3179214 01	.2401105-09	.1667399-03	.1164617-02-	.6666667 00
.2278006-02	.3179214 01	.6439316-09	.2607897-03	.1609840-02-	.3333334 00
.3179213-02	.3179213 01	.1727106-08	.4184919-03	.2222159-02-	.5960465-07
.4436946-02	.3179211 01	.4635913-08	.6893713-03	.3061397-02	.3333333 00
.6192252-02	.3179208 01	.1247161-07	.1164386-02	.4206118-02	.6666666 00
.8641967-02	.3179202 01	.3372696-07	.2011099-02	.5756950-02	.9999999 00
.1206079-01	.3179191 01	.9220912-07	.3537588-02	.7837907-02	.1333333 01
.1683207-01	.3179168 01	.2574260-06	.6305998-02	.1059239-01	.1666667 01
.2349069-01	.3179120 01	.7452463-06	.1132721-01	.1416781-01	.2000000 01
.3278286-01	.3179019 01	.2280193-05	.2037607-01	.1867890-01	.2333333 01
.4574883-01	.3178787 01	.7484304-05	.3645437-01	.2413542-01	.2666667 01
.6383623-01	.3178220 01	.2633001-04	.6434933-01	.3031883-01	.3000000 01
.8904935-01	.3176747 01	.9703495-04	.1109912 00	.3660379-01	.3333333 01
.1241250 00	.3172827 01	.3600721-03	.1847503 00	.4175982-01	.3666667 01
.1726721 00	.3162601 01	.1283716-02	.2918484 00	.4385943-01	.4000000 01
.2390851 00	.3137689 01	.4182416-02	.4271986 00	.4056703-01	.4333333 01
.3279445 00	.3083848 01	.1177938-01	.5585567 00	.3018067-01	.4666667 01
.4432451 00	.2986563 01	.2682158-01	.6115420 00	.1343198-01	.5000000 01
.5902651 00	.2849771 01	.4543306-01	.4792905 00	.5182731-02	.5333333 01
.7837216 00	.2711190 01	.5359549-01	.8590019-01	.1855892-01	.5666667 01
.1050112 01	.2602969 01	.6235195-01	.5016501 00	.2101177-01	.6000000 01
.1388003 01	.2465237 01	.1660046 00	.1011054 01	.1341261-01	.6333333 01
.1711969 01	.2178711 01	.4437520 00	.1136332 01	.3800094-02	.6666667 01
.1913317 01	.1744720 01	.7651792 00	.8564914 00	.1168175-02	.7000000 01
.1985704 01	.1297443 01	.9464132 00	.4402988 00	.1692548-02	.7333333 01
.1998947 01	.9358588 00	.9945810 00	.1455357 00	.7684792-03	.7666666 01
.1999974 01	.6709167 00	.9998159 00	.2737396-01	.1683716-03	.8000000 01
.2000000 01	.4807390 00	.9999986 00	.2436687-02	.1628600-04	.8333333 01
.2000000 01	.3444646 00	.1000000 01	.7856379-04	.3519583-06	.8666666 01
.2000000 01	.2468197 00	.1000000 01	.6225140-06	.4521673-08	.9000000 01
.2000000 01	.1768540 00	.1000000 01	.7015862-09	.5214302-11	.9333333 01
.2000000 01	.1267215-00	.1000000 01	.0000000-39	.0000000-39	.9666666 01
.2000000 01	.9079990-01	.1000000 01	.0000000-39	.0000000-39	.1000000 02
.2000000 01	.6506796-01	.1000000 01	.0000000-39	.0000000-39	.1033333 02

DESIGNATION	NP	BIND. ENERGY	V(0)	LAMBDA
3 S 1/2	.2000000	01-.7087837 01	.3451333 01	.9818364 00

ALPHA S	.6316403-02-	.1658775-01	.1694725-00-	.1063328 01	.4769110 01
	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39
BETA S	-.6046954-04	.1237403-02-	.1165342-01	.6971594-01-	.3039516 00
	.0000000-39	.0000000-39	.0000000-39	.0000000-39	.0000000-39

R TIMES V(R)	V(R)	INTEGRAL	F	G	RHO
.6321336-04	.3451333 01	.2486463-11	.6313366-03-	.6044688-04-	.4000000 01
.8822135-04	.3451333 01	.6675662-11	.8756160-03-	.8383876-04-	.3666667 01
.1231228-03	.3451332 01	.1792082-10	.1214322-02-	.1162761-03-	.3333333 01
.1718317-03	.3451332 01	.4810089-10	.1683868-02-	.1612502-03-	.3000000 01
.2398104-03	.3451331 01	.1290783-09	.2334633-02-	.2235942-03-	.2666667 01
.3346822-03	.3451330 01	.3462749-09	.3236238-02-	.3099928-03-	.2333333 01
.4670862-03	.3451326 01	.9285459-09	.4484747-02-	.4296808-03-	.2000000 01
.6518701-03	.3451320 01	.2488441-08	.6212438-02-	.5953953-03-	.1666667 01
.9097548-03	.3451308 01	.6663317-08	.8600904-02-	.8246629-03-	.1333333 01
.1269656-02	.3451284 01	.1782173-07	.1189838-01-	.1141523-02-	.1000000 01
.1771925-02	.3451239 01	.4758895-07	.1644217-01-	.1578795-02-	.6666667 00
.2472858-02	.3451152 01	.1267886-06	.2268661-01-	.2180992-02-	.3333334 00
.3450986-02	.3450986 01	.3367307-06	.3123601-01-	.3007924-02-	.5960465-07
.4815800-02	.3450672 01	.8903660-06	.4287922-01-	.4138851-02	.3333333 00
.6719834-02	.3450078 01	.2339783-05	.5861684-01-	.5676698-02	.6666666 00
.9375258-02	.3448965 01	.6095861-05	.7966107-01-	.7751024-02	.9999999 00
.1307640-01	.3446901 01	.1569092-04	.1073675 00-	.1051699-01	.1333333 01
.1822960-01	.3443126 01	.3971065-04	.1430236 00-	.1414497-01	.1666667 01
.2539150-01	.3436366 01	.9813784-04	.1873641 00-	.1879145-01	.2000000 01
.3531536-01	.3424600 01	.2345417-03	.2396190 00-	.2452653-01	.2333333 01
.4900355-01	.3404936 01	.5346142-03	.2958559 00-	.3126962-01	.2666667 01
.6776638-01	.3373900 01	.1139276-02	.3464822 00-	.3850945-01	.3000000 01
.9331006-01	.3328743 01	.2204732-02	.3732894 00-	.4517388-01	.3333333 01
.1279365 00	.3270255 01	.3713190-02	.3478040 00-	.4939023-01	.3666667 01
.1750448 00	.3206058 01	.5133589-02	.2353363 00-	.4856996-01	.4000000 01
.2399814 00	.3149451 01	.5615470-02	.1209883-01-	.4012629-01	.4333333 01
.3303221 00	.3106206 01	.6550900-02-	.2988397 00-	.2320732-01	.4666667 01
.4533013 00	.3054321 01	.1572242-01-	.5845010 00-	.1085465-02	.5000000 01
.6119213 00	.2954326 01	.4004780-01-	.6419732 00	.1808445-01	.5333333 01
.8131266 00	.2812913 01	.6093974-01-	.2906481 00	.2513082-01	.5666667 01
.1085289 01	.2690164 01	.6629739-01	.4134051 00	.1708248-01	.6000000 01
.1436037 01	.2550550 01	.1701080 00	.1063535 01	.1753383-02	.6333333 01
.1763298 01	.2244033 01	.4850840 00	.1201877 01-	.7897542-02	.6666667 01
.1942995 01	.1771783 01	.8208772 00	.8304670 00-	.7722445-02	.7000000 01
.1993492 01	.1302532 01	.9711712 00	.3593292 00-	.3657595-02	.7333333 01
.1999726 01	.9362235 00	.9983120 00	.9039062-01-	.9399174-03	.7666666 01
.1999997 01	.6709244 00	.9999744 00	.1136149-01-	.1177991-03	.8000000 01
.2000000 01	.4807391 00	.9999999 00	.8670314-03-	.5808784-05	.8333333 01
.2000000 01	.3444646 00	.1000000 01	.8057813-03-	.8145026-07	.8666666 01
.2000000 01	.2468197 00	.1000000 01	.2025266-07-	.2024821-09	.9000000 01
.2000000 01	.1768540 00	.1000000 01	.4670602-11-	.4631571-13	.9333333 01
.2000000 01	.1267215 00	.1000000 01	.0000000-39	.0000000-39	.9666666 01
.2000000 01	.9079997-01	.1000000 01	.0000000-39	.0000000-39	.1000000 02
.2000000 01	.6506096-01	.1000000 01	.0000000-39	.0000000-39	.1033333 02

DESIGNATION NP BIND. ENERGY V(0)
4 S 1/2 .2000000 01-.4890228 00 .7607882 00

LAMBDA
.9818364 00

ALPHA S .1382614-03-.3631251-02 .3701146-01-.2312224 00 .1031756 01
 .0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39
 BETA S -.1323633-04 .2702171-03-.2533869-02 .1508139-01-.6537565-01
 .0000000-39 .0000000-39 .0000000-39 .0000000-39 .0000000-39

R	TIMES	V(R)	V(R)	INTEGRAL	F	G	RHO
.1393432-04	.7607882	00	.1191363-12	.1381949-03-	.1323139-04-	.4000000	01
.1944691-04	.7607882	00	.3198574-12	.1916658-03-	.1835171-04-	.3666667	01
.2714035-04	.7607882	00	.8586572-12	.2658059-03-	.2545201-04-	.3333333	01
.3787741-04	.7607882	00	.2304704-11	.3685862-03-	.3529656-04-	.3000000	01
.5286219-04	.7607882	00	.6184653-11	.5110338-03-	.4894328-04-	.2666667	01
.7377512-04	.7607881	00	.1659140-10	.7083882-03-	.6785544-04-	.2333333	01
.1029615-03	.7607880	00	.4449030-10	.9816775-03-	.9405455-04-	.2000000	01
.1436942-03	.7607877	00	.1192310-09	.1359856-02-	.1303288-03-	.1666667	01
.2005413-03	.7607871	00	.3192657-09	.1882673-02-	.1805149-03-	.1333333	01
.2798775-03	.7607860	00	.8539088-09	.2604465-02-	.2498753-03-	.1000000	01
.3905994-03	.7607838	00	.2280171-08	.3599064-02-	.3455950-03-	.6666667	00
.5451224-03	.7607797	00	.6074930-08	.4965920-02-	.4774195-03-	.3333334	00
.7607717-03	.7607718	00	.1613404-07	.6837310-02-	.6584440-03-	.5960465-07	
.1061722-02	.7607567	00	.4266074-07	.8385900-02-	.9060245-03	.3333333	00
.1481696-02	.7607283	00	.1121073-06	.1283070-01-	.1242703-02	.6666666	00
.2067729-02	.7606750	00	.2920730-06	.1743702-01-	.1696861-02	.9999999	00
.2885373-02	.7605761	00	.7517976-06	.2350151-01-	.2302504-02	.1333333	01
.4025904-02	.7603953	00	.1902624-05	.3130580-01-	.3096999-02	.1666667	01
.5616209-02	.7600714	00	.4701871-05	.4101029-01-	.4114716-02	.2000000	01
.7832238-02	.7595077	00	.1123654-04	.5244542-01-	.5373379-02	.2333333	01
.1091721-01	.7585657	00	.2561013-04	.6474805-01-	.6849034-02	.2666667	01
.1520634-01	.7570791	00	.5456590-04	.7581329-01-	.8436576-02	.3000000	01
.2116154-01	.7549167	00	.1055591-03	.8164492-01-	.9899072-02	.3333333	01
.2942379-01	.7521172	00	.1776610-03	.7599225-01-	.1082550-01	.3666667	01
.4089659-01	.7490474	00	.2453213-03	.5124120-01-	.1064565-01	.4000000	01
.5686982-01	.7463442	00	.2680103-03	.2197637-02-	.8785607-02	.4333333	01
.7914849-01	.7442779	00	.3138457-03-	.6592512-01-	.5048321-02	.4666667	01
.1100907 00	.7417855	00	.7554456-03-	.1278513 00-	.1473932-03	.5000000	01
.1526539 00	.7370057	00	.1902287-02-	.1381133 00	.4102710-02	.5333333	01
.2111257 00	.7303638	00	.2827177-02-	.5660021-01	.5606992-02	.5666667	01
.2923550 00	.7246758	00	.3131587-02	.1003778 00	.3595258-02	.6000000	01
.4041717 00	.7178509	00	.8313285-02	.2280088 00-	.2135991-03	.6333333	01
.5531862 00	.7040037	00	.1997845-01-	.1978992 00-	.2721700-02	.6666667	01
.7538893 00	.6874583	00	.2419291-01-	.1375899-01-	.2700443-02	.7000000	01
.1030318 01	.6732016	00	.3939225-01-	.3049169 00-	.1265625-02	.7333333	01
.1373216 01	.6429067	00	.1561551 00-	.5287572 00	.1505472-03	.7666666	01
.1698897 01	.5699168	00	.4316252 00-	.5765838 00	.8968227-03	.8000000	01
.1906517 01	.4582688	00	.7506638 00-	.4443340 00	.8988517-03	.8333333	01
.1984429 01	.3417828	00	.9412314 00-	.2360739-00	.5249652-03	.8666666	01
.1998928 01	.2466873	00	.9942708 00-	.7817614-01	.1822315-03	.9000000	01
.1999978 01	.1768522	00	.9998400 00-	.1360405-01	.3264314-04	.9333333	01
.2000000 01	.1267214	00	.9999993 00-	.9704484-03	.2373133-05	.9666666	01
.2000000 01	.9079988-01	.1000000 01-	.2001652-04	.4957827-07	.1000000 02		
.2000000 01	.6506096-01	.1000000 01-	.7343726-07	.1834985-09	.1033333 02		

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