^{158}Eu β^- decay 1974Kl11,1975Bl03,1996Gr20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 141, 1 (2017)	1-Feb-2017

Parent: ^{158}Eu: E=0; J$^{\pi}$=(1$^-$); T$_{1/2}$=45.9 min *2*; Q(β^-)=3434 *10*; %β^- decay=100.0

The decay scheme and γ data are primarily from 1974Kl11; that of 1975Bl03 is in substantial agreement. The sum of the intensities of the β- branches to the 0- and 79-keV levels is from the 4$\pi\gamma$-β- measurement of 1996Gr20. Other measurements: 1997Gr09, 1972Kl01, 1972Ho08, 1969RiZY, 1966Da19, 1966Da06, 1965Sc19, 1965Mu16, 1963Da07.

^{158}Gd Levels

See ^{158}Gd Adopted Levels for band assignments.

E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡
0.0	0$^+$	1265.48 *10*	3$^+$	2215.5? *3*	1	2600.3? *12*	1$^{(+)}$
79.51 *7*	2$^+$	1402.97 *14*	3$^-$	2221.63 *22*	2$^-$	2620.92 *24*	
261.47 *10*	4$^+$	1451.51 *21*	0$^+$	2269.29 *14*	(0,1,2)$^+$	2642? *2*	
977.15 *7*	1$^-$	1517.5 *3*	2$^+$	2325.33 *10*	1$^-$,2$^+$	2670.6 *3*	
1023.66 *8*	2$^-$	1793.50 *8*	2$^-$	2340.3? *3*	2$^+$	2761.94 *22*	
1041.62 *8*	3$^-$	1847.80 *12*	1$^+$	2395.40 *13*	(3$^+$)	2823.5? *6*	1$^-$
1187.13 *8*	2$^+$	1894.39 *10*	2$^+$	2447.30 *25*	1	2844.2? *8*	
1196.00 *11*	0$^+$	1930.16 *9*	1$^+$	2450.9 *4*	1,2$^+$	2859.6 *6*	
1259.95 *12*	2$^+$	1964.14 *8*	2$^+$	2475.5 *3*	1,2$^+$		
1263.67 *12*	1$^-$	2023.93 *11*	1$^+$	2499.19 *12*	(1,2)$^+$		

† From least-squares fit to γ energies.
‡ From ^{158}Gd Adopted Levels.

β^- radiations

Below 2100 keV, these calculated I$_{\beta-}$ are in excellent agreement with those deduced from the total absorption γ spectrometer, TAGS, data of 1997Gr09. Above this energy, these I$_{\beta-}$ are lower than those from the TAGS data which is consistent with the fact that there are a number of unplaced, high-energy γ rays. For the larger differences, the TAGS results are given in comments.

Measured E(β-) in keV include:
3400 *150* (1966Da06).
2430 *100* (1966Da06), 2520 *120* (1965Sc19).
1550 *100* (1966Da06), 1950 *230* (1965Sc19).
≈ 1100 (1966Da06), 1150 *90* (1965Sc19).
Measured I(β-) include:
Iβ(3400 keV)/Iβ(2430 keV)=0.11 (1966Da06) and Iβ(3400 keV)=5%.

E(decay)	E(level)	Iβ^-†#	Log *ft*‡	Comments
(574 *10*)	2859.6	0.036 *10*	7.76 *13*	av Eβ=177.5 *36* Iβ^-: 0.110 from TAGS data (1997Gr09).
(672 *10*)	2761.94	0.22 *4*	7.21 *9*	av Eβ=212.9 *37* Iβ^-: 0.51 from TAGS data (1997Gr09).
(763 *10*)	2670.6	0.075 *18*	7.87 *11*	av Eβ=247.1 *38* Iβ^-: 0.159 from TAGS data (1997Gr09).
(813 *10*)	2620.92	0.13 *3*	7.72 *11*	av Eβ=266.0 *39* Iβ^-: 0.27 from TAGS data (1997Gr09).
(935 *10*)	2499.19	0.55 *7*	7.31 *6*	av Eβ=313.3 *40*

Continued on next page (footnotes at end of table)

^{158}Eu β^- decay 1974Kl11,1975Bl03,1996Gr20 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^{-}[†#]	Log *ft*[‡]	Comments
(959 *10*)	2475.5	0.17 *3*	7.86 *8*	av Eβ=322.7 *40*
(983 *10*)	2450.9	0.44 *10*	7.49 *10*	av Eβ=332.4 *40*
(987 *10*)	2447.30	1.55 *18*	6.95 *6*	av Eβ=333.9 *40*
(1039 *10*)	2395.40	0.32 *5*	8.28[1u] *8*	av Eβ=362.4 *39*
(1109 *10*)	2325.33	3.2 *4*	6.82 *6*	av Eβ=383.0 *41* Iβ^-: 4.45 from TAGS data (1997Gr09).
(1165 *10*)	2269.29	1.63 *23*	7.19 *7*	av Eβ=405.8 *41* Iβ^-: 2.24 from TAGS data (1997Gr09).
(1212 *10*)	2221.63	0.14 *4*	8.32 *13*	av Eβ=425.5 *42* Iβ^-: 0.198 from TAGS data (1997Gr09).
(1410 *10*)	2023.93	3.5 *4*	7.17 *6*	av Eβ=508.1 *43*
(1470 *10*)	1964.14	6.6 *7*	6.96 *5*	av Eβ=533.4 *43*
(1504 *10*)	1930.16	7.6 *8*	6.94 *5*	av Eβ=547.9 *43*
(1540 *10*)	1894.39	0.95 *11*	7.88 *6*	av Eβ=563.1 *44*
(1586 *10*)	1847.80	2.6 *3*	7.49 *6*	av Eβ=583.1 *43*
(1641 *10*)	1793.50	7.0 *8*	7.12 *5*	av Eβ=606.5 *44*
(1917 *10*)	1517.5	0.066 *17*	9.41 *12*	av Eβ=726.8 *44*
(1982 *10*)	1451.51	0.08 *3*	9.38 *17*	av Eβ=755.8 *45*
(2031 *10*)	1402.97	0.11 *5*	9.29 *20*	av Eβ=777.3 *45* Log *ft*: Value highly questionable for a (1$^-$) to 3$^-$ transition.
(2169 *10*)	1265.48	0.7 *6*	9.7[1u] *4*	av Eβ=827.7 *44*
(2170 *10*)	1263.67	3.7 *6*	7.87 *7*	av Eβ=839.1 *45*
(2174 *10*)	1259.95	0.39 *12*	8.85 *14*	av Eβ=840.7 *45*
(2238 *10*)	1196.00	0.87 *14*	8.56 *7*	av Eβ=869.2 *45*
(2247 *10*)	1187.13	<0.9	>8.5	av Eβ=873.2 *45* Additional information 1.
(2392 *10*)	1041.62	0.31 *25*	9.1 *4*	av Eβ=938.3 *45* Log *ft*: Value highly questionable for a (1$^-$) to 3$^-$ transition.
(2410 *10*)	1023.66	25 *3*	7.23 *6*	av Eβ=946.4 *45*
(2457 *10*)	977.15	21.3 *24*	7.33 *5*	av Eβ=967.3 *45*
(3173 *10*)	261.47	0.8 *4*	9.21 *22*	av Eβ=1291.9 *46* Log *ft*: Value highly questionable for a (1$^-$) to 4$^+$ transition.
(3354 *10*)	79.51	9 *3*	8.26 *15*	av Eβ=1375.1 *46* Iβ^-: From $I_{\beta-}$(0) + $I_{\beta-}$(79)=8.6% *24* (1996Gr20) and the assumption that $I_{\beta-}$(0) = 0.0.

[†] Deduced from γ-ray intensity balances at the various levels and along with the $I_{\beta-}$(0) + $I_{\beta-}$(79) = 8.6% *24* from 1996Gr20. Other: $I_{\beta-}$(0) = 0 and $I_{\beta-}$(79)=24 from 1974Kl11.

[‡] See $I_{\beta-}$ comments for assumptions and limitations.

[#] Absolute intensity per 100 decays.

$\gamma(^{158}$Gd)

Iγ normalization: calculated to give 91% β- feeding to the levels above 100 keV. The uncertainty allows for the large number of unplaced γ's. This is based on 1996Gr20 that found by total absorption spectrometry that that the summed population of the two states under 100 keV is 8.6% *24*. This is in between the previously established figures of 5% (1966Da06) and 22.3% *80* (1974Kl11), rather assigned to the 79.5 state alone.

E_γ[‡]	I_γ[‡d]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
79.49 *10*	35 *6*	79.51	2$^+$	0.0	0$^+$	E2		5.94	α(K)=2.02 *3*; α(L)=3.02 *5*; α(M)=0.715 *11*; α(N+..)=0.180 *3* α(N)=0.1593 *25*; α(O)=0.0207 *4*; α(P)=9.94×10^{-5} *15* %Iγ=10.6 *5*. I$_\gamma$: From I$_{\beta-}$(79)=8.6% *24*; measurements are 20 *4* (1966Da06) and 44 *4* (1974Kl11). If a portion of the β- goes to the ground state, this I$_\gamma$ will be less.
181.97 *11*	7.8 *8*	261.47	4$^+$	79.51	2$^+$	E2		0.305	α(K)=0.206 *3*; α(L)=0.0769 *11*; α(M)=0.0178 *3*; α(N+..)=0.00455 *7* α(N)=0.00399 *6*; α(O)=0.000544 *8*; α(P)=1.156×10^{-5} *17* %Iγ=2.4 *4*.
^{x}218.4 *4*	0.15 *5*								%Iγ=0.046 *17*.
245.33 *17*	0.32 *4*	2269.29	(0,1,2)$^+$	2023.93	1$^+$	M1,E2		0.14 *3*	α(K)=0.11 *3*; α(L)=0.0215 *19*; α(M)=0.0048 *6*; α(N+..)=0.00126 *12* α(N)=0.00109 *11*; α(O)=0.000161 *8*; α(P)=8.E−6 *3* %Iγ=0.097 *18*.
528.05 *10*	5.1 *3*	1793.50	2$^-$	1265.48	3$^+$	E1		0.00417 *6*	α=0.00417 *6*; α(K)=0.00356 *5*; α(L)=0.000479 *7*; α(M)=0.0001032 *15*; α(N+..)=2.75×10^{-5} *4* α(N)=2.36×10^{-5} *4*; α(O)=3.63×10^{-6} *5*; α(P)=2.35×10^{-7} *4* %Iγ=1.55 *22*.
606.39 *9*	13.2 *7*	1793.50	2$^-$	1187.13	2$^+$	E1		0.00309 *5*	α=0.00309 *5*; α(K)=0.00264 *4*; α(L)=0.000353 *5*; α(M)=7.59×10^{-5} *11*; α(N+..)=2.02×10^{-5} *3* α(N)=1.739×10^{-5} *25*; α(O)=2.68×10^{-6} *4*; α(P)=1.751×10^{-7} *25* %Iγ=4.0 *6*.
698.63 *12*	3.52 *19*	1964.14	2$^+$	1265.48	3$^+$	E2+M1		0.0085 *25*	α=0.0085 *25*; α(K)=0.0072 *22*; α(L)=0.00104 *24*; α(M)=0.00023 *5*; α(N+..)=6.0×10^{-5} *14* α(N)=5.2×10^{-5} *12*; α(O)=8.0×10^{-6} *20*; α(P)=5.1×10^{-7} *17* %Iγ=1.07 *15*.
743.02 *9*	12.0 *6*	1930.16	1$^+$	1187.13	2$^+$	M1+E2	+0.17 *15*	0.0093 *3*	α=0.0093 *3*; α(K)=0.0079 *3*; α(L)=0.00108 *3*; α(M)=0.000234 *7*; α(N+..)=6.29×10^{-5} *18* α(N)=5.39×10^{-5} *16*; α(O)=8.40×10^{-6} *25*; α(P)=5.73×10^{-7} *20* %Iγ=3.6 *5*.
751.70 *16*	0.94 *15*	1793.50	2$^-$	1041.62	3$^-$	M1+E2		0.0071 *20*	α=0.0071 *20*; α(K)=0.0060 *18*; α(L)=0.00086 *20*; α(M)=0.00019 *5*; α(N+..)=5.0×10^{-5} *12* α(N)=4.3×10^{-5} *10*; α(O)=6.6×10^{-6} *17*; α(P)=4.3×10^{-7} *14* %Iγ=0.29 *6*.

$\gamma(^{158}$Gd) (continued)

E_γ [‡]	I_γ [‡d]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α [†]	Comments
763.94 *12*	2.10[b] *15*	2023.93	1^+	1259.95	2^+	E2	0.00495 *7*	α=0.00495 *7*; α(K)=0.00413 *6*; α(L)=0.000637 *9*; α(M)=0.0001395 *20*; α(N+..)=3.70×10^{-5} *6* α(N)=3.19×10^{-5} *5*; α(O)=4.84×10^{-6} *7*; α(P)=2.84×10^{-7} *4* %Iγ=0.64 *10.*
769.87 *12*	2.16 *16*	1793.50	2^-	1023.66	2^-	E2	0.00486 *7*	α=0.00486 *7*; α(K)=0.00406 *6*; α(L)=0.000625 *9*; α(M)=0.0001368 *20*; α(N+..)=3.63×10^{-5} *5* α(N)=3.13×10^{-5} *5*; α(O)=4.74×10^{-6} *7*; α(P)=2.80×10^{-7} *4* %Iγ=0.66 *10.*
776.98 *15*	2.6 *3*	1964.14	2^+	1187.13	2^+	M1	0.00842 *12*	α=0.00842 *12*; α(K)=0.00717 *10*; α(L)=0.000981 *14*; α(M)=0.000212 *3*; α(N+..)=5.69×10^{-5} *8* α(N)=4.88×10^{-5} *7*; α(O)=7.60×10^{-6} *11*; α(P)=5.20×10^{-7} *8* %Iγ=0.79 *14.*
780.13 *19*	3.0 *3*	1041.62	3^-	261.47	4^+	E1	0.00183 *3*	α=0.00183 *3*; α(K)=0.001571 *22*; α(L)=0.000207 *3*; α(M)=4.46×10^{-5} *7*; α(N+..)=1.191×10^{-5} *17* α(N)=1.023×10^{-5} *15*; α(O)=1.580×10^{-6} *23*; α(P)=1.050×10^{-7} *15* %Iγ=0.91 *15.*
816.33 *16*	1.22 *8*	1793.50	2^-	977.15	1^-	[M1,E2]	0.0059 *16*	α=0.0059 *16*; α(K)=0.0050 *14*; α(L)=0.00070 *17*; α(M)=0.00015 *4*; α(N+..)=4.1×10^{-5} *10* α(N)=3.5×10^{-5} *8*; α(O)=5.4×10^{-6} *13*; α(P)=3.5×10^{-7} *11* %Iγ=0.37 *6.*
824.11 *10*	4.3 *3*	1847.80	1^+	1023.66	2^-	E1	0.001646 *23*	α=0.001646 *23*; α(K)=0.001410 *20*; α(L)=0.000186 *3*; α(M)=3.99×10^{-5} *6*; α(N+..)=1.066×10^{-5} *1* α(N)=9.15×10^{-6} *13*; α(O)=1.415×10^{-6} *20*; α(P)=9.44×10^{-8} *14* %Iγ=1.31 *19.*
827.93 *16*	1.29[c] *13*	2023.93	1^+	1196.00	0^+			%Iγ=0.39 *7.*
852.81 *12*	1.32 *9*	1894.39	2^+	1041.62	3^-			%Iγ=0.40 *6.*
870.67[@] *11*	0.81[&] *9*	1894.39	2^+	1023.66	2^-			%Iγ=0.25 *5.*
870.70[@] *20*	4.2[&] *4*	1847.80	1^+	977.15	1^-			%Iγ=1.28 *21.*
[x]879.31 *15*	0.56 *9*							%Iγ=0.17 *4.* E_γ: May be an ^{160}Tb impurity line.
897.61 *9*	41.2 *21*	977.15	1^-	79.51	2^+	[E1]	0.001394 *20*	α=0.001394 *20*; α(K)=0.001195 *17*; α(L)=0.0001567 *22*; α(M)=3.37×10^{-5} *5*; α(N+..)=9.00×10^{-6} α(N)=7.73×10^{-6} *11*; α(O)=1.196×10^{-6} *17*; α(P)=8.01×10^{-8} *12* %Iγ=12.5 *18.*
906.50 *10*	6.1 *4*	1930.16	1^+	1023.66	2^-	E1	0.001368 *20*	α=0.001368 *20*; α(K)=0.001172 *17*; α(L)=0.0001537 *22*; α(M)=3.30×10^{-5} *5*; α(N+..)=8.83×10^{-6} α(N)=7.58×10^{-6} *11*; α(O)=1.173×10^{-6} *17*; α(P)=7.86×10^{-8} *11* %Iγ=1.9 *3.*
917.28 *16*	0.93 *13*	1894.39	2^+	977.15	1^-			%Iγ=0.28 *6.*
922.4[@] *3*	1.02[&] *12*	2325.33	$1^-,2^+$	1402.97	3^-			%Iγ=0.31 *6.*
922.51 *11*	5.4 *6*	1964.14	2^+	1041.62	3^-	(E1)	0.001323 *19*	α=0.001323 *19*; α(K)=0.001134 *16*; α(L)=0.0001485 *21*; α(M)=3.19×10^{-5}

$^{158}_{64}$Gd$_{94}$-4

γ(^{158}Gd) (continued)

E_γ ‡	I_γ ‡d	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	δ	α†	Comments
									5; α(N+..)=8.53×10^{-6} α(N)=7.32×10^{-6} 11; α(O)=1.134×10^{-6} 16; α(P)=7.61×10^{-8} 11 %Iγ=1.6 3.
925.6@ 3	0.40& 11	1187.13	2^+	261.47	4^+	[E2]		0.00324 5	α=0.00324 5; α(K)=0.00273 4; α(L)=0.000401 6; α(M)=8.74×10^{-5} 13; α(N+..)=2.33×10^{-5} 4 α(N)=2.00×10^{-5} 3; α(O)=3.06×10^{-6} 5; α(P)=1.89×10^{-7} 3 %Iγ=0.12 4.
940.6 3	1.1 3	1964.14	2^+	1023.66	2^-				%Iγ=0.33 10.
944.15 10	100.	1023.66	2^-	79.51	2^+	E1		0.001266 18	α=0.001266 18; α(K)=0.001085 16; α(L)=0.0001420 20; α(M)=3.05×10^{-5} 5; α(N+..)=8.16×10^{-6} α(N)=7.00×10^{-6} 10; α(O)=1.084×10^{-6} 16; α(P)=7.28×10^{-8} 11 %Iγ=30 4.
953.03 10	6.6 4	1930.16	1^+	977.15	1^-	(E1)		0.001243 18	α=0.001243 18; α(K)=0.001066 15; α(L)=0.0001395 20; α(M)=3.00×10^{-5} 5; α(N+..)=8.01×10^{-6} α(N)=6.88×10^{-6} 10; α(O)=1.065×10^{-6} 15; α(P)=7.16×10^{-8} 10 %Iγ=2.0 3.
962.09 9	6.3 4	1041.62	3^-	79.51	2^+	E1		0.001221 18	α=0.001221 18; α(K)=0.001047 15; α(L)=0.0001369 20; α(M)=2.94×10^{-5} 5; α(N+..)=7.87×10^{-6} α(N)=6.75×10^{-6} 10; α(O)=1.046×10^{-6} 15; α(P)=7.03×10^{-8} 10 %Iγ=1.9 3.
977.14 9	54.3 27	977.15	1^-	0.0	0^+	E1		0.001186 17	α=0.001186 17; α(K)=0.001017 15; α(L)=0.0001329 19; α(M)=2.85×10^{-5} 4; α(N+..)=7.64×10^{-6} α(N)=6.55×10^{-6} 10; α(O)=1.015×10^{-6} 15; α(P)=6.83×10^{-8} 10 %Iγ=16.5 22.
986.96 10	4.5 3	1964.14	2^+	977.15	1^-	E1		0.001164 17	α=0.001164 17; α(K)=0.000998 14; α(L)=0.0001304 19; α(M)=2.80×10^{-5} 4; α(N+..)=7.49×10^{-6} α(N)=6.43×10^{-6} 9; α(O)=9.96×10^{-7} 14; α(P)=6.71×10^{-8} 10 %Iγ=1.37 20.
998.47 15	1.27 14	1259.95	2^+	261.47	4^+	E2		0.00276 4	α=0.00276 4; α(K)=0.00233 4; α(L)=0.000337 5; α(M)=7.34×10^{-5} 11; α(N+..)=1.96×10^{-5} 3 α(N)=1.682×10^{-5} 24; α(O)=2.58×10^{-6} 4; α(P)=1.614×10^{-7} 23 %Iγ=0.39 7.
1004.0@ 3	1.6& 3	1265.48	3^+	261.47	4^+	E2+M1	−23 +19−7	0.00273 11	α=0.00273 11; α(K)=0.00231 10; α(L)=0.000334 12; α(M)=7.3×10^{-5} 3; α(N+..)=1.93×10^{-5} 7 α(N)=1.66×10^{-5} 6; α(O)=2.55×10^{-6} 10; α(P)=1.60×10^{-7} 8 %Iγ=0.49 11.

$\gamma(^{158}Gd)$ (continued)

E_γ[‡]	I_γ[‡d]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ	α[†]	Comments
1005.4[@] 3	4.1[&] 5	2269.29	(0,1,2)$^+$	1263.67	1$^-$				%Iγ=1.25 22.
1034.5 2	0.48 10	2221.63	2$^-$	1187.13	2$^+$	E1		0.001066 15	α=0.001066 15; α(K)=0.000915 13; α(L)=0.0001193 17; α(M)=2.56×10^{-5} 4; α(N+..)=6.85×10^{-6} α(N)=5.88×10^{-6} 9; α(O)=9.11×10^{-7} 13; α(P)=6.15×10^{-8} 9 %Iγ=0.15 4.
1061.68 16	1.08 9	2325.33	1$^-$,2$^+$	1263.67	1$^-$				%Iγ=0.33 5.
1107.63 9	17.1 8	1187.13	2$^+$	79.51	2$^+$	E2		0.00223 4	α=0.00223 4; α(K)=0.00189 3; α(L)=0.000268 4; α(M)=5.81×10^{-5} 9; α(N+..)=1.592×10^{-5} 23 α(N)=1.334×10^{-5} 19; α(O)=2.05×10^{-6} 3; α(P)=1.308×10^{-7} 19; α(IPF)=3.97×10^{-7} 6 %Iγ=5.2 7.
1116.49 10	4.2 3	1196.00	0$^+$	79.51	2$^+$	E2		0.00219 3	α=0.00219 3; α(K)=0.00186 3; α(L)=0.000263 4; α(M)=5.71×10^{-5} 8; α(N+..)=1.580×10^{-5} 23 α(N)=1.311×10^{-5} 19; α(O)=2.01×10^{-6} 3; α(P)=1.287×10^{-7} 18; α(IPF)=5.53×10^{-7} 8 %Iγ=1.28 19.
^{x}1130.2 4	0.06 3								%Iγ=0.018 10.
1138.3 3	0.71 9	2325.33	1$^-$,2$^+$	1187.13	2$^+$				%Iγ=0.22 4.
1141.5 3	0.61 9	1402.97	3$^-$	261.47	4$^+$	E1		0.000897 13	α=0.000897 13; α(K)=0.000764 11; α(L)=9.93×10^{-5} 14; α(M)=2.13×10^{-5} 3; α(N+..)=1.262×10^{-5} 1 α(N)=4.89×10^{-6} 7; α(O)=7.59×10^{-7} 11; α(P)=5.15×10^{-8} 8; α(IPF)=6.92×10^{-6} 12 %Iγ=0.19 4.
^{x}1166.5 5	0.05 3								%Iγ=0.015 10.
1180.4[@] 3	1.1[&] 2	1259.95	2$^+$	79.51	2$^+$	M1		0.00309 5	α=0.00309 5; α(K)=0.00263 4; α(L)=0.000355 5; α(M)=7.65×10^{-5} 11; α(N+..)=2.46×10^{-5} 4 α(N)=1.762×10^{-5} 25; α(O)=2.75×10^{-6} 4; α(P)=1.90×10^{-7} 3; α(IPF)=4.05×10^{-6} 7 %Iγ=0.33 8.
1184.1[@] 3	10.1[&] 12	1263.67	1$^-$	79.51	2$^+$	E1(+M2)	+0.11 6	0.00093 11	α=0.00093 11; α(K)=0.00078 9; α(L)=0.000102 13; α(M)=2.2×10^{-5} 3; α(N+..)=2.43×10^{-5} 6 α(N)=5.1×10^{-6} 7; α(O)=7.8×10^{-7} 10; α(P)=5.3×10^{-8} 7; α(IPF)=1.84×10^{-5} 4 %Iγ=3.1 6.
1186.0[@] 3	9.8[&] 18	1265.48	3$^+$	79.51	2$^+$	E2		0.00195 3	α=0.00195 3; α(K)=0.001646 23; α(L)=0.000231 4; α(M)=5.01×10^{-5} 7; α(N+..)=1.752×10^{-5} 25 α(N)=1.150×10^{-5} 17; α(O)=1.770×10^{-6} 25; α(P)=1.142×10^{-7} 16; α(IPF)=4.14×10^{-6} 7 %Iγ=3.0 7.
1187.1[@] 2	14.7[&] 10	1187.13	2$^+$	0.0	0$^+$	E2		0.00194 3	α=0.00194 3; α(K)=0.001643 23; α(L)=0.000231 4;

γ(^{158}Gd) (continued)

E_γ[‡]	I_γ[‡d]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(M)=5.00×10^{-5} *7*; α(N+..)=1.759×10^{-5} *25* α(N)=1.148×10^{-5} *16*; α(O)=1.767×10^{-6} *25*; α(P)=1.140×10^{-7} *16*; α(IPF)=4.24×10^{-6} *7* %Iγ=4.5 *7*.
1215.7 *4*	0.28 *6*	2475.5	1,2$^+$	1259.95	2$^+$			%Iγ=0.085 *22*.
1233.7 *2*	0.52 *11*	2499.19	(1,2)$^+$	1265.48	3$^+$			%Iγ=0.16 *4*.
^{x}1245.1 *4*	0.10 *4*							%Iγ=0.030 *13*.
^{x}1250.4 *4*	0.11 *4*							%Iγ=0.033 *13*.
^{x}1256.0 *8*	<0.10							%Iγ=0.015 *16*.
1259.9 *3*	1.3[&] *2*	1259.95	2$^+$	0.0	0$^+$	E2	0.001734 *25*	α=0.001734 *25*; α(K)=0.001462 *21*; α(L)=0.000203 *3*; α(M)=4.40×10^{-5} *7*; α(N+..)=2.51×10^{-5} *4* α(N)=1.011×10^{-5} *15*; α(O)=1.559×10^{-6} *22*; α(P)=1.014×10^{-7} *15*; α(IPF)=1.337×10^{-5} *20* %Iγ=0.40 *8*.
1263.6 *4*	0.7[&] *3*	2450.9	1,2$^+$	1187.13	2$^+$			%Iγ=0.21 *10*.
1263.61 *20*	7.3[&] *6*	1263.67	1$^-$	0.0	0$^+$	E1	0.000796 *12*	α=0.000796 *12*; α(K)=0.000638 *9*; α(L)=8.25×10^{-5} *12*; α(M)=1.770×10^{-5} *25*; α(N+..)=5.86×10^{-5} *9* α(N)=4.07×10^{-6} *6*; α(O)=6.31×10^{-7} *9*; α(P)=4.30×10^{-8} *6*; α(IPF)=5.39×10^{-5} *8* %Iγ=2.2 *4*.
1284.0 *2*	0.21 *3*	2325.33	1$^-$,2$^+$	1041.62	3$^-$			%Iγ=0.064 *13*.
1292.3 *2*	0.89 *11*	2269.29	(0,1,2)$^+$	977.15	1$^-$			%Iγ=0.27 *5*.
1301.68 *14*	0.61 *6*	2325.33	1$^-$,2$^+$	1023.66	2$^-$			%Iγ=0.19 *3*.
1312.08 *12*	0.89 *7*	2499.19	(1,2)$^+$	1187.13	2$^+$			%Iγ=0.27 *4*.
1323.46 *14*	0.76 *6*	1402.97	3$^-$	79.51	2$^+$	E1	0.000770 *11*	α=0.000770 *11*; α(K)=0.000588 *9*; α(L)=7.60×10^{-5} *11*; α(M)=1.629×10^{-5} *23*; α(N+..)=8.95×10^{-5} *1* α(N)=3.74×10^{-6} *6*; α(O)=5.81×10^{-7} *9*; α(P)=3.97×10^{-8} *6*; α(IPF)=8.51×10^{-5} *12* %Iγ=0.23 *4*.
1347.95 *13*	5.5 *3*	2325.33	1$^-$,2$^+$	977.15	1$^-$			%Iγ=1.67 *24*.
1353.64 *14*	0.39 *5*	2395.40	(3$^+$)	1041.62	3$^-$			%Iγ=0.119 *22*.
^{x}1363.2 *4*	0.12 *3*							%Iγ=0.036 *11*.
1372.0[f] *2*	0.25[f] *10*	1451.51	0$^+$	79.51	2$^+$	E2	0.001492 *21*	α=0.001492 *21*; α(K)=0.001239 *18*; α(L)=0.0001705 *24*; α(M)=3.68×10^{-5} *6*; α(N+..)=4.57×10^{-5} α(N)=8.46×10^{-6} *12*; α(O)=1.307×10^{-6} *19*; α(P)=8.59×10^{-8} *12*; α(IPF)=3.59×10^{-5} *5* %Iγ=0.08 *4*.
1372.0[f] *2*	0.44[f] *10*	2395.40	(3$^+$)	1023.66	2$^-$			%Iγ=0.13 *4*.
1433.7 *3*	0.21 *8*	2620.92		1187.13	2$^+$			%Iγ=0.06 *3*.
1438.0 *3*	0.12 *4*	1517.5	2$^+$	79.51	2$^+$			%Iγ=0.036 *13*.
1475.2 *4*	0.16 *4*	2499.19	(1,2)$^+$	1023.66	2$^-$			%Iγ=0.049 *14*.

γ(^{158}Gd) (continued)

E_γ [‡]	I_γ [‡d]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	α [†]	Comments
[x]1492.5 7	0.08 4							%Iγ=0.024 13.
1517.4 5	0.10 3	1517.5	2^+	0.0	0^+	E2	0.001280 18	α=0.001280 18; α(K)=0.001022 15; α(L)=0.0001391 20; α(M)=3.00×10^{-5} 5; α(N+..)=8.81×10^{-5} α(N)=6.90×10^{-6} 10; α(O)=1.067×10^{-6} 15; α(P)=7.09×10^{-8} 10; α(IPF)=8.01×10^{-5} 12 %Iγ=0.030 10.
1531.4 5	0.20 4	1793.50	2^-	261.47	4^+	[M2]	0.00387 6	α=0.00387 6; α(K)=0.00326 5; α(L)=0.000455 7; α(M)=9.86×10^{-5} 14; α(N+..)=6.27×10^{-5} 9 α(N)=2.27×10^{-5} 4; α(O)=3.54×10^{-6} 5; α(P)=2.42×10^{-7} 4; α(IPF)=3.62×10^{-5} 6 %Iγ=0.061 15.
[x]1552.0 7	0.11 3							%Iγ=0.033 10.
[x]1563.8 6	0.09 3							%Iγ=0.027 10.
1596.9 7	0.08 2	2620.92		1023.66	2^-			%Iγ=0.024 7.
1644.0 4	0.12 4	2620.92		977.15	1^-			%Iγ=0.036 13.
[x]1657.3 8	0.06 3							%Iγ=0.018 10.
1693.4 3	0.21 5	2670.6		977.15	1^-			%Iγ=0.064 18.
1702.8 2	0.45[a] 6	1964.14	2^+	261.47	4^+			%Iγ=0.14 3.
1714.1 2	0.61 7	1793.50	2^-	79.51	2^+			%Iγ=0.19 4.
1738.0 3	0.42 8	2761.94		1023.66	2^-			%Iγ=0.13 3.
1768.5 5	0.13 3	1847.80	1^+	79.51	2^+			%Iγ=0.040 11.
1785.0 3	0.24 4	2761.94		977.15	1^-			%Iγ=0.073 16.
1793.5 15	0.05 2	1793.50	2^-	0.0	0^+	[M2]	0.00271 4	α=0.00271 4; α(K)=0.00222 4; α(L)=0.000306 5; α(M)=6.63×10^{-5} 10; α(N+..)=0.0001180 17 α(N)=1.527×10^{-5} 22; α(O)=2.38×10^{-6} 4; α(P)=1.633×10^{-7} 24; α(IPF)=0.0001002 15 %Iγ=0.015 7.
1814.8 4	0.12 3	1894.39	2^+	79.51	2^+			%Iγ=0.036 11.
1835.9 6	0.12 3	2859.6		1023.66	2^-			%Iγ=0.036 11.
1850.3 4	0.50 10	1930.16	1^+	79.51	2^+			%Iγ=0.15 4.
[x]1857.0 5	0.32 7							%Iγ=0.097 25.
1884.62 20	4.1 2	1964.14	2^+	79.51	2^+			%Iγ=1.25 17.
1930.2 6	0.15 3	1930.16	1^+	0.0	0^+			%Iγ=0.046 11.
1944.47 20	5.4 3	2023.93	1^+	79.51	2^+			%Iγ=1.64 23.
[x]1956.2 3	0.30 4							%Iγ=0.091 17.
1964.2 3	0.44 5	1964.14	2^+	0.0	0^+			%Iγ=0.134 23.
2023.9 3	3.08 18	2023.93	1^+	0.0	0^+			%Iγ=0.94 13.
2136.4[g] 9	0.42 14	2215.5?	1	79.51	2^+			%Iγ=0.13 5.
[x]2139.0 4	0.88 22							%Iγ=0.27 8.
[x]2163.4 4	0.14 2							%Iγ=0.043 9.
2189.3 8	0.09 2	2269.29	$(0,1,2)^+$	79.51	2^+			%Iγ=0.027 7.
[x]2194.2 7	0.11 3							%Iγ=0.033 10.
[x]2203.8 4	0.28 4							%Iγ=0.085 17.

γ(^{158}Gd) (continued)

E_γ ‡	I_γ ‡d	E_i(level)	J^π_i	E_f	J^π_f	Comments
2215.3[g] *3*	0.37 *5*	2215.5?	1	0.0	0^+	%Iγ=0.112 *21*.
2246.1 *3*	1.53 *11*	2325.33	$1^-,2^+$	79.51	2^+	%Iγ=0.46 *7*.
2260.7[g] *3*	0.82 *8*	2340.3?	2^+	79.51	2^+	%Iγ=0.25 *4*.
[x]2268.2 *5*	0.21 *3*					%Iγ=0.064 *13*.
[x]2273.7 *5*	0.17 *3*					%Iγ=0.052 *12*.
2315.3 *10*	0.07 *3*	2395.40	(3^+)	79.51	2^+	%Iγ=0.021 *10*.
2326.0 *15*	0.06 *2*	2325.33	$1^-,2^+$	0.0	0^+	%Iγ=0.018 *7*.
2340.5[g] *10*	0.10 *3*	2340.3?	2^+	0.0	0^+	%Iγ=0.030 *10*.
2367.7 *3*	2.62 *14*	2447.30	1	79.51	2^+	%Iγ=0.80 *11*.
2395.6[e] *5*	0.17[e] *3*	2395.40	(3^+)	0.0	0^+	%Iγ=0.052 *12*.
2395.6[e] *5*	0.17[e] *3*	2475.5	$1,2^+$	79.51	2^+	%Iγ=0.052 *12*.
[x]2402.7 *4*	0.16 *3*					%Iγ=0.049 *11*.
2421.0 *11*	0.05 *2*	2499.19	$(1,2)^+$	79.51	2^+	%Iγ=0.015 *7*.
2447.4 *4*	2.54 *20*	2447.30	1	0.0	0^+	%Iγ=0.77 *12*.
2451.2 *6*	0.75 *2*	2450.9	$1,2^+$	0.0	0^+	%Iγ=0.23 *3*.
[x]2464. *2*	0.04 *2*					%Iγ=0.012 *7*.
2475.5 *5*	0.13 *2*	2475.5	$1,2^+$	0.0	0^+	%Iγ=0.040 *8*.
2499.0 *10*	0.208 *12*	2499.19	$(1,2)^+$	0.0	0^+	%Iγ=0.063 *9*.
[x]2514.0 *5*	0.36 *3*					%Iγ=0.109 *17*.
2520.5[g] *12*	0.023 *12*	2600.3?	$1^{(+)}$	79.51	2^+	%Iγ=0.007 *4*.
2542.0 *16*	0.035 *11*	2620.92		79.51	2^+	%Iγ=0.011 *4*.
2564[g] *2*	0.030 *10*	2642?		79.51	2^+	%Iγ=0.009 *4*.
2601.0[g] *12*	0.097 *18*	2600.3?	$1^{(+)}$	0.0	0^+	%Iγ=0.029 *7*.
2640[g] *2*	0.037 *15*	2642?		0.0	0^+	%Iγ=0.011 *5*.
2673 *2*	0.040 *16*	2670.6		0.0	0^+	%Iγ=0.012 *6*.
[x]2703 *2*	0.11 *2*					%Iγ=0.033 *8*.
2743.8[g] *15*	0.21 *2*	2823.5?	1^-	79.51	2^+	%Iγ=0.064 *11*.
2764 *2*	0.062 *12*	2761.94		0.0	0^+	%Iγ=0.019 *5*.
[x]2806 *3*	0.017 *8*					%Iγ=0.005 *3*.
2824[g] *2*	0.11 *2*	2823.5?	1^-	0.0	0^+	%Iγ=0.033 *8*.
2844[g] *2*	0.069 *14*	2844.2?		0.0	0^+	%Iγ=0.021 *5*.
[x]2873 *2*	0.016 *8*					%Iγ=0.005 *3*.
[x]2884 *2*	0.018 *9*					%Iγ=0.005 *3*.
[x]2967 *3*	0.016 *8*					%Iγ=0.005 *3*.

† Additional information 2.

‡ From 1974Kl11 for ≈ 130 γ′s; others: 1975Bl03 for 65 γ′s and 1966Da06, 1965Sc19, 1965Mu16, and 1963Da07 with <25 γ′s.

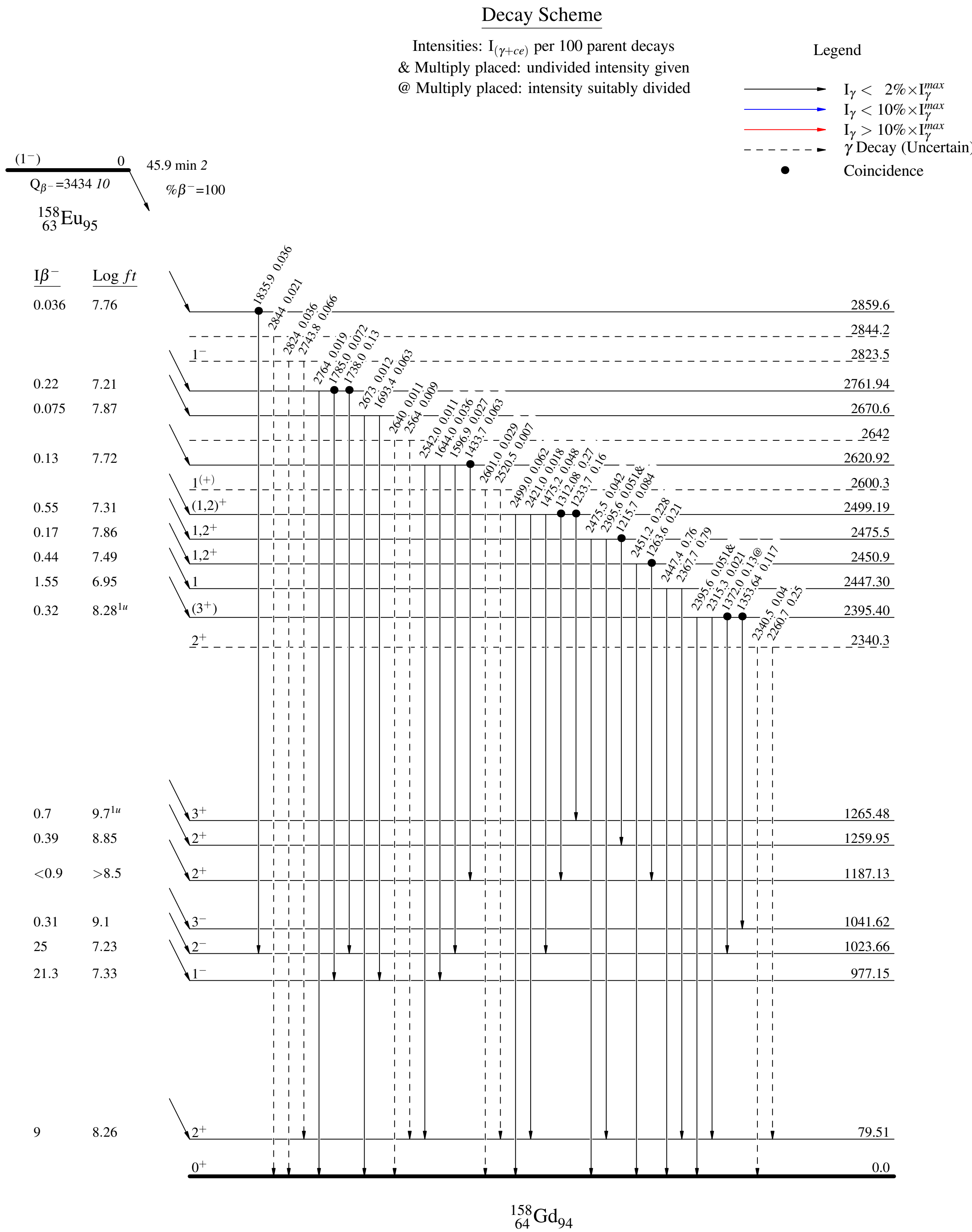
From ^{158}Gd Adopted γ radiations.

@ From level energy differences (1974Kl11).

γ(^{158}Gd) (continued)

[&] From coincidence data (1974Kl11).
[a] Author's uncertainty (1974Kl11) of 0.60 is assumed by evaluator to be a misprint; evaluator used 0.06.
[b] This value of 2.10 *15* is higher relative to that of the 1944 γ than that observed in ^{157}Gd(n,γ) where the relative values would give I_γ(763)=0.89 *13*.
[c] This value of 1.29 *13* is higher relative to that of the 1944 γ than that observed in ^{157}Gd(n,γ) where the relative values would give I_γ(827)=0.62 *9*.
[d] For absolute intensity per 100 decays, multiply by 0.30 *3*.
[e] Multiply placed with undivided intensity.
[f] Multiply placed with intensity suitably divided.
[g] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{158}Eu β^- decay 1974Kl11,1975Bl03,1996Gr20

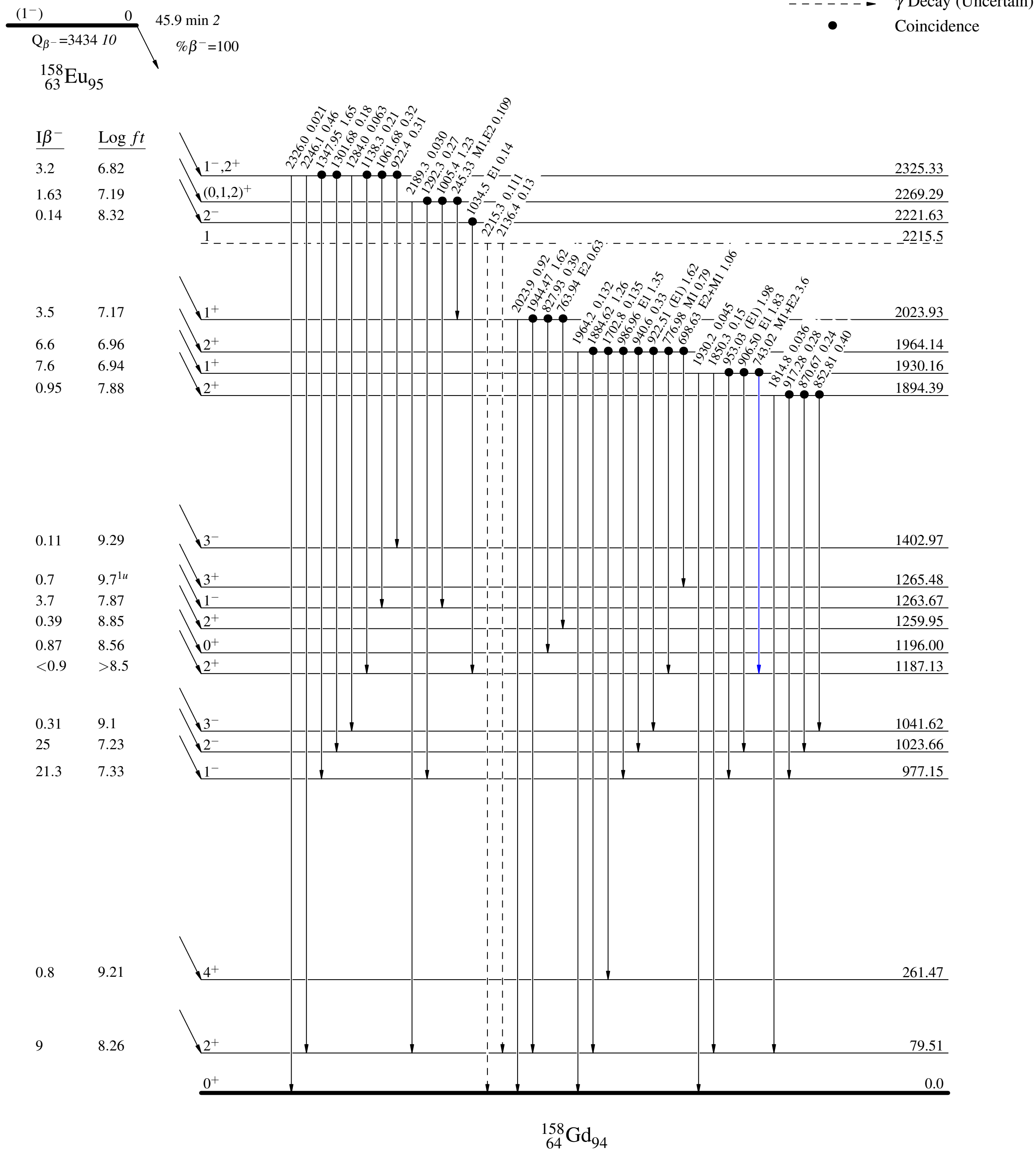


^{158}Eu β^- decay 1974Kl11,1975Bl03,1996Gr20

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ 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



^{158}Eu β^- decay 1974Kl11,1975Bl03,1996Gr20

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided