^{142}Gd ε decay 1991Fi03,1988Tu03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112, 1949 (2011)	1-Jun-2010

Parent: ^{142}Gd: E=0.0; $J^\pi=0^+$; $T_{1/2}$=70.2 s *6*; Q(ε)=4360 *40*; %ε+%β^+ decay=100.0

Identification: mass-separator (1991Fi03,1988GiZV), excit (1988Tu03).

Measured: γ, γ-K x ray coin (1991Fi03,1988GiZV,1988Tu03,1973VaYZ), ce, $\gamma\gamma$ (1988Tu03).

1988GiZV: same authors as 1991Fi03.

^{142}Eu Levels

E(level)†	J^π	E(level)†	J^π	E(level)†	E(level)†
0.0	1^+	550.60 *10*	+	732.07 *7*	1480.9 *10*
178.87 *5*	$(2)^-$	585.84 *10*		750.33 *8*	1485.9 *10*
280.33 *7*	$1^+,2^+$	591.23 *8*		935.59 *8*	1779.01 *8*
284.26 *5*	$0^+,1^+,2^+$	614.52 *7*	+	1000.20 *10*	1948.6 *3*
496.45 *11*		619.72 *10*		1210.23? *25*	1956.6 *3*
503.23 *6*	+	631.70 *10*		1383.28 *12*	2025.59 *21*
526.30 *7*	+	660.89 *8*		1412.94 *8*	2160.9 *10*
544.53 *12*		704.93 *10*		1438.33 *7*	

† From least-squares fit to Eγ.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(2.20×10^3 *4*)	2160.9	0.015	0.20	6.1	0.22	av Eβ=535 *18*; εK=0.783 *7*; εL=0.1153 *10*; εM+=0.0334 *3*
(2.33×10^3 *4*)	2025.59	0.07	0.6	5.7	0.7	av Eβ=595 *18*; εK=0.760 *8*; εL=0.1117 *12*; εM+=0.0324 *4*
(2.40×10^3 *4*)	1956.6	0.09	0.7	5.7	0.8	av Eβ=625 *18*; εK=0.747 *8*; εL=0.1097 *13*; εM+=0.0318 *4*
(2.41×10^3 *4*)	1948.6	0.11	0.89	5.6	1.0	av Eβ=629 *18*; εK=0.745 *9*; εL=0.1094 *13*; εM+=0.0317 *4*
(2.58×10^3 *4*)	1779.01	0.99	5.3	4.8	6.3	av Eβ=704 *18*; εK=0.709 *10*; εL=0.1038 *15*; εM+=0.0301 *5*
(2.87×10^3 *4*)	1485.9	0.027	0.083	6.7	0.11	av Eβ=836 *18*; εK=0.636 *11*; εL=0.0928 *16*; εM+=0.0269 *5*
(2.88×10^3 *4*)	1480.9	0.084	0.26	6.3	0.34	av Eβ=838 *18*; εK=0.634 *11*; εL=0.0926 *16*; εM+=0.0268 *5*
(2.92×10^3 *4*)	1438.33	1.9	5.5	4.9	7.4	av Eβ=857 *18*; εK=0.623 *11*; εL=0.0909 *16*; εM+=0.0263 *5*
(2.95×10^3 *4*)	1412.94	0.86	2.3	5.3	3.2	av Eβ=868 *18*; εK=0.616 *11*; εL=0.0899 *16*; εM+=0.0260 *5*
(2.98×10^3 *4*)	1383.28	0.12	0.33	6.2	0.45	av Eβ=882 *18*; εK=0.608 *11*; εL=0.0887 *16*; εM+=0.0257 *5*
(3.15×10^3 *4*)	1210.23?	0.080	0.16	6.5	0.24	av Eβ=960 *19*; εK=0.561 *11*; εL=0.0818 *17*; εM+=0.0237 *5*
(3.36×10^3 *4*)	1000.20	0.72	1.1	5.8	1.8	av Eβ=1055 *19*; εK=0.505 *11*; εL=0.0734 *16*; εM+=0.0212 *5*
(3.42×10^3 *4*)	935.59	0.38	0.53	6.1	0.91	av Eβ=1085 *19*; εK=0.488 *11*; εL=0.0709 *16*; εM+=0.0205 *5*
(3.61×10^3 *4*)	750.33	0.81	0.89	5.9	1.7	av Eβ=1169 *19*; εK=0.441 *10*; εL=0.0640 *15*; εM+=0.0185 *5*
(3.63×10^3 *4*)	732.07	0.646	0.694	6.0	1.34	av Eβ=1178 *19*; εK=0.436 *10*; εL=0.0634 *15*; εM+=0.0183 *5*
(3.66×10^3 *4*)	704.93	0.43	0.45	6.2	0.88	av Eβ=1190 *19*; εK=0.430 *10*; εL=0.0624 *15*; εM+=0.0180 *5*
(3.70×10^3 *4*)	660.89	0.39	0.38	6.3	0.77	av Eβ=1210 *19*; εK=0.419 *10*; εL=0.0608 *14*; εM+=0.0176 *4*
(3.73×10^3 *4*)	631.70	0.659	0.631	6.1	1.29	av Eβ=1224 *19*; εK=0.412 *10*; εL=0.0598 *14*; εM+=0.0173 *4*
(3.74×10^3 *4*)	619.72	0.966	0.914	5.9	1.88	av Eβ=1229 *19*; εK=0.410 *10*; εL=0.0594 *14*; εM+=0.0172 *4*
(3.75×10^3 *4*)	614.52	0.3	0.3	6.4	0.6	av Eβ=1231 *19*; εK=0.408 *10*; εL=0.0592 *14*; εM+=0.0171 *4*
(3.77×10^3 *4*)	591.23	0.642	0.588	6.1	1.23	av Eβ=1242 *19*; εK=0.403 *10*; εL=0.0584 *14*; εM+=0.0169 *4*
(3.77×10^3 *4*)	585.84	0.49	0.45	6.3	0.94	av Eβ=1245 *19*; εK=0.402 *10*; εL=0.0583 *14*; εM+=0.0168 *4*
(3.81×10^3 *4*)	550.60	0.21	0.18	6.7	0.39	av Eβ=1261 *19*; εK=0.394 *10*; εL=0.0571 *14*; εM+=0.0165 *4*
(3.82×10^3 *4*)	544.53	0.25	0.21	6.6	0.46	av Eβ=1264 *19*; εK=0.392 *10*; εL=0.0569 *14*; εM+=0.0165 *4*
(3.83×10^3 *4*)	526.30	3.3	2.9	5.5	6.2	av Eβ=1272 *19*; εK=0.388 *9*; εL=0.0563 *14*; εM+=0.0163 *4*
(3.86×10^3 *4*)	503.23	0.98	0.82	6.0	1.8	av Eβ=1283 *19*; εK=0.383 *9*; εL=0.0555 *13*; εM+=0.0161 *4*
(3.86×10^3 *4*)	496.45	0.066	0.054	7.2	0.12	av Eβ=1286 *19*; εK=0.382 *9*; εL=0.0553 *13*; εM+=0.0160 *4*
(4.08×10^3 *4*)	284.26	2.2	1.5	5.8	3.7	av Eβ=1383 *19*; εK=0.337 *8*; εL=0.0488 *12*; εM+=0.0141 *4*

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^{142}Gd ε decay 1991Fi03,1988Tu03 (continued)

ε,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I(ε+β^+)†	Comments
(4.08×10^3 *4*)	280.33	0.78	0.52	6.3	1.3	av Eβ=1385 *19*; εK=0.336 *8*; εL=0.0487 *12*; εM+=0.0141 *4*
(4.36×10^3 *4*)	0.0	34 *3*	18 *2*	4.79 *5*	52 *5*	av Eβ=1515 *19*; εK=0.285 *7*; εL=0.0413 *10*; εM+=0.0119 *3* Iε: from balance of Iγ with I(178.8γ)=11.2% *11* and decay scheme; others: Iε+Iβ^+=20.0% *8* (1988GiZV), 61% *33* (1988Tu03).

† Absolute intensity per 100 decays.

γ(^{142}Eu)

Iγ normalization: I(178.8γ)=11.2% *11* (1988GiZV).

E$_\gamma$‡	I$_\gamma$‡a	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.&	α†	Comments
101.4 *1*	0.92 *23*	280.33	$1^+,2^+$	178.87	$(2)^-$	[E1]	0.273	α(K)=0.230 *4*; α(L)=0.0342 *5*; α(M)=0.00736 *11*; α(N+..)=0.00192 *3* α(N)=0.001656 *24*; α(O)=0.000249 *4*; α(P)=1.92×10^{-5} *3*
105@ *1*	≈1	631.70		526.30	$^+$			
136@ *1*	≈1	631.70		496.45				
178.9 *1*	100.0 *15*	178.87	$(2)^-$	0.0	1^+	E1	0.0590	α(K)=0.0500 *7*; α(L)=0.00706 *10*; α(M)=0.001517 *22*; α(N+..)=0.000401 *6* α(N)=0.000344 *5*; α(O)=5.28×10^{-5} *8*; α(P)=4.51×10^{-6} *7* Mult.: α(K)exp=0.044 *5*.
203@ *1*	≈0.8	935.59		732.07				
212.2 *1*	1.53 *15*	496.45		284.26	$0^+,1^+,2^+$			
216@ *1*	≈0.5	496.45		280.33	$1^+,2^+$			
222.8 *1*	14.4 *6*	503.23	$^+$	280.33	$1^+,2^+$	M1+E2	0.173 *23*	α(K)=0.14 *3*; α(L)=0.028 *5*; α(M)=0.0061 *11*; α(N+..)=0.0016 *3* α(N)=0.00139 *24*; α(O)=0.000208 *25*; α(P)=1.4×10^{-5} *5* Mult.: α(K)exp=0.138 *15*, K/L=4.1 *8*; δ=1.0 *+9−3* (from α(K)exp).
228.1@ *1*	≈0.9	732.07		503.23	$^+$			
^{x}238.8 *1*	1.3 *2*							
241.7 *2*	1.5 *4*	526.30	$^+$	284.26	$0^+,1^+,2^+$	M1	0.1570	α(K)=0.1331 *19*; α(L)=0.0187 *3*; α(M)=0.00404 *6*; α(N+..)=0.001087 *16* α(N)=0.000926 *14*; α(O)=0.0001470 *21*; α(P)=1.463×10^{-5} *21* Mult.: α(K)exp=0.18 *5*.
247.2 *1*	1.60 *23*	750.33		503.23	$^+$			
264.2 *1*	4.1 *3*	544.53		280.33	$1^+,2^+$			
274.3# *4*	#	1210.23?		935.59				
280.3 *1*	35.9 *8*	280.33	$1^+,2^+$	0.0	1^+	E2+M1	0.089 *17*	α(K)=0.072 *18*; α(L)=0.0129 *4*; α(M)=0.00285 *15*; α(N+..)=0.00075 *3* α(N)=0.00065 *3*; α(O)=9.82×10^{-5} *14*; α(P)=7.4×10^{-6} *24* Mult.: α(K)exp=0.060 *6*; δ>1.5 (from α(K)exp).

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^{142}Gd ε decay 1991Fi03,1988Tu03 (continued)

γ(^{142}Eu) (continued)

E_γ[‡]	I_γ[‡][a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
284.4 *1*	55.0 *15*	284.26	$0^+,1^+,2^+$	0.0	1^+	M1	0.1014	α(K)=0.0860 *12*; α(L)=0.01205 *17*; α(M)=0.00260 *4*; α(N+..)=0.000699 *10* α(N)=0.000595 *9*; α(O)=9.46×10^{-5} *14*; α(P)=9.43×10^{-6} *14* Mult.: α(K)exp=0.083 *9*, K/L=9.2 *23*.
306.9 *1*	7.2 *5*	591.23		284.26	$0^+,1^+,2^+$			
330.4 *1*	2.9 *5*	614.52	$+$	284.26	$0^+,1^+,2^+$			
335[@] *1*	≈2	614.52	$+$	280.33	$1^+,2^+$			
336[@] *1*	≈0.5	619.72		284.26	$0^+,1^+,2^+$			
347.6 *1*	4.0 *6*	526.30	$+$	178.87	$(2)^-$			
[x]375.4 *1*	2.5 *3*							
407.0 *1*	4.8 *4*	585.84		178.87	$(2)^-$			
448.2 *1*	1.8 *4*	732.07		284.26	$0^+,1^+,2^+$			
466[@] *1*		750.33		284.26	$0^+,1^+,2^+$			
472[@] *1*	≈1	750.33		280.33	$1^+,2^+$			
482.0 *1*	2.6 *5*	660.89		178.87	$(2)^-$			I_γ: from level scheme (1991Fi03).
503.0 *1*	6.4 *15*	503.23	$+$	0.0	1^+			
526.2 *1*	52.7 *15*	526.30	$+$	0.0	1^+	E2	0.01170	α(K)=0.00960 *14*; α(L)=0.001646 *23*; α(M)=0.000362 *5*; α(N+..)=9.55×10^{-5} *14* α(N)=8.21×10^{-5} *12*; α(O)=1.252×10^{-5} *18*; α(P)=9.60×10^{-7} *14* Mult.: α(K)exp=0.010 *2*.
550.6 *1*	6.4 *7*	550.60	$+$	0.0	1^+	E2	0.01041	α(K)=0.00857 *12*; α(L)=0.001443 *21*; α(M)=0.000317 *5*; α(N+..)=8.37×10^{-5} *12* α(N)=7.19×10^{-5} *10*; α(O)=1.100×10^{-5} *16*; α(P)=8.60×10^{-7} *12* Mult.: α(K)exp=0.011 *4*.
553[@] *1*	≈5	732.07		178.87	$(2)^-$			
572[@] *1*	≈5	750.33		178.87	$(2)^-$			
585.7 *2*	4.7 *6*	585.84		0.0	1^+			
591.3 *1*	9.8 *7*	591.23		0.0	1^+			
595.9[#] *3*	2.1[#] *15*	1210.23?		614.52	$+$			
614.5 *1*	13.0 *8*	614.52	$+$	0.0	1^+	E2	0.00790 *11*	α=0.00790 *11*; α(K)=0.00655 *10*; α(L)=0.001060 *15*; α(M)=0.000232 *4*; α(N+..)=6.15×10^{-5} *9* α(N)=5.27×10^{-5} *8*; α(O)=8.11×10^{-6} *12*; α(P)=6.63×10^{-7} *10* Mult.: α(K)exp=0.007 *2*.
619.7 *1*	18.3 *8*	619.72		0.0	1^+			
631.7 *1*	9.5 *8*	631.70		0.0	1^+			
651.3 *1*	2.9 *4*	935.59		284.26	$0^+,1^+,2^+$			
660.9 *1*	4.3 *5*	660.89		0.0	1^+			
704.9 *1*	7.9 *22*	704.93		0.0	1^+			
732.4 *1*	5.1 *4*	732.07		0.0	1^+			
750.2 *1*	7.2 *7*	750.33		0.0	1^+			
821[@] *1*	≈2	1000.20		178.87	$(2)^-$			
823.9 *1*	10.8 *25*	1438.33		614.52	$+$			
853[@] *1*	≈1.1	1438.33		585.84				

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^{142}Gd ε decay 1991Fi03,1988Tu03 (continued)

γ(^{142}Eu) (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J^π_i	E_f	J^π_f
862[@] *1*	≈3	1412.94		550.60	$^+$
[x]886.3[#] *2*	2.9[#] *13*				
910.0 *1*	2.4 *5*	1412.94		503.23	$^+$
912.0[#] *2*	2.9[#] *6*	1438.33		526.30	$^+$
935.6 *1*	4.4 *5*	935.59		0.0	1^+
1000.2 *1*	14 *2*	1000.20		0.0	1^+
1073.6[#] *4*	[#]	1779.01		704.93	
1133[@] *1*	≈1.3	1412.94		280.33	$1^+,2^+$
1153.8 *1*	2.1 *5*	1438.33		284.26	$0^+,1^+,2^+$
1158[@] *1*	≈2	1779.01		619.72	
1187[@] *1*	≈6	1779.01		591.23	
1204.4 *1*	4 *2*	1383.28		178.87	$(2)^-$
1233.9 *1*	15.0 *8*	1412.94		178.87	$(2)^-$
1259.6 *1*	38.2 *15*	1438.33		178.87	$(2)^-$
1275[@] *1*	≈2	1779.01		503.23	$^+$
1302[@] *1*	≈3	1480.9		178.87	$(2)^-$
1307[@] *1*	≈1	1485.9		178.87	$(2)^-$
1412.4 *2*	6.8 *15*	1412.94		0.0	1^+
1438.4 *2*	11 *4*	1438.33		0.0	1^+
1495.0 *2*	5.9 *15*	1779.01		284.26	$0^+,1^+,2^+$
1599.7 *2*	18 *3*	1779.01		178.87	$(2)^-$
1779.1 *1*	22.1 *23*	1779.01		0.0	1^+
1846.7 *2*	6 *3*	2025.59		178.87	$(2)^-$
1948.6 *3*	9 *4*	1948.6		0.0	1^+
1956.6 *3*	7 *3*	1956.6		0.0	1^+
1982[@] *1*	≈2	2160.9		178.87	$(2)^-$

[†] Additional information 1.

[‡] From 1991Fi03.

[#] From 1988Tu03.

[@] Observed only in coincidence (1991Fi03).

[&] α(K)exp were normalized to data on Iγ and ce(K) in ^{207}Bi source as standard (1988Tu03).

[a] For absolute intensity per 100 decays, multiply by 0.112 *11*.

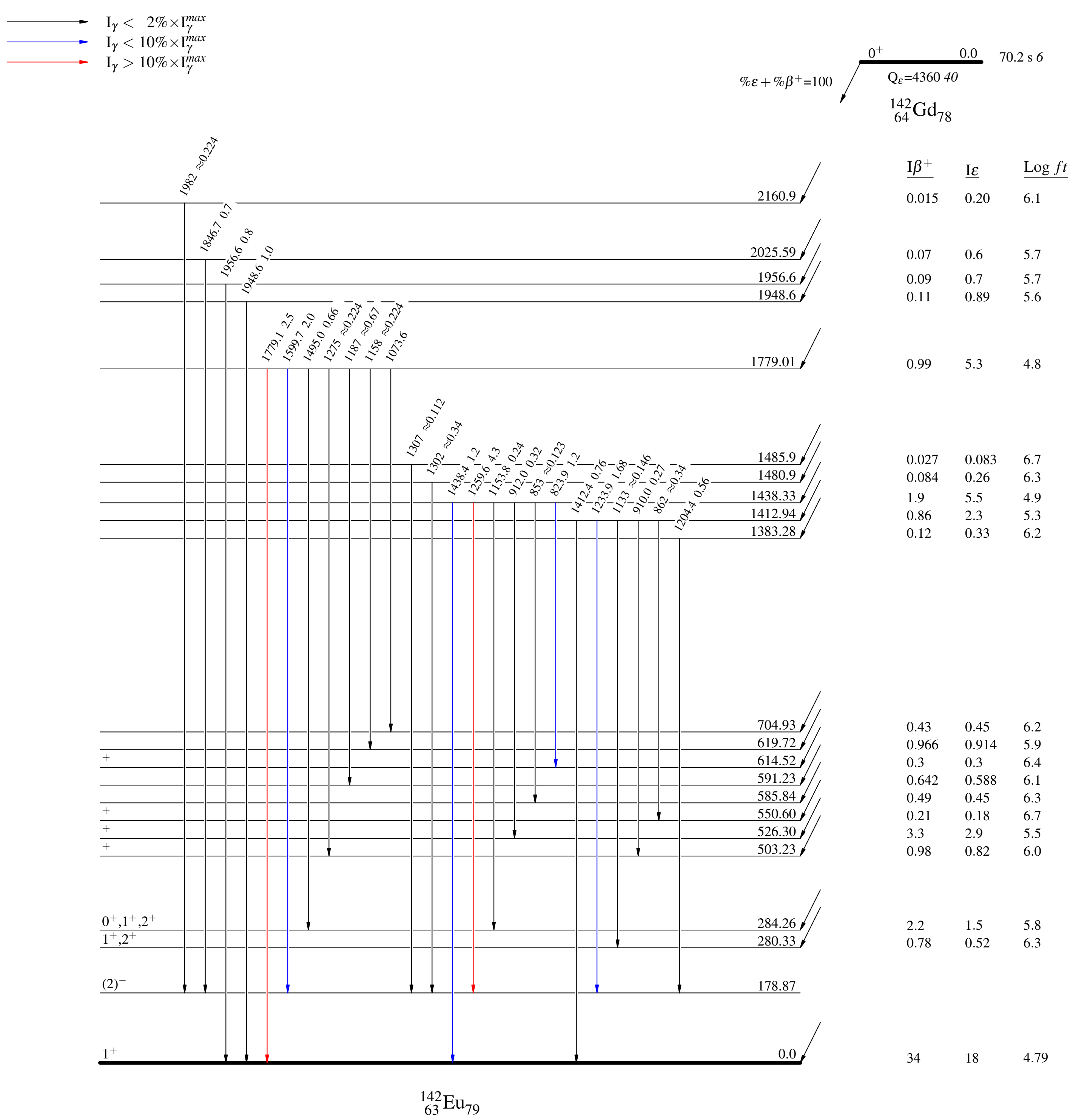
[x] γ ray not placed in level scheme.

^{142}Gd ε decay 1991Fi03,1988Tu03

Decay Scheme

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

Legend



		$I\beta^+$	$I\varepsilon$	Log ft
	2160.9	0.015	0.20	6.1
	2025.59	0.07	0.6	5.7
	1956.6	0.09	0.7	5.7
	1948.6	0.11	0.89	5.6
	1779.01	0.99	5.3	4.8
	1485.9	0.027	0.083	6.7
	1480.9	0.084	0.26	6.3
	1438.33	1.9	5.5	4.9
	1412.94	0.86	2.3	5.3
	1383.28	0.12	0.33	6.2
	704.93	0.43	0.45	6.2
	619.72	0.966	0.914	5.9
+	614.52	0.3	0.3	6.4
	591.23	0.642	0.588	6.1
	585.84	0.49	0.45	6.3
+	550.60	0.21	0.18	6.7
+	526.30	3.3	2.9	5.5
+	503.23	0.98	0.82	6.0
$0^+,1^+,2^+$	284.26	2.2	1.5	5.8
$1^+,2^+$	280.33	0.78	0.52	6.3
$(2)^-$	178.87			
1^+	0.0	34	18	4.79

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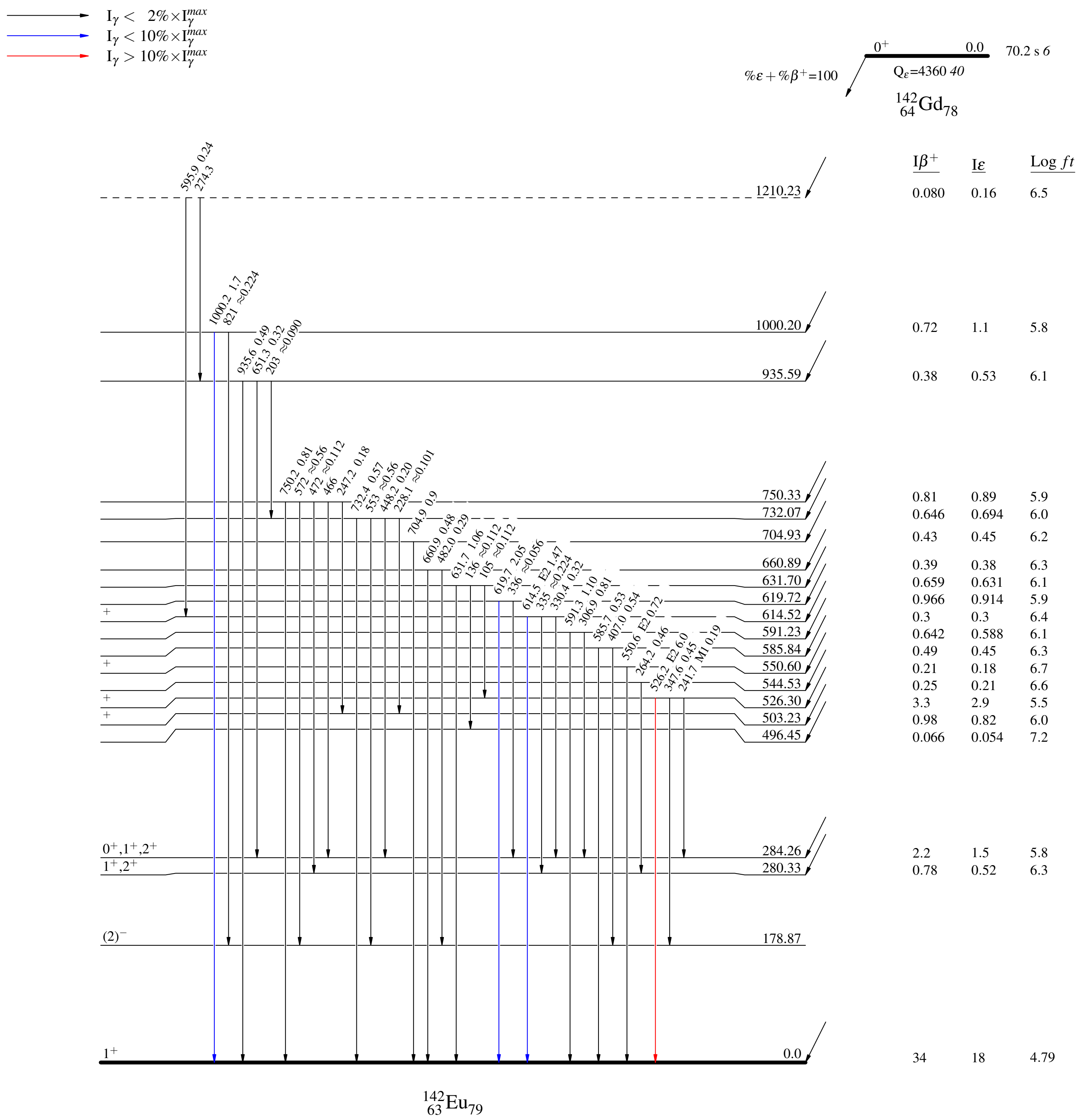
Decay Scheme (continued)

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

Legend



^{142}Gd ε decay 1991Fi03,1988Tu03

Decay Scheme (continued)

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