^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200,2 (2025)	22-Aug-2022

Parent: ^{154}Tb: E=0.0; J$^\pi$=0; T$_{1/2}$=21.5 h *4*; Q(ε)=3550 *50*; %ε+%β^+ decay=?
^{154}Tb-J$^\pi$: Additional information 1.
^{154}Tb-T$_{1/2}$: Additional information 2.
^{154}Tb-Q($\varepsilon+\beta^+$): Additional information 3.
^{154}Tb-Q($\varepsilon+\beta^+$): From 2021Wa16.
Additional information 4.
2013Be38 and 2014BeZX compiled for the XUNDL database by M. S. Basunia (LBNL).
Three ^{154}Tb isomers (21.5, 9.4, and 22.7 h) have been observed. The most complete decomposition of the γ data among these isomers is from 1975So03, so these data are used to place the γ's.
A study of the ^{154}Tb isomers is reported as a part of the thesis which constitutes 2001KuZS. These data are not included here, since further analysis appears to be required.
1975So03: ^{154}Tb from ^{153}Eu(α,3n) reaction on enriched (99%) target at 36 MeV, same reaction on natural Eu target at 38 MeV with chemical and isotope separations, and ^{155}Gd(p,2n) reaction on enriched (91.8%) target at 15 MeV. Measured γ singles and $\gamma\gamma$ coincidences with Ge detectors. Report 159 γ's from 9.4-h decay, 155 γ's from 21.5-h decay, and 51 γ's from 22.7-h decay.
2013Be38, 2014BeZX: ^{154}Tb isomer populated by ^{154}Gd(p,n) reaction with E$_p$=12 MeV at Tandem accelerator of University of Cologne. Measured off beam γ and $\gamma\gamma$ spectra with 14 HPGe detectors and reported γ-ray branching ratios for five levels. Deduced reduced transition strengths combining data of resonant photon-scattering cross sections for ^{154}Gd(γ,γ') reaction (see dataset). Theory: Calculated Nuclear Matrix Elements (NME) for neutrinoless double beta decay. Interacting Boson Model (IBM-2) and Energy Density Functional (EDF) model calculations.
Others: 1961Ha23, 1969Ba16, 1969Cl11, 1970Ag02, 1971Ri08, 1973Ba20, 1973La20, 1975Gr44, 1977Ya04, 1978We08, 1980By03, 1981Fe01.
The 2009Re14 evaluation presents a normalization of this level scheme deduced based on the γ-ray intensity balance and the ratio Iβ^+(681)/Iβ^+(g.s.)=0.31 measured by 1970Ag02, as well as the log *ft* > 8.5 limits for both these branches. However, without a more secure determination of I($\varepsilon+\beta^+$)(g.s.), this gives only a plausible version of the $\varepsilon+\beta^+$ decay scheme. In order to prompt remeasuring this decay scheme, this evaluation does no longer present the $\varepsilon+\beta^+$ data.
1970Ag02 measured end point energies of 2450 *50* and 1860 *50* for beta decays to g.s. and 671 levels, respectively.

^{154}Gd Levels

Additional information 5.

E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]
0.0[a]	0$^+$	1414.59[e] *8*	1$^-$
123.064[a] *24*	2$^+$	1418.23 *13*	2$^+$
371.01[a] *4*	4$^+$	1531.41[f] *11*	2$^+$
680.70[b] *5*	0$^+$	1559.11[e] *6*	(4$^-$)
717.56[@a] *17*	6$^+$	2080.79 *8*	4$^+$[&]
815.48[b] *4*	2$^+$	2119.61[‡] *5*	1$^+$,2$^+$
996.30[c] *4*	2$^+$	2186.0?	4$^-$
1047.56[b] *5*	4$^+$	2187.17 *9*	1$^+$
1127.75[c] *5*	3$^+$	2305.61 *10*	3$^+$
1182.1 *7*	0$^+$	2336.11 *15*	3$^-$
1241.37[d] *9*	1$^-$	2342.67 *16*	1,2$^+$
1251.82[d] *13*	3$^-$	2369.0[@] *6*	2$^+$,3,4$^+$
1263.64[@c] *19*	4$^+$	2402.02 *21*	1,2$^+$
1397.505[e] *25*	2$^-$	2430.66 *7*	1,2$^+$

Continued on next page (footnotes at end of table)

^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04 (continued)

^{154}Gd Levels (continued)

E(level)†	Jπ#	$T_{1/2}$	Comments
2468.4 *3*	1,2$^+$		
2486.40 *12*	1,2$^+$		
2500.0 *6*	2$^+$		
2590.02 *20*	(1,2)$^+$		
2654.69 *15*	2$^+$		
2722.59 *10*	1,2$^+$		
2734.2 *4*	1$^+$,2$^+$		
2788.91 *17*	1,2$^+$		
2851.1 *7*	2$^+$		
2872.1 *6*	2$^+$		
2934.2 *4*	1$^+$	2.07 fs *23*	$T_{1/2}$: from Γ=0.221 eV *25* (2014BeZX), calculated from Γ_0=0.153 eV *17* (2014BeZX), and total branching ratio of 2934, 1.442 *9*. E(level): Identified as scissors mode state in (γ,γ′) dataset (2013Be38).
2949.7 *3*	(1$^+$)	3.1 fs *7*	$T_{1/2}$: from Γ=0.150 eV *35* (2014BeZX), calculated from Γ_0=0.062 eV *14* (2014BeZX), and total branching ratio of 2950, 2.412 *172*.
2989.89 *20*	1,2$^+$		
3009.7 *4*	1,2$^+$		
3022.78 *17*	2$^+$		
3032.2 *7*	1,2$^+$		
3090.3 *5*	1$^+$	2.0 fs *4*	$T_{1/2}$: from Γ=0.230 eV *48* (2014BeZX), calculated from Γ_0=0.130 eV *27* (2014BeZX), and total branching ratio of 3090, 1.770 *28*.
3122.8 *6*	1$^+$	5.4 fs *26*	$T_{1/2}$: from Γ=0.085 eV *40* (2014BeZX), calculated from Γ_0=0.044 eV *21* (2014BeZX), and total branching ratio of 3122, 1.923 *11*.
3162.7 *12*	1,2$^+$		
3184.9 *6*	1,2$^+$		
3264.0 *7*	1,2$^+$		
3294.2 *7*	1,2$^+$		
3327.3 *6*	1,2$^+$		
3345.9 *10*	1,2$^+$		
3350.7 *9*	1,2$^+$		
3415.0 *4*	1,2$^+$		

† From least-squares fit to γ energies.
‡ Previously proposed as a $K^\pi=1^+$ bandhead, but the evaluator has not adopted this proposal.
# From ^{154}Gd Adopted Levels.
@ Level included to account for populating γ assigned by 1975So03 to this activity.
& There are Adopted Levels of 4^+ at 2080.2 and 3^- at 2080.8.
a Band(A): $K^\pi=0^+$ ground-state band.
b Band(B): $K^\pi=0^+$ band. Probable β-vibrational band.
c Band(C): $K^\pi=2^+$ γ-vibrational band.
d Band(D): $K^\pi=0^-$ octupole-vibrational band.
e Band(E): $K^\pi=1^-$ octupole-vibrational band.
f Band(F): $K^\pi=2^+$ band.

γ(^{154}Gd)

Iγ values are not given for several γ's by 1975So03. These γ's are known from other studies to deexcite levels observed in this decay, but for various reasons are not seen in this decay (1975So03).

E_γ[‡#]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	α[†]	Comments
123.07 *3*	364 *55*	123.064	2+	0.0	0+	E2	1.187 *17*	α(K)=0.656 *9*; α(L)=0.411 *6*; α(M)=0.0963 *14* α(N)=0.02153 *30*; α(O)=0.00286 *4*; α(P)=3.36×10^{-5} *5* I_γ: This value gives I(γ+ce)(123)=796 *120* units. A more precise value of 851 *24* is obtained from the feeding of this level, with the reasonable assumption that there is no $\varepsilon+\beta^+$ feeding. α: Calculated value. From ^{154}Eu β^- decay, this value is measured to be 1.197 *14*. See the comment there on this value.
(232.10 *4*)		1047.56	4+	815.48	2+	E2	0.1359 *19*	α(K)=0.0986 *14*; α(L)=0.0290 *4*; α(M)=0.00663 *9* α(N)=0.001494 *21*; α(O)=0.0002077 *29*; α(P)=5.86×10^{-6} *8*
247.94 *3*	24 *12*	371.01	4+	123.064	2+	E2	0.1098 *15*	α(K)=0.0809 *11*; α(L)=0.02244 *31*; α(M)=0.00513 *7* α(N)=0.001156 *16*; α(O)=0.0001616 *23*; α(P)=4.87×10^{-6} *7*
(330.00 *16*)		1047.56	4+	717.56	6+	E2	0.0451 *6*	α(K)=0.0350 *5*; α(L)=0.00786 *11*; α(M)=0.001773 *25* α(N)=0.000401 *6*; α(O)=5.75×10^{-5} *8*; α(P)=2.224×10^{-6} *31*
x429.82 *24*	7.5 *25*							
444.54 *7*	13.4 *25*	815.48	2+	371.01	4+	E2	0.01914 *27*	α(K)=0.01540 *22*; α(L)=0.00292 *4*; α(M)=0.000650 *9* α(N)=0.0001479 *21*; α(O)=2.168×10^{-5} *30*; α(P)=1.020×10^{-6} *14*
470.3 *6*	5.7 *6*	2590.02	(1,2)+	2119.61	1+,2+	M1	0.0296 *4*	α(K)=0.0251 *4*; α(L)=0.00349 *5*; α(M)=0.000757 *11* α(N)=0.0001742 *25*; α(O)=2.71×10^{-5} *4*; α(P)=1.840×10^{-6} *26*
x489.0 *6*	3.2 *3*							
536.11 *21*	18.5 *25*	3022.78	2+	2486.40	1,2+			
557.60 *6*	76 *5*	680.70	0+	123.064	2+	E2	0.01053 *15*	α(K)=0.00863 *12*; α(L)=0.001479 *21*; α(M)=0.000327 *5* α(N)=7.46×10^{-5} *10*; α(O)=1.110×10^{-5} *16*; α(P)=5.84×10^{-7} *8*
587.8 *5*	6.3 *7*	2119.61	1+,2+	1531.41	2+	[M1,E2]	0.013 *4*	α(K)=0.0109 *34*; α(L)=0.00162 *35*; α(M)=0.00035 *7* α(N)=8.1×10^{-5} *17*; α(O)=1.24×10^{-5} *29*; α(P)=7.8×10^{-7} *26*
602.67[a] *24*	3.5[a] *5*	1418.23	2+	815.48	2+	E0+M1+E2	0.012 *4*	α(K)=0.0103 *31*; α(L)=0.00152 *33*; α(M)=0.00033 *7* α(N)=7.6×10^{-5} *16*; α(O)=1.17×10^{-5} *27*; α(P)=7.3×10^{-7} *25* α: From the adopted values. The listed subshell coefficients do not include a contribution from the E0 component.
602.67[a] *24*	3.5[a] *5*	2722.59	1,2+	2119.61	1+,2+			
625.19 *22*	2.3 *1*	996.30	2+	371.01	4+	E2	0.00792 *11*	α(K)=0.00655 *9*; α(L)=0.001075 *15*; α(M)=0.0002367 *33* α(N)=5.41×10^{-5} *8*; α(O)=8.11×10^{-6} *11*; α(P)=4.47×10^{-7} *6*
653.8[ab] *5*	1.3[a] *6*	2989.89	1,2+	2336.11	3−			E_γ: Poor energy fit.
653.8[a] *5*	1.3[a] *6*	3022.78	2+	2369.0	2+,3,4+			

From ENSDF

$^{154}_{64}$Gd$_{90}$-3

γ(^{154}Gd) (continued)

E_γ‡#	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.@	δ@	α†	$I_{(\gamma+ce)}$	Comments
676.55 *7*	2.5 *7*	1047.56	4+	371.01	4+	E0+M1+E2	+2.9 *4*	0.00712 *19*		α(K)=0.00594 *17*; α(L)=0.000925 *21*; α(M)=0.000203 *4* α(N)=4.64×10^{-5} *10*; α(O)=7.02×10^{-6} *16*; α(P)=4.11×10^{-7} *13* α: Deduced from α(K)exp=0.044 *3*. See the Adopted Gammas data set. δ: From ^{154}Eu β^- decay.
680.7 *1*		680.70	0+	0.0	0+	E0			1.0 *5*	$I_{(\gamma+ce)}$: From I(ce(K) 680)/I(ce(K) 557)=1.5 *7* from several measurements and I(ce(K) 557)=0.66.
x687 *1*	0.9 *4*									
692.41 *4*	44.8 *28*	815.48	2+	123.064	2+	E0+M1+E2	7.5 *4*	0.00629 *9*		α(K)=0.00524 *7*; α(L)=0.000828 *12*; α(M)=0.0001815 *25* α(N)=4.15×10^{-5} *6*; α(O)=6.27×10^{-6} *9*; α(P)=3.60×10^{-7} *5* α: From the adopted values. The listed subshell coefficients do not include a contribution from the E0 component.
701.0 *5*	6.9 *8*	2119.61	1+,2+	1418.23	2+	M1		0.01084 *15*		α(K)=0.00923 *13*; α(L)=0.001267 *18*; α(M)=0.000274 *4* α(N)=6.30×10^{-5} *9*; α(O)=9.82×10^{-6} *14*; α(P)=6.71×10^{-7} *9*
704.90 *11*	67 *4*	2119.61	1+,2+	1414.59	1−	E1		2.25×10^{-3} *3*		α(K)=0.001928 *27*; α(L)=0.000256 *4*; α(M)=5.50×10^{-5} *8* α(N)=1.261×10^{-5} *18*; α(O)=1.946×10^{-6} *27*; α(P)=1.285×10^{-7} *18*
715.8	11.5 *12*	1531.41	2+	815.48	2+	E0,M1,E2		0.0080 *23*		α(K)=0.0068 *20*; α(L)=0.00098 *23*; α(M)=0.00021 *5* α(N)=4.9×10^{-5} *11*; α(O)=7.5×10^{-6} *18*; α(P)=4.8×10^{-7} *15* α: From the adopted values. The listed subshell coefficients do not include a contribution from the E0 component.
722.12 *8*	108 *7*	2119.61	1+,2+	1397.505	2−	[E1]		2.14×10^{-3} *3*		α(K)=0.001835 *26*; α(L)=0.0002431 *34*; α(M)=5.23×10^{-5} *7* α(N)=1.199×10^{-5} *17*; α(O)=1.851×10^{-6} *26*; α(P)=1.224×10^{-7} *17*
756.71 *6*	4.6 *10*	1127.75	3+	371.01	4+	E2+M1	−6.1 *3*	0.00516 *7*		α(K)=0.00431 *6*; α(L)=0.000663 *9*;

γ(^{154}Gd) (continued)

E_γ [‡#]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	δ [@]	α [†]	Comments
									α(M)=0.0001450 *20* α(N)=3.32×10^{-5} *5*; α(O)=5.03×10^{-6} *7*; α(P)=2.97×10^{-7} *4* δ: From ^{154}Eu β^- decay.
[x]789.5 *9*	3.7 *7*								
815.49 *7*	12.2 *13*	815.48	2$^+$	0.0	0$^+$	E2		0.00427 *6*	α(K)=0.00358 *5*; α(L)=0.000543 *8*; α(M)=0.0001185 *17* α(N)=2.71×10^{-5} *4*; α(O)=4.12×10^{-6} *6*; α(P)=2.469×10^{-7} *35*
850.54 *13*	11.5 *9*	1531.41	2$^+$	680.70	0$^+$	E2		0.00389 *5*	α(K)=0.00327 *5*; α(L)=0.000490 *7*; α(M)=0.0001069 *15* α(N)=2.449×10^{-5} *34*; α(O)=3.73×10^{-6} *5*; α(P)=2.256×10^{-7} *32*
[x]863.2 *25*	2.5 *10*								
873.21 *4*	74 *7*	996.30	2$^+$	123.064	2$^+$	E0+M1+E2	−9.4 *4*	0.00371 *5*	α(K)=0.00311 *4*; α(L)=0.000463 *6*; α(M)=0.0001010 *14* α(N)=2.314×10^{-5} *32*; α(O)=3.53×10^{-6} *5*; α(P)=2.153×10^{-7} *30*
878.3 *2*	39.5 *24*	2119.61	1$^+$,2$^+$	1241.37	1$^-$	[E1]		1.45×10^{-3} *2*	α(K)=0.001246 *17*; α(L)=0.0001635 *23*; α(M)=3.51×10^{-5} *5* α(N)=8.06×10^{-6} *11*; α(O)=1.248×10^{-6} *17*; α(P)=8.35×10^{-8} *12*
(880.6 *6*)		1251.82	3$^-$	371.01	4$^+$	E1+M2	+0.07 *3*	0.00152 *8*	α(K)=0.00130 *6*; α(L)=0.000172 *10*; α(M)=3.69×10^{-5} *21* α(N)=8.5×10^{-6} *5*; α(O)=1.31×10^{-6} *7*; α(P)=8.8×10^{-8} *5*
924.6 *3*	<1	1047.56	4$^+$	123.064	2$^+$	E2		0.00325 *5*	α(K)=0.00274 *4*; α(L)=0.000402 *6*; α(M)=8.76×10^{-5} *12* α(N)=2.008×10^{-5} *28*; α(O)=3.07×10^{-6} *4*; α(P)=1.892×10^{-7} *27*
945.8[a] *4*	5.8[a] *5*	2187.17	1$^+$	1241.37	1$^-$	[E1]		1.26×10^{-3} *2*	α(K)=0.001081 *15*; α(L)=0.0001415 *20*; α(M)=3.04×10^{-5} *4* α(N)=6.98×10^{-6} *10*; α(O)=1.080×10^{-6} *15*; α(P)=7.26×10^{-8} *10*
945.8[a] *4*	5.8[a] *5*	2342.67	1,2$^+$	1397.505	2$^-$				
(953.18 *13*)		2080.79	4$^+$	1127.75	3$^+$	M1,E2		0.0041 *11*	
[x]956.9 *7*	3.2 *6*								
996.24 *6*	69 *7*	996.30	2$^+$	0.0	0$^+$	E2		0.00277 *4*	α(K)=0.002342 *33*; α(L)=0.000339 *5*; α(M)=7.37×10^{-5} *10* α(N)=1.690×10^{-5} *24*; α(O)=2.59×10^{-6} *4*; α(P)=1.621×10^{-7} *23*
1004.73 *5*	11.2 *26*	1127.75	3$^+$	123.064	2$^+$	E2+M1	−7.4 *4*	0.00276 *4*	α(K)=0.002329 *33*; α(L)=0.000336 *5*; α(M)=7.30×10^{-5} *10* α(N)=1.675×10^{-5} *24*; α(O)=2.57×10^{-6} *4*; α(P)=1.615×10^{-7} *23* δ: From ^{154}Eu β^- decay.

$\gamma(^{154}$Gd) (continued)

E_{γ}[‡#]	I_{γ}	E_i(level)	J_i^{π}	E_f	J_f^{π}	Mult.[@]	α[†]	Comments
1016.0 *4*	5.8 *10*	2430.66	1,2$^+$	1414.59	1$^-$			
1033.30[a] *9*	6.2[a] *10*	2080.79	4$^+$	1047.56	4$^+$			
1033.30[a] *9*	6.2[a] *10*	2430.66	1,2$^+$	1397.505	2$^-$			
(1041.9 *2*)		2305.61	3$^+$	1263.64	4$^+$			
1047.22 *15*	13.0 *11*	1418.23	2$^+$	371.01	4$^+$	E2	2.50×10^{-3} *4*	α(K)=0.002114 *30*; α(L)=0.000303 *4*; α(M)=6.59×10^{-5} *9* α(N)=1.510×10^{-5} *21*; α(O)=2.317×10^{-6} *32*; α(P)=1.465×10^{-7} *21*
1053.9[a] *7*	1.8[a] *9*	2305.61	3$^+$	1251.82	3$^-$			
1053.9[a] *7*	1.8[a] *9*	2468.4	1,2$^+$	1414.59	1$^-$			
1058.34[b] *18*	11.7 *12*	2186.0?	4$^-$	1127.75	3$^+$			E_{γ}: γ placed by 1975So03 to this activity and level, but other γ's from this level are not seen and no feeding of it is observed.
(1084.21 *14*)		2080.79	4$^+$	996.30	2$^+$			
1118.03 *22*	34 *3*	1241.37	1$^-$	123.064	2$^+$	E1	9.28×10^{-4} *13*	α(K)=0.000793 *11*; α(L)=0.0001031 *14*; α(M)=2.214×10^{-5} *31* α(N)=5.08×10^{-6} *7*; α(O)=7.88×10^{-7} *11*; α(P)=5.34×10^{-8} *7*; α(IPF)=3.45×10^{-6} *5*
1123.09[&] *16*	80 *5*	2119.61	1$^+$,2$^+$	996.30	2$^+$	E2,M1	0.0028 *7*	α(K)=0.0024 *6*; α(L)=0.00033 *7*; α(M)=7.1×10^{-5} *15* α(N)=1.64×10^{-5} *35*; α(O)=2.5×10^{-6} *6*; α(P)=1.7×10^{-7} *4*; α(IPF)=7.4×10^{-7} *4*
1123.09[&] *16*	5 *5*	2654.69	2$^+$	1531.41	2$^+$			I_{γ}: Estimated by evaluator from intensity balance at 1531 level.
1128.77 *13*	2.5 *8*	1251.82	3$^-$	123.064	2$^+$	E1	9.14×10^{-4} *13*	α(K)=0.000780 *11*; α(L)=0.0001013 *14*; α(M)=2.175×10^{-5} *30* α(N)=4.99×10^{-6} *7*; α(O)=7.75×10^{-7} *11*; α(P)=5.25×10^{-8} *7*; α(IPF)=4.81×10^{-6} *7*
[x]1160.37 *8*	3.9 *12*							
[x]1175.0 *8*	3.3 *14*							
(1177.71 *19*)		2305.61	3$^+$	1127.75	3$^+$			
1188.10 *4*	3.9 *12*	1559.11	(4$^-$)	371.01	4$^+$			
1191.2[a] *8*	13[a] *4*	2187.17	1$^+$	996.30	2$^+$	[M1,E2]	0.0025 *5*	α(K)=0.0021 *5*; α(L)=0.00029 *6*; α(M)=6.2×10^{-5} *13* α(N)=1.43×10^{-5} *29*; α(O)=2.2×10^{-6} *5*; α(P)=1.5×10^{-7} *4*; α(IPF)=4.88×10^{-6} *27*
1191.2[ab] *8*	13[a] *4*	2722.59	1,2$^+$	1531.41	2$^+$			
[x]1218.6 *9*	2.3 *7*							
1241.44 *10*	39 *4*	1241.37	1$^-$	0.0	0$^+$	E1	8.10×10^{-4} *11*	α(K)=0.000658 *9*; α(L)=8.52×10^{-5} *12*; α(M)=1.827×10^{-5} *26* α(N)=4.20×10^{-6} *6*; α(O)=6.52×10^{-7} *9*; α(P)=4.43×10^{-8} *6*; α(IPF)=4.33×10^{-5} *6*
(1258.17 *14*)		2305.61	3$^+$	1047.56	4$^+$			
(1265.0 *4*)		2080.79	4$^+$	815.48	2$^+$			

γ(^{154}Gd) (continued)

E_γ[‡#]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[@]	α[†]	Comments
1274.436 *6*	148 *10*	1397.505	2^-	123.064	2^+	E1+M2	+0.035 *9*	7.97×10^{-4} *12*	α(K)=0.000634 *9*; α(L)=8.21×10^{-5} *12*; α(M)=1.760×10^{-5} *27* α(N)=4.04×10^{-6} *6*; α(O)=6.28×10^{-7} *9*; α(P)=4.28×10^{-8} *6*; α(IPF)=5.91×10^{-5} *8* δ: From ^{154}Eu β^- decay.
1291.31 *13*	97 *6*	1414.59	1^-	123.064	2^+	E1		7.82×10^{-4} *11*	α(K)=0.000614 *9*; α(L)=7.94×10^{-5} *11*; α(M)=1.702×10^{-5} *24* α(N)=3.91×10^{-6} *5*; α(O)=6.07×10^{-7} *9*; α(P)=4.14×10^{-8} *6*; α(IPF)=6.76×10^{-5} *9*
1309.05 *22*	11.0 *8*	2305.61	3^+	996.30	2^+				
1325.1 *3*	16.5 *12*	2722.59	$1,2^+$	1397.505	2^-				
[x]1370.2 *10*	≈2								
1374.2 *3*	7.2 *6*	2788.91	$1,2^+$	1414.59	1^-				
1391.2[a] *3*	7.0[a] *6*	2654.69	2^+	1263.64	4^+				
1391.2[a] *3*	7.0[a] *6*	2788.91	$1,2^+$	1397.505	2^-				
1405.0 *10*	4.0 *18*	2402.02	$1,2^+$	996.30	2^+				
1408.34 *20*	≈3.9	1531.41	2^+	123.064	2^+	E0,M1,E2		0.00176 *33*	α(K)=0.00146 *28*; α(L)=0.00020 *4*; α(M)=4.3×10^{-5} *8* α(N)=9.8×10^{-6} *18*; α(O)=1.52×10^{-6} *29*; α(P)=1.03×10^{-7} *22*; α(IPF)=4.85×10^{-5} *29*
1414.60 *14*	27.0 *21*	1414.59	1^-	0.0	0^+	E1		7.54×10^{-4} *11*	α(K)=0.000524 *7*; α(L)=6.76×10^{-5} *9*; α(M)=1.448×10^{-5} *20* α(N)=3.33×10^{-6} *5*; α(O)=5.17×10^{-7} *7*; α(P)=3.54×10^{-8} *5*; α(IPF)=0.0001440 *20*
1458.4 *2*	21.8 *14*	2989.89	$1,2^+$	1531.41	2^+				
[x]1481.2 *5*	3.2 *10*								
(1490.37 *22*)		2305.61	3^+	815.48	2^+				
1506.4 *4*	4.0 *4*	2187.17	1^+	680.70	0^+	[M1,E2]		0.00156 *27*	α(K)=0.00126 *23*; α(L)=0.000170 *29*; α(M)=3.7×10^{-5} *6* α(N)=8.5×10^{-6} *15*; α(O)=1.31×10^{-6} *23*; α(P)=8.9×10^{-8} *18*; α(IPF)=8.1×10^{-5} *5*
1527.2 *4*	2.8 *6*	2654.69	2^+	1127.75	3^+				
[x]1548.2 *8*	<1								
1593.7 *3*	8.5 *9*	2590.02	$(1,2)^+$	996.30	2^+				
1607[a] *1*	1.9[a] *7*	2654.69	2^+	1047.56	4^+				
1607[a] *1*	1.9[a] *7*	2734.2	$1^+,2^+$	1127.75	3^+				
1693	0.051 *6*	2934.2	1^+	1241.37	1^-	[E1]		7.99×10^{-4} *11*	B(E1)↓=5.1×10^{-6} *6* (2013Be38) α(K)=0.000388 *5*; α(L)=4.97×10^{-5} *7*; α(M)=1.065×10^{-5} *15*

γ(^{154}Gd) (continued)

E_γ ‡#	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.@	α†	Comments
								α(N)=2.447×10^{-6} *34*; α(O)=3.81×10^{-7} *5*; α(P)=2.62×10^{-8} *4*; α(IPF)=0.000348 *5* I_γ: deduced from branching ratio for this transition (0.017 *1*) (2014BeZX), and branching ratio (1.000 *1*) (2014BeZX) and relative intensity (3.0 *3*) for 2934.2γ.
1709	0.20 *8*	2949.7	(1$^+$)	1241.37	1$^-$	[E1]	8.04×10^{-4} *11*	B(E1)↓=3.7×10^{-6} *16* (2014BeZX) α(K)=0.000382 *5*; α(L)=4.89×10^{-5} *7*; α(M)=1.048×10^{-5} *15* α(N)=2.409×10^{-6} *34*; α(O)=3.75×10^{-7} *5*; α(P)=2.58×10^{-8} *4*; α(IPF)=0.000360 *5* I_γ: deduced from branching ratio for this transition (0.031 *11*) (2014BeZX), and branching ratio (1.00 *11*) (2014BeZX) and relative intensity (6.6 *4*) for 2949.5γ.
1737.6 *5*	9.1 *9*	2734.2	1$^+$,2$^+$	996.30	2$^+$			
1752	0.075 *12*	2934.2	1$^+$	1182.1	0$^+$	[M1]	1.43×10^{-3} *2*	B(M1)↓=0.062 *10* (2013Be38) α(K)=0.001056 *15*; α(L)=0.0001407 *20*; α(M)=3.03×10^{-5} *4* α(N)=6.98×10^{-6} *10*; α(O)=1.089×10^{-6} *15*; α(P)=7.55×10^{-8} *11*; α(IPF)=0.0001980 *28* I_γ: deduced from branching ratio for this transition (0.025 *3*) (2014BeZX), and branching ratio (1.000 *1*) (2014BeZX) and relative intensity (3.0 *3*) for 2934.2γ.
1768	0.32 *13*	2949.7	(1$^+$)	1182.1	0$^+$	[M1]	1.42×10^{-3} *2*	B(M1)↓=0.047 *21* (2014BeZX) α(K)=0.001034 *14*; α(L)=0.0001377 *19*; α(M)=2.97×10^{-5} *4* α(N)=6.83×10^{-6} *10*; α(O)=1.066×10^{-6} *15*; α(P)=7.40×10^{-8} *10*; α(IPF)=0.0002061 *29* I_γ: deduced from branching ratio for this transition (0.049 *18*) (2014BeZX), and branching ratio (1.00 *11*) (2014BeZX) and relative intensity (6.6 *4*) for 2949.5γ.
1774.9 *5*	4.0 *6*	2590.02	(1,2)$^+$	815.48	2$^+$			
^{x}1841.0 *9*	1.5 *6*							
1907.0 *5*	18.6 *15*	2722.59	1,2$^+$	815.48	2$^+$			
1908	0.22 *5*	3090.3	1$^+$	1182.1	0$^+$	[M1]	1.30×10^{-3} *2*	α(N)=5.74×10^{-6} *8*; α(O)=8.96×10^{-7} *13*; α(P)=6.22×10^{-8} *9*; α(IPF)=0.000279 *4* B(M1)↓=0.24 *6* (2014BeZX) α(K)=0.000870 *12*; α(L)=0.0001157 *16*; α(M)=2.491×10^{-5} *35* I_γ: deduced from branching ratio for this transition (0.0146 *26*) (2014BeZX), and branching ratio (1.000 *2*) (2014BeZX) and relative intensity (1.5 *2*) for 3090.5γ.
1909.1 *4*	18.6 *15*	2590.02	(1,2)$^+$	680.70	0$^+$			
(1934.7 *14*)		2305.61	3$^+$	371.01	4$^+$			
1938	0.015 *15*	2934.2	1$^+$	996.30	2$^+$			I_γ: deduced from branching ratio for this transition (0.005 *5*) (2014BeZX),

γ(^{154}Gd) (continued)

E_γ ‡#	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.@	α†	Comments
								and branching ratio (1.000 *1*) (2014BeZX) and relative intensity (3.0 *3*) for 2934.2γ.
1954	0.26 *4*	2949.7	(1$^+$)	996.30	2$^+$	[M1]	1.27×10^{-3} *2*	B(M1)↓=0.029 *7* (2014BeZX) α(K)=0.000825 *12*; α(L)=0.0001096 *15*; α(M)=2.359×10^{-5} *33* α(N)=5.43×10^{-6} *8*; α(O)=8.48×10^{-7} *12*; α(P)=5.89×10^{-8} *8*; α(IPF)=0.000304 *4* I_γ: deduced from branching ratio for this transition (0.040 *2*) (2014BeZX), and branching ratio (1.00 *11*) (2014BeZX) and relative intensity (6.6 *4*) for 2949.5γ.
1973.6	2.9 *14*	2788.91	1,2$^+$	815.48	2$^+$			
1974.3	2.0 *10*	2654.69	2$^+$	680.70	0$^+$			
1996.61 *9*	105 *7*	2119.61	1$^+$,2$^+$	123.064	2$^+$	E2+M1	0.00112 *12*	α(K)=0.00070 *9*; α(L)=9.3×10^{-5} *11*; α(M)=2.00×10^{-5} *25* α(N)=4.6×10^{-6} *6*; α(O)=7.2×10^{-7} *9*; α(P)=4.9×10^{-8} *7*; α(IPF)=0.000306 *21*
2041.91 *10*	27.5 *14*	2722.59	1,2$^+$	680.70	0$^+$			
2064.11 *10*	100	2187.17	1$^+$	123.064	2$^+$	M1+E2	0.00111 *11*	α(K)=0.00065 *8*; α(L)=8.7×10^{-5} *10*; α(M)=1.87×10^{-5} *22* α(N)=4.3×10^{-6} *5*; α(O)=6.7×10^{-7} *8*; α(P)=4.6×10^{-8} *6*; α(IPF)=0.000341 *24*
2108.4	4.9 *10*	2788.91	1,2$^+$	680.70	0$^+$			
2119	0.015 *15*	2934.2	1$^+$	815.48	2$^+$			I_γ: deduced from branching ratio for this transition (0.005 *5*) (2014BeZX), and branching ratio (1.000 *1*) (2014BeZX) and relative intensity (3.0 *3*) for 2934.2γ.
2119.68 *15*	59 *4*	2119.61	1$^+$,2$^+$	0.0	0$^+$	(M1,E2)	0.00109 *11*	α(K)=0.00062 *7*; α(L)=8.2×10^{-5} *9*; α(M)=1.76×10^{-5} *20* α(N)=4.1×10^{-6} *5*; α(O)=6.3×10^{-7} *7*; α(P)=4.4×10^{-8} *5*; α(IPF)=0.000369 *26* Mult.: Reported as M1+E2, but placed to a 0$^+$ level, which requires M1 or E2.
2127	0.16 *5*	3122.8	1$^+$	996.30	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)↓=0.10 *5* (2014BeZX) α(K)=0.000682 *10*; α(L)=9.04×10^{-5} *13*; α(M)=1.946×10^{-5} *27* α(N)=4.48×10^{-6} *6*; α(O)=7.00×10^{-7} *10*; α(P)=4.87×10^{-8} *7*; α(IPF)=0.000399 *6* I_γ: deduced from branching ratio for this transition (0.26 *2*) (2014BeZX), and branching ratio (1.000 *9*) (2014BeZX) and relative intensity (0.6 *2*) for 3122.6γ.
2135	0.24 *3*	2949.7	(1$^+$)	815.48	2$^+$	[M1]	1.19×10^{-3} *2*	B(M1)↓=0.020 *5* (2014BeZX) α(K)=0.000677 *9*; α(L)=8.96×10^{-5} *13*; α(M)=1.930×10^{-5} *27* α(N)=4.44×10^{-6} *6*; α(O)=6.94×10^{-7} *10*; α(P)=4.83×10^{-8} *7*; α(IPF)=0.000403 *6*

γ(^{154}Gd) (continued)

E_γ ‡#	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.@	α†	Comments
								I_γ: deduced from branching ratio for this transition (0.036 *11*) (2014BeZX), and branching ratio (1.00 *11*) (2014BeZX) and relative intensity (6.6 *4*) for 2949.5γ.
2175 *1*	0.2 *1*	2989.89	1,2$^+$	815.48	2$^+$			
(2182.6)		2305.61	3$^+$	123.064	2$^+$			
2187.10 *16*	140 *9*	2187.17	1$^+$	0.0	0$^+$	M1	0.00118 *2*	α(K)=0.00064 *1*; α(L)=8.5×10^{-5} *1*; α(M)=1.83×10^{-5} *3* α(N)=4.21×10^{-6} *4*; α(O)=6.57×10^{-7} *10*; α(P)=4.57×10^{-7} *5*; α(IPF)=0.000432 *6* Mult.: Reported as E2+M1, but placed to a 0$^+$ level, which requires M1 or E2.
2219.5 *2*	11.4 *8*	2342.67	1,2$^+$	123.064	2$^+$			
2253	0.081 *9*	2934.2	1$^+$	680.70	0$^+$	[M1]	1.17×10^{-3} *2*	α(N)=3.94×10^{-6} *6*; α(O)=6.15×10^{-7} *9*; α(P)=4.28×10^{-8} *6*; α(IPF)=0.000468 *7* B(M1)↓=0.031 *4* (2013Be38) α(K)=0.000600 *8*; α(L)=7.94×10^{-5} *11*; α(M)=1.709×10^{-5} *24* I_γ: deduced from branching ratio for this transition (0.027 *1*) (2014BeZX), and branching ratio (1.000 *1*) (2014BeZX) and relative intensity (3.0 *3*) for 2934.2γ.
2269	0.11 *4*	2949.7	(1$^+$)	680.70	0$^+$	[M1]	1.17×10^{-3} *2*	B(M1)↓=0.007 *3* (2014BeZX) α(K)=0.000591 *8*; α(L)=7.82×10^{-5} *11*; α(M)=1.683×10^{-5} *24* α(N)=3.87×10^{-6} *5*; α(O)=6.05×10^{-7} *8*; α(P)=4.21×10^{-8} *6*; α(IPF)=0.000477 *7* I_γ: deduced from branching ratio for this transition (0.016 *5*) (2014BeZX), and branching ratio (1.00 *11*) (2014BeZX) and relative intensity (6.6 *4*) for 2949.5γ.
2275	0.90 *13*	3090.3	1$^+$	815.48	2$^+$	[M1]	1.17×10^{-3} *2*	B(M1)↓=0.057 *12* (2014BeZX) α(K)=0.000588 *8*; α(L)=7.77×10^{-5} *11*; α(M)=1.673×10^{-5} *23* α(N)=3.85×10^{-6} *5*; α(O)=6.01×10^{-7} *8*; α(P)=4.19×10^{-8} *6*; α(IPF)=0.000481 *7* I_γ: deduced from branching ratio for this transition (0.060 *4*) (2014BeZX), and branching ratio (1.000 *2*) (2014BeZX) and relative intensity (1.5 *2*) for 3090.5γ.
2278.5 *3*	4.3 *5*	2402.02	1,2$^+$	123.064	2$^+$			
2307.49 *15*	20.4 *13*	2430.66	1,2$^+$	123.064	2$^+$			
2342.5 *3*	20.9 *15*	2342.67	1,2$^+$	0.0	0$^+$			
2345.3 *3*	20.9 *15*	2468.4	1,2$^+$	123.064	2$^+$			
2363.3 *2*	5.6 *6*	2486.40	1,2$^+$	123.064	2$^+$			
2377.0 *7*	4.3 *9*	2500.0	2$^+$	123.064	2$^+$			
^{x}2380.1 *7*	4.4 *9*							
2402.5 *3*	3.4 *5*	2402.02	1,2$^+$	0.0	0$^+$			
2409	0.107 *18*	3090.3	1$^+$	680.70	0$^+$	[M1]	1.16×10^{-3} *2*	B(M1)↓=0.057 *13* (2014BeZX)

From ENSDF

$\gamma(^{154}Gd)$ (continued)

E_γ[‡#]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	α[†]	Comments
								α(K)=0.000518 *7*; α(L)=6.84×10^{-5} *10*; α(M)=1.472×10^{-5} *21* α(N)=3.39×10^{-6} *5*; α(O)=5.29×10^{-7} *7*; α(P)=3.69×10^{-8} *5*; α(IPF)=0.000555 *8* I_γ: deduced from branching ratio for this transition (0.071 *7*) (2014BeZX), and branching ratio (1.000 *2*) (2014BeZX) and relative intensity (1.5 *2*) for 3090.5γ.
2430.50 *10*	30.4 *19*	2430.66	1,2$^+$	0.0	0$^+$			
2442.2 *8*	1.0 *4*	3122.8	1$^+$	680.70	0$^+$	[M1]	1.16×10^{-3} *2*	B(M1)↓=0.006 *3* (2014BeZX) α(K)=0.000503 *7*; α(L)=6.63×10^{-5} *9*; α(M)=1.428×10^{-5} *20* α(N)=3.29×10^{-6} *5*; α(O)=5.13×10^{-7} *7*; α(P)=3.58×10^{-8} *5*; α(IPF)=0.000573 *8*
^{x}2449.5 *6*	1.0 *4*							
2466.9	7.0 *20*	2590.02	(1,2)$^+$	123.064	2$^+$			
2468.0	11.0 *25*	2468.4	1,2$^+$	0.0	0$^+$			
2486.24 *15*	18.6 *12*	2486.40	1,2$^+$	0.0	0$^+$			
2499.8[a] *8*	3.9[a] *8*	2500.0	2$^+$	0.0	0$^+$			
2499.8[a] *8*	3.9[a] *8*	2872.1	2$^+$	371.01	4$^+$			
2503.4 *10*	3.2 *10*	3184.9	1,2$^+$	680.70	0$^+$			
^{x}2525.1 *7*	2.5 *4*							
2532.3 *7*	1.9 *3*	2654.69	2$^+$	123.064	2$^+$			
^{x}2575.1 *5*	1.1 *3*							
2590.5 *15*	1.3 *4*	2590.02	(1,2)$^+$	0.0	0$^+$			
2599.6[a] *4*	3.6[a] *4*	2722.59	1,2$^+$	123.064	2$^+$			
2599.6[a] *4*	3.6[a] *4*	3415.0	1,2$^+$	815.48	2$^+$			
2611.3 *7*	1.4 *6*	2734.2	1$^+$,2$^+$	123.064	2$^+$			
2646.3 *7*	5.4 *5*	3327.3	1,2$^+$	680.70	0$^+$			
2655.8 *8*	3.4 *4*	2654.69	2$^+$	0.0	0$^+$			
2666.0 *5*	5.8 *5*	2788.91	1,2$^+$	123.064	2$^+$			
^{x}2711.7 *5*	1.6 *2*							
^{x}2716 *1*	0.4 *2*							
2722.8 *4*	1.70 *14*	2722.59	1,2$^+$	0.0	0$^+$			
2727.8 *9*	0.6 *2*	2851.1	2$^+$	123.064	2$^+$			
2734.2[a] *8*	0.4[a] *2*	2734.2	1$^+$,2$^+$	0.0	0$^+$			
2734.2[a] *8*	0.4[a] *2*	3415.0	1,2$^+$	680.70	0$^+$			
2750 *1*	0.9 *3*	2872.1	2$^+$	123.064	2$^+$			
^{x}2770.5 *8*	0.9 *3*							
2789.1 *3*	9.7 *7*	2788.91	1,2$^+$	0.0	0$^+$			
2811.3 *10*	0.75 *24*	2934.2	1$^+$	123.064	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)↓=0.22 *2* (2013Be38) α(K)=0.000370 *5*; α(L)=4.87×10^{-5} *7*; α(M)=1.047×10^{-5} *15* α(N)=2.410×10^{-6} *34*; α(O)=3.77×10^{-7} *5*; α(P)=2.63×10^{-8} *4*; α(IPF)=0.000769 *11*

From ENSDF

γ(^{154}Gd) (continued)

E_γ ‡#	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.@	α†	Comments
^{x}2820.7 *15*	0.57 *17*							
2826.0 *6*	8.1 *5*	2949.7	(1$^+$)	123.064	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)↓=0.29 *8* (2014BeZX) B(M1)(W.u.)=0.16 *5* α(K)=0.000366 *5*; α(L)=4.81×10^{-5} *7*; α(M)=1.035×10^{-5} *14* α(N)=2.383×10^{-6} *33*; α(O)=3.72×10^{-7} *5*; α(P)=2.60×10^{-8} *4*; α(IPF)=0.000777 *11*
2851.2 *9*	1.2 *2*	2851.1	2$^+$	0.0	0$^+$			
2867.1 *6*	4.0 *3*	2989.89	1,2$^+$	123.064	2$^+$			
2873.1 *10*	0.9 *2*	2872.1	2$^+$	0.0	0$^+$			
2887.1 *8*	1.3 *3*	3009.7	1,2$^+$	123.064	2$^+$			
2899.9 *4*	14 *9*	3022.78	2$^+$	123.064	2$^+$			
2908.5 *15*	0.8 *2*	3032.2	1,2$^+$	123.064	2$^+$			
2934.2 *7*	3.0 *3*	2934.2	1$^+$	0.0	0$^+$	[M1]	1.23×10^{-3} *2*	B(M1)↓=0.53 *6* (2013Be38) α(K)=0.000338 *5*; α(L)=4.44×10^{-5} *6*; α(M)=9.54×10^{-6} *13* α(N)=2.196×10^{-6} *31*; α(O)=3.43×10^{-7} *5*; α(P)=2.394×10^{-8} *34*; α(IPF)=0.000832 *12*
^{x}2940.5 *10*	0.8 *3*							
2949.5 *5*	6.6 *4*	2949.7	(1$^+$)	0.0	0$^+$	[M1]	1.23×10^{-3} *2*	B(M1)↓=0.21 *5* (2014BeZX) α(K)=0.000334 *5*; α(L)=4.39×10^{-5} *6*; α(M)=9.43×10^{-6} *13* α(N)=2.171×10^{-6} *30*; α(O)=3.39×10^{-7} *5*; α(P)=2.368×10^{-8} *33*; α(IPF)=0.000839 *12*
2967.6 *15*	0.5 *2*	3090.3	1$^+$	123.064	2$^+$	[M1]	1.23×10^{-3} *2*	α(K)=0.000330 *5*; α(L)=4.33×10^{-5} *6*; α(M)=9.31×10^{-6} *13* B(M1)↓=0.21 *4* (2014BeZX) α(N)=2.143×10^{-6} *30*; α(O)=3.35×10^{-7} *5*; α(P)=2.337×10^{-8} *33*; α(IPF)=0.000848 *12*
2989.9 *5*	6.6 *4*	2989.89	1,2$^+$	0.0	0$^+$			
2998.9 *16*	0.4 *2*	3122.8	1$^+$	123.064	2$^+$	[M1]	1.24×10^{-3} *2*	B(M1)↓=0.09 *4* (2014BeZX) α(K)=0.000322 *5*; α(L)=4.23×10^{-5} *6*; α(M)=9.10×10^{-6} *13* α(N)=2.095×10^{-6} *29*; α(O)=3.27×10^{-7} *5*; α(P)=2.284×10^{-8} *32*; α(IPF)=0.000864 *12*
3009.6 *4*	4.8 *3*	3009.7	1,2$^+$	0.0	0$^+$			
3023.2 *3*	11.0 *10*	3022.78	2$^+$	0.0	0$^+$			
3032.4 *8*	2.0 *2*	3032.2	1,2$^+$	0.0	0$^+$			
3039.4 *15*	0.5 *2*	3162.7	1,2$^+$	123.064	2$^+$			
3062.4 *9*	2.3 *2*	3184.9	1,2$^+$	123.064	2$^+$			
^{x}3085 *2*	0.2 *1*							
3090.5 *10*	1.5 *2*	3090.3	1$^+$	0.0	0$^+$	[M1]	1.26×10^{-3} *2*	B(M1)↓=0.38 *8* (2014BeZX) α(K)=0.000302 *4*; α(L)=3.97×10^{-5} *6*; α(M)=8.53×10^{-6} *12*

γ(^{154}Gd) (continued)

E_γ [‡#]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	α [†]	Comments
								α(N)=1.963×10^{-6} *28*; α(O)=3.07×10^{-7} *4*; α(P)=2.141×10^{-8} *30*; α(IPF)=0.000909 *13*
[x]3103 *2*	0.2 *1*							
3122.2 *15*	0.6 *2*	3122.8	1$^+$	0.0	0$^+$	[M1]	1.27×10^{-3} *2*	B(M1)↓=0.13 *6* (2014BeZX) α(K)=0.000296 *4*; α(L)=3.88×10^{-5} *5*; α(M)=8.34×10^{-6} *12* α(N)=1.920×10^{-6} *27*; α(O)=3.00×10^{-7} *4*; α(P)=2.095×10^{-8} *29*; α(IPF)=0.000925 *13*
[x]3137.9 *12*	0.8 *2*							
3141.0 *10*	1.5 *3*	3264.0	1,2$^+$	123.064	2$^+$			
3163 *2*	0.5 *3*	3162.7	1,2$^+$	0.0	0$^+$			
3170.8 *10*	0.92 *15*	3294.2	1,2$^+$	123.064	2$^+$			
3185.0 *10*	0.89 *15*	3184.9	1,2$^+$	0.0	0$^+$			
3205 *2*	0.10 *5*	3327.3	1,2$^+$	123.064	2$^+$			
3222.9 *15*	0.41 *16*	3345.9	1,2$^+$	123.064	2$^+$			
3227.6 *10*	1.1 *2*	3350.7	1,2$^+$	123.064	2$^+$			
3263.8 *10*	1.0 *2*	3264.0	1,2$^+$	0.0	0$^+$			
[x]3280 *2*	0.3 *2*							
3292.0 *10*	0.91 *13*	3415.0	1,2$^+$	123.064	2$^+$			
3294.4 *10*	1.0 *2*	3294.2	1,2$^+$	0.0	0$^+$			
3328.3 *15*	0.3 *2*	3327.3	1,2$^+$	0.0	0$^+$			
3345.8 *13*	0.78 *15*	3345.9	1,2$^+$	0.0	0$^+$			
3350.7 *15*	0.55 *14*	3350.7	1,2$^+$	0.0	0$^+$			
[x]3381.4 *15*	0.2 *1*							
3414.5 *9*	0.90 *14*	3415.0	1,2$^+$	0.0	0$^+$			
[x]3435 *2*	0.09 *5*							
[x]3467.9 *20*	0.13 *7*							

† Additional information 6.

‡ From weighted average of values of 1972Vy04 and 1975So03. Values without uncertainties were computed from level energies by 1975So03.

\# Because of their more definitive isomer assignment, only the unplaced γ's of 1975So03 are given.

@ Assignments and values are from ^{154}Gd adopted γ radiations and include the results of all types of experiments and all decay modes. See ^{154}Gd adopted γ radiations for other information including: (1) mixing ratios such as δ(M3/E2) and δ(M2/E1) where δ can be zero and is not included here; (2) comments on measurements for lines which are multiplets; and (3) identification of α values that are based on experimental values rather than theory.

& Multiply placed.

a Multiply placed with undivided intensity.

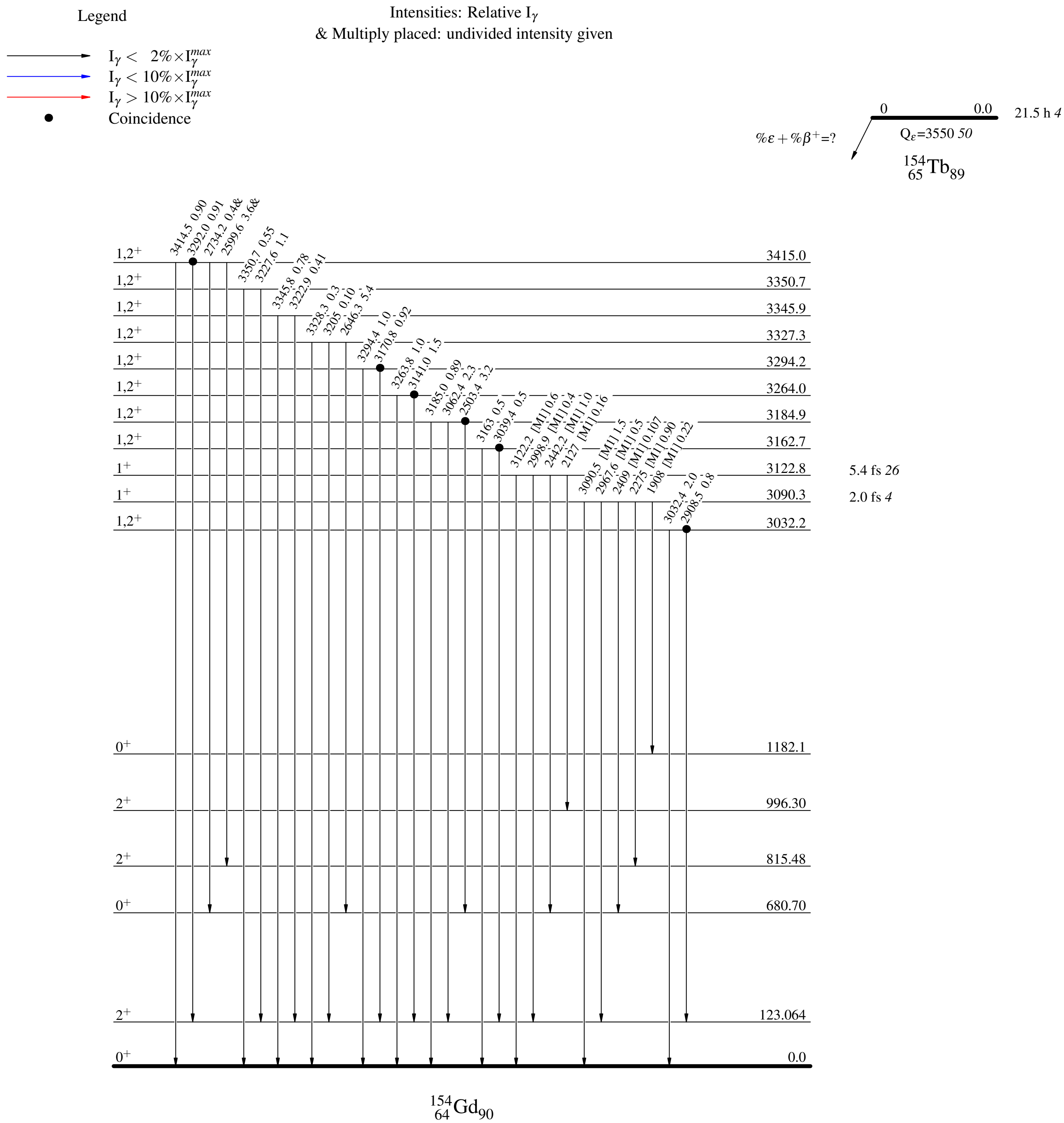
b Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

^{154}Tb ε+β^+ decay (21.5 h) 1975So03,1972Vy04

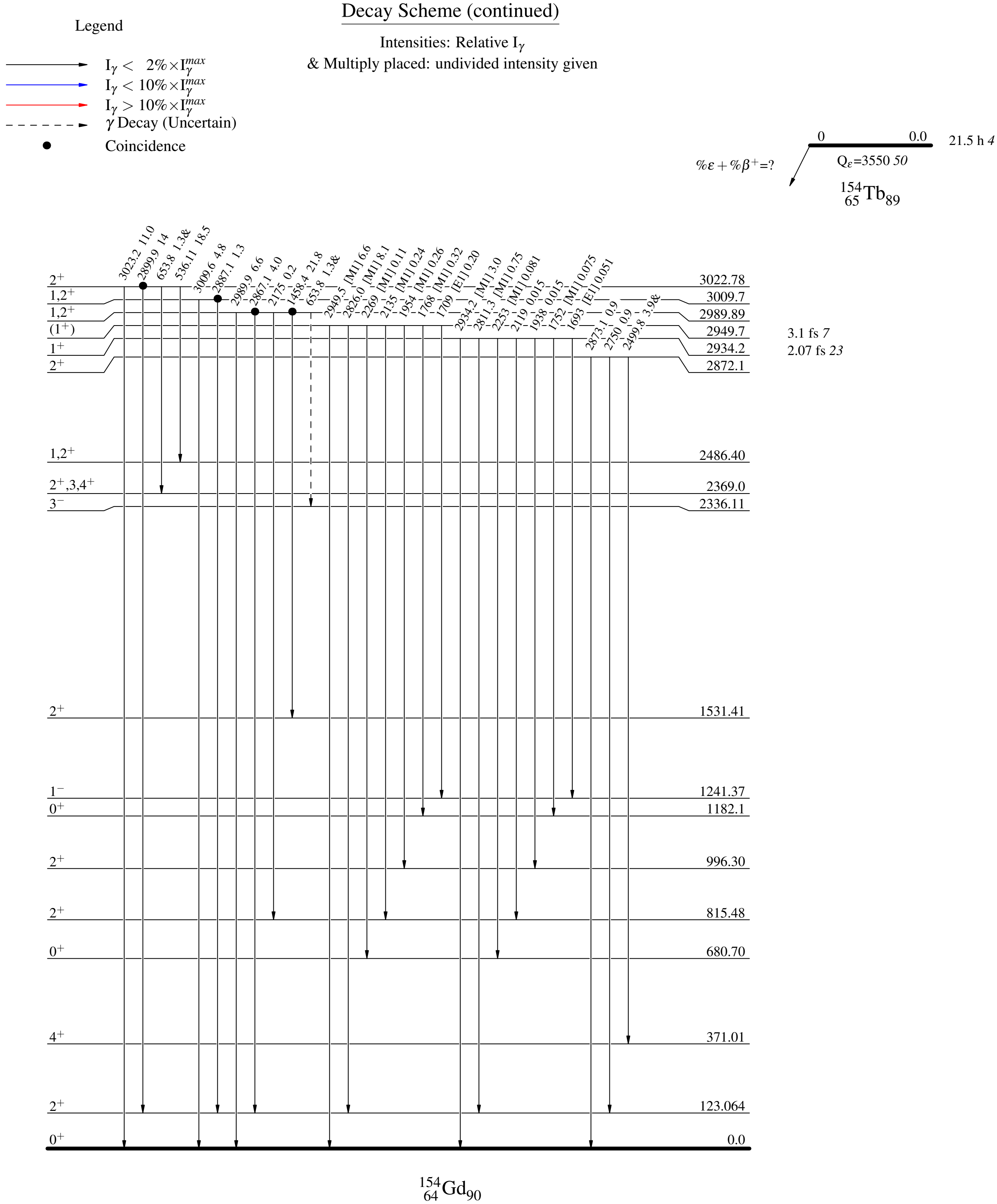
Decay Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



^{154}Tb ε+β^+ decay (21.5 h) 1975So03,1972Vy04

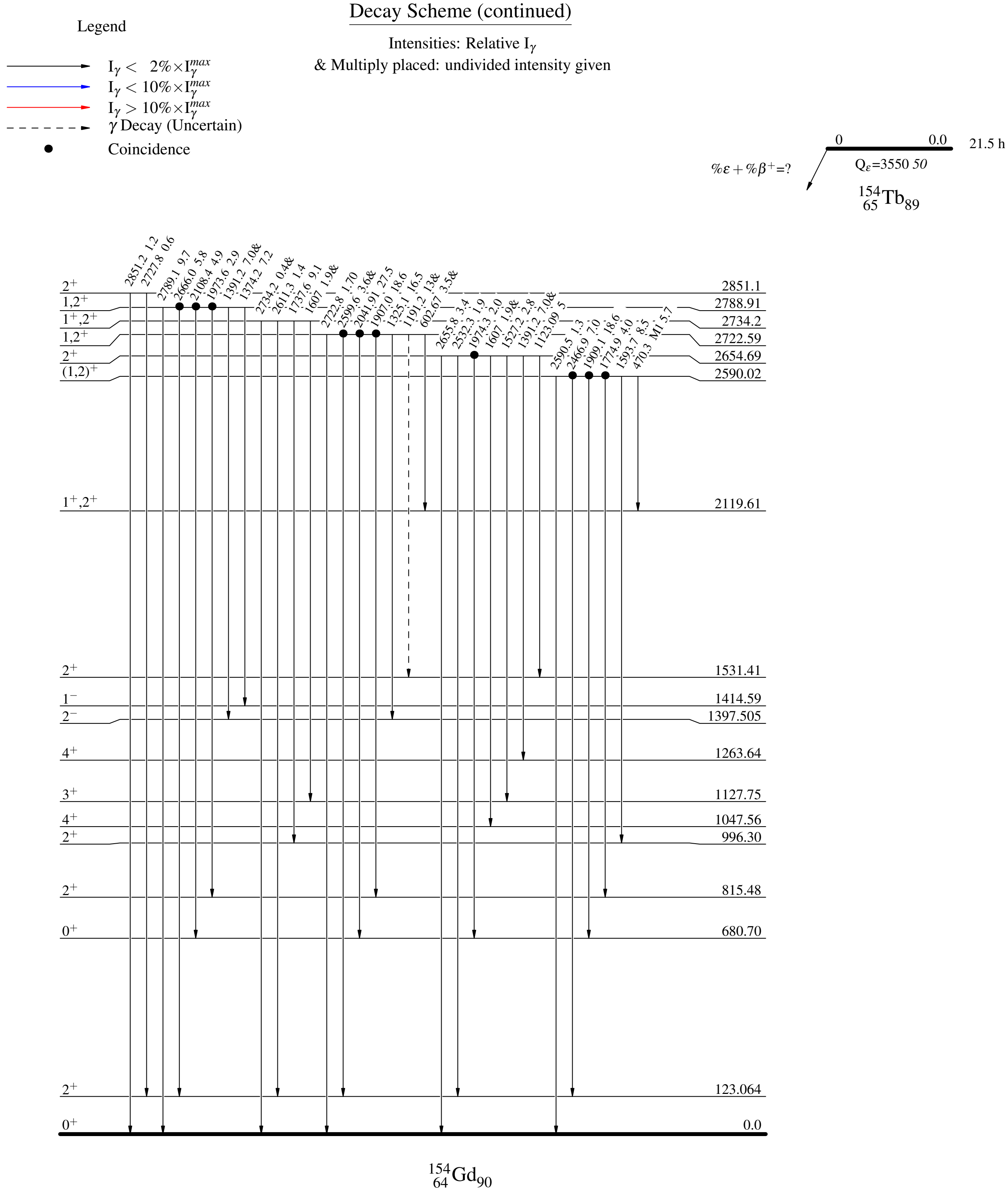
Decay Scheme (continued)



^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04

Decay Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

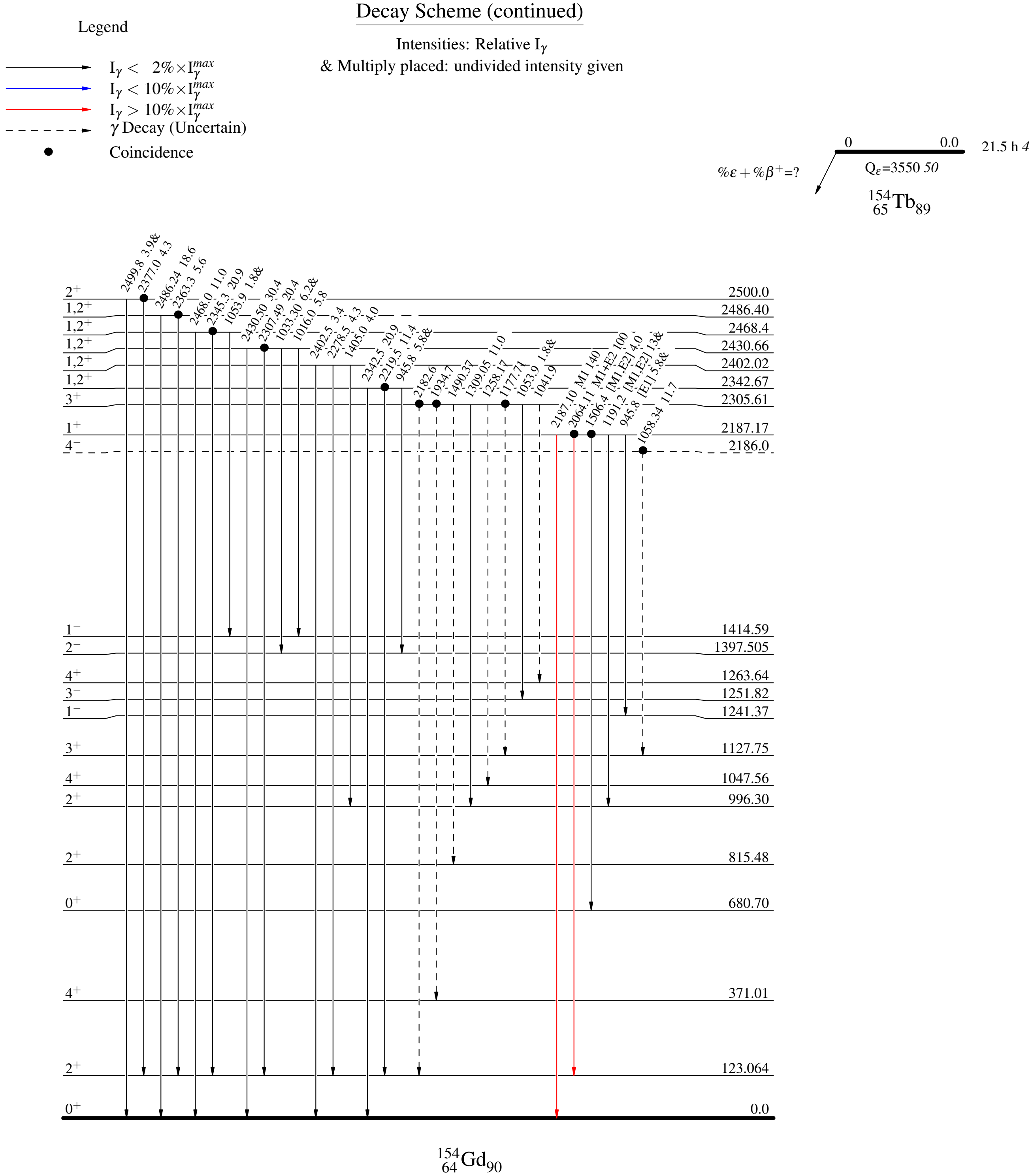


^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04

Decay Scheme (continued)

Intensities: Relative I_γ

& Multiply placed: undivided intensity given

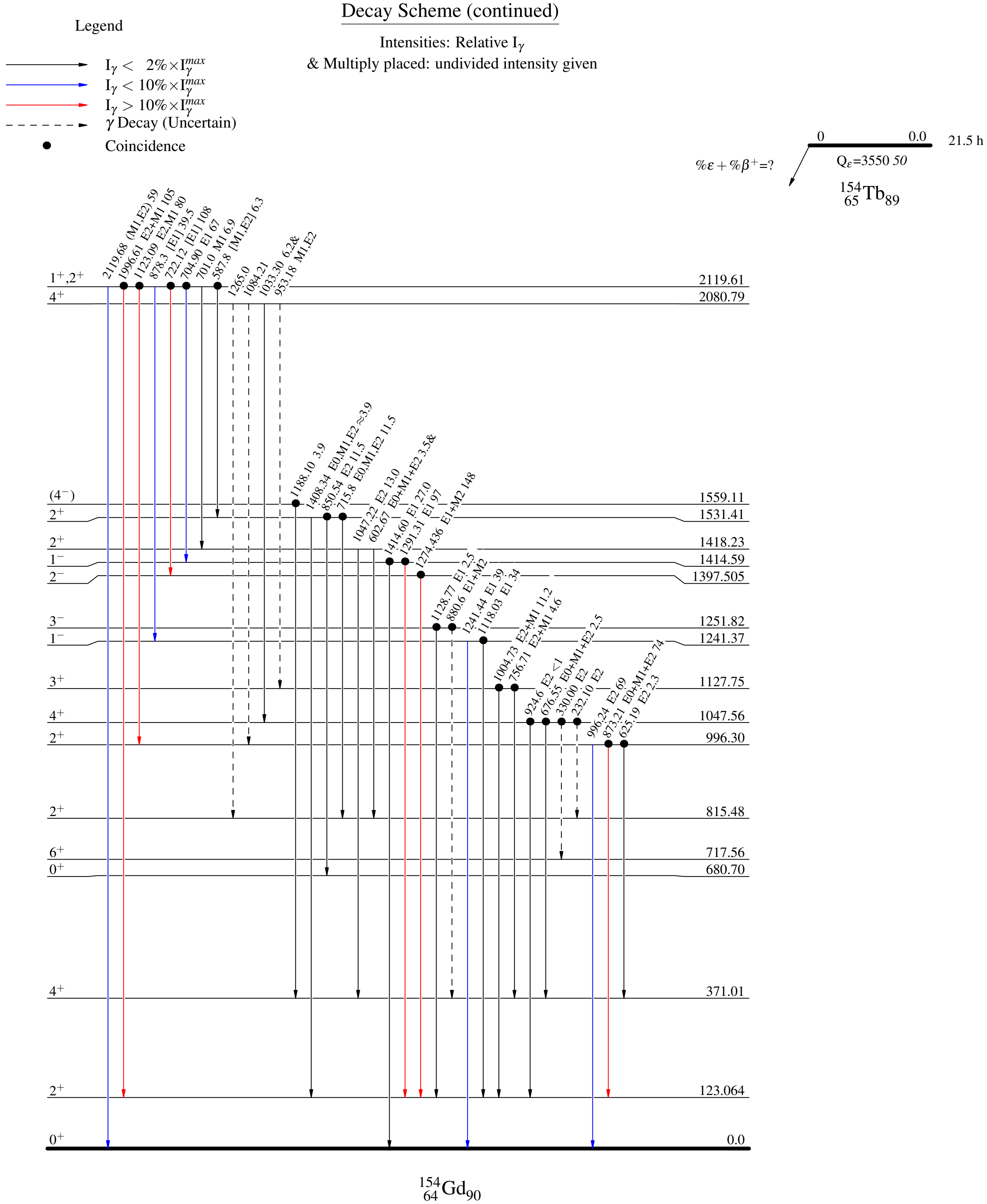


^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04

Decay Scheme (continued)

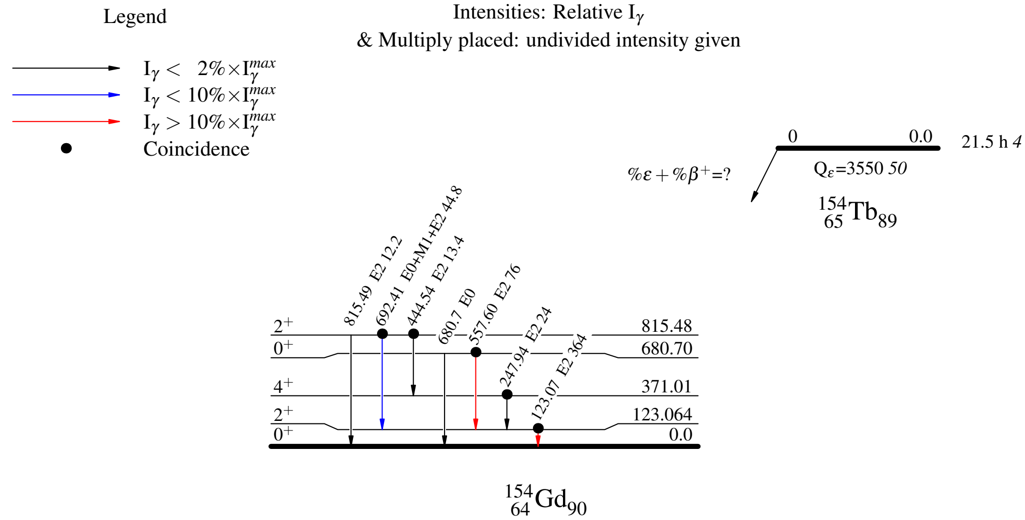
Intensities: Relative I_γ

& Multiply placed: undivided intensity given

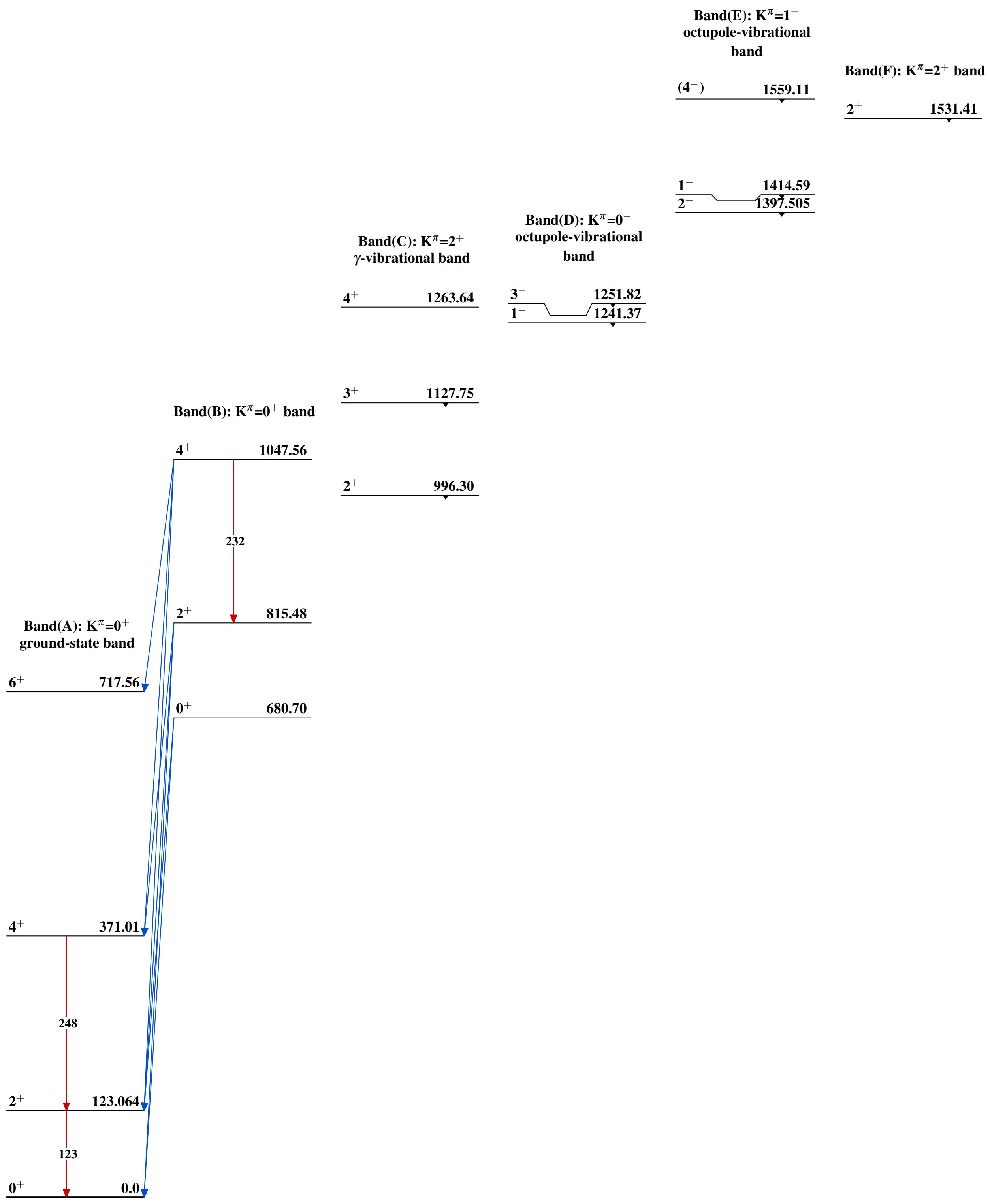


^{154}Tb $\varepsilon+\beta^+$ decay (21.5 h) 1975So03,1972Vy04

Decay Scheme (continued)



^{154}Tb ε decay (21.5 h) 1975So03,1972Vy04



$^{154}_{64}Gd_{90}$