^{154}Eu β^- decay 2004Ku13

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

Parent: ^{154}Eu: E=0.0; J^π=3$^-$; $T_{1/2}$=8.592 y *5*; Q(β^-)=1968.0 *8*; %β^- decay=99.982 *12*

^{154}Eu-J^π: Additional information 2.

^{154}Eu-$T_{1/2}$: Additional information 3.

^{154}Eu-Q(β^-): Additional information 4.

^{154}Eu-Q(β^-): From 2021Wa16.

^{154}Eu-%β^- decay: Calculated by evaluator from the adopted data in ^{154}Eu ε decay and ^{154}Eu β^- decay. Same values are also obtained by the evaluation of γ emission probability data in 2004BeZQ.

Additional information 5.

The level scheme is primarily from 2004Ku13. This work eliminates a number of previously reported levels and sets rather stringent upper limits on the intensities of ≈75 gammas that were previously associated with the ^{154}Gd level scheme. All the γ's listed by these authors are placed in their proposed level scheme. In earlier studies, a number of γ's were shown as unplaced. In view of this recent study, the evaluator has not listed any of these previously unplaced γ's.

2004Ku13: measured ≈2.4×10^8 γ-ray singles and ≈1.×10^8 $\gamma\gamma$ coin events using the "8π SPECTROMETER" array of 20 Compton-suppressed HPGe detectors, having nominal active volumes of 115 cm^3. 380 twofold coincidence combinations were available for the array. The source-detector distances were 22 cm. No absorbers were placed in front of the detectors, and only the surrounding BGO Compton-suppression detectors served to suppress the room background.

Data are from many measurements including γ energies from 1968Me12, 1970Ri19, 1980Sh15, 1989Ki10, 1990He05, 1990Me15, and 1992Sm02; γ intensities from 1968Me12, 1969Va09, 1970Ri19, 1980Ro22, 1980Sh15, 1984Iw03, 1989Ki10, 1990He05, 1990Me15, 1991BaZS, 1992Ha02, 1992Sa04, and 1992Sm02; half-lives from 1955Su64, 1961St04, 1963Bu03, 1968Ku03, 1972Aw04, 1995Ma03; β^- intensities from 1966Ha36 and 1968Ng01; and $\gamma\gamma$ coincidences from 1968Me12 and 1977Gu10. Measurements related to J^π's and γ multipolarity assignments are listed in ^{154}Gd Adopted Levels and γ radiations. Other references on Eγ, Iγ, γ multipolarities, and the decay scheme include 1959Ha07, 1960De16, 1966Dz15, 1968Br20, 1968Me18, 1968Ng01, 1969An01, 1969Au09, 1969GuZW, 1969Ri03, 1970Ke13, 1970Ra37, 1970Re08, 1972De12, 1972Ha84, 1974HeYW, 1980Yo06, 1982Co05, 1982HoZF, 1991ZaZZ, 1992Ak03 and 2002El07; on half-lives 1961Na06; and on miscellaneous properties 1960Ma38, 1962Lu03, 1966Di02, 1967Ho06, 1970Wa26, 1977Ra08. brief descriptions of the experimental methods employed in these are not given here. They are available on-line in the ENSDF file (at www.nndc.bnl.gov).

^{154}Gd Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0[@]	0$^+$	stable	
123.071[@] *3*	2$^+$	1.184 ns *5*	g=+0.455 *21* The g-factor was computed from the adopted μ value. See the comment in the "Adopted Levels, Gammas" data set. $T_{1/2}$: From 1995Ma03, $\beta\gamma\gamma$(t). Others: 1.19 ns *10* (1955Su64); 1.18 ns 3 (1961St04); 1.16 ns *5* (1963Bu03); 1.21 ns *4* (1968Ku03); 1.18 ns *4* (1972Aw04); 1.15 ns *3* (1961Na06); and 1.18 ns *3* (1963Fo02).
371.000[@] *1*	4$^+$	45.6 ps *8*	$T_{1/2}$: From this dataset only: 39 ps *5* (1963Bu03) and 41 ps *7* (1972Aw04). Other: 61 ps *4* (1972PlZW).
680.61[&] *4*	0$^+$		
717.67[@] *4*	6$^+$		
815.493[&] *2*	2$^+$		
996.257[a] *2*	2$^+$		g=+0.41 *+4−5* The g-factor is that deduced by 1996Al31 from their measured difference in the g-factors of the 2$^+$ members of the g.s. and the γ band. This difference was determined using their measured δ of the 3$^+$ → 2$^+$ transition within the γ band and the g-factor of the 2$^+$ member of the g.s. band. For this latter quantity, the value g(2$^+$)=+0.455 *21* was used.
1047.584[&] *23*	4$^+$		

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^{154}Eu β^- decay 2004Ku13 (continued)

^{154}Gd Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
1127.804[a] 2	3+	1397.506[d] 4	2−	1531.284[e] 22	2+	1719.560[g] 2	2−
1181.96[c] 5	0+	1404.45[b] 7	(5−)	1559.17[d] 6	(4−)	1788.83[e] 7	(4+)
1241.32[b] 4	1−	1414.42[d] 5	1−	1617.127[d] 3	3−	1796.97[g] 4	3−
1251.630[b] 7	3−	1418.146[c] 25	2+	1645.85[f] 3	4+		
1263.778[a] 5	4+	1432.66[a] 6	5+	1660.910[e] 7	3+		

† From a least-squares fit to the γ-ray energies. Three Eγ's out of 135 differ by more than 3σ.
‡ From Adopted Levels.
# Adopted values.
@ Band(A): $K^\pi=0^+$ ground-state band.
& Band(B): $K^\pi=0^+$ β^-vibrational band.
a Band(C): $K^\pi=2^+$ γ-vibrational band.
b Band(D): $K^\pi=0^-$ octupole-vibrational band.
c Band(E): Second excited $K^\pi=0^+$ band. Proposed as a "pairing isomer" by 2003Ku19.
d Band(F): $K^\pi=1^-$ octupole-vibrational band.
e Band(G): $K^\pi=2^+$ band.
f Band(H): $K^\pi=4^+$ band. Bandhead of a hexadecapole-vibrational band.
g Band(I): $K^\pi=2^-$ octupole-vibrational band.

β^- radiations

Beta-spectral shape factors are given by 1960La04, 1966Ha36, 1968Ng01, and 1977Ra08. βγ(θ) has been measured by 1961Sa10, 1961Su08, 1961Wy04, 1962Bh02, 1963Su08, 1966Ci02, 1968Zg01, 1969Su09, and 1978RaYT. βγ circular polarization has been measured by 1963He09. β^- decay matrix elements have been computed in many of these papers, as well as in 1964Du03 and 1964Li05.

E(decay)	E(level)	Iβ−†&	Log *ft*	Comments
(171.0 *13*)	1796.97	0.0662@ *21*	10.784 *17*	av Eβ=46.3 *3*
(179.2 *13*)	1788.83	0.0086@ *4*	11.733 *22*	av Eβ=48.7 *3*
274# *10*	1719.560	28.6 *2*	8.659 *7*	av Eβ=69.3 *3* Iβ−: Value from intensity balance is 28.42 *24*.
(307.1 *13*)	1660.910	0.822@ *13*	10.495 *9*	av Eβ=87.5 *4*
(322.2 *13*)	1645.85	0.172@ *4*	11.242 *12*	av Eβ=92.3 *4*
(350.9 *13*)	1617.127	1.584@ *16*	10.398 *7*	av Eβ=101.5 *4*
(408.8 *13*)	1559.17	0.0916@ *10*	11.853 *7*	av Eβ=120.5 *4*
(436.7 *13*)	1531.284	0.320@ *10*	11.405 *14*	av Eβ=129.9 *4*
(535.3 *13*)	1432.66	0.0021@ *11*	13.98[1u] *23*	av Eβ=178.10 *39*
(549.9 *13*)	1418.146	0.106@ *3*	12.220 *13*	av Eβ=169.0 *4*
(553.6 *13*)	1414.42	≤0.013@	≥13.1	av Eβ=170.4 *4* Log *ft*: A lower limit, computed from Iβ=0.005 *8*, from intensity balance.
(563.6 *13*)	1404.45	0.0010@ *5*	14.28 *22*	av Eβ=173.9 *4*
579# *5*	1397.506	36.3 *3*	9.740 *5*	av Eβ=176.4 *4* Iβ−: Value from intensity balance is 35.9 *4*.
(704.2 *13*)	1263.778	0.728@ *8*	11.753 *6*	av Eβ=225.2 *4*
(716.4 *13*)	1251.630	0.301@ *8*	12.162 *12*	av Eβ=229.7 *4*

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^{154}Eu β^- decay 2004Ku13 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†][&]	Log *ft*	Comments
843[#] *15*	1127.804	16.8 *5*	10.659 *13*	av Eβ=276.8 *4* Iβ^-: Value from intensity balance is 17.58 *19*.
(920.4 *13*)	1047.584	0.131 *4*	12.909 *14*	av Eβ=307.98 *44* E(decay): Component probably includes branch to 996 level. Iβ^-: Value from intensity balance is 0.108 *10*.
976[#] *30*	996.257	3.5 *12*	11.57 *15*	av Eβ=328.3 *4* E(decay): Component probably includes branch to 1047 level. Iβ^-: Value from intensity balance is 2.46 *18*.
1198[#] *60*	815.493	0.7 *5*	12.5 *4*	av Eβ=401.2 *5* Iβ^-: Value from intensity balance is 0.213 *23*.
1597[‡]	371.000	0.19 *5*	13.64 *12*	av Eβ=588.1 *5* Iβ^-: Value from intensity balance is 0.34 *7*.
1844 *2*	123.071	10.0 *12*	12.16 *6*	av Eβ=695.8 *5* Iβ^-: Value from intensity balance is 10.7 *18*. E(decay): From 1977Ra08. Others: 1866 *12* (1968Ng01), 1845 *10* (1966Ha36), and 1855 *5* (1960La04).

[†] Average of measured values from 1966Ha36 and 1968Ng01, unless noted as from γ-transition intensity balances. Where the measured values are given, the intensity-balance values are also given as as comments and are in excellent agreement. The total β^- intensity listed is 100.4%. The following levels (and upper limits on the intensities of the feeding β^- transitions) are not observed by 2004Ku13: 1135.96 (<0.0073); 1233 (<0.0049); 1276.63 (<0.0039); 1293.59 (<0.0051); 1294.17 (<0.0083); 1295.467 (<0.0091); 1510.1 (<0.0086); 1698.2 (<0.0006); 1770.5 (<0.0045); 1838.3 (<0.0023); 1861.2 (<0.0008); 1879.0 (<0.0003); and 1894.7 (<0.0017). Note that these limits are given relative to Iγ(1274γ)=100. To express them in transitions per 100 decays, multiply by 0.3484.

[‡] From 1966Ha36.

[#] From 1968Ng01.

[@] From γ-transition intensity balance.

[&] Absolute intensity per 100 decays.

$\gamma(^{154}Gd)$

Iγ normalization: Weighted average of 0.3532 *18* (1992Ha02), 0.348 *2* (1994Co02) and 0.3456 *14* (2004Te01), all from γ-activity and emission-rate measurements. In the evaluation in 2004BeZQ, a value of 0.349 *3* is derived. With this value of Iγ normalization, the total feeding to the g.s. is 100.0±1.7%.

The indicated placements of the γ′s in the level scheme are supported by the γγ-coincidence relations from 2004Ku13, as well as from 1968Me12 and 1977Gu10. These are not specifically shown on the level-scheme drawing.

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
58.4	0.0112 *11*	1719.560	2−	1660.910	3+	[E1]	1.215 *17*	%Iγ=0.0039 *4* α(K)=1.002 *14*; α(L)=0.1678 *23*; α(M)=0.0365 *5* α(N)=0.00818 *11*; α(O)=0.001158 *16*; α(P)=5.21×10^{-5} *7* E_γ: Value listed in 2004BeZQ. 2004Ku13 do not show this transition.
80.4	0.0080 *40*	1127.804	3+	1047.584	4+	[M1,E2]	4.7 *10*	%Iγ=0.0028 *14* α(K)=2.6 *6*; α(L)=1.7 *12*; α(M)=0.39 *29* α(N)=0.09 *6*; α(O)=0.012 *8*; α(P)=1.7×10^{-4} *7* E_γ,I_γ: From 2004BeZQ. 2004Ku13 do not show this transition.
123.0706[@] *9*	116.0 *10*	123.071	2+	0	0+	E2	1.187 *17*	%Iγ=40.4 *4* α(K)=0.656 *9*; α(L)=0.411 *6*; α(M)=0.0963 *13* α(N)=0.02153 *30*; α(O)=0.00286 *4*; α(P)=3.36×10^{-5} *5* α: Weighted average of the measured values 1.200 *20* (1962Lu03) and 1.194 *19* (1995Ma03). The former value was determined by a high-accuracy coincidence-sum method using a 4π NaI(Tl) detector. The latter used the measured $T_{1/2}$ value and the B(E2) of the deexciting γ to deduce α(exp). The B(E2) value employed in this calculation was obtained from the weighted average of the following B(E2)↑ values: 3.85 *8* (1977Ro08,1977Ro26), 3.90 *6* (1977Sc33) and 3.83 *4* (1977Wo02), from Coul. ex.; and 3.87 *6* (1983La08), from muonic x-ray studies. (The α(exp) value actually reported by 1995Ma03 was 1.193 *19*. The slight difference between this and the α(exp) given above results from a different choice of statistical weights used by the evaluator, in accordance with ENSDF policy.) Note that the theoretical value from 2005KiZW is 1.187, with an estimated uncertainty of 1.4%. The listed subshell coefficients have been scaled up from the calculated ones to be consistent with the adopted α value. α(K)exp,ce(K)/(γ+ce): From 1962Lu03, α(K)exp=0.635 *16* and K/(L+M+...)=3.53 *7*. Weighted average of 1.51 *3* (1957Ke08) and 1.57 *5* (1966Ja02). L1/L2/L3 L1:L2:L3=1.00:2.69 *8*:2.46 *6*, from 1957Ke08.

$^{154}_{64}Gd_{90}$-4

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
129.60 *13*	0.0045 *6*	1660.910	3^+	1531.284	2^+	[M1,E2]		0.975 *19*	%Iγ=0.00157 *21* α(K)=0.69 *12*; α(L)=0.22 *11*; α(M)=0.051 *26* α(N)=0.011 *6*; α(O)=0.0016 *7*; α(P)=4.5×10^{-5} *16* I_γ: In 2004BeZQ, Iγ=0.014 *2* is listed for a 129.5 G.
131.56 *7*	0.0377 *12*	1127.804	3^+	996.257	2^+	M1+E2	−4.3 *+21−94*	0.936 *13*	%Iγ=0.0131 *4* α(K)=0.553 *30*; α(L)=0.296 *24*; α(M)=0.069 *6* α(N)=0.0155 *13*; α(O)=0.00207 *15*; α(P)=3.0×10^{-5} *4* δ: From 1996Al31, $\gamma\gamma(\theta)$. The other value consistent with the $\gamma\gamma(\theta)$ data implies a sizable M1 component, which has been rejected on physical grounds.
134.87 *7*	0.023 *3*	815.493	2^+	680.61	0^+	E2		0.858 *12*	%Iγ=0.0080 *10* α(K)=0.503 *7*; α(L)=0.275 *4*; α(M)=0.0642 *9* α(N)=0.01436 *20*; α(O)=0.001916 *27*; α(P)=2.63×10^{-5} *4*
146.01 *7*	0.0205 *10*	1397.506	2^-	1251.630	3^-	[M1,E2]		0.668 *21*	%Iγ=0.00714 *35* α(K)=0.49 *9*; α(L)=0.14 *6*; α(M)=0.032 *14* α(N)=0.0072 *30*; α(O)=1.0×10^{-3} *4*; α(P)=3.2×10^{-5} *11*
156.28 *8*	0.0247 *25*	1397.506	2^-	1241.32	1^-	[M1,E2]		0.541 *28*	%Iγ=0.0086 *9* α(K)=0.40 *8*; α(L)=0.11 *4*; α(M)=0.024 *9* α(N)=0.0055 *21*; α(O)=7.8×10^{-4} *24*; α(P)=2.7×10^{-5} *9*
166.32 *10*	0.0030 *3*	1418.146	2^+	1251.630	3^-	[E1]		0.0742 *10*	%Iγ=0.00105 *10* α(K)=0.0627 *9*; α(L)=0.00900 *13*; α(M)=0.001946 *27* α(N)=0.000443 *6*; α(O)=6.61×10^{-5} *9*; α(P)=3.75×10^{-6} *5* E_γ: Associated by the evaluator with the 165.90 γ, previously placed elsewhere in the level scheme.
177.05 *20*	0.0020 *4*	1418.146	2^+	1241.32	1^-	[E1]		0.0628 *9*	%Iγ=0.00070 *14* α(K)=0.0531 *8*; α(L)=0.00759 *11*; α(M)=0.001640 *24* α(N)=0.000373 *5*; α(O)=5.59×10^{-5} *8*; α(P)=3.20×10^{-6} *5* E_γ: Transition is not listed in 2004BeZQ.
180.72 *7*	0.0150 *20*	996.257	2^+	815.493	2^+	[M1,E2]		0.346 *34*	%Iγ=0.0052 *7* α(K)=0.27 *6*; α(L)=0.062 *17*; α(M)=0.014 *4* α(N)=0.0032 *9*; α(O)=0.00046 *10*; α(P)=1.8×10^{-5} *6*
188.22 *7*	0.689 *5*	1719.560	2^-	1531.284	2^+	[E1]		0.0533 *7*	%Iγ=0.2400 *24* α(K)=0.0451 *6*; α(L)=0.00642 *9*; α(M)=0.001388 *19* α(N)=0.000316 *4*; α(O)=4.74×10^{-5} *7*; α(P)=2.74×10^{-6} *4*
199.20 *8*	0.0029 *4*	1617.127	3^-	1418.146	2^+	[E1]		0.0459 *6*	%Iγ=0.00101 *14* α(K)=0.0389 *5*; α(L)=0.00551 *8*; α(M)=0.001191 *17* α(N)=0.000271 *4*; α(O)=4.08×10^{-5} *6*; α(P)=2.377×10^{-6} *33* E_γ: Transition is not listed in 2004BeZQ.
203.40 *29*	0.0015 *2*	1617.127	3^-	1414.42	1^-	[E2]		0.2099 *31*	%Iγ=0.00052 *7*

^{154}Eu β^- decay 2004Ku13 (continued)

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								α(K)=0.1470 *22*; α(L)=0.0488 *7*; α(M)=0.01125 *17* α(N)=0.00253 *4*; α(O)=0.000348 *5*; α(P)=8.47×10^{-6} *12*
213.06 *11*	0.0012 *2*	1617.127	3$^-$	1404.45	(5$^-$)	[E2]	0.1800 *25*	E_γ: A 202.50 γ deexciting this level is reported by 1992El11 only. %Iγ=0.00042 *7* α(K)=0.1277 *18*; α(L)=0.0406 *6*; α(M)=0.00932 *13* α(N)=0.002098 *30*; α(O)=0.000290 *4*; α(P)=7.44×10^{-6} *10*
218.71 *26*	0.0023 *4*	1617.127	3$^-$	1397.506	2$^-$	[M1,E2]	0.195 *30*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00080 *14* α(K)=0.15 *4*; α(L)=0.032 *5*; α(M)=0.0071 *13* α(N)=0.00162 *27*; α(O)=0.000236 *26*; α(P)=1.0×10^{-5} *4*
228.23 *9*	0.0059 *4*	1660.910	3$^+$	1432.66	5$^+$	[E2]	0.1436 *20*	E_γ: A 219.4 γ is shown deexciting this level in 2004BeZQ. %Iγ=0.00206 *14* α(K)=0.1038 *15*; α(L)=0.0309 *4*; α(M)=0.00709 *10* α(N)=0.001596 *22*; α(O)=0.0002216 *31*; α(P)=6.14×10^{-6} *9*
232.12 *7*	0.0627 *12*	1047.584	4$^+$	815.493	2$^+$	E2	0.1359 *19*	In 2004BeZQ, a 229.01 γ is listed, but is placed from α 1276.6 level, whose existence 2004Ku13 do not confirm. %Iγ=0.0218 *4* α(K)=0.0986 *14*; α(L)=0.0289 *4*; α(M)=0.00663 *9* α(N)=0.001494 *21*; α(O)=0.0002076 *29*; α(P)=5.86×10^{-6} *8*
236.36 *8*	0.0050 *9*	1418.146	2$^+$	1181.96	0$^+$	[E2]	0.1281 *18*	%Iγ=0.00174 *31* α(K)=0.0934 *13*; α(L)=0.0270 *4*; α(M)=0.00617 *9* α(N)=0.001392 *20*; α(O)=0.0001937 *27*; α(P)=5.57×10^{-6} *8*
241.20 *9*	0.0036 *5*	1645.85	4$^+$	1404.45	(5$^-$)	[E1]	0.0278 *4*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00125 *17* α(K)=0.02359 *33*; α(L)=0.00331 *5*; α(M)=0.000714 *10* α(N)=0.0001629 *23*; α(O)=2.462×10^{-5} *35*; α(P)=1.472×10^{-6} *21*
242.86 *6*	0.0117 *10*	1660.910	3$^+$	1418.146	2$^+$	[E2+M1]	0.143 *26*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00408 *35* α(K)=0.114 *28*; α(L)=0.0223 *20*; α(M)=0.0050 *6* α(N)=0.00113 *12*; α(O)=0.000166 *9*; α(P)=7.9×10^{-6} *27*
245.07 *13*	0.0013 *2*	1241.32	1$^-$	996.257	2$^+$	[E1]	0.0267 *4*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00045 *7* α(K)=0.02264 *32*; α(L)=0.00317 *4*; α(M)=0.000685 *10* α(N)=0.0001562 *22*; α(O)=2.362×10^{-5} *33*; α(P)=1.415×10^{-6} *20*
247.9290[@] *7*	19.77 *14*	371.000	4$^+$	123.071	2$^+$	E2	0.1098 *15*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=6.89 *7*

$^{154}_{64}Gd_{90}$-6

^{154}Eu β^- decay 2004Ku13 (continued)

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								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*
255.80 *10*	0.0079 *26*	1251.630	3$^-$	996.257	2$^+$	[E1]	0.02388 *34*	%Iγ=0.0028 *9* α(K)=0.02028 *28*; α(L)=0.00283 *4*; α(M)=0.000612 *9* α(N)=0.0001396 *20*; α(O)=2.113×10^{-5} *30*; α(P)=1.273×10^{-6} *18*
263.50 *16*	0.0029 *4*	1660.910	3$^+$	1397.506	2$^-$	[E1]	0.02213 *31*	E$_\gamma$: Transition is not listed in 2004BeZQ. %Iγ=0.00101 *14* α(K)=0.01880 *26*; α(L)=0.00262 *4*; α(M)=0.000566 *8* α(N)=0.0001292 *18*; α(O)=1.957×10^{-5} *28*; α(P)=1.183×10^{-6} *17*
267.46 *15*	0.021 *4*	1263.778	4$^+$	996.257	2$^+$	E2	0.0862 *12*	E$_\gamma$: Transition is not listed in 2004BeZQ. %Iγ=0.0073 *14* α(K)=0.0646 *9*; α(L)=0.01684 *24*; α(M)=0.00383 *5* α(N)=0.000866 *12*; α(O)=0.0001218 *17*; α(P)=3.95×10^{-6} *6*
267.54 *8*	0.0110 *3*	1531.284	2$^+$	1263.778	4$^+$	[E2]	0.0862 *12*	E$_\gamma$,I$_\gamma$: 2004BeZQ list Iγ=0.0390 *20* for a 267.44 γ, which the evaluator assumes represents a doublet consisting of this γ and the 267.54 γ. %Iγ=0.00383 *11* α(K)=0.0645 *9*; α(L)=0.01682 *24*; α(M)=0.00383 *5* α(N)=0.000865 *12*; α(O)=0.0001217 *17*; α(P)=3.95×10^{-6} *6*
269.65 *8*	0.0330 *15*	1397.506	2$^-$	1127.804	3$^+$	[E1]	0.02086 *29*	E$_\gamma$,I$_\gamma$: 2004BeZQ list Iγ=0.0390 *20* for a 267.44 γ, which the evaluator assumes represents a doublet consisting of this γ and the 267.46 γ. %Iγ=0.0115 *5* α(K)=0.01772 *25*; α(L)=0.002468 *35*; α(M)=0.000533 *7* α(N)=0.0001217 *17*; α(O)=1.844×10^{-5} *26*; α(P)=1.118×10^{-6} *16*
279.65 *7*	0.0092 *3*	1531.284	2$^+$	1251.630	3$^-$	[E1]	0.01902 *27*	%Iγ=0.00320 *11* α(K)=0.01616 *23*; α(L)=0.002246 *31*; α(M)=0.000485 *7* α(N)=0.0001107 *16*; α(O)=1.680×10^{-5} *24*; α(P)=1.022×10^{-6} *14*
289.99 *22*	0.0041 *2*	1531.284	2$^+$	1241.32	1$^-$	[E1]	0.01735 *25*	%Iγ=0.00143 *7* α(K)=0.01474 *21*; α(L)=0.002046 *29*; α(M)=0.000442 *6* α(N)=0.0001009 *14*; α(O)=1.531×10^{-5} *22*; α(P)=9.36×10^{-7} *13*
290.38 *11*	0.0050 *2*	1418.146	2$^+$	1127.804	3$^+$	[E2+M1]	0.085 *19*	%Iγ=0.00174 *7* α(K)=0.070 *19*; α(L)=0.01245 *18*; α(M)=0.00276 *7* α(N)=0.000630 *11*; α(O)=9.4×10^{-5} *4*; α(P)=4.8×10^{-6} *17*
295.7	0.0010 *2*	1559.17	(4$^-$)	1263.778	4$^+$	[E1]	0.01652 *23*	E$_\gamma$: Transition is not listed in 2004BeZQ. %Iγ=0.00035 *7* α(K)=0.01404 *20*; α(L)=0.001946 *27*; α(M)=0.000420 *6* α(N)=9.60×10^{-5} *13*; α(O)=1.457×10^{-5} *20*; α(P)=8.93×10^{-7} *12*

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								E_γ: From 2004BeZQ. 2004Ku13 place a 293.26 *22* γ from this level, but this is a poor energy fit. The evaluator associates the 295.7 γ with this 293.26 γ.
301.38 *7*	0.0355 *10*	1719.560	2^-	1418.146	2^+	[E1]	0.01575 *22*	%Iγ=0.0124 *4* α(K)=0.01339 *19*; α(L)=0.001853 *26*; α(M)=0.000400 *6* α(N)=9.14×10^{-5} *13*; α(O)=1.389×10^{-5} *19*; α(P)=8.52×10^{-7} *12*
305.19	0.0588 *11*	1719.560	2^-	1414.42	1^-	[M1,E2]	0.074 *17*	%Iγ=0.0205 *4* α(K)=0.061 *17*; α(L)=0.01065 *31*; α(M)=0.002358 *35* α(N)=0.000538 *10*; α(O)=8.0×10^{-5} *5*; α(P)=4.2×10^{-6} *15*
307.7 *3*	0.0011 *3*	1559.17	(4^-)	1251.630	3^-	[E2+M1]	0.073 *17*	%Iγ=0.00038 *10* α(K)=0.059 *16*; α(L)=0.01038 *34*; α(M)=0.00230 *4* α(N)=0.000525 *12*; α(O)=7.8×10^{-5} *5*; α(P)=4.1×10^{-6} *15*
312.32 *7*	0.0522 *10*	1127.804	3^+	815.493	2^+	[M1,E2]	0.070 *16*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.0182 *4* α(K)=0.057 *16*; α(L)=0.0099 *4*; α(M)=0.00219 *5* α(N)=0.000501 *14*; α(O)=7.5×10^{-5} *5*; α(P)=4.0×10^{-6} *14*
315.64 *7*	0.0254 *3*	996.257	2^+	680.61	0^+	[E2]	0.0516 *7*	%Iγ=0.00885 *12* α(K)=0.0398 *6*; α(L)=0.00919 *13*; α(M)=0.002079 *29* α(N)=0.000470 *7*; α(O)=6.71×10^{-5} *9*; α(P)=2.509×10^{-6} *35*
322.07 *7*	0.1778 *17*	1719.560	2^-	1397.506	2^-	[M1,E2]	0.064 *15*	%Iγ=0.0619 *7* α(K)=0.052 *15*; α(L)=0.0090 *5*; α(M)=0.00199 *6* α(N)=0.000455 *18*; α(O)=6.8×10^{-5} *5*; α(P)=3.7×10^{-6} *13*
329.95 *7*	0.027 *3*	1047.584	4^+	717.67	6^+	E2	0.0451 *6*	%Iγ=0.0094 *10* α(K)=0.0350 *5*; α(L)=0.00786 *11*; α(M)=0.001774 *25* α(N)=0.000402 *6*; α(O)=5.75×10^{-5} *8*; α(P)=2.225×10^{-6} *31*
346.70 *7*	0.0747 *12*	717.67	6^+	371.000	4^+	E2	0.0389 *5*	%Iγ=0.0260 *5* α(K)=0.0304 *4*; α(L)=0.00662 *9*; α(M)=0.001490 *21* α(N)=0.000338 *5*; α(O)=4.86×10^{-5} *7*; α(P)=1.949×10^{-6} *27*
349.24 *7*	0.0206 *15*	1531.284	2^+	1181.96	0^+	[E2]	0.0381 *5*	%Iγ=0.0072 *5* α(K)=0.0298 *4*; α(L)=0.00645 *9*; α(M)=0.001453 *20* α(N)=0.000329 *5*; α(O)=4.74×10^{-5} *7*; α(P)=1.911×10^{-6} *27*
352.85 *20*	0.0038 *4*	1617.127	3^-	1263.778	4^+	[E1]	0.01066 *15*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00132 *14* α(K)=0.00908 *13*; α(L)=0.001247 *18*; α(M)=0.000269 *4* α(N)=6.15×10^{-5} *9*; α(O)=9.38×10^{-6} *13*; α(P)=5.85×10^{-7} *8*
365.47 *15*	0.0029 *4*	1617.127	3^-	1251.630	3^-	[E2+M1]	0.045 *12*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00101 *14*

$^{154}_{64}Gd_{90}$-8

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								α(K)=0.037 *11*; α(L)=0.0061 *6*; α(M)=0.00135 *11* α(N)=0.000309 *28*; α(O)=4.7×10^{-5} *6*; α(P)=2.6×10^{-6} *9* E_γ: Transition is not listed in 2004BeZQ.
366.49 *8*	0.0044 *10*	1181.96	0^+	815.493	2^+	E2	0.0331 *5*	%Iγ=0.00153 *35* α(K)=0.0260 *4*; α(L)=0.00548 *8*; α(M)=0.001230 *17* α(N)=0.000279 *4*; α(O)=4.03×10^{-5} *6*; α(P)=1.682×10^{-6} *24* E_γ: Transition is not listed in 2004BeZQ.
370.78 *8*	0.0121 *4*	1418.146	2^+	1047.584	4^+	E2	0.0320 *4*	%Iγ=0.00421 *14* α(K)=0.02520 *35*; α(L)=0.00526 *7*; α(M)=0.001182 *17* α(N)=0.000268 *4*; α(O)=3.88×10^{-5} *5*; α(P)=1.631×10^{-6} *23*
378.90 *27*	0.0011 *3*	1796.97	3^-	1418.146	2^+	[E1]	0.00898 *13*	%Iγ=0.00038 *10* α(K)=0.00765 *11*; α(L)=0.001046 *15*; α(M)=0.0002256 *32* α(N)=5.16×10^{-5} *7*; α(O)=7.88×10^{-6} *11*; α(P)=4.95×10^{-7} *7* E_γ: Transition is not listed in 2004BeZQ.
382.09 *8*	0.0272 *9*	1645.85	4^+	1263.778	4^+	E2+M1	0.040 *11*	%Iγ=0.00947 *32* α(K)=0.033 *10*; α(L)=0.0054 *6*; α(M)=0.00118 *12* α(N)=0.000271 *29*; α(O)=4.1×10^{-5} *6*; α(P)=2.3×10^{-6} *8*
382.46 *27*	0.0006 *2*	1796.97	3^-	1414.42	1^-	[E2]	0.0292 *4*	%Iγ=0.00021 *7* α(K)=0.02312 *33*; α(L)=0.00475 *7*; α(M)=0.001064 *15* α(N)=0.0002415 *34*; α(O)=3.50×10^{-5} *5*; α(P)=1.503×10^{-6} *21* E_γ: Transition is not listed in 2004BeZQ.
397.07 *7*	0.0792 *18*	1660.910	3^+	1263.778	4^+	[M1,E2]	0.036 *10*	%Iγ=0.0276 *7* α(K)=0.030 *9*; α(L)=0.0048 *6*; α(M)=0.00106 *12* α(N)=0.000242 *29*; α(O)=3.7×10^{-5} *6*; α(P)=2.1×10^{-6} *7*
401.26 *7*	0.541 *8*	1397.506	2^-	996.257	2^+	(E1,M2,E3)	0.0093 *15*	%Iγ=0.1885 *31* α(K)=0.0079 *12*; α(L)=0.00112 *21*; α(M)=0.00024 *5* α(N)=5.6×10^{-5} *11*; α(O)=8.5×10^{-6} *16*; α(P)=5.4×10^{-7} *11*
403.49 *7*	0.064 *5*	1531.284	2^+	1127.804	3^+	[M1,E2]	0.034 *9*	%Iγ=0.0223 *17* α(K)=0.029 *9*; α(L)=0.0046 *6*; α(M)=0.00101 *12* α(N)=0.000231 *29*; α(O)=3.5×10^{-5} *6*; α(P)=2.0×10^{-6} *7*
409.19 *8*	0.015 *5*	1660.910	3^+	1251.630	3^-	[E1]	0.00748 *10*	%Iγ=0.0052 *17* α(K)=0.00637 *9*; α(L)=0.000868 *12*; α(M)=0.0001872 *26* α(N)=4.28×10^{-5} *6*; α(O)=6.55×10^{-6} *9*; α(P)=4.15×10^{-7} *6* E_γ: Transition is not listed in 2004BeZQ.
421.8 *8*	0.0038 *29*	1418.146	2^+	996.257	2^+	E0+(E2,M1)	0.031 *9*	%Iγ=0.0013 *10*

$^{154}_{64}Gd_{90}$-9

^{154}Eu β^- decay 2004Ku13 (continued)

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
									α(K)=0.025 *8*; α(L)=0.0040 *6*; α(M)=0.00089 *12* α(N)=0.000203 *28*; α(O)=3.1×10^{-5} *5*; α(P)=1.8×10^{-6} *6* E_γ,Mult.: From 2004Ku13. Evaluator associates this with the 422.1 γ, which is unplaced in 2004BeZQ. 2004BeZQ report Iγ=0.0063 *26* for the 422.1 γ.
426.00 *13*	0.0023 *4*	1241.32	1$^-$	815.493	2$^+$	[E1]		0.00680 *10*	%Iγ=0.00080 *14* α(K)=0.00580 *8*; α(L)=0.000789 *11*; α(M)=0.0001700 *24* α(N)=3.89×10^{-5} *5*; α(O)=5.96×10^{-6} *8*; α(P)=3.78×10^{-7} *5*
436.20 *11*	0.0090 *16*	1251.630	3$^-$	815.493	2$^+$	[E1]		0.00644 *9*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.0031 *6* α(K)=0.00549 *8*; α(L)=0.000746 *10*; α(M)=0.0001607 *23* α(N)=3.68×10^{-5} *5*; α(O)=5.63×10^{-6} *8*; α(P)=3.59×10^{-7} *5*
444.4924[@] *19*	1.570 *14*	815.493	2$^+$	371.000	4$^+$	E2		0.01914 *27*	E_γ,I$_\gamma$: A 435.9 γ is listed in 2004BeZQ, but not placed. %Iγ=0.547 *6* α(K)=0.01540 *22*; α(L)=0.00292 *4*; α(M)=0.000650 *9* α(N)=0.0001479 *21*; α(O)=2.169×10^{-5} *30*; α(P)=1.021×10^{-6} *14*
448.45 *19*	0.0073 *11*	1263.778	4$^+$	815.493	2$^+$	[E2]		0.01868 *26*	%Iγ=0.0025 *4* α(K)=0.01505 *21*; α(L)=0.00284 *4*; α(M)=0.000632 *9* α(N)=0.0001439 *20*; α(O)=2.110×10^{-5} *30*; α(P)=9.98×10^{-7} *14*
467.92 *7*	0.1798 *21*	1719.560	2$^-$	1251.630	3$^-$	[M1,E2]		0.023 *7*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.0626 *8* α(K)=0.019 *6*; α(L)=0.0030 *5*; α(M)=0.00066 *11* α(N)=0.000151 *25*; α(O)=2.3×10^{-5} *4*; α(P)=1.4×10^{-6} *5*
478.24 *7*	0.646 *5*	1719.560	2$^-$	1241.32	1$^-$	E2		0.01570 *22*	%Iγ=0.2250 *23* α(K)=0.01272 *18*; α(L)=0.002327 *33*; α(M)=0.000517 *7* α(N)=0.0001178 *16*; α(O)=1.735×10^{-5} *24*; α(P)=8.49×10^{-7} *12*
483.76 *7*	0.0269 *5*	1531.284	2$^+$	1047.584	4$^+$	[E2]		0.01523 *21*	%Iγ=0.00937 *18* α(K)=0.01235 *17*; α(L)=0.002248 *31*; α(M)=0.000499 *7* α(N)=0.0001137 *16*; α(O)=1.677×10^{-5} *23*; α(P)=8.25×10^{-7} *12*
511.60 *8*	0.0091 *7*	1559.17	(4$^-$)	1047.584	4$^+$	[E1]		0.00448 *6*	%Iγ=0.00317 *24* α(K)=0.00382 *5*; α(L)=0.000515 *7*; α(M)=0.0001109 *16* α(N)=2.54×10^{-5} *4*; α(O)=3.90×10^{-6} *5*; α(P)=2.517×10^{-7} *35*
517.98 *7*	0.143 *4*	1645.85	4$^+$	1127.804	3$^+$	E2+M1	−7 *3*	0.0129 *4*	E_γ,I$_\gamma$: An unplaced 512 γ is listed in 2004BeZQ. %Iγ=0.0498 *14* α(K)=0.0106 *4*; α(L)=0.00185 *4*; α(M)=0.000410 *9* α(N)=9.34×10^{-5} *21*; α(O)=1.386×10^{-5} *35*; α(P)=7.13×10^{-7} *30*
533.03 *8*	0.053 *3*	1660.910	3$^+$	1127.804	3$^+$	[E0+M1+E2]		0.017 *5*	%Iγ=0.0185 *11*

$^{154}_{64}Gd_{90}$-10

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
									α(K)=0.014 *4*; α(L)=0.0021 *4*; α(M)=0.00046 *9* α(N)=0.000106 *21*; α(O)=1.61×10^{-5} *35*; α(P)=9.9×10^{-7} *34* E_γ: In 2004BeZQ list two γ's, each having Eγ=533.1.
533.11 *7*	0.0234 *14*	1796.97	3$^-$	1263.778	4$^+$	[E1]		0.00408 *6*	%Iγ=0.0082 *5* α(K)=0.00349 *5*; α(L)=0.000469 *7*; α(M)=0.0001010 *14* α(N)=2.314×10^{-5} *32*; α(O)=3.56×10^{-6} *5*; α(P)=2.302×10^{-7} *32*
534.86 *7*	0.049 *18*	1531.284	2$^+$	996.257	2$^+$	[E0+M1+E2]		0.017 *5*	2004BeZQ list two γ's, each having Eγ=533.1. %Iγ=0.017 *6* α(K)=0.014 *4*; α(L)=0.0021 *4*; α(M)=0.00046 *9* α(N)=0.000105 *20*; α(O)=1.60×10^{-5} *35*; α(P)=9.8×10^{-7} *34*
545.20 *14*	0.0039 *5*	1796.97	3$^-$	1251.630	3$^-$	[E2+M1]		0.016 *5*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.00136 *17* α(K)=0.013 *4*; α(L)=0.0020 *4*; α(M)=0.00043 *8* α(N)=9.9×10^{-5} *20*; α(O)=1.52×10^{-5} *34*; α(P)=9.4×10^{-7} *32*
546.08 *7*	0.025 *2*	1263.778	4$^+$	717.67	6$^+$	[E2]		0.01110 *16*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.0087 *7* α(K)=0.00909 *13*; α(L)=0.001571 *22*; α(M)=0.000347 *5* α(N)=7.92×10^{-5} *11*; α(O)=1.178×10^{-5} *16*; α(P)=6.14×10^{-7} *9*
557.53 *7*	0.773 *7*	680.61	0$^+$	123.071	2$^+$	E2		0.01053 *15*	%Iγ=0.2693 *30* α(K)=0.00864 *12*; α(L)=0.001480 *21*; α(M)=0.000327 *5* α(N)=7.46×10^{-5} *10*; α(O)=1.111×10^{-5} *16*; α(P)=5.85×10^{-7} *8*
560.79 *19*	0.0018 *5*	1241.32	1$^-$	680.61	0$^+$	[E1]		0.00366 *5*	%Iγ=0.00063 *17* α(K)=0.00312 *4*; α(L)=0.000419 *6*; α(M)=9.02×10^{-5} *13* α(N)=2.066×10^{-5} *29*; α(O)=3.18×10^{-6} *4*; α(P)=2.065×10^{-7} *29*
569.50 *7*	0.040 *6*	1617.127	3$^-$	1047.584	4$^+$	[E1]		0.00353 *5*	E_γ: Transition is not listed in 2004BeZQ. %Iγ=0.0139 *21* α(K)=0.00302 *4*; α(L)=0.000405 *6*; α(M)=8.71×10^{-5} *12* α(N)=1.997×10^{-5} *28*; α(O)=3.07×10^{-6} *4*; α(P)=1.999×10^{-7} *28*
581.97 *7*	2.563 *18*	1397.506	2$^-$	815.493	2$^+$	E1		0.00337 *5*	%Iγ=0.893 *9* α(K)=0.00288 *4*; α(L)=0.000386 *5*; α(M)=8.30×10^{-5} *12* α(N)=1.903×10^{-5} *27*; α(O)=2.93×10^{-6} *4*; α(P)=1.909×10^{-7} *27*
591.755[@] *3*	14.21 *10*	1719.560	2$^-$	1127.804	3$^+$	E1(+M2)	+0.02 *3*	0.00327 *11*	%Iγ=4.95 *5* α(K)=0.00280 *9*; α(L)=0.000374 *14*; α(M)=8.06×10^{-5} *30* α(N)=1.85×10^{-5} *7*; α(O)=2.84×10^{-6} *11*; α(P)=1.86×10^{-7} *7*

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
598.30 *7*	0.030 *4*	1645.85	4^+	1047.584	4^+	M1+E2	0.65 *20*	0.0139 *10*	%Iγ=0.0105 *14* α(K)=0.0118 *8*; α(L)=0.00169 *9*; α(M)=0.000366 *19* α(N)=8.4×10^{-5} *4*; α(O)=1.30×10^{-5} *7*; α(P)=8.5×10^{-7} *7*
598.93 *7*	0.0010 *3*	1414.42	1^-	815.493	2^+	[E1]		0.00317 *4*	%Iγ=0.00035 *10* α(K)=0.00271 *4*; α(L)=0.000362 *5*; α(M)=7.80×10^{-5} *11* α(N)=1.787×10^{-5} *25*; α(O)=2.75×10^{-6} *4*; α(P)=1.797×10^{-7} *25*
602.68 *7*	0.084 *3*	1418.146	2^+	815.493	2^+	E0+M1+E2		0.012 *4*	%Iγ=0.0293 *11* 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.
613.24 *7*	0.2674 *29*	1660.910	3^+	1047.584	4^+	E2,M1		0.0117 *34*	%Iγ=0.0931 *12* α(K)=0.0099 *30*; α(L)=0.00145 *32*; α(M)=0.00032 *7* α(N)=7.3×10^{-5} *16*; α(O)=1.11×10^{-5} *26*; α(P)=7.0×10^{-7} *24*
621.6 *5*	0.012 *5*	1617.127	3^-	996.257	2^+	[E1]		0.00293 *4*	%Iγ=0.0042 *17* α(K)=0.002504 *35*; α(L)=0.000334 *5*; α(M)=7.19×10^{-5} *10* α(N)=1.648×10^{-5} *23*; α(O)=2.54×10^{-6} *4*; α(P)=1.662×10^{-7} *23*
625.2556[@] *24*	0.906 *9*	996.257	2^+	371.000	4^+	E2		0.00792 *11*	%Iγ=0.316 *4* α(K)=0.00655 *9*; α(L)=0.001075 *15*; α(M)=0.0002366 *33* α(N)=5.40×10^{-5} *8*; α(O)=8.10×10^{-6} *11*; α(P)=4.46×10^{-7} *6*
649.52 *7*	0.251 *5*	1645.85	4^+	996.257	2^+	E2		0.00723 *10*	%Iγ=0.0874 *18* α(K)=0.00599 *8*; α(L)=0.000970 *14*; α(M)=0.0002132 *30* α(N)=4.87×10^{-5} *7*; α(O)=7.32×10^{-6} *10*; α(P)=4.09×10^{-7} *6*
664.74 *8*	0.075 *3*	1660.910	3^+	996.257	2^+	[M1,E2]		0.0096 *28*	%Iγ=0.0261 *11* α(K)=0.0081 *24*; α(L)=0.00118 *27*; α(M)=0.00026 *6* α(N)=5.9×10^{-5} *13*; α(O)=9.1×10^{-6} *22*; α(P)=5.8×10^{-7} *19*
669.14 *8*	0.0460 *22*	1796.97	3^-	1127.804	3^+	E1		2.51×10^{-3} *4*	%Iγ=0.0160 *8* α(K)=0.002146 *30*; α(L)=0.000285 *4*; α(M)=6.14×10^{-5} *9*

^{154}Eu β^- decay 2004Ku13 (continued)

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	$I_{(\gamma+ce)}$[c]	Comments
										α(N)=1.407×10^{-5} *20*; α(O)=2.170×10^{-6} *30*; α(P)=1.428×10^{-7} *20*
676.60 *7*	0.480 *4*	1047.584	4$^+$	371.000	4$^+$	E0+M1+E2	+2.9 *4*	0.00712 *19*		I$_\gamma$: For a 668.9 γ placed from this level in previous studies, 2004BeZQ give Iγ=0.037 *6*. %Iγ=0.1672 *18* 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.
680.72 *10*		680.61	0$^+$	0	0$^+$	E0			0.015 *2*	%Iγ=0.005225 *34* E$_\gamma$,I$_{(\gamma+ce)}$: Value listed in 2004BeZQ. 2004Ku13 do not show this transition.
692.4205[@] *18*	5.10 *4*	815.493	2$^+$	123.071	2$^+$	E0+M1+E2	7.5 *4*	0.00629 *9*		%Iγ=1.777 *18* 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.
714.90 *16*	0.0026 *2*	1432.66	5$^+$	717.67	6$^+$	E2,M1		0.0080 *23*		%Iγ=0.00091 *7* 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} *16*
715.76 *7*	0.536 *15*	1531.284	2$^+$	815.493	2$^+$	E0,M1,E2		0.0080 *23*		E$_\gamma$: Transition is not listed in 2004BeZQ. %Iγ=0.187 *5* 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.
723.3014[@] *22*	57.6 *4*	1719.560	2$^-$	996.257	2$^+$	E1+M2	+0.022 *13*	0.00215 *4*		%Iγ=20.06 *19* α(K)=0.001839 *30*; α(L)=0.000244 *4*; α(M)=5.24×10^{-5} *9* α(N)=1.203×10^{-5} *21*; α(O)=1.857×10^{-6} *32*; α(P)=1.229×10^{-7} *21*

$^{154}_{64}Gd_{90}$-13

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
737.69 *13*	0.0065 *6*	1418.146	2^+	680.61	0^+	[E2]		0.00536 *8*	%Iγ=0.00226 *21* α(K)=0.00447 *6*; α(L)=0.000696 *10*; α(M)=0.0001525 *21* α(N)=3.49×10^{-5} *5*; α(O)=5.28×10^{-6} *7*; α(P)=3.07×10^{-7} *4* E_γ: γ is unplaced in 2004BeZQ. I_γ: 2004BeZQ report Iγ=0.018 *7* for a 737.6 G.
740.91 *16*	0.0030 *5*	1788.83	(4^+)	1047.584	4^+	[E0+M1+E2]		0.0074 *21*	%Iγ=0.00105 *17* α(K)=0.0062 *18*; α(L)=0.00090 *21*; α(M)=0.00019 *4* α(N)=4.5×10^{-5} *10*; α(O)=6.9×10^{-6} *17*; α(P)=4.4×10^{-7} *14* E_γ: Transition is not listed in 2004BeZQ.
749.48 *9*	0.0215 *13*	1796.97	3^-	1047.584	4^+	[E1]		1.99×10^{-3} *3*	%Iγ=0.0075 *5* α(K)=0.001702 *24*; α(L)=0.0002251 *32*; α(M)=4.84×10^{-5} *7* α(N)=1.110×10^{-5} *16*; α(O)=1.715×10^{-6} *24*; α(P)=1.137×10^{-7} *16* E_γ: Transition is not listed in 2004BeZQ.
756.8020[@] *23*	12.98 *9*	1127.804	3^+	371.000	4^+	E2+M1	−6.1 *3*	0.00516 *7*	%Iγ=4.52 *4* α(K)=0.00431 *6*; α(L)=0.000663 *9*; 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*
800.61 *8*	0.061 *3*	1796.97	3^-	996.257	2^+	E1		1.74×10^{-3} *2*	%Iγ=0.0212 *11* α(K)=0.001492 *21*; α(L)=0.0001967 *28*; α(M)=4.23×10^{-5} *6* α(N)=9.70×10^{-6} *14*; α(O)=1.500×10^{-6} *21*; α(P)=9.98×10^{-8} *14* I_γ: For a 800.2 γ placed from this level in previous studies, 2004BeZQ give Iγ=0.092 *14*.
801.69 *11*	0.0177 *17*	1617.127	3^-	815.493	2^+	[E1]		1.74×10^{-3} *2*	%Iγ=0.0062 *6* α(K)=0.001488 *21*; α(L)=0.0001962 *27*; α(M)=4.22×10^{-5} *6* α(N)=9.68×10^{-6} *14*; α(O)=1.496×10^{-6} *21*; α(P)=9.96×10^{-8} *14*
815.51 *7*	1.467 *11*	815.493	2^+	0	0^+	E2		0.00427 *6*	%Iγ=0.511 *5* α(K)=0.00358 *5*; α(L)=0.000542 *8*; α(M)=0.0001185 *17*

$^{154}_{64}Gd_{90}$-14

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
									α(N)=2.71×10^{-5} *4*; α(O)=4.12×10^{-6} *6*; α(P)=2.469×10^{-7} *35*
830.42 *10*	0.0179 *16*	1645.85	4$^+$	815.493	2$^+$	[E2]		0.00410 *6*	%Iγ=0.0062 *6* α(K)=0.00344 *5*; α(L)=0.000519 *7*; α(M)=0.0001133 *16* α(N)=2.60×10^{-5} *4*; α(O)=3.95×10^{-6} *6*; α(P)=2.374×10^{-7} *33* E_γ: An 830.3 γ is shown as unplaced in 2004BeZQ.
845.416[@] *7*	1.63 *3*	1660.910	3$^+$	815.493	2$^+$	E2		0.00395 *6*	%Iγ=0.568 *11* α(K)=0.00331 *5*; α(L)=0.000497 *7*; α(M)=0.0001085 *15* α(N)=2.485×10^{-5} *35*; α(O)=3.78×10^{-6} *5*; α(P)=2.285×10^{-7} *32*
850.67 *7*	0.697 *6*	1531.284	2$^+$	680.61	0$^+$	E2		0.00389 *5*	%Iγ=0.2428 *26* α(K)=0.00327 *5*; α(L)=0.000490 *7*; α(M)=0.0001069 *15* α(N)=2.448×10^{-5} *34*; α(O)=3.73×10^{-6} *5*; α(P)=2.255×10^{-7} *32*
873.1834[@] *23*	34.68 *24*	996.257	2$^+$	123.071	2$^+$	E0+E2+M1	−9.4 *4*	0.00371 *5*	%Iγ=12.08 *12* 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)=2.154×10^{-7} *30*
880.65 *7*	0.241 *16*	1251.630	3$^-$	371.000	4$^+$	E1+M2	+0.07 *3*	0.00152 *8*	%Iγ=0.084 *6* 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*
892.775[@] *6*	1.497 *12*	1263.778	4$^+$	371.000	4$^+$	E0+M1+E2	−3.8 *3*	0.00367 *6*	%Iγ=0.521 *5* α(K)=0.00309 *5*; α(L)=0.000454 *7*; α(M)=9.88×10^{-5} *15* α(N)=2.264×10^{-5} *35*; α(O)=3.46×10^{-6} *5*; α(P)=2.144×10^{-7} *35*
904.064[@] *3*	2.551 *20*	1719.560	2$^-$	815.493	2$^+$	E1(+M2)		0.00151 *14*	%Iγ=0.889 *9* α(K)=0.00129 *11*; α(L)=0.000171 *17*; α(M)=3.7×10^{-5} *4* α(N)=8.5×10^{-6} *9*; α(O)=1.31×10^{-6} *13*; α(P)=8.8×10^{-8} *9*
924.57 *7*	0.1862 *25*	1047.584	4$^+$	123.071	2$^+$	E2		0.00325 *5*	%Iγ=0.0649 *10* 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} *26*
928.21 *8*	0.0086 *5*	1645.85	4$^+$	717.67	6$^+$	[E2]		0.00322 *5*	%Iγ=0.00300 *18* α(K)=0.00271 *4*; α(L)=0.000399 *6*; α(M)=8.68×10^{-5} *12* α(N)=1.990×10^{-5} *28*; α(O)=3.04×10^{-6} *4*; α(P)=1.877×10^{-7} *26* E_γ: A 928.4 γ is shown as unplaced in 2004BeZQ.

$^{154}_{64}Gd_{90}$-15

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
981.61 *8*	0.025 *4*	1796.97	3^-	815.493	2^+	[E1]		1.18×10^{-3} *2*	%Iγ=0.0087 *14* α(K)=0.001008 *14*; α(L)=0.0001318 *18*; α(M)=2.83×10^{-5} *4* α(N)=6.50×10^{-6} *9*; α(O)=1.006×10^{-6} *14*; α(P)=6.77×10^{-8} *9*
996.29 *7*	30.09 *21*	996.257	2^+	0	0^+	E2		0.00277 *4*	%Iγ=10.48 *10* 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*
1004.76 *7*	51.7 *4*	1127.804	3^+	123.071	2^+	E2+M1	−7.4 *4*	0.00276 *4*	%Iγ=18.01 *18* 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*
1033.72 *21*	0.0079 *11*	1404.45	(5^-)	371.000	4^+	E1		1.07×10^{-3} *2*	%Iγ=0.0028 *4* α(K)=0.000916 *13*; α(L)=0.0001194 *17*; α(M)=2.56×10^{-5} *4* α(N)=5.89×10^{-6} *8*; α(O)=9.12×10^{-7} *13*; α(P)=6.16×10^{-8} *9* E_γ: γ is unplaced in 2004BeZQ.
1047.18 *18*	0.176 *4*	1418.146	2^+	371.000	4^+	E2		2.50×10^{-3} *4*	%Iγ=0.0613 *15* α(K)=0.002114 *30*; α(L)=0.000303 *4*; α(M)=6.59×10^{-5} *9* α(N)=1.511×10^{-5} *21*; α(O)=2.317×10^{-6} *32*; α(P)=1.465×10^{-7} *21*
1058.94 *10*	0.021 *4*	1181.96	0^+	123.071	2^+	E2		2.44×10^{-3} *3*	%Iγ=0.0073 *14* α(K)=0.002067 *29*; α(L)=0.000296 *4*; α(M)=6.42×10^{-5} *9* α(N)=1.473×10^{-5} *21*; α(O)=2.261×10^{-6} *32*; α(P)=1.432×10^{-7} *20* E_γ: Transition is not listed in 2004BeZQ.
1061.67 *8*	0.0102 *30*	1432.66	5^+	371.000	4^+	E2+M1	−4.3 *+12−26*	0.00251 *7*	%Iγ=0.0036 *10* α(K)=0.00212 *6*; α(L)=0.000303 *8*; α(M)=6.57×10^{-5} *18* α(N)=1.51×10^{-5} *4*; α(O)=2.31×10^{-6} *6*; α(P)=1.48×10^{-7} *5* E_γ: Transition is not listed in 2004BeZQ.
1071.17 *24*	0.0007 *1*	1788.83	(4^+)	717.67	6^+	[E2]		2.39×10^{-3} *3*	%Iγ=0.000244 *35* α(K)=0.002019 *28*; α(L)=0.000288 *4*; α(M)=6.26×10^{-5} *9* α(N)=1.436×10^{-5} *20*; α(O)=2.205×10^{-6} *31*; α(P)=1.399×10^{-7} *20* E_γ: In 2004BeZQ, a 1072.2 γ is listed but not placed.
1118.27 *7*	0.325 *11*	1241.32	1^-	123.071	2^+	E1		9.28×10^{-4} *13*	%Iγ=0.113 *4*

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[b]	Comments
									α(K)=0.000793 *11*; α(L)=0.0001031 *14*; α(M)=2.213×10^{-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)=3.47×10^{-6} *5*
1128.552[@] *7*	0.86 *1*	1251.630	3$^-$	123.071	2$^+$	E1		9.14×10^{-4} *13*	%Iγ=0.300 *4* α(K)=0.000780 *11*; α(L)=0.0001014 *14*; α(M)=2.175×10^{-5} *30* α(N)=5.00×10^{-6} *7*; α(O)=7.75×10^{-7} *11*; α(P)=5.25×10^{-8} *7*; α(IPF)=4.78×10^{-6} *7*
1140.702[@] *6*	0.681 *9*	1263.778	4$^+$	123.071	2$^+$	E2		2.10×10^{-3} *3*	%Iγ=0.2372 *35* α(K)=0.001779 *25*; α(L)=0.0002515 *35*; α(M)=5.45×10^{-5} *8* α(N)=1.251×10^{-5} *18*; α(O)=1.924×10^{-6} *27*; α(P)=1.233×10^{-7} *17*; α(IPF)=1.252×10^{-6} *18*
1160.31 *7*	0.1326 *13*	1531.284	2$^+$	371.000	4$^+$	[E2]		2.03×10^{-3} *3*	%Iγ=0.0462 *5* α(K)=0.001720 *24*; α(L)=0.0002424 *34*; α(M)=5.25×10^{-5} *7* α(N)=1.205×10^{-5} *17*; α(O)=1.855×10^{-6} *26*; α(P)=1.192×10^{-7} *17*; α(IPF)=2.210×10^{-6} *31*
1188.14 *7*	0.2515 *18*	1559.17	(4$^-$)	371.000	4$^+$				%Iγ=0.0876 *9*
1241.34 *7*	0.352 *4*	1241.32	1$^-$	0	0$^+$	E1		8.10×10^{-4} *11*	%Iγ=0.1226 *16* α(K)=0.000658 *9*; α(L)=8.52×10^{-5} *12*; α(M)=1.828×10^{-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)=4.32×10^{-5} *6*
1246.121[@] *4*	2.456 *25*	1617.127	3$^-$	371.000	4$^+$	E1		8.07×10^{-4} *11*	%Iγ=0.856 *10* α(K)=0.000654 *9*; α(L)=8.46×10^{-5} *12*; α(M)=1.815×10^{-5} *25* α(N)=4.17×10^{-6} *6*; α(O)=6.47×10^{-7} *9*; α(P)=4.41×10^{-8} *6*; α(IPF)=4.55×10^{-5} *6*
1274.429[@] *4*	100.0 *7*	1397.506	2$^-$	123.071	2$^+$	E1+M2	+0.035 *9*	7.97×10^{-4} *12*	%Iγ=34.83 *34* 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*
1275.66 *12*	0.005 *5*	1645.85	4$^+$	371.000	4$^+$	[E2+M1]		0.0021 *4*	%Iγ=0.0017 *17* α(K)=0.0018 *4*; α(L)=0.00025 *5*; α(M)=5.3×10^{-5} *10*

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								α(N)=1.22×10^{-5} *24*; α(O)=1.9×10^{-6} *4*; α(P)=1.28×10^{-7} *29*; α(IPF)=1.67×10^{-5} *9*
1289.88 *11*	0.0603 *22*	1660.910	3$^+$	371.000	4$^+$	[M1,E2]	0.0021 *4*	E$_\gamma$: Poor energy fit. Transition is not listed in 2004BeZQ. %Iγ=0.0210 *8* α(K)=0.0018 *4*; α(L)=0.00024 *5*; α(M)=5.2×10^{-5} *10* α(N)=1.19×10^{-5} *23*; α(O)=1.9×10^{-6} *4*; α(P)=1.25×10^{-7} *28*; α(IPF)=1.92×10^{-5} *10*
1291.36 *8*	0.063 *22*	1414.42	1$^-$	123.071	2$^+$	E1	7.82×10^{-4} *11*	%Iγ=0.022 *8* 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)=6.77×10^{-5} *9*
1294.99 *8*	0.0333 *17*	1418.146	2$^+$	123.071	2$^+$	E2	1.65×10^{-3} *2*	%Iγ=0.0116 *6* α(K)=0.001385 *19*; α(L)=0.0001921 *27*; α(M)=4.16×10^{-5} *6* α(N)=9.54×10^{-6} *13*; α(O)=1.472×10^{-6} *21*; α(P)=9.61×10^{-8} *13*; α(IPF)=1.910×10^{-5} *27*
1408.28 *7*	0.071 *3*	1531.284	2$^+$	123.071	2$^+$	E0,M1,E2	0.00176 *33*	Mult.: From 2004Ku13. Mult not listed in 2004BeZQ. %Iγ=0.0247 *11* 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* α: From the adopted values. The listed subshell coefficients do not include a contribution from the E0 component.
1414.44 *10*	0.0148 *14*	1414.42	1$^-$	0	0$^+$	E1	7.54×10^{-4} *11*	%Iγ=0.0052 *5* α(K)=0.000524 *7*; α(L)=6.76×10^{-5} *9*; α(M)=1.449×10^{-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)=0.0001439 *20*
1417.88 *9*	0.0152 *8*	1788.83	(4$^+$)	371.000	4$^+$	[M1,E2]	0.00174 *32*	%Iγ=0.00529 *28* α(K)=0.00144 *28*; α(L)=0.000195 *35*; α(M)=4.2×10^{-5} *8* α(N)=9.7×10^{-6} *18*; α(O)=1.50×10^{-6} *28*; α(P)=1.02×10^{-7} *21*; α(IPF)=5.14×10^{-5} *30* E$_\gamma$: 2004BeZQ show a 1419.0 γ deexciting a level with properties similar to those of this level.
1418.15 *9*	0.024 *3*	1418.146	2$^+$	0	0$^+$	E2	1.41×10^{-3} *2*	%Iγ=0.0084 *10* α(K)=0.001162 *16*; α(L)=0.0001593 *22*; α(M)=3.44×10^{-5} *5* α(N)=7.91×10^{-6} *11*; α(O)=1.222×10^{-6} *17*; α(P)=8.07×10^{-8} *11*; α(IPF)=4.85×10^{-5} *7*
1426.03 *27*	0.0012 *2*	1796.97	3$^-$	371.000	4$^+$	[E1]	7.54×10^{-4} *11*	%Iγ=0.00042 *7*

$^{154}_{64}Gd_{90}$-18

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

E_γ[#]	I_γ[†‡&c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
								α(K)=0.000517 *7*; α(L)=6.66×10^{-5} *9*; α(M)=1.428×10^{-5} *20* α(N)=3.28×10^{-6} *5*; α(O)=5.10×10^{-7} *7*; α(P)=3.49×10^{-8} *5*; α(IPF)=0.0001519 *21* I_γ: For a 1425.9 γ placed from this level in previous studies, 2004BeZQ give Iγ=0.0034 *9*.
1494.048[@] *4*	2.003 *18*	1617.127	3$^-$	123.071	2$^+$	E1	7.56×10^{-4} *11*	%Iγ=0.698 *8* α(K)=0.000478 *7*; α(L)=6.15×10^{-5} *9*; α(M)=1.318×10^{-5} *18* α(N)=3.03×10^{-6} *4*; α(O)=4.71×10^{-7} *7*; α(P)=3.23×10^{-8} *5*; α(IPF)=0.0002001 *28*
1522.19 *16*	0.0025 *4*	1645.85	4$^+$	123.071	2$^+$	[E2]	1.27×10^{-3} *2*	%Iγ=0.00087 *14* α(K)=0.001016 *14*; α(L)=0.0001382 *19*; α(M)=2.98×10^{-5} *4* α(N)=6.85×10^{-6} *10*; α(O)=1.061×10^{-6} *15*; α(P)=7.05×10^{-8} *10*; α(IPF)=8.18×10^{-5} *11* E_γ: Poor energy fit. In 2004BeZQ, a 1522 *1* γ is listed, but is placed from a 1894.7 level, whose existence 2004Ku13 do not confirm.
1531.33 *16*	0.0184 *6*	1531.284	2$^+$	0	0$^+$	[E2]	1.26×10^{-3} *2*	%Iγ=0.00641 *21* α(K)=0.001005 *14*; α(L)=0.0001366 *19*; α(M)=2.95×10^{-5} *4* α(N)=6.77×10^{-6} *9*; α(O)=1.048×10^{-6} *15*; α(P)=6.97×10^{-8} *10*; α(IPF)=8.50×10^{-5} *12*
1537.81 *7*	0.165 *3*	1660.910	3$^+$	123.071	2$^+$	[M1,E2]	0.00151 *25*	%Iγ=0.0575 *11* α(K)=0.00121 *21*; α(L)=0.000163 *27*; α(M)=3.5×10^{-5} *6* α(N)=8.1×10^{-6} *14*; α(O)=1.26×10^{-6} *22*; α(P)=8.6×10^{-8} *16*; α(IPF)=9.3×10^{-5} *6*
1596.4804[@] *28*	5.16 *6*	1719.560	2$^-$	123.071	2$^+$	E1(+M2)	8.00×10^{-4} *29*	%Iγ=1.797 *24* α(K)=0.000452 *26*; α(L)=5.8×10^{-5} *4*; α(M)=1.25×10^{-5} *8* α(N)=2.88×10^{-6} *18*; α(O)=4.48×10^{-7} *28*; α(P)=3.07×10^{-8} *19*; α(IPF)=0.000274 *4*
1665.83 *12*	0.0058 *3*	1788.83	(4$^+$)	123.071	2$^+$	[E2]	1.14×10^{-3} *2*	%Iγ=0.00202 *11* α(K)=0.000858 *12*; α(L)=0.0001156 *16*; α(M)=2.493×10^{-5} *35* α(N)=5.73×10^{-6} *8*; α(O)=8.88×10^{-7} *12*; α(P)=5.95×10^{-8} *8*; α(IPF)=0.0001366 *19* E_γ: 2004BeZQ show a 1667.3 γ deexciting a level with properties similar to those of this level.
1673.93 *8*	0.0058 *3*	1796.97	3$^-$	123.071	2$^+$	[E1]	7.93×10^{-4} *11*	%Iγ=0.00202 *11* α(K)=0.000395 *6*; α(L)=5.07×10^{-5} *7*; α(M)=1.086×10^{-5} *15*

$^{154}_{64}Gd_{90}$-19

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

E_γ [#]	E_i(level)	Comments
		α(N)=2.494×10^{-6} *35*; α(O)=3.88×10^{-7} *5*; α(P)=2.67×10^{-8} *4*; α(IPF)=0.000334 *5* I_γ: For a 1674.0 γ placed from this level in previous studies, 2004BeZQ give Iγ=0.0049 *11*.

† The Iγ values for the prominent γ rays are important because ^{154}Eu is used as an efficiency calibration standard for Ge detectors. For this reason, some of these Iγ values were given detailed consideration by the Decay Data Evaluation Project, a program carried out under the auspices of the IAEA. The ^{154}Eu data were evaluated by V.P. Chechev and N.K. Kuzmenko and included all the data available to them. Their results are given in 2004BeZQ. The data reported by 2004Ku13 were not included in their work, but are in generally good agreement with it.

‡ Values of the absolute emission probabilities of the ^{154}Eu-decay γ's have also recently been measured by 2004Te01. These values are in generally in good agreement with the evaluated values of Chechev and Kuzmenko, as well as with those of 2004Ku13.

Values are from 2004Ku13, unless noted otherwise.

@ From the recommended values in the analysis and evaluation of 2000He14.

& Relative values, from 2004Ku13 unless noted otherwise.

a 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.

b Additional information 6.

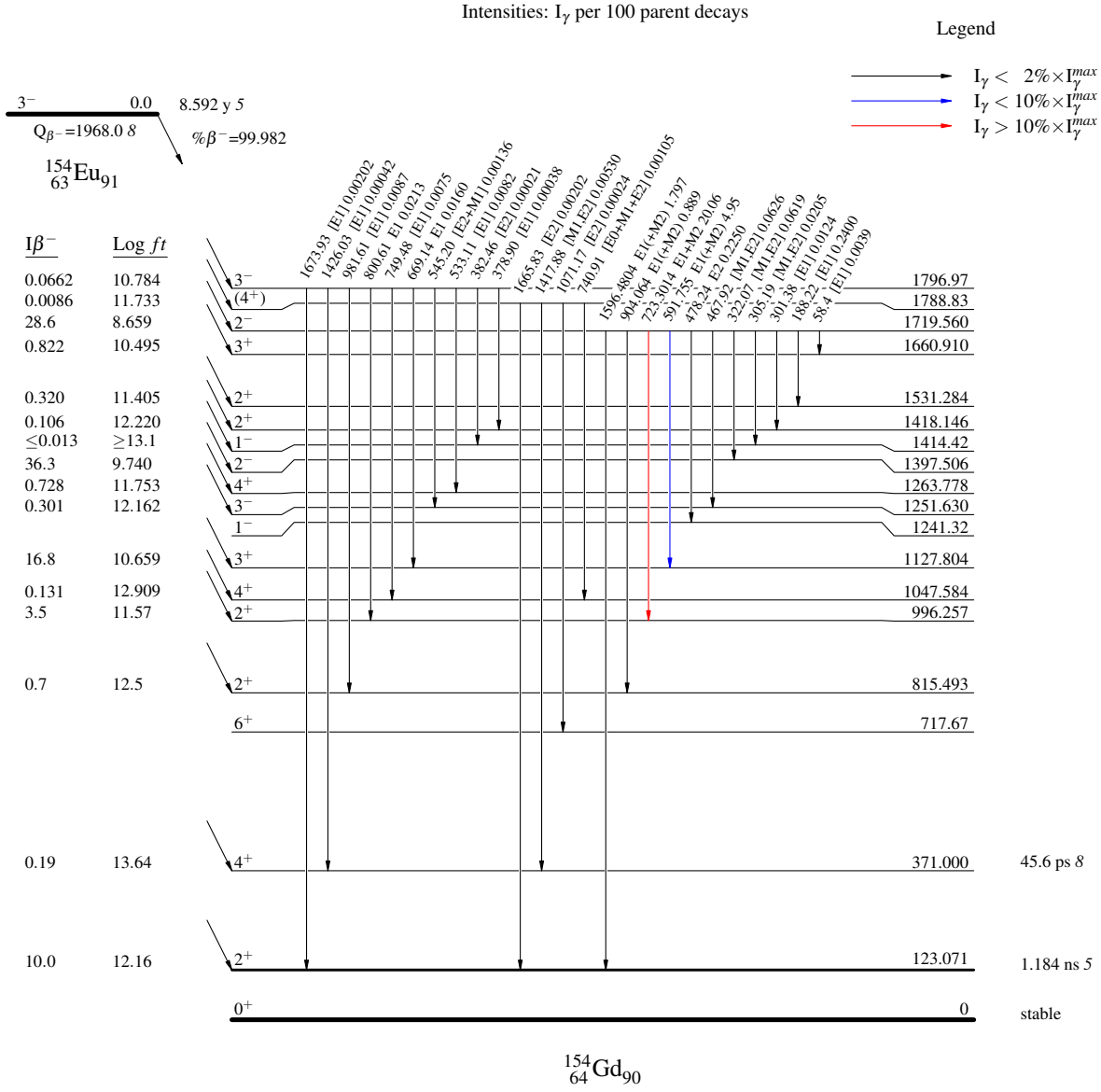
c For absolute intensity per 100 decays, multiply by 0.3483 *23*.

$^{154}_{64}Gd_{90}$-20

^{154}Eu β^- decay 2004Ku13

Decay Scheme

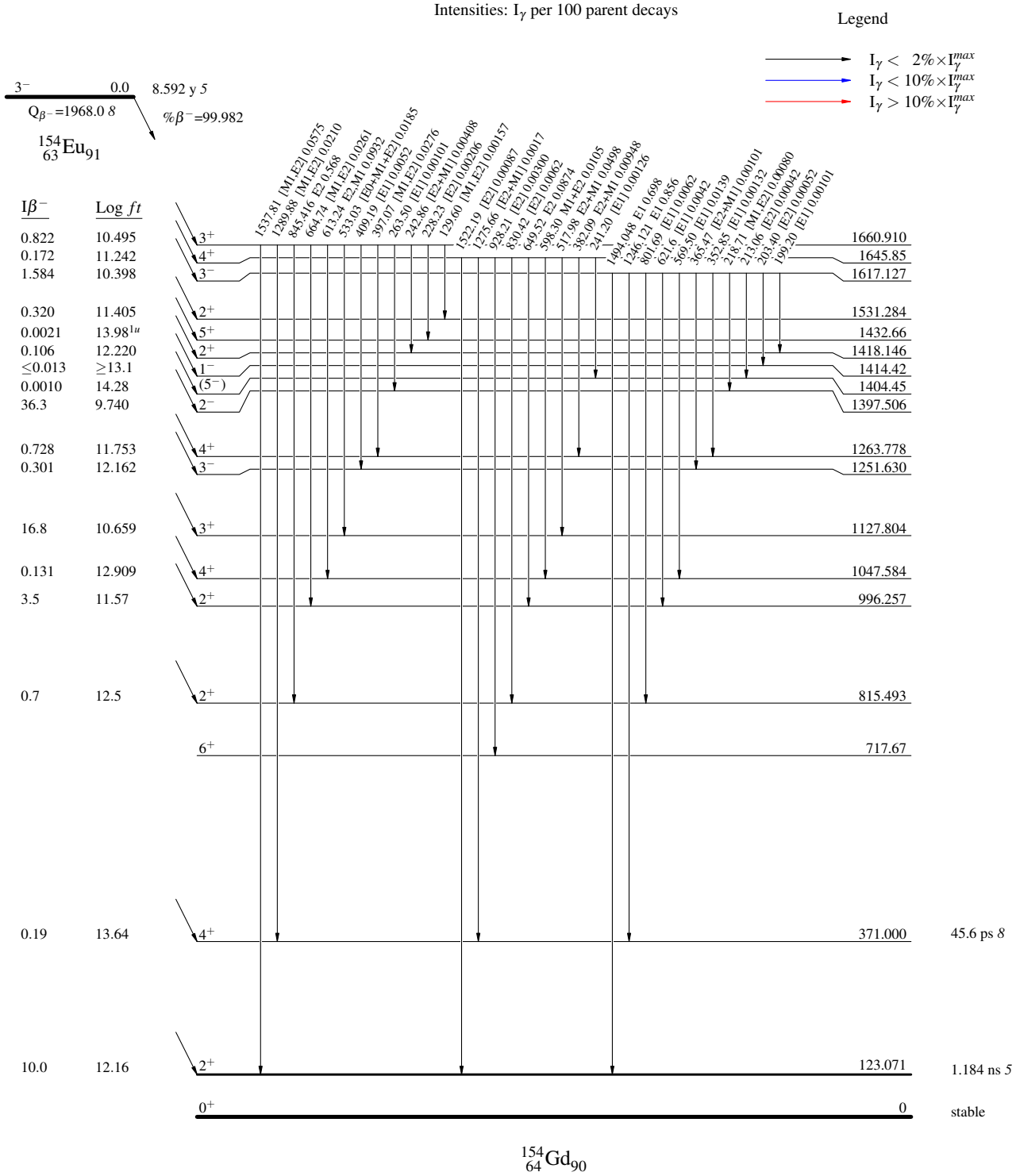
Intensities: I_γ per 100 parent decays



^{154}Eu β^- decay 2004Ku13

Decay Scheme (continued)

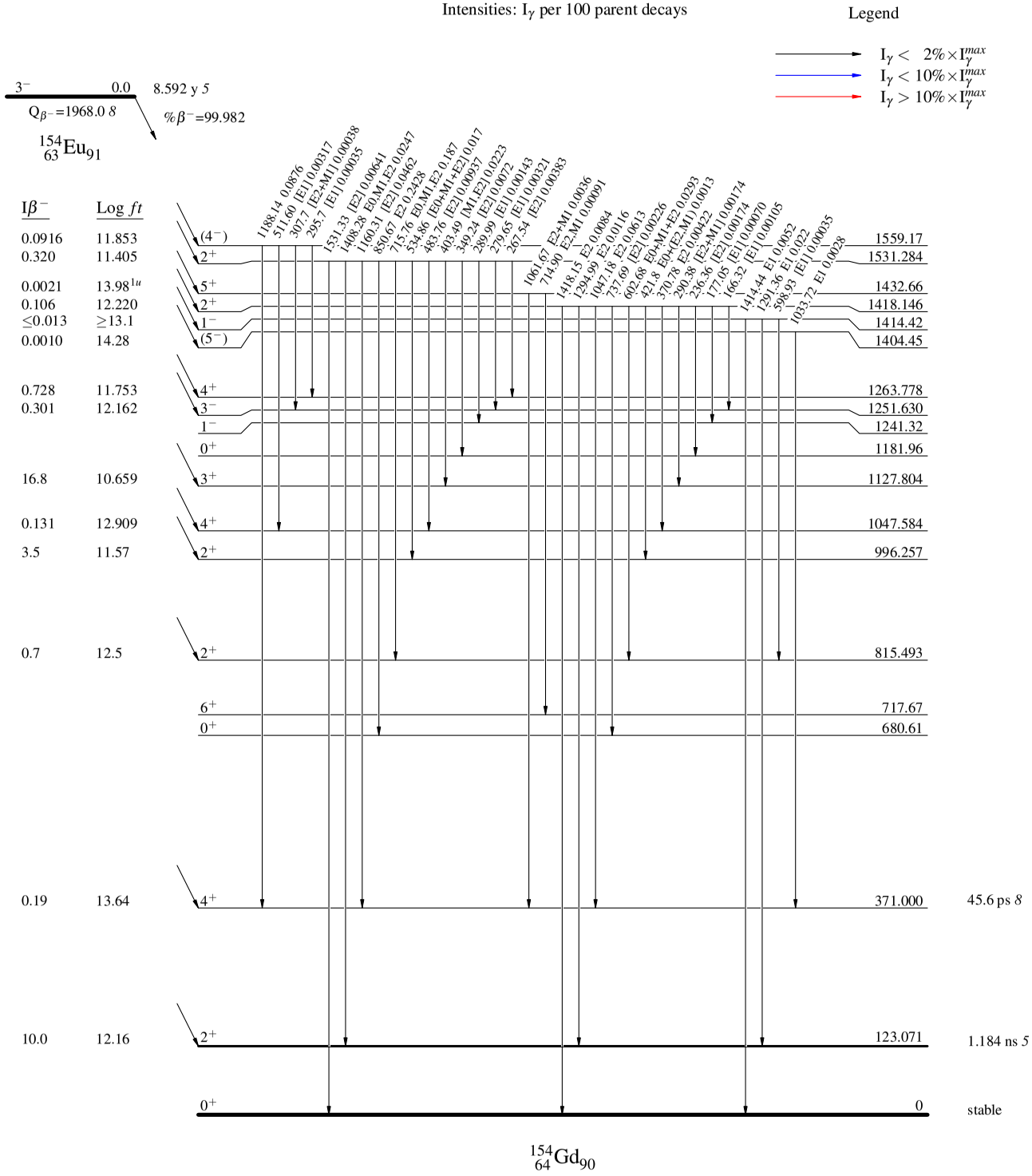
Intensities: I_γ per 100 parent decays



^{154}Eu β^- decay 2004Ku13

Decay Scheme (continued)

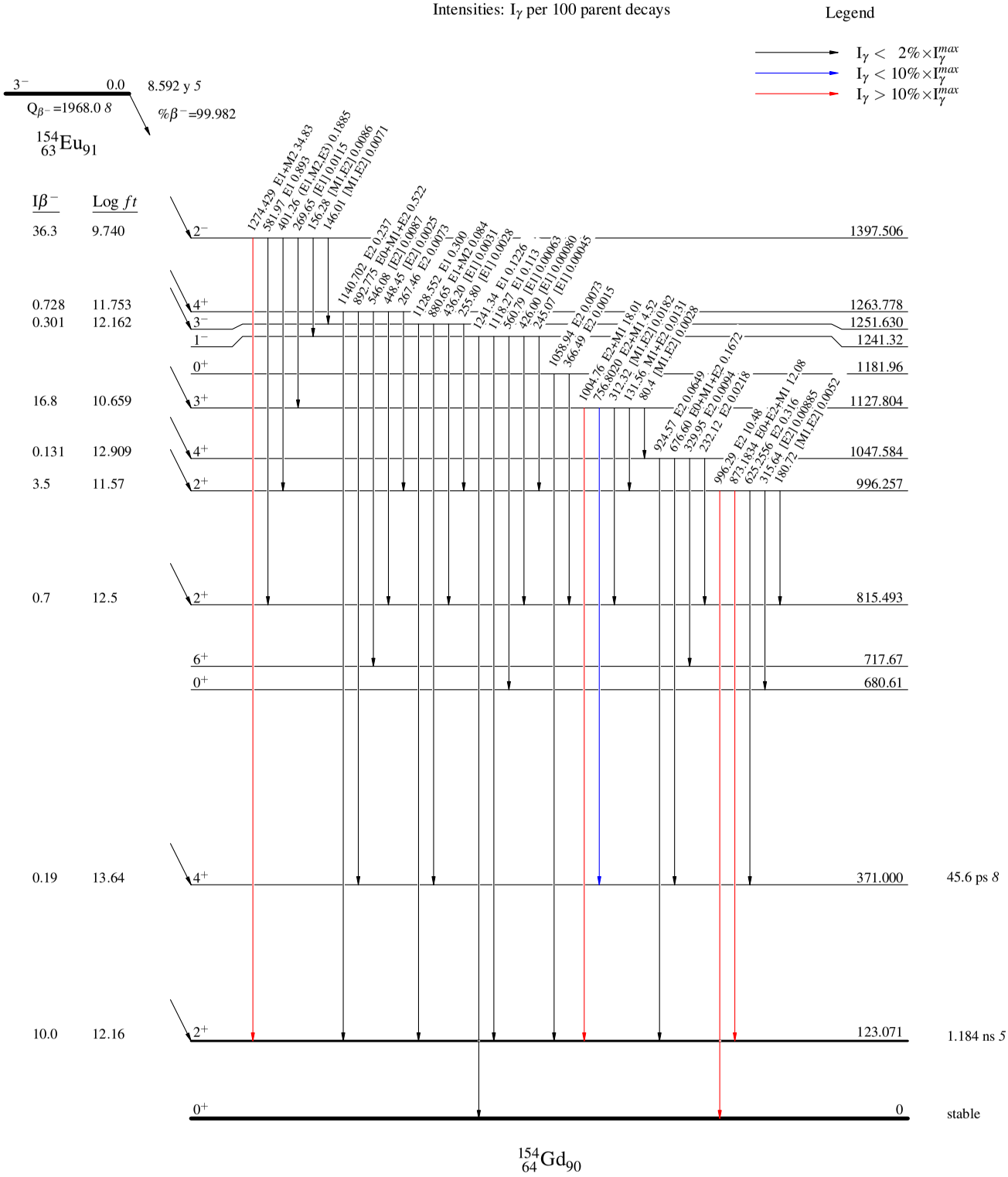
Intensities: I_γ per 100 parent decays



^{154}Eu β^- decay 2004Ku13

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays

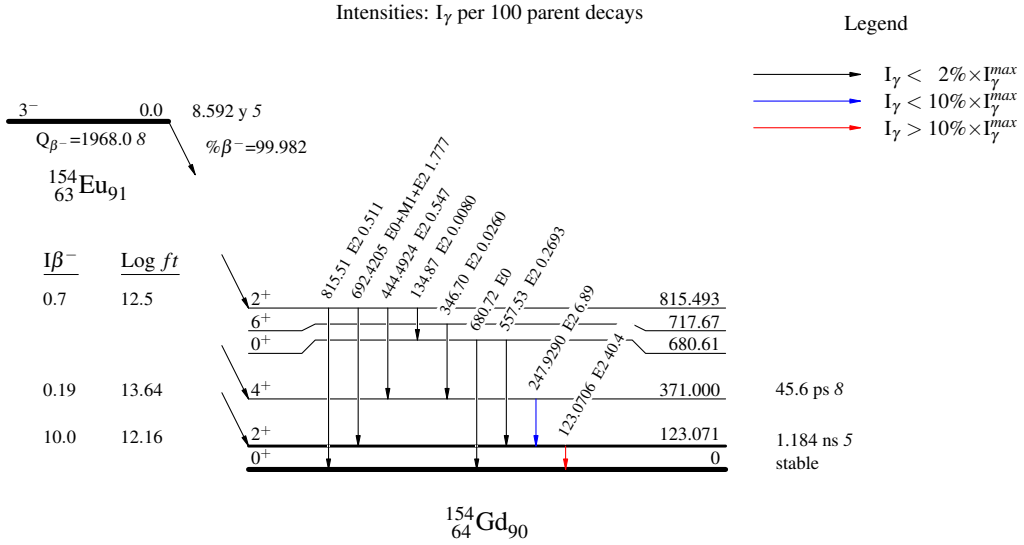


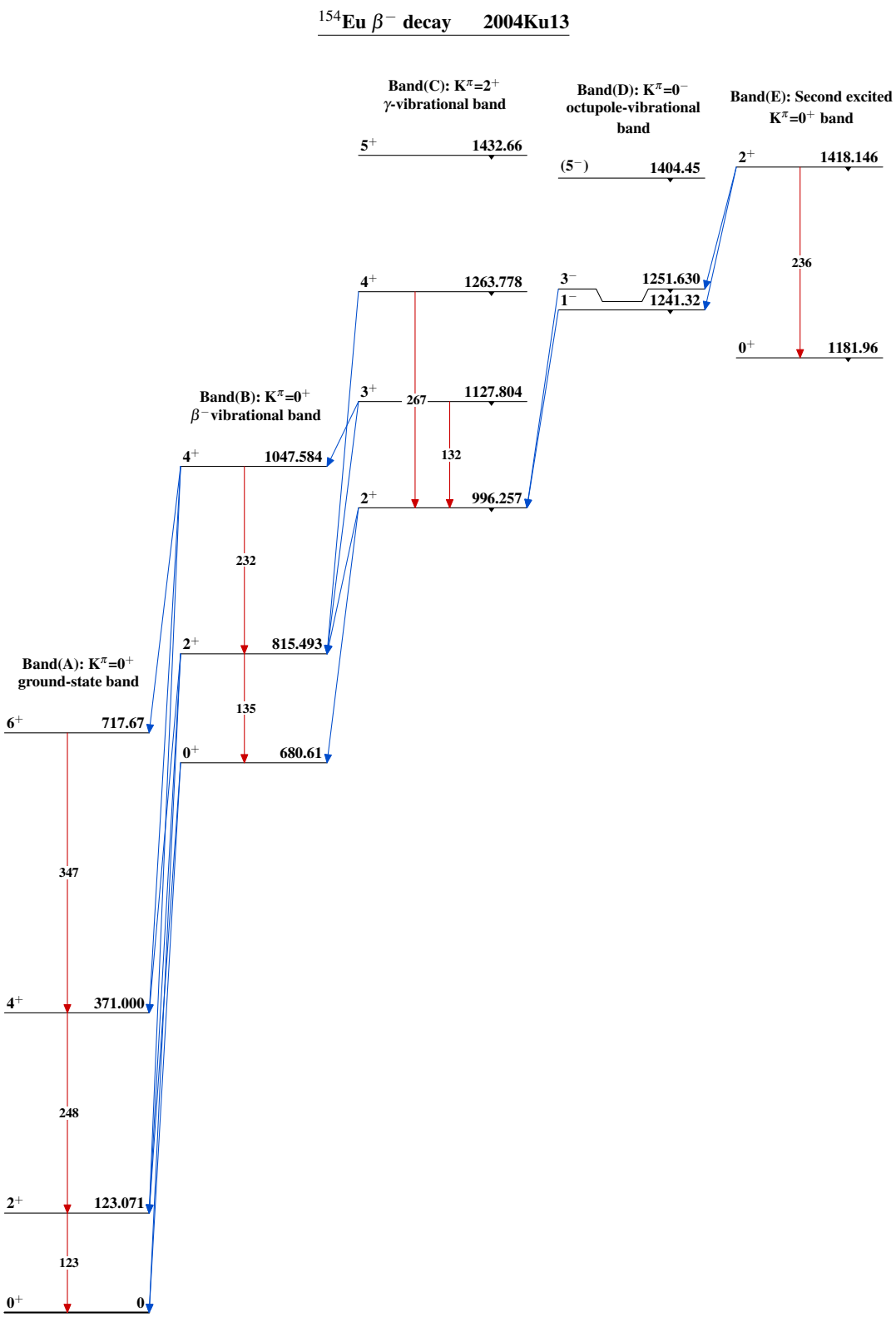
$^{154}_{64}Gd_{90}$

^{154}Eu β^- decay 2004Ku13

Decay Scheme (continued)

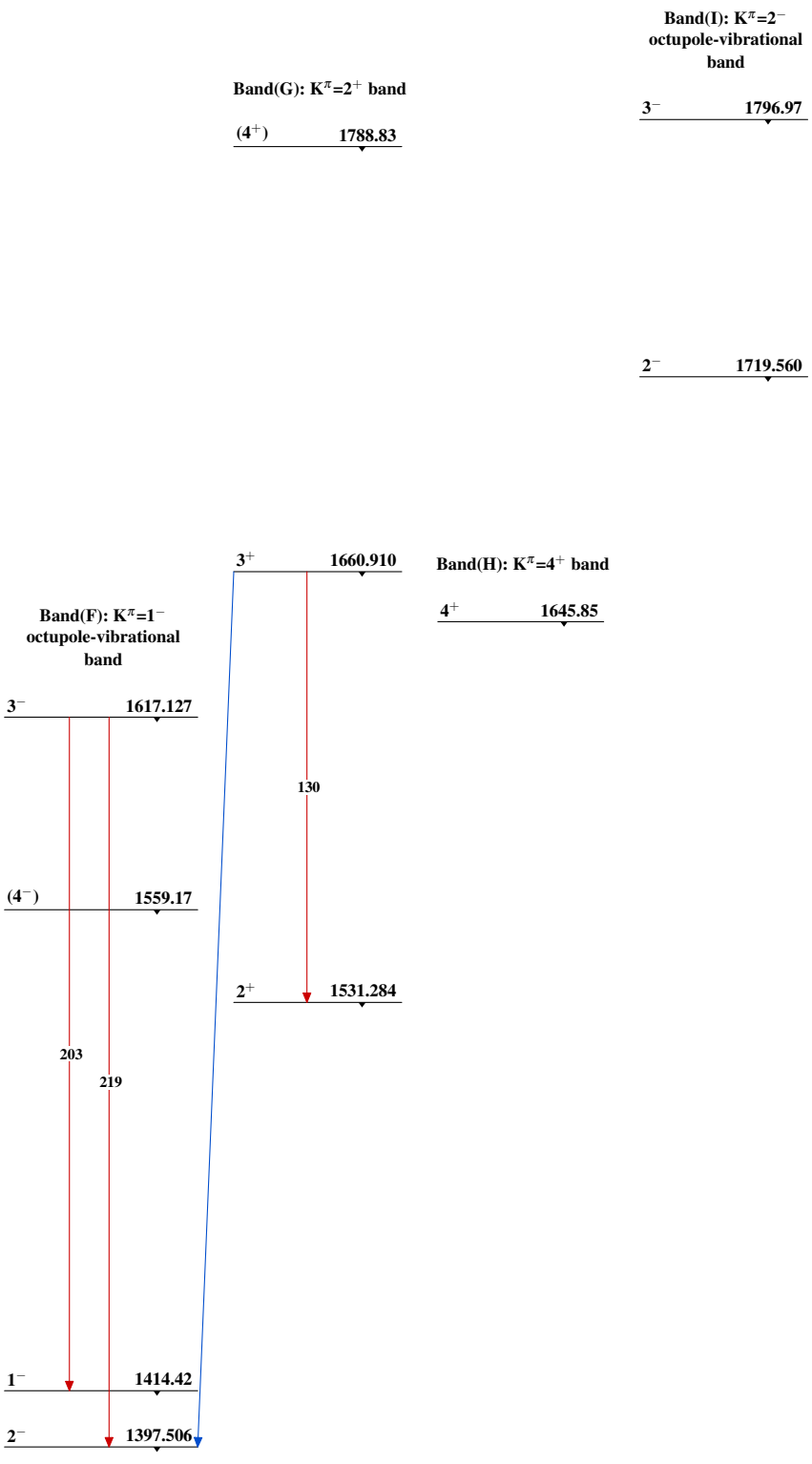
Intensities: I_γ per 100 parent decays




^{154}Eu β^- decay 2004Ku13
Band(C): K$^\pi$=2$^+$ γ-vibrational band
Band(D): K$^\pi$=0$^-$ octupole-vibrational band
Band(E): Second excited K$^\pi$=0$^+$ band
Band(B): K$^\pi$=0$^+$ β$^-$vibrational band
Band(A): K$^\pi$=0$^+$ ground-state band
5$^+$ 1432.66
(5$^-$) 1404.45
2$^+$ 1418.146
4$^+$ 1263.778
3$^-$ 1251.630
1$^-$ 1241.32
236
0$^+$ 1181.96
3$^+$ 1127.804
267
132
4$^+$ 1047.584
2$^+$ 996.257
232
2$^+$ 815.493
135
6$^+$ 717.67
0$^+$ 680.61
347
4$^+$ 371.000
248
2$^+$ 123.071
123
0$^+$ 0

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

^{154}Eu β^- decay 2004Ku13 (continued)



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