Adopted Levels, Gammas

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

Q(β^-)=−3550 *50*; S(n)=8894.73 *17*; S(p)=7627.9 *7*; Q(α)=920.1 *7* 2021Wa16
S(2n)=15141.69 *21*, S(2p)=13521.32 *27* (2021Wa16).
Data are from ^{153}Gd(n,γ), ^{154}Eu β^- decay, ^{154}Tb ε decay (21.5 h, 9.973 h, and 22.7 h), ^{150}Nd(^{9}Be,5nγ) and Sm(α,xnγ) reactions, Coulomb excitation, ^{156}Gd(p,t), ^{152}Gd(t,p), ^{154}Gd(e,e′), ^{154}Gd(d,d′), and ^{154}Gd(p,p′) reactions.
In a study of the β^- decay of ^{154}Eu, 2004Ku13 do not confirm the existence of the following levels, previously reported in thermal-neutron capture: 1276.99; 1294.19; 1295.09; 1698.51; 1702.04; 1838.61; and 1861.55. These levels and their associated γ′s are not included here. See the comments in the ^{154}Eu β^- decay and ^{153}Gd(n,γ) E=th data sets.
Possible ^{158}Dy α decay (2011Be18): $T_{1/2}$ ≥ 1.3×10^{16} Y established by γ spectroscopy based on 31 events for 2$^+$ to 0$^+$, 123.1γ in ^{154}Gd (no peak observed).

^{154}Gd Levels

From the compilation of 1973Mu14 there are 48 n resonances below 1 keV in ^{154}Gd; the related measurements are given in 1974Ra23. See 1987Ma13 for data on 134 resonances from 0.48 to 2.76 keV. For a recent publication of n resonances for this, and other nuclides, see 2018MuZZ.
For the labeling used to identify the cranked shell-model configurations, see the (^{9}Be,5nγ) data set. For a discussion of the various band crossings in the cranked shell-model, see 1989Mo20 (^{9}Be,5nγ).
Additional information 1.

Cross Reference (XREF) Flags

A	^{154}Eu β^- decay	F	^{152}Sm(α,2nγ),^{154}Sm(α,4nγ)	K	^{154}Gd(e,e′)
B	^{154}Tb ε decay (21.5 h)	G	^{152}Gd(t,p)	L	^{154}Gd(d,d′),^{154}Gd(p,p′)
C	^{154}Tb ε decay (9.973 h)	H	^{153}Eu(^{3}He,d),^{153}Eu(α,t)	M	^{156}Gd(P,tγ)
D	^{154}Tb ε decay (22.7 h)	I	^{153}Gd(n,γ) E=th	N	^{156}Gd(p,t)
E	^{150}Nd(^{9}Be,5nγ)	J	^{154}Gd(γ,γ′)	O	Coulomb excitation

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0[@]	0$^+$	stable	ABCDEFGHIJKLMNO	The isotope shift has been deduced from optical spectroscopy and muonic atom x-ray energies. These results include, all in fm^2, Δ<r^2>(^{152}Gd−^{154}Gd)=0.412 *21* (1990Wa25), 0.43 *2* (1987Bo58) and 0.48 (1988Al40, read from graph by evaluator); λ(^{152}Gd-^{154}Gd)=0.425 *13* (2000Bl10), 0.43 *5* (1990Du08); λ(^{154}Gd-^{155}Gd)=0.099 *2* (2000Bl10), 0.112 *24* (1974Bo60); Δ<r^2>(^{154}Gd−^{156}Gd)=0.183 *9* (1990Wa25), 0.216 *25* (1983La08), 0.188 *10* (1987Bo58), and 0.21 (1988Al40, read from graph by evaluator); and λ(^{154}Gd-^{156}Gd)=0.203 *23* (1974Bo60) and 0.197 *9* (1990Du08). See 1990Wa25 for Δ<r^4> and Δ<r^6> values. In an evaluation of nuclear rms charge radii, 2013An02 report <r^2>$^{1/2}$=5.1223 fm *40*.
123.0709[@] *9*	2$^+$	1.184 ns *5*	ABCDEFGHIJKLMNO	μ=+0.96 *6*; Q= −1.82 *4* J$^\pi$: From E2 γ to 0$^+$ level. $T_{1/2}$: From 1995Ma03 (^{154}Eu β^- decay, by $\beta\gamma\gamma$(t) method) reported as the weighted average of the independent results 1.186 ns *9* and 1.183 ns *6*. 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), all from ^{154}Eu β^- decay; and 1.183 ns *13* determined from

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
				B(E2)↑=3.862 *27*, weighted average of 3.86 *3* in Coulex (α,α') and 3.87 *6* from (e,e′). μ: From 2020StZV evaluation (measured by 1974Ar23). Additional information 2. Q: From 2021StZZ compilation and based on a muonic atom study (1983La08). Other: 1962Ju06. The isomer shift has been deduced from muonic atom studies to be 0.020 fm^2 *4* (1983La08) and $\Delta<r^2>/<r^2>$= +0.00059 *8* (1968Be24) and from Mossbauer studies $\Delta<r^2>/<r^2>$= +0.00075 *23* (1969Re05) and 0.00007 *7* (1968Ga09).
370.9998[@] *11*	4^+	45.6 ps *8*	ABCDEFGHI KLMNO	B(E4)↑=0.146 *12* J^{π}: From E2 γ to 2^+ level, L=4 in ^{156}Gd(p,t), and expected structure of 0^+ ground-state band. $T_{1/2}$: From Coul. ex. Others: 39 ps *5* (1963Bu03), 41 ps *7* (1972Aw04) and 61 ps *4* (1972PlZW), all from ^{154}Eu β^- decay. From β(E2,2+→4^+)=1.43 (1964Al25), $T_{1/2}$=68 ps. B(E4)↑: From (e,e′). Other: 0.33 *6*, from Coulomb excitation.
680.6673[&] *18*	0^+	4.56 ps *27*	ABC FG I KLMNO	J^{π}: From E0 transition to 0^+ level and L=0 in ^{156}Gd(p,t). $T_{1/2}$: From Coul. ex. From B(E2) (2+→0^+)=0.043 *+13−14* (1977Wo03), $T_{1/2}$=4.8 ps *15*, in excellent agreement.
717.663[@] *4*	6^+	8.26 ps *25*	ABCDEF HI KLMNO	B(E6)↑=0.0034 *7* J^{π}: From E2 γ to 4^+ level and expected structure of 0^+ ground-state band. $T_{1/2}$: From Coul. ex. Other: also from Coul. ex., 7.9 ps *11* (1975Wa15 and 1977Si18). B(E6)↑: From (e,e′).
815.4918[&] *15*	2^+	6.4 ps *4*	ABCDEFGHI KLMNO	J^{π}: From E0 component in γ to 2^+ and E2 γ to 0^+. $T_{1/2}$: Weighted average of 6.4 ps *5*, from B(E2)↑=0.0216 *16* in (e,e′), and 6.4 ps *7*, from recoil-distance Doppler shift in Coul. ex. Other: 0.020 *3* from B(E2) in Coul. ex. (1970RiZY,1977Ro08,1977Wo03).
996.2568[b] *16*	2^+	0.95 ps *7*	ABCD F HI KLMNO	μ=+0.83 *+7−9* μ: Computed by the evaluator from the g-factor deduced by 1996Al31 (see the comment on this level in the ^{154}Eu β^- decay data set). J^{π}: From E0 γ component to 2^+ level and E2 to 0^+. $T_{1/2}$: From B(E2)↑=0.140 *8*, an average of 0.147 *5* from Coulomb excitation (1970RiZY,1977Ro08,1977Wo03) and 0.132 *5* from (e,e′).
1047.592[&] *3*	4^+	7.6 ps *4*	ABCDEFGHI LMNO	J^{π}: From E0 γ component to 4^+ level and E2 γ′s to 2^+ and 6^+. $T_{1/2}$: From Coul. ex.
1127.8018[b] *20*	3^+		ABCD F HI	J^{π}: From M1 γ′s to 2^+ and 4^+ levels.
1144.47[@] *5*	8^+	2.57 ps *10*	DEF M O	J^{π}: From γ to 6^+ level and expected structure of 0^+ ground-state band. $T_{1/2}$: From Coul. ex.
1182.091[e] *4*	0^+		AB FG I N	J^{π}: From E0 transition to 0^+ level.
1241.291[c] *4*	1^-	1.54 fs	ABC F I LM O	B(E1)↑=0.00243 J^{π}: From E1 γ′s to 2^+ and 0^+ levels. $T_{1/2}$: From B(E1)↑ (1993Su16, Coulomb excitation) and the adopted γ branching. B(E1)↑: From 1993Su16, Coulomb excitation.
1251.641[c] *4*	3^-		ABC FG I LM O	B(E3)↑=0.21 *5* J^{π}: From E1 γ′s to 2^+ and 4^+ levels.

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
				B(E3)↑: From Coulomb excitation.
1263.778[b] *4*	4^+		ABCD F HI LMN	J^{π}: From E0 component in γ to 4^+ and E2 γ to 2^+.
1352.9 *3*	0^+		N	
1365.878[&] *8*	6^+		DEF I L	E(level): Assigned in (d,d′) as the 5^- member of the $K^{\pi}=0^-$ octupole band, but that state is now assigned to the 1404 level. J^{π}: From E0 γ component to 6^+ level and γ's to 4^+ levels.
1397.515[d] *4*	2^-		ABC F I	J^{π}: From E1 γ's to 2^+ levels, populated by primary γ in (n,γ), and band assignment.
1404.16[c] *3*	(5^-)		A F I M	J^{π}: From (E1) γ to 4^+ level and band assignment.
1414.426[i] *15*	1^-		AB I	J^{π}: From E1 γ's to 2^+ and 0^+ levels.
1418.160[e] *3*	2^+		ABC FG I	J^{π}: From E0 γ components to 2^+ levels and E2 to 0^+.
1432.588[b] *6*	5^+		A CD F I	J^{π}: from M1 γ to 4^+ level, γ to 6^+, and expected structure of 2^+ band.
1497.7 *3*	0^+		N	
1531.305[g] *3*	2^+		ABC F HI LMN	XREF: L(1534) J^{π}: From E2 γ to 0^+ level and (E0) γ components to 2^+ levels.
1559.92[d] *3*	(4^-)		ABC F HI	XREF: H(1556) J^{π}: From γ's to 4^+ and 2^- levels and band assignment.
1573.974[l] *7*	0^+		G I N	J^{π}: From E0 γ's to 0^+ levels.
1606.51[b] *7*	6^+		D F	J^{π}: From M1+E2 γ to 6^+ level, γ to 4^+, and expected structure of 2^+ band.
1617.125[i] *3*	3^-		A C I L O	B(E3)↑=0.030 The Eγ values of all the γ's deexciting this level are from the ^{154}Eu β^- decay data. J^{π}: From E1 γ's to 4^+ and 2^+ levels. B(E3)↑: From 1993Su16 (Coul. ex.).
1637.08[@] *8*	10^+	1.11 ps *14*	EF O	J^{π}: From E2 γ to 8^+ level, Coul. ex., and expected structure of 0^+ ground-state band. $T_{1/2}$: From Coulomb excitation (1975Wa15 and 1977Si18).
1645.814[j] *6*	4^+		A CD F HI	J^{π}: From M1 γ's to 3^+ and 4^+ levels and γ to 6^+.
1650.34[m] *3*	0^+		I MN	J^{π}: From E0's to 0^+ levels.
1660.903[f] *6*	3^+		A C F I	J^{π}: From E2 γ to 2^+ level, M2 γ to 1^-, γ to 4^+, and band assignment.
1674.1[c] *10*	(7^-)		F	J^{π}: From (E1) γ to 6^+ level and assumed band structure.
1701.40[e] *7*	4^+		C F L	J^{π}: γ's to 2^+ and 6^+ levels and expected band structure.
1716.050[l] *6*	2^+		I	J^{π}: From E2 γ to 3^+ level and γ's to 0^+ and 4^+ levels.
1719.5593[h] *18*	2^-		A C F I	J^{π}: From E1 γ's to 2^+ and 3^+ levels and band assignment.
1731.7 *6*	(7^-)		E	J^{π}: From γ from $8^{(-)}$ and assumed J^{π} sequence in in-beam scheme.
1756.46[&] *9*	8^+		EF	J^{π}: From E0 γ component to 8^+ level.
1770.187[k] *6*	5^+		CD F HI	J^{π}: From (E0) component in γ to 5^+ level and band assignment.
1775.430[m] *14*	2^+		I	J^{π}: From E2 γ to 0^+ level, (E0) component to 2^+, and γ to 4^+.
1788.83[g] *7*	(4^+)		A F	J^{π}: From γ's to 4^+ and 6^+ levels. Possible 4^+ member of the second excited 2^+ band (2004Ku13, ^{154}Eu β^- decay).
1796.961 *9*	3^-		A C F I L	J^{π}: From E1 γ's to 2^+ and γ to 4^+.
1810.22[b] *6*	7^+		F	J^{π}: From E2 γ to 5^+ level and E2+M1 γ to 6^+ level.
1825[d]	6^-		F	
1826 *2*			H	
1836.61 *12*	0^+		F I N	J^{π}: E0 transition to 0^+ and L=0 in (p,t). Note, however, that a γ to the g.s. suggests that J^{π} may not be 0^+.
1899.3 *4*	0^+		N	
1900.34 *12*	(2^+)		I	J^{π}: From E2 γ to 4^+ and populated by primary γ in (n,γ).

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
1911.545[j] 24	6^+		D F HI	J^{π}: From M1 γ to 5^+ level, γ's to 4^+ and 6^+, and band assignment.
1912.08 15	(0,1,2)		I	J^{π}: From γ's to 2^+ levels and populated by primary γ in (n,γ).
1922[h]	(4^-)[#]		F	
1942.9 4	0^+		N	
1943.95 3	$(1,2^+)$		I	J^{π}: From γ's to 0^+ and 2^+ levels and population by primary γ in (n,γ).
1948.559 10	(5^-)		I L	J^{π}: Gammas to the 3^- members of the three lowest-lying octupole bands and to the 4^+ member of the g.s. band indicate that J^{π} can be 2^+, $3^{\pm}$, $4^{\pm}$ or 5^-. From this decay pattern and the position of this state in the level scheme, 1996SpZZ assign this as the 5^- member of either the $K^{\pi}=1^-$ or the $K^{\pi}=2^-$ octupole band.
1964.05 12	$(2)^+$		I	J^{π}: From (E2) γ to 4^+ level, γ's to 0^+ and 2^+, and populated by γ in (n,γ).
1973.07 17	2^+		I	J^{π}: From γ's to 0^+ and 4^+ levels; populated by primary γ in (n,γ).
1988[f]	(5^+)[#]		F	
2018.39[b] 7	8^+		F	J^{π}: From E2 γ to 6^+ and band assignment.
2023.82 11	$1,2^+$		C HI	XREF: H(2024?) J^{π}: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
2039.8 4	0^+		N	
2040.5[c] 3	(9^-)		EF	J^{π}: From D γ to 8^+ level and assumed band structure.
2041.07 11	$(1,2)^+$		I	J^{π}: From M1 γ to 2^+, γ to 0^+, and population by primary γ in (n,γ).
2073.30[k] 4	(7^+)		F	J^{π}: From D γ to 6^+ level and assumed band structure.
2080.230[l] 20	4^+		bc I	J^{π}: From M1,E2 γ to 3^+ level and γ's to 2^+ and 6^+.
2080.792 10	3^-		bc I	J^{π}: From M1 γ to 2^- level and γ's to 2^+, 3^-, 4^+, and 4^-.
2088 2			H	
2101.6 3	(1,2)		I L	J^{π}: From γ to 0^+ level and population by primary γ in (n,γ).
2113.74 3	2^+		I	J^{π}: From γ's to 0^+ and 4^+ levels.
2116.9 10			F	
2119.55 5	$1^+,2^+$		B HI	XREF: H(2117) J^{π}: From M1 γ to 2^+ level, E1 to 1^-, and populated by primary γ in (n,γ).
2128 2			H	
2137.48[n] 4	7^-	68 ns	DEF M	J^{π}: From E1 γ's to 6^+ and 8^+ levels.
2148.81 6	$(1,2)^+$		HI	XREF: H(2150) J^{π}: From M1,E2 γ to 2^+ level, γ to 0^+, and populated by primary γ in (n,γ).
2168 2			H	
2176.03[o] 3	(1^+)		HI	XREF: H(2179) J^{π}: From M1 γ to (2^+) level, γ to 0^+, populated by primary γ in (n,γ), and band assignment.
2183[d]	(8^-)[#]		F	
2183.22[r] 19	$8^{(-)}$		E	J^{π}: From γ's to 8^+ and (7^-) levels.
2184.75[@] 12	12^+		EF	J^{π}: From E2 γ decay to 10^+ level and expected band structure.
2185.869 13	4^-		BC I	J^{π}: From E1 γ's to 4^+ and 5^+ levels and γ to 3^+.
2187.01[p] 3	1^+		B HI	XREF: H(2184) J^{π}: From M1 γ's to 0^+ and 2^+ levels. Populated by primary γ in (n,γ), and band assignment.
2194.12[&] 11	10^+		EF	J^{π}: From E0+M1+E2 γ's to 10^+ levels and expected band structure.
2215.2 7	$(6^+,7,8^+)$		F	J^{π}: From γ's to 6^+ and 8^+ levels.
2222.48[o] 3	(2^+)		hI	XREF: h(2224) J^{π}: From γ's to 0^+, 2^+, and 4^+ levels.
2229.77[p] 3	(2^+)		hI	XREF: h(2224)

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
			J^{π}: From γ to 0^+ level and band assignment.
2230.08 *18*	$2^+,3,4^+$	C h	XREF: h(2224) E(level): Level present because evaluator assumes this level is not the same as the 2229 level in (n,γ). J^{π}: From γ's to 2^+ and 4^+ levels.
2245[f]	7^+[#]	F	
2245.29 *6*		F	
2249 *2*		h	XREF: h(2249?)
2249.02 *3*	(3)	hI L	XREF: h(2249?) J^{π}: From γ's to 1^-, 2^+, and 4^+ levels.
2251.3[t] *3*	$9^{(-)}$	EF	J^{π}: From 1989Mo20, (^{9}Be,5nγ). Also shown as $9^{(-)}$ on the level scheme of 1994Wu01 (α,2nγ), but no reasons were given in support of it.
2251.38[b] *10*	9^+	F	J^{π}: From M1+E2 γ to 10^+ level and (E2) γ to 7^+ level.
2254.13[j] *5*	(8^+)	F	J^{π}: From D γ's to (7^+) level, γ to 8^+ level and assumed band structure.
2266.13 *10*	$2^+,3,4^+$	C F I	J^{π}: From ε from 3^- parent and γ's to 2^+ and 4^+ levels.
2272.3 *7*	$(8^+,9^+)$	F	J^{π}: From γ's to (7^+) and 10^+ levels.
2277.13 *9*	3	C I	J^{π}: From ε from 3^- parent, γ's to 2^+ and 4^+ levels, and $\gamma(\theta)$ from oriented nuclei (1981Fe01).
2293.50[o] *3*	$(3)^+$	hI	XREF: h(2302) J^{π}: From M1 γ to 2^+ level, γ to 4^+ level, population by primary γ in (n,γ), and band assignment.
2299.39 *17*	(1,2)	hI	XREF: h(2302) J^{π}: From γ's to 0^+ and 2^+ levels and population by primary γ from (n,γ).
2299.9? *5*	0^+	N	
2300.7[g]	(6^+)[#]	F	
2302.28 *24*	(1,2)	hI	XREF: h(2302) J^{π}: From γ's to 2^+ levels and population by primary γ in (n,γ).
2305.79[p] *3*	3^+	BC hI	XREF: h(2302) J^{π}: From ε from 3^- parent, M1 γ to 2^+, γ's to 4^+ levels, and band assignment.
2309.47[n] *6*	(8^-)	DEF	J^{π}: From D+Q γ to 7^-, γ to 6^+ and assumed band structure.
2309.53 *15*	$(2)^+$	hI	XREF: h(2302) J^{π}: From M1 γ to 2^+ level, γ to 4^+, and population by primary γ from (n,γ).
2324.3 *10*		F	
2336.02 *5*	3^-	BC I	J^{π}: From ε from 3^- parent, γ's to 1^- and 4^+, and $\gamma(\theta)$ from oriented nuclei (1981Fe01).
2342 *2*		H	
2342.53 *21*	$1,2^+$	B I	J^{π}: From γ's to 0^+, 2^+, and 2^- levels and population by primary γ from (n,γ).
2356 *2*		H	
2368.87 *17*	$2^+,3,4^+$	BC HI	XREF: H(2367)I(2369.4) J^{π}: From ε from 3^- parent and γ's to 2^+ and 4^+ levels.
2378 *2*		H	
2381.46 *4*	$0^+,1,2$	I	J^{π}: From γ to 2^+ level and population by primary γ in (n,γ).
2386.00 *3*	4^+	I	J^{π}: From γ's to 2^+ and 6^+ levels.
2392.0[f] *6*	(9^+)[#]	F	
2401.34 *17*	$1,2^+$	B hI	XREF: h(2406) J^{π}: From γ's to 0^+ and 2^+ levels and population by primary γ from (n,γ).
2403.1[o] *3*	(4^+)	hI	XREF: h(2406) J^{π}: From γ's to 4^+ levels and band assignment.
2403.8[q] *6*	(7^+)	F	J^{π}: $(6^+,7,8,9^-)$ from γ's to (8^+) and 7^- levels. (7^+) from proposed Configuration=(ν 3/2[521])+(ν 11/2[505]); possible bandhead.
2406.19 *25*	2^+	C hI	XREF: h(2406) J^{π}: From ε from 3^- parent and γ's to 0^+ and 4^+ levels.
2410.86[p] *3*	4^+	hI	XREF: h(2406) J^{π}: From γ's to 2^+ and 6^+ levels.

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
2416.22 *8*	4^+	C	J^{π}: From ε from 3^- parent, γ's to 2^+ and 5^+ levels, and $\gamma(\theta)$ from oriented nuclei (1981Fe01).
2418[s] *2*	(6^-)	H	
2430.58 *6*	$1,2^+$	B I	J^{π}: From γ's to 0^+ and 2^+ levels.
2433.78 *4*	$0^+,1,2$	HI	XREF: H(2430) J^{π}: From γ's to 1^- and 2^+ levels and populated by primary γ in (n,γ).
2440.7 *7*		F	
2441.70 *16*	(1,2)	I	J^{π}: From γ's to 0^+ and 2^+ levels and population by primary γ in (n,γ).
2449.2 *3*	(1,2)	HI	XREF: H(2455) J^{π}: From γ's to 0^+ levels and populated by primary γ in (n,γ).
2453.29[k] *7*	(9^+)	F	J^{π}: Gammas to levels interpreted as the 7^+ and 8^+ members of the $K^{\pi}=4^+$ band. Probable 9^+ member of that band.
2459.4 *4*	$6^+,7,8^+$	D	J^{π}: From γ's to 6^+ and 8^+ levels.
2459.74 *22*	2^+	I	J^{π}: From γ's to 0^+ and 4^+ levels and populated by primary γ in (n,γ).
2468.45 *4*	$1,2^+$	B I	J^{π}: From γ's to 0^+ and 2^+ levels, including (M1) to (2^+).
2469 *2*		H	
2475.25[n] *11*	(9^-)	EF	J^{π}: From D+Q γ to (8^-) level and assumed band structure. For this J^{π} the 1109 γ must be E3, or else it is misplaced.
2482.02 *21*	2^+	I	J^{π}: From γ's to 0^+ and 4^+ levels and populated by primary γ from (n,γ).
2482.34[c] *24*	(11^-)	EF	J^{π}: From E2 γ to (9^-) and D γ to 10^+ levels and band assignment.
2485.1 *5*	0^+	N	
2486.42 *11*	$1,2^+$	B I	J^{π}: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
2490.24[b] *10*	10^+	F	J^{π}: From E2 γ to 8^+ level and M1+E2 γ to 9^+ level.
2495.76 *4*	$1,2^+$	C I	J^{π}: From γ's to 0^+ and 2^+ levels.
2499.3 *3*	2^+	B I	J^{π}: From γ's to 0^+, 2^+, and 4^+ levels and population by primary γ in (n,γ).
2502.58 *17*	$1,2^+$	I	J^{π}: From γ's to 0^+ and 2^+ and population by primary γ in (n,γ).
2510[h]	(8^-)[#]	F	
2511.52 *9*	2	I	J^{π}: From γ's to 2^+ and 4^+ levels and populated by primary γ in (n,γ).
2512 *2*		H	
2514.8 *3*	$1,2^+$	I	J^{π}: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
2533.74 *16*	$0^+,1,2$	I	J^{π}: From γ to 2^+ level and populated by primary γ in (n,γ).
2538 *2*		H	
2556[v]	(9^-)[#]	F	
2561.3 *4*	$2,3^-$	I	J^{π}: From γ's to 2^+ and 4^+ levels and populated by primary γ in (n,γ).
2568[s] *2*	(7^-)	H	
2569.00 *16*	2	I	J^{π}: From γ's to 2^+ and 4^+ levels and populated by primary γ in (n,γ).
2579.66[t] *18*	$10^{(-)}$	EF	J^{π}: From γ's to $9^{(-)}$ and 10^+ levels and band assignment.
2585.5 *4*	0^+	I N	J^{π}: L=0 in (p,t).
2590.34 *5*	$(1,2)^+$	B I	J^{π}: From M1 γ to 1^+ level and γ's to 0^+ and 2^+.
2592 *2*		H	
2603[g]	(10^+)[#]	F	
2616.15[n] *19*	$10^{(-)}$	E	
2619.51[r] *14*	$10^{(-)}$	EF	J^{π}: From γ's to $8^{(-)}$ and 10^+ levels and assumed band structure.
2619.9 *3*		H	
2621.4[d] *12*	(10^-)	F	
2622.05[a] *16*	12^+	EF	J^{π}: From E2 γ to 10^+ level and assumed band structure.
2633.17 *24*	$1,2^+$	I	J^{π}: From γ's to 0^+ and 2^+ levels.
2637.48 *21*	$(2)^-$	I	J^{π}: From E1 γ to 3^+ level, γ's to 2^+, and populated by primary γ in (n,γ).
2645 *2*		H	
2655.04 *11*	2^+	BC HI	XREF: H(2658) J^{π}: From γ's to 0^+ and 4^+ levels.
2666.2[j] *11*	(10^+)	F	J^{π}: From γ to $9^{(-)}$ level and assumed band structure. Additional information 3.

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
2686.7 *3*	2		I	J^{π}: From γ's to 2^+ and 4^+ and populated by primary γ in (n,γ).
2695.4 *7*			F	
2699.4 *4*	0^+,1,2		I	J^{π}: From γ to 2^+ level and populated by primary γ from (n,γ).
2710.1[f] *6*	(11^+)[#]		F	J^{π}: From γ's to (9^+) and 10^+ levels and assumed band structure.
2710.5 *4*	1,2^+		I	J^{π}: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
2721.5 *10*			F	
2722.35 *13*	1,2^+		B I	J^{π}: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
2729 *2*			H	
2734.30 *21*	1^+,2^+		B I	J^{π}: From γ's to 0^+, 2^+, and 3^+ levels.
2735.9 *8*			F	
2741[v]	(10^-)[#]		F	
2741.5 *3*	2^+,3^-		I	J^{π}: From γ's to 2^+ and 4^+ levels and populated by primary γ in (n,γ).
≈2743			H	
2744.1 *4*	0^+		I N	J^{π}: L=0 in (p,t) (tentative assignment). γ to 2^+, and populated by primary γ in (n,γ).
2746.49[b] *14*	11^+		F	J^{π}: From (E2) γ to 9^+ level and M1+E2 γ to 10^+ level.
2773 *2*			H	
2775.51[n] *19*	$11^{(-)}$		EF	J^{π}: From γ's to $9^{(-)}$ and $10^{(-)}$ levels and band assignment.
2777.41[@] *14*	14^+		EF	J^{π}: From E2 γ to 12^+ level and band assignment.
2779.9 *6*	$(7,8,9^+)$		F	J^{π}: From γ's to (8^-), (8^+) and(7^+) levels.
2784.731 *24*	$(7^-,8^+)$		F	J^{π}: From γ's to 6^+ and (9^-) levels.
2785 *2*			H	
2788.46 *6*	1,2^+		B I	J^{π}: From γ's to 0^+, 2^-, and 2^+ levels.
2850.3 *3*	2^+		B I	J^{π}: From γ's to 0^+ and 4^+ levels.
2855.0? *2*	0^+		N	
2860	1^+		K	E(level): Estimated by evaluator from figure (1989Ha20). J^{π}: From M1 excitation.
2872.39 *24*	2^+		B I	J^{π}: From γ's 0^+ and 4^+ levels.
2900[k]	11^+[#]		F	
2934.2 *4*	1^+	2.07 fs *23*	BC IJK	E(level): Identified as scissors mode state in (γ,γ') dataset (2013Be38). J^{π}: From M1 excitation in (γ,γ'), γ's to 0^+ and 2^+ levels, and populated by primary γ in (n,γ). $T_{1/2}$: from Γ in ^{154}Tb ε decay (21.5 h).
2949.29 *4*	(1^+)	3.1 fs *7*	B IJ	J^{π}: From M1 excitation in (γ,γ') and populated by primary γ in (n,γ). Eight out nine γ's depopulating this level go to 0^+, 1^-, or 2^+ in agreement with 1^+ for this level, while 2579γ to 4^+ contradicts it. However the 2579γ observed in the (n,γ) dataset is unobserved in the more accurate measurement of 2013Be38-2014BeZX, which makes its placement at this level questionable. $T_{1/2}$: from Γ in ^{154}Tb ε decay (21.5 h).
2950.71[t] *19*	$12^{(-)}$		EF	J^{π}: From γ's to $10^{(-)}$ and 12^+ levels and band assignment.
2955.80[r] *19*	$12^{(-)}$		EF	J^{π}: From γ's to $10^{(-)}$ and $11^{(-)}$ levels and band assignment.
2957[v]	(11^-)[#]		F	
2964.4[g] *7*	(12^+)[#]		EF	J^{π}: From γ's to 10^+ and 12^+ levels and band assignment.
2981.35[c] *18*	$13^{(-)}$		EF	J^{π}: From γ's to (11^-) and 12^+ levels and band assignment.
2989.89 *15*	1,2^+		B I	J^{π}: From γ's to 0^+ and 2^+ levels, possible γ to 3^-, and populated by primary γ in (n,γ).
3009.7 *4*	1,2^+		B	J^{π}: From γ's to 0^+ and 2^+ levels.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
3011.11[b] 13	12^+		F	Jπ: From γ's to 10^+ and 12^+ levels and band assignment.
3022.73 15	2^+		B I	Jπ: From γ's to 0^+ and 4^+ levels; populated by primary γ in (n,γ).
3027.41[a] 18	14^+		EF	Jπ: From E2 γ to 12^+ level and band assignment.
3031.5 3	$1,2^+$		BC I	Jπ: From γ's to 0^+ and 2^+ levels.
3080	(1^+)		K	E(level): Estimated by evaluator from figure (1989Ha20). Jπ: From (M1) mode of excitation.
3090.3 5	1^+	2.0 fs 4	B J	Jπ: From M1 excitation in (γ,γ'); γ's to 0^+ and 2^+ levels. $T_{1/2}$: from Γ in ^{154}Tb ε decay (21.5 h).
3100[d]	(12^-)		F	
3122.59 23	1^+	5.4 fs 26	B IJK	Jπ: From M1 excitation in (γ,γ'); γ's to 0^+ and 2^+ levels. $T_{1/2}$: from Γ in ^{154}Tb ε decay (21.5 h).
3136.3[f] 7	(13^+)[#]		F	Jπ: From γ's to (11^+) and 12^+ levels and band assignment.
3141[j]	(12^+)[#]		F	
3153.1 8			F	
3154.8[u] 4			E	
3158.86[n] 20	$13^{(-)}$		EF	Jπ: From γ's to $11^{(-)}$ and $12^{(-)}$ levels and band assignment.
3162.7 12	$1,2^+$		B	Jπ: From γ's to 0^+ and 2^+ levels.
3184.06 18	$1,2^+$		B I	Jπ: From γ's to 0^+, 2^+, and 2^- levels.
3186[v]	(12^-)[#]		F	
3264.42 21	$1,2^+$		B I	Jπ: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
3284.91[b] 23	13^+		F	Jπ: From E2 γ to 11^+ level and D+Q γ to 12^+ level.
3294.2 7	$1,2^+$		B	Jπ: From γ's to 0^+ and 2^+ levels.
3327.32 20	$1,2^+$		B I	Jπ: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
3345.9 10	$1,2^+$		B	Jπ: From γ's to 0^+ and 2^+ levels.
3350.7 9	$1,2^+$		B	Jπ: From γ's to 0^+ and 2^+ levels.
3363.6 4	(2^+)		C	Jπ: From γ's to 0^+ and 2^+ levels.
3384.1[r] 3	$14^{(-)}$		E	Jπ: From γ's to $12^{(-)}$ and $13^{(-)}$ levels and band assignment.
3402[k]	(13^+)[#]		F	
3404.56[@] 17	16^+		EF	Jπ: From E2 γ to 14^+ level and band assignment.
3414.76 20	$1,2^+$		B I	Jπ: From γ's to 0^+ and 2^+ levels and populated by primary γ in (n,γ).
3428.1[t] 3	$14^{(-)}$		EF	Jπ: From γ to $12^{(-)}$ level and band assignment.
3429[v]	(13^-)[#]		F	
3469.3[g] 7	(14^+)[#]		F	Jπ: From γ's to 12^+ and 14^+ and band assignment.
3490.96[a] 17	16^+		EF	Jπ: From E2 γ to 14^+ levels and band assignment.
3517.18 16	$(3^+,4^+)$		C	Jπ: From γ's to 2^+, 3^+, 4^+, and 5^+ levels.
3519.16[c] 19	(15^-)		EF	Jπ: From γ's to $13^{(-)}$ and 14^+ levels and band assignment.
3550.3 3	$2^+,3,4^+$		C I	Jπ: From ε from 3^- parent and γ's to 2^+ and 3^+ levels.
3563.8[b] 7	(14^+)		F	Jπ: From γ's to 12^+ level and band assignment.
3599.2[u] 6			E	
3609[d]	(14^-)		F	
3629.56[n] 22	$15^{(-)}$		EF	Jπ: From γ's to $13^{(-)}$ and $14^{(-)}$ levels and band assignment.
3674.8[f] 7	(15^+)[#]		F	Jπ: From γ's to (13^+) and 14^+ levels and band assignment.
3687[v]	(14^-)[#]		F	
3852.9[b] 11	(15^+)[#]		F	Jπ: From γ to 13^+ level and band assignment.
3894.47[r] 24	$16^{(-)}$		E	Jπ: From γ's to $14^{(-)}$ and $15^{(-)}$ levels and band assignment.
3907.4[g] 11	(16^+)[#]		F	Jπ: From γ to 14^+ level and band assignment.
3959[v]	(15^-)[#]		F	

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
3987.4[t] 4	$16^{(-)}$	E	Jπ: From γ to $14^{(-)}$ level and band assignment.
4016.22[a] 19	(18^+)	EF	Jπ: From γ's to 16^+ levels and band assignment.
4087.26[@] 23	(18^+)	EF	Jπ: From γ's to 16^+ levels and band assignment.
4099.3[u] 6		E	
4102.1[c] 3	(17^-)	EF	Jπ: From γ to $15^{(-)}$ level and band assignment.
4125[d]	(16^-)	F	
4146.4[b] 7	(16^+)[#]	F	
4176.5[n] 3	$17^{(-)}$	E	Jπ: From γ's to $15^{(-)}$ and $16^{(-)}$ levels and band assignment.
4244[v]	(16^-)[#]	F	
4290.7[f] 8	(17^+)[#]	F	Jπ: From γ's to (15^+) and 16^+ levels and band assignment.
4422.0[g] 11	(18^+)[#]	F	Jπ: From γ to 16^+ level and band assignment.
4473.9[b] 15	(17^+)[#]	F	Jπ: From γ to (15^+) level and band assignment.
4475.0[r] 3	$18^{(-)}$	E	Jπ: From γ's to $16^{(-)}$ and $17^{(-)}$ levels and band assignment.
4538[v]	(17^-)[#]	F	
4595.2[t] 4	$18^{(-)}$	E	Jπ: From γ to $16^{(-)}$ level and band assignment.
4646.42[a] 21	(20^+)	EF	Jπ: From γ to (18^+) level and band assignment.
4656.0[u] 8		E	
4735.6[c] 4	(19^-)	EF	Jπ: From γ to (17^-) level and band assignment.
4782.5[@] 3	(20^+)	EF	Jπ: From γ to (18^+) level and band assignment.
4788.7[n] 3	$19^{(-)}$	E	Jπ: From γ's to $17^{(-)}$ and $18^{(-)}$ levels and band assignment.
5116.5[r] 4	$20^{(-)}$	E	Jπ: From γ's to $18^{(-)}$ and $19^{(-)}$ levels and band assignment.
5209.3[t] 8	$20^{(-)}$	E	Jπ: From γ to $18^{(-)}$ level and band assignment.
5254.3[u] 10		E	
5350.0[a] 3	(22^+)	EF	Jπ: From γ to (20^+) level and band assignment.
5415.9[c] 5	$21^{(-)}$	E	Jπ: From γ to $19^{(-)}$ level and band assignment.
5457.6[n] 5	$21^{(-)}$	E	Jπ: From γ's to $19^{(-)}$ and $20^{(-)}$ levels and band assignment.
5519.7[@] 4	(22^+)	EF	Jπ: From γ to (20^+) level and band assignment.
5811.0[r] 4	(22^-)	E	Jπ: From γ to $20^{(-)}$ and band assignment.
5848.5[t] 8	(22^-)	E	Jπ: From γ to $20^{(-)}$ and band assignment.
5889.4?[u] 11		E	
6121.7[a] 4	(24^+)	EF	Jπ: From γ to 22^+ and band assignment.
6136.3[c] 6	(23^-)	E	Jπ: From γ to $21^{(-)}$ and band assignment.
6178.1[n] 6	(23^-)	E	Jπ: From γ to $21^{(-)}$ and band assignment.
6294.3[@] 5	(24^+)	EF	Jπ: From γ to (22^+) and band assignment.
6535.6[t] 9	(24^-)	E	Jπ: From γ to (22^-) and band assignment.
6555.5[r] 5	(24^-)	E	Jπ: From γ to (22^-) and band assignment.
6883.3?[c] 7	(25^-)	E	Jπ: From γ to (23^-) and band assignment.
6946.1?[n] 7	(25^-)	E	Jπ: From γ to (23^-) and band assignment.
6955.1[a] 6	(26^+)	E	Jπ: From γ to 24^+ and band assignment.
7055.7[@] 6	(26^+)	E	Jπ: From γ to 24^+ and band assignment.
7274.0?[t] 10	(26^-)	E	Jπ: From γ to (24^-) and band assignment.
7353.1?[r] 7	(26^-)	E	Jπ: From γ to (24^-) and band assignment.

† From a least-squares fit to the listed γ-ray energies with χ^2norm=2.13 greater than χ^2critical=1.15. The multiply placed gammas were not included in this fit. γ-ray energies for which no uncertainties are given were assigned an uncertainty of 1 keV.

‡ 1996SpZZ, in (n,γ), give detailed a discussion of many of the band assignments.

\# From (α,2nγ),(α,4nγ) dataset with no arguments other than placement in band sequence.

@ Band(A): $K^\pi=0^+$ ground-state band. a=21.35, b=−0.14 (from 0^+, 2^+ and 4^+ levels). The large b value suggests that the usual

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Adopted Levels, Gammas (continued)

^{154}Gd Levels (continued)

expansion in powers of J(J+1) does not give a good description of the band structure.

[&] Band(B): First excited $K^{\pi}=0^{+}$ band. Probable β-vibrational band. a=24.24, b=−0.30 (from 0^{+}, 2^{+} and 4^{+} levels). Assignment as a β band based on deduced ρ^2(E0) value (2001Ga02). The large b value suggests that the usual expansion in powers of J(J+1) does not give a good description of the level energies.

[a] Band(b): Aligned two-neutron-quasiparticle band. Configuration=(ν 3/2[651])+(ν 3/2[651]) (cranked shell-model configuration AB in ^{150}Nd(^{9}Be,5nγ) dataset) crosses the g.s. band at $\hbar\omega$=0.31 MeV (near the 18^{+} level).

[b] Band(C): $K^{\pi}=2^{+}$ γ-vibrational band. a=23.63, b=−0.222, A_4=−0.0216 (from 2^{+}, 3^{+}, 4^{+}, and 5^{+} levels). The large values of b and A_4 suggest that the usual rotational formula does not provide a good description of the level energies.

[c] Band(D): $K^{\pi}=1^{-}$ odd-spin octupole-vibrational band. At higher spins, it can be ascribed to Configuration=(ν 3/2[651])+(ν 3/2[532]) (cranked shell-model configuration AE in ^{150}Nd(^{9}Be,5nγ) dataset).

[d] Band(d): $K^{\pi}=1^{-}$ even-spin octupole-vibrational band. Most of the J^{π} values from (α,2nγ),(α,4nγ) that are not justified in dataset are adopted tentatively.

[e] Band(E): Second excited $K^{\pi}=0^{+}$ band. Intruder band. band is associated with a smaller deformation (2003Ku19). Proposed by these authors as a “pairing isomer”.

[f] Band(F): $K^{\pi}=2^{+}$ odd-spin band. 2011Sh07 do not give the 8^{+} member of this band.

[g] Band(f): $K^{\pi}=2^{+}$ even-spin band.

[h] Band(G): $K^{\pi}=1^{-}$ even spin band.

[i] Band(g): $K^{\pi}=1^{-}$ odd spin band.

[j] Band(H): $K^{\pi}=4^{+}$ even-spin band. Dominant Configuration=(π 3/2[411])+(π 5/2[413]). a=12.98, b=−0.030 (from 4^{+}, 5^{+} and 6^{+} levels). From single-nucleon-transfer studies, 2001Bu17 interpret this band as being a hexadecapole vibration (or a g boson excitation). 1994Wu01 (see also 1993Wu03 and 1993ApZZ), however, propose that IT is a $K^{\pi}=4^{+}$ $\gamma\gamma$ vibrational band. The dominant two-quasiparticle make-up of this band argues against this latter interpretation.

[k] Band(h): $K^{\pi}=4^{+}$ odd-spin band.

[l] Band(I): Excited $K^{\pi}=0^{+}$ band.

[m] Band(J): Excited $K^{\pi}=0^{+}$ band. Proposed as the three-phonon β band by 1996SpZZ.

[n] Band(K): $K^{\pi}=7^{-}$ band. Configuration=(ν 3/2[651])+(ν 11/2[505]) (cranked shell-model configuration AX in ^{150}Nd(^{9}Be,5nγ) dataset).

[o] Band(L): $K^{\pi}=1^{+}$ band. Strongly mixed with the other $K^{\pi}=1^{+}$ band. Contains a significant component of Configuration=(π 5/2[413])-(π3/2[411]).

[p] Band(M): $K^{\pi}=1^{+}$ band. Strongly mixed with the other $K^{\pi}=1^{+}$ band. Contains a significant component of Configuration=(π 5/2[413])-(π3/2[411]).

[q] Band(N): Additional information 4.

[r] Band(O): Two-quasineutron band. Configuration=(ν 3/2[651])+(ν 11/2[505]) (cranked shell-model configuration AY in ^{150}Nd(^{9}Be,5nγ) dataset).

[s] Band(P): $K^{\pi}=(5^{-})$ band. Dominant Configuration=(π 5/2[413])+(π 5/2[532]). Strong Coriolis mixing is expected to bring in admixtures of other π $h_{11/2}$-related orbitals. Except for the common 7^{-} and (8^{-}) levels of this band, the upper levels differ in (α,2nγ),(α,4nγ) and ^{150}Nd(^{9}Be,5nγ) datasets. Given here are the levels from ^{150}Nd(^{9}Be,5nγ) dataset that gives both levels and in-band γ's, while (α,2nγ),(α,4nγ) dataset gives only the levels with no description on how they were assigned to the 7^{-} band.

[t] Band(Q): Two-quasineutron band. Configuration=(ν 3/2[651])+(ν 3/2[532]) (cranked shell-model configuration AF in ^{150}Nd(^{9}Be,5nγ) dataset) crossed by the Configuration=(ν 3/2[651])+(ν 1/2[660]) (cranked shell-model configuration BC in ^{150}Nd(^{9}Be,5nγ) dataset) near $\hbar\omega$=0.30 MeV (with configuration becoming AFBC).

[u] Seq.(R): Level sequence 1.

[v] Seq.(S): Level sequence 2. Sequence of levels placed in $K^{\pi}=7^{-}$ band in (α,2nγ),(α,4nγ) dataset that conflicts the assignment of this band in ^{150}Nd(^{9}Be,5nγ) dataset (see comment on 7^{-} band).

γ(^{154}Gd)

Additional information 5.

Unplaced γ's are not included here; see ^{154}Tb ε decays (21.5 h, 9.973 h, and 22.7 h), ^{154}Eu β^- decay, and ^{152}Sm(α,2nγ).

E_i(level)	J_i^π	E_γ[†]	I_γ[‡#]	E_f	J_f^π	Mult.[@&]	δ[@a]	α[c]	$I_{(\gamma+ce)}$	Comments
123.0709	2$^+$	123.0706 *9*	100	0.0	0$^+$	E2		1.187 *17*		B(E2)(W.u.)=157.9 *14* E_γ: From ^{154}Eu β^- decay. α: weighted average of the measured values 1.194 *19* (1995Ma03) and 1.200 *20* (1962Lu03), both from ^{154}Eu β^- decay. See the comment on the α(exp) value in the ^{154}Eu β^- decay data set. δ: δ(M3/E2)=0.0 *10* (1978We08).
370.9998	4$^+$	247.9288 *7*	100	123.0709	2$^+$	E2		0.1098		B(E2)(W.u.)=243.5 *44* E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.091 *6* (1972Na21,1968Ng01). Others: 1974Go30, 1996SpZZ. δ: δ(M3/E2)=−0.009 *+22−26* (1978We08).
680.6673	0$^+$	557.581 *7*	100.0 *9*	123.0709	2$^+$	E2		0.01053		B(E2)(W.u.)=45.5 *+29−26* Mult.: α(K)exp=0.0087 *5* (1977Ya04), 0.009 *1* (1996SpZZ), and 0.0075 *30* (1972Na21). Others: 1972Vy04, 1968Br20.
		680.652 *7*		0.0	0$^+$	E0			2.1 *2*	Mult.: α(K)exp>3.0 (1996SpZZ). Others: 1968Br20, 1969An01, 1972Na21, and 1977Ya04. $I_{(\gamma+ce)}$: From ^{153}Gd(n,γ) and ^{154}Eu β^- decay. Others: 1.2 *6* from ^{154}Tb ε decay.
717.663	6$^+$	346.643 *5*	100	370.9998	4$^+$	E2		0.0389		B(E2)(W.u.)=269 *8* Mult.: α(K)exp=0.031 *1* (1971Ri08,1974Go30,1972Vy04, 1996SpZZ). δ: δ(M3/E2)=−0.009 *+11−12* (1978We08).
815.4918	2$^+$	134.8236 *12*	0.45 *6*	680.6673	0$^+$	E2		0.859		B(E2)(W.u.)=111 *16* I_γ: From ^{154}Eu β^- decay; from ^{153}Gd(n,γ), Iγ=0.75 *2*. Mult.: α(K)exp=0.48 *9* (1996SpZZ).
		444.4924 *19*	30.78 *27*	370.9998	4$^+$	E2		0.0191		B(E2)(W.u.)=19.4 *12* E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0155 *11* (1971Ri08,1977Ya04,1972Na21, 1996SpZZ). Other: 1968Br20. δ: δ(M3/E2)=+0.001 *1* (1969Ha36) and +0.010 *20* (1977Gu10). Others: 1983Gi07 and 1989Ki10. δ(E2/M1)<−22 (1969HaZJ).
		692.4205 *18*	100.0 *8*	123.0709	2$^+$	E2+M1+E0	7.5 *4*	0.046 *3*		B(M1)(W.u.)=1.09×10^{-4} *+15−13*; B(E2)(W.u.)=6.72

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
									+44−41 E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.040 *3* (1968Br20,1971Ma65,1971Ru05, 1972Na21,1972Vy04,1977Ya04, and 1996SpZZ). Others: 1964Ha47 and 1968Ng01. δ: δ(E2/M1) from 1977Gu10, 1983Gi07, and 1989Ki10. Others: 1969Ha01, 1969HaZJ, 1971Wh01 and 1992Ak03. Additional information 6. α: Based on α(K)exp, for comparison α(M1+E2)=0.00635.
815.4918	2+	815.509 *9*	28.76 *16*	0.0	0+	E2		0.00427	B(E2)(W.u.)=0.87 *+6−5* Mult.: α(K)exp=0.0039 *2* (1971Ru05,1972Na21,1977Ya04, 1996SpZZ). Others: 1968Br20 and 1972Vy04.
996.2568	2+	180.72 *7*	0.043 *6*	815.4918	2+	[M1,E2]		0.35 *4*	
		315.64 *7*	0.0732 *9*	680.6673	0+	[E2]		0.0516	B(E2)(W.u.)=1.50 *11*
		625.2556 *24*	2.61 *3*	370.9998	4+	E2		0.00792	B(E2)(W.u.)=1.75 *+14−12* E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0080 *15* (1971Ru05,1996SpZZ). Others: 1968Br20 and 1972Vy04. δ: δ(M3/E2)=+0.02 *2* (1969Ha36,1977Gu10,1983Gi07,1989Ki10).
		873.1834[d] *23*	100.0[d] *7*	123.0709	2+	E2+M1+E0	−9.4 *4*	0.00371	B(M1)(W.u.)=2.05×10^{-4} *+25−22*; B(E2)(W.u.)=12.5 *9* E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.00346 *10* (1968Br20,1968Ng01,1971Ru05, 1972Na21,1972Vy04, 1977Ya04,1996SpZZ). Penetration parameter: 70<λ<190 (1983Gi07). δ: unweighted average of −8.0 *10* (1970Ru09), −10.2 *10* (1971La11), −9.5 *+6−8* (1977Gu10), −9.7 *10* (1983Gi07), −10.2 *8* (1983Le19), −8.1 *5* (1989Ki10) and −10.1 *+9−12* (1992Ak03). Others: 1960De16, 1969BoZK,1969Ha01,1969Ha36,1969HaZJ,1969Va09, 1971Wh01, 1972Go35, and 1973Ob01. Additional information 7.
		996.264 *8*	86.8 *6*	0.0	0+	E2		0.00277	B(E2)(W.u.)=5.65 *+44−40* Mult.: α(K)exp=0.00245 *10* (1968Br20,1968Ng01,1972Na21, 1972Vy04,1977Ya04,1996SpZZ). δ: δ(M3/E2)=0.0 *9* (1978We08).
1047.592	4+	232.101 *3*	13.06 *25*	815.4918	2+	E2		0.1359	B(E2)(W.u.)=179 *10* Mult.: α(K)exp=0.089 *8* (1971Ri08,1977Ya04,1996SpZZ). δ: δ(M3/E2)=−0.13 *+13−14* (1978We08).
		329.920 *4*	5.6 *6*	717.663	6+	E2		0.0451	B(E2)(W.u.)=13.2 *15* Mult.: α(K)exp=0.034 *3* (1996SpZZ,1972Vy04).

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
1047.592	4+	676.593 *6*	100.0 *8*	370.9998	4+	E0+M1+E2	+2.9 *4*	0.053 *3*	B(M1)(W.u.)=6.0×10^{-4} *+19−13*; B(E2)(W.u.)=5.80 *+34−37* Mult.: α(K)exp=0.044 *3* (1971Ru05,1972Na21,1974Go30, 1977Ya04,1996SpZZ). Others: 1968Br20,1968Ha28,1969An01. δ: unweighted average of +2.2 *9* (1977Gu10), +2.9 *+21−9* (1978We08), and +3.5 *+10−8* (1982Da12). Others: 1969HaZJ, 1971Ru05, 1971Wh01. Additional information 8. α: Value based on α(K)exp, for comparison α(M1+E2)=0.0071 *2* for the mixed multipole with the listed value of δ and neglecting the presence of an E0 admixture.
		924.55 *3*	38.8 *5*	123.0709	2+	E2		0.00325	B(E2)(W.u.)=0.529 *+30−28* Mult.: α(K)exp=0.0030 *2* (1977Ya04,1996SpZZ). δ: δ(M3/E2)=−0.2 *+13−27* (1978We08).
1127.8018	3+	80.4	0.016 *8*	1047.592	4+	[M1,E2]		4.7 *10*	
		131.544 *5*	0.073 *2*	996.2568	2+	E2+M1	−4.3 *+21−94*	0.937	
		312.32 *7*	0.101 *2*	815.4918	2+	[M1,E2]		0.070 *17*	E_γ: From ^{154}Eu β^- decay. γ not reported in (n,γ).
		756.8020 *23*	25.11 *17*	370.9998	4+	E2+M1	−6.1 *3*	0.00516	E_γ: From ^{154}Eu β^- decay. I_γ: From ^{154}Eu β^- decay. Others: 24.3 *14*, 28.9 *11*, and 29.1 *15*. Mult.: α(K)exp=0.00425 *15* (1971Ru05,1996SpZZ). Others: 1968Br20, 1968Ng01, 1972Na21, and 1972Vy04. δ: unweighted average of −5.7 *3* (1971Wh01), −5.9 *6* (1970Ru09), −4.9 *+8−18* (1972Go35), −6.1 *2* (1977Gu10), −7.0 *+10−8* (1983Gi07), −7.6 *4* (1989Ki10) and −5.8 *+13−18* (1992Ak03). Others: 1969Ha36, 1969HaZJ, 1969Va09, and 1978We08.
		1004.729 *12*	100.0 *8*	123.0709	2+	E2+M1	−7.4 *4*	0.00276	Mult.: α(K)exp=0.00235 *10* (1968Br20,1968Ng01,1971Ri08,1972Na21,1996SpZZ); other: 1972Vy04. δ: unweighted average of −8.5 *10* (1970Ru09), −6.6 *7* (1971La11), −7.8 *+3−2* (1977Gu10), −6.0 *+11−16* (1978We08), −7.1 *+5−4* (1983Gi07), −8.7 *4* (1989Ki10) and −7.1 *+26−30* (1992Ak03); others: 1960De16, 1969Ha36, 1969HaZJ, 1969Va09, 1971Wh01, 1972Go35, 1973Ob01, and 1982Da12.
1144.47	8+	426.78 *7*	100	717.663	6+	E2		0.0214	B(E2)(W.u.)=311 *12*

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

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	$I_{(\gamma+ce)}$	Comments
										Mult.: DCO and linear polarization (2019Ma70). α(K)exp=0.017 *2* (1971Ri08,1974Go30,1972Vy04) which implies E2 character, but peak is a doublet. δ: δ(M3/E2)=−0.004 *11*, but peak is a doublet.
1182.091	0⁺	366.581 *6*	21 *5*	815.4918	2⁺	E2		0.0330		Mult.: α(K)exp=0.019 *2* (1996SpZZ) compared to α(K)(E2)=0.026.
		501.419 *8*		680.6673	0⁺	E0			1.0	Mult.: α(K)exp>1.2 (1996SpZZ).
		1059.033 *12*	100 *19*	123.0709	2⁺	E2		0.00244		Mult.: α(K)exp=0.0021 *1* (1996SpZZ).
		1182.07 *2*		0.0	0⁺	E0			0.25	Mult.: α(K)exp>0.05 (1996SpZZ).
1241.291	1⁻	245.07 *13*	0.37 *6*	996.2568	2⁺	[E1]		0.0267		E_γ,I_γ: From ^{154}Eu β^- decay only. B(E1)(W.u.)=0.020 exceeds RUL=0.01.
		425.777 *13*	0.65 *11*	815.4918	2⁺	[E1]		0.00681		B(E1)(W.u.)=0.007
		560.83 *10*	0.51 *14*	680.6673	0⁺	[E1]		0.00365		B(E1)(W.u.)=0.0023
		1118.237 *16*	92 *3*	123.0709	2⁺	E1		9.28×10^{-4}		Mult.: α(K)exp=0.0009 *1* (1996SpZZ). δ: δ(M2/E1)=0.16 *+31−18* (1977Gu10). B(E1)(W.u.)=0.052 exceeds RUL=0.01.
		1241.304 *14*	100.0 *11*	0.0	0⁺	E1		8.10×10^{-4}		Mult.: α(K)exp=0.0007 (1996SpZZ). B(E1)(W.u.)=0.041 exceeds RUL=0.01.
1251.641	3⁻	255.80 *10*	0.9 *3*	996.2568	2⁺	[E1]		0.0239		E_γ,I_γ: From ^{154}Eu β^- decay only.
		436.20 *11*	1.05 *19*	815.4918	2⁺	[E1]		0.00644		E_γ,I_γ: From ^{154}Eu β^- decay only.
		880.640 *10*	28.0 *19*	370.9998	4⁺	E1+M2	+0.07 *3*	0.00152 *8*		I_γ: From ^{154}Eu β^- decay. Others: 31.8 *10* from ^{153}Gd(n,γ) and 19.8 *25* from ^{154}Tb ε decay (9.0 h). Mult.: α(K)exp=0.0020 *1* compared to α(K)(E1)=0.0012. δ: From −0.01 *+8−6* (1971Wh01) and +0.08 *3* (1977Gu10).
		1128.552 *7*	100.0 *11*	123.0709	2⁺	E1		9.14×10^{-4}		E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0009 (1996SpZZ). δ: δ(M2/E1)=+0.04 *3* (1977Gu10,1982Da12).
1263.778	4⁺	137		1127.8018	3⁺					
		267.499[d] *16*	1.4[d] *3*	996.2568	2⁺	E2		0.0862		Mult.: α(K)exp=0.067 *23* (1996SpZZ), which implies E2.
		448.45 *19*	0.49 *7*	815.4918	2⁺	[E2]		0.0187		E_γ: From ^{154}Eu β^- decay only.
		546.083 *14*	1.68 *13*	717.663	6⁺	[E2]		0.01110		I_γ: From ^{154}Eu β^- decay. Other: 4.2 *4* from ^{153}Gd(n,γ) where γ is multiply placed. Mult.: α(K)exp=0.024 *2* (1996SpZZ) which implies E2, but γ is doubly placed.

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
1263.778	4^+	892.775 *6*	100.0 *8*	370.9998	4^+	E0+M1+E2	−3.8 *3*	0.00367	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0039 *3* (1971Ru05,1977Ya04,1996SpZZ). Others: 1972Na21 and 1972Vy04. δ: unweighted average of −4.4 *5* (1971Wh01), −3.0 *10* (1969Va09), −4.0 *+3−4* (1977Gu10), −3.8 *3* (1989Ki10). Others: 1969Ha36, 1969HaZJ, 1978We08, and 1983Gi07.
		1140.702 *6*	45.6 *6*	123.0709	2^+	E2		0.00210	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0020 *2* (1977Ya04,1996SpZZ). δ: δ(M3/E2)=0.05 *7* (1977Gu10).
1365.878	6^+	318.306 *11*	40.3 *21*	1047.592	4^+	E2			I_γ: From Sm(α,xnγ); from $^{153}Gd(n,\gamma)$ Iγ(318)>Iγ(648) but with large uncertainty. Mult.: DCO and linear polarization (2019Ma70). δ: δ(O/Q)=−0.00 *7* (1978We08); γ is assumed to be E2.
		648.3 *3*	100 *5*	717.663	6^+	E0+M1+E2	+1.30 *20*	0.045 *8*	Mult.: α(K)exp=0.039 *7* (1974Go30). δ: From 1978We08. Others: 3.5 *+25−20* and 1.8 *+3−2* quoted in 1974Go30. Additional information 9. α: Based on α(K)exp, for comparison α(M1+E2)=0.0095 *5*.
		994.9 *3*	31.2 *17*	370.9998	4^+	E2		0.00278 *4*	Mult.: DCO and linear polarization (2019Ma70). δ: δ(O/Q)=+0.04 *+21−23* (1978We08); γ is assumed to be E2.
1397.515	2^-	146.01 *7*	0.0205 *10*	1251.641	3^-	[M1,E2]		0.668 *21*	E_γ: From ^{154}Eu β^- decay.
		156.28 *8*	0.0247 *25*	1241.291	1^-	[M1,E2]		0.54 *3*	E_γ: From ^{154}Eu β^- decay.
		269.65 *8*	0.0330 *15*	1127.8018	3^+	[E1]		0.0209	E_γ: From ^{154}Eu β^- decay.
		401.258 *14*	0.541 *8*	996.2568	2^+	(E1,M2,E3)		0.070 *6*	Mult.: α(K)exp=0.058 *5* (1996SpZZ) which can be E1+M2 or E1+M2+E3. α: Based on α(K)exp.
		582.097 *12*	2.563 *18*	815.4918	2^+	E1		0.00337	Mult.: α(K)exp=0.0035 *9* (1968Ng01,1996SpZZ). δ: δ(M2,E1)=0.01 *4* (1983Gi07).
		1274.429 *4*	100.0 *7*	123.0709	2^+	E1+M2	+0.035 *9*	7.97×10^{-4}	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.000635 *15* (1968Br20,1968Ng01,1971Ru05,1972Na21, 1996SpZZ). δ: unweighted average of +0.047 *5* (1969Va09), +0.015 *12* (1970Ru09), +0.054 *10* (1972Go35), and +0.025 *20* (1983Gi07). Others: 1960De16, 1964Ca12, 1989Ki10 and 1992Ak03.
1404.16	(5^-)	1033.11[e] *3*	100[e]	370.9998	4^+	E1		1.07×10^{-3}	Mult.: DCO and linear polarization (2019Ma70).

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

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
								α(K)exp=0.0050 (1972Vy04), but γ is multiply placed. δ: δ(Q/D)=0.012 +*33*−*12* (1982Da12).
1414.426	1^-	598.96 *4*	3.5 *2*	815.4918	2^+	[E1]	0.00317	I_γ: From 1996SpZZ (n,γ). In ^{154}Eu β^- decay, Iγ=1.6 *7*.
		1291.332 *17*	100 *4*	123.0709	2^+	E1	7.82×10^{-4}	I_γ: From 1996SpZZ (n,γ). In ^{154}Eu β^- decay, Iγ=100 *35*. Mult.: α(K)exp=0.0006 *1* (1975So03,1996SpZZ).
		1414.50 *5*	28 *3*	0.0	0^+	E1	7.54×10^{-4}	I_γ: From 1996SpZZ (n,γ). In ^{154}Eu β^- decay, Iγ=24 *9*. Mult.: α(K)exp=0.0004 *1* (1996SpZZ).
1418.160	2^+	166.520 *3*	1.7 *2*	1251.641	3^-	[E1]	0.0739	
		176.868 *3*	1.1 *2*	1241.291	1^-	[E1]	0.0629	
		236.064 *3*	2.8 *5*	1182.091	0^+	[E2]	0.1287	
		290.365 *6*	2.8 *1*	1127.8018	3^+	[E2+M1]	0.085 *19*	
		370.568 *19*	6.88 *23*	1047.592	4^+	E2	0.0320	Mult.: α(K)exp=0.025 *5* (1996SpZZ).
		421.893 *13*	2.2 *16*	996.2568	2^+	E0+(E2,M1)	0.135 *19*	Mult.: α(K)exp=0.114 *16* (1996SpZZ). α: Based on α(K)exp. For comparison α(M1,E2)=0.031.
		602.688 *9*	47.7 *17*	815.4918	2^+	E0,E2,M1	0.038 *8*	I_γ: From ^{154}Eu β^- decay. Others: 45.0 *9* from (n,γ) and 27 *4* from ^{154}Tb ε decay (21.5 h). Mult.: α(K)exp=0.033 *8* (1977Ya04,1996SpZZ). Additional information 10. α: Based on α(K)exp. For comparison, α(E2,M1)=0.012 *4*.
		737.49 *14*	3.7 *3*	680.6673	0^+	[E2]	0.00536	
		1047.181 *13*	100.0 *23*	370.9998	4^+	E2	0.00250	Mult.: α(K)exp=0.0022 *2* (1996SpZZ).
		1295.08 *13*	18.9 *10*	123.0709	2^+	E2	0.00165	Mult.: α(K)exp≈0.009 (1996SpZZ), but γ is multiply placed.
		1417.89 *11*	13.6 *17*	0.0	0^+	E2	0.00141	Mult.: α(K)exp=0.0011 *2* (1996SpZZ).
1432.588	5^+	168.810 *4*	≤5.0[b]	1263.778	4^+			Mult.: α(K)exp=0.30 *6* (1996SpZZ) which implies M1,E2, but γ is doubly placed. γ not reported in ^{154}Eu β^- decay.
		304.75 *15*		1127.8018	3^+	E2		E_γ: from (α,2nγ). γ not reported in ^{154}Eu β^- decay. Mult.: DCO and linear polarization (2019Ma70).
		714.94 *5*	25.5 *20*	717.663	6^+	E2,M1	0.0080 *23*	I_γ: from ^{154}Eu, β^- decay. Others: 19 *5* from ^{154}Tb ε decay (22.7 h); 35 *2*, from Sm(α,xnγ); and>18 from ^{153}Gd(n,γ). Mult.: α(K)exp=0.0054 *16* (1996SpZZ). DCO and linear polarization (2019Ma70).

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
1432.588	5^+	1061.39 *9*	100 *3*	370.9998	4^+	E2+M1	−4.3 *+12−26*	0.00251 *8*	Mult.: α(K)exp=0.0029 (1972Vy04). DCO and linear polarization (2019Ma70). δ: from 1978We08.
1531.305	2^+	267.499[d] *16*	1.58[d] *4*	1263.778	4^+	[E2]		0.0862	Mult.: α(K)exp=0.067 *23* (1996SpZZ) which implies E2.
		279.640 *15*	1.32 *4*	1251.641	3^-	[E1]		0.0190	
		289.99 *22*	0.59 *3*	1241.291	1^-	[E1]		0.01735	E_γ: From ^{154}Eu β^- decay.
		349.24 *7*	2.96 *22*	1182.091	0^+	[E2]		0.0381	E_γ: From ^{154}Eu β^- decay.
		403.506 *5*	9.2 *7*	1127.8018	3^+	[M1,E2]		0.034 *10*	
		483.68 *2*	3.86 *7*	1047.592	4^+	[E2]		0.01523	I_γ: Other: 6.6 *10* from ^{153}Gd(n,γ).
		535.050 *11*	7.0 *3*	996.2568	2^+	[E0+M1+E2]		0.016 *5*	I_γ: from ^{154}Eu β^- decay. Other: 21.5 *9* from ^{153}Gd(n,γ), where most of the intensity must be from another level. Mult.: α(K)exp=0.093 *11* (1996SpZZ) which implies E0,M1,E2, but this is for another placement.
		715.819 *9*	76.9 *22*	815.4918	2^+	E0,M1,E2		0.013 *4*	Mult.: α(K)exp=0.011 *4* (1971Ru05,1972Vy04). α: Based on α(K)exp, for comparison, α(M1,E2)=0.0080 *23*.
		850.64 *3*	100.0 *9*	680.6673	0^+	E2		0.00389	Mult.: α(K)exp=0.0036 *2* (1996SpZZ).
		1160.5 *3*	19.0 *2*	370.9998	4^+	[E2]		0.00203	δ: δ(O/Q)=0.00 *8* or +0.26 *+24−15* (1977Gu10); γ is assumed to be E2.
		1408.2 *2*	10.2 *4*	123.0709	2^+	E0,M1,E2		0.0037 *14*	I_γ: From ^{154}Eu β^- decay. Other: 30 *12* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.0032 *12* (1996SpZZ). α: Based on α(K)exp, for comparison α(M1,E2)=0.0018 *4*.
		1531.6 *3*	2.64 *9*	0.0	0^+	[E2]		1.26×10^{-3}	I_γ: Other: 11.6 *27* from ^{153}Gd(n,γ).
1559.92	(4^-)	295.7	0.40 *8*	1263.778	4^+	[E1]		0.01652	
		307.7 *3*	0.44 *11*	1251.641	3^-	[E2+M1]		0.073 *17*	
		511.60 *8*	3.6 *3*	1047.592	4^+	[E1]		0.00448	
		1188.90 *12*	100.0 *7*	370.9998	4^+				δ: δ(Q/D)=−0.18 *+15−18* (1971Wh01,1977Gu10), 0.20 *20* (1992Ak03); γ is assumed to be E1.
1573.974	0^+	332.692 *8*	56.8 *21*	1241.291	1^-				

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	$I_{(\gamma+ce)}$	Comments
1573.974	0^+	391.85 *4*		1182.091	0^+	E0			0.5	Mult.: α(K)exp>0.10 (1996SpZZ).
		577.704 *12*	85.3 *16*	996.2568	2^+					
		758.462 *14*	100 *5*	815.4918	2^+					
		1451.7[d] *5*	27[d] *8*	123.0709	2^+					
		1574.04 *5*		0.0	0^+	E0			0.5	Mult.: α(K)exp>0.01 (1996SpZZ).
1606.51	6^+	173		1432.588	5^+					
		343.0 *2*		1263.778	4^+					
		888.69 *13*	100 *15*	717.663	6^+	E2+M1	>1.8	0.0038 *3*		Mult.: α(K)exp=0.0033 *2* (1977Ya04). δ: <−1.8 or>+7 (1978We08).
		1235.11 *19*	43 *6*	370.9998	4^+					
1617.125	3^-	199.20 *8*	0.118 *16*	1418.160	2^+	[E1]		0.0459		
		203.40 *29*	0.061 *8*	1414.426	1^-	[E2]		0.210		
		213.06 *11*	0.049 *8*	1404.16	(5^-)	[E2]		0.180		
		218.71 *26*	0.094 *16*	1397.515	2^-	[M1,E2]		0.19 *3*		
		352.85 *20*	0.154 *16*	1263.778	4^+	[E1]		0.01066		
		365.47 *15*	0.118 *16*	1251.641	3^-	[E2+M1]		0.045 *12*		
		569.50 *7*	1.6 *2*	1047.592	4^+	[E1]		0.00353		
		621.6 *5*	0.49 *20*	996.2568	2^+	[E1]		0.00293		
		801.69 *11*	0.72 *7*	815.4918	2^+	[E1]		1.74×10^{-3}		
		1246.121 *4*	100.0 *10*	370.9998	4^+	E1		8.07×10^{-4}		Mult.: α(K)exp=0.0006 (1996SpZZ). δ: δ(M2/E1)=0.00 *2* (1971Wh01,1977Gu10,1983Gi07,1989Ki10). Others: 1969Ha36 and 1969HaZJ.
		1494.048 *4*	81.55 *7*	123.0709	2^+	E1		7.56×10^{-4}		I_γ: Other: 99 *7* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.0004 *1* (1996SpZZ).
1637.08	10^+	492.6 *1*	100	1144.47	8^+	E2		0.01451		B(E2)(W.u.)=353 *+50−41* Mult.: α(K)exp=0.0124 *21* (1974Go30). DCO and linear polarization (2019Ma70). δ: δ(M3/E2)=0.00 *22* (1978We08).
1645.814	4^+	241.20 *9*	1.4 *2*	1404.16	(5^-)	[E1]		0.0278		E_γ: From ^{154}Eu β^- decay. I_γ: from ^{154}Eu β^- decay. In (n,γ) Iγ=8.1 *11*, but peak is a doublet.
		382.025 *7*	10.8 *4*	1263.778	4^+	E2+M1		0.040 *11*		I_γ: from ^{154}Eu β^- decay. From ^{153}Gd(n,γ), Iγ=10.9 *16*. Other: 9.5 *7*, from ^{154}Tb ε decay (9.0 h). Mult.: α(K)exp=0.029 *4* (1971Ri08,1996SpZZ).
		518.012 *16*	57.0 *16*	1127.8018	3^+	E2+M1	−7 *3*	0.0129 *5*		Mult.: α(K)exp=0.0113 *9* (1971Ri08,1972Vy04). δ: From 1978We08.
		598.22 *2*	12.0 *16*	1047.592	4^+	M1+E2	0.65 *20*	0.0139 *10*		Mult.: α(K)exp=0.0123 *4* (1977Ya04).

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡#	E_f	J^π_f	Mult.@&	α[c]	$I_{(\gamma+ce)}$	Comments
									Others: 1971Ri08, 1972Vy04, and 1996SpZZ.
1645.814	4^+	649.565 *11*	100.0 *20*	996.2568	2^+	E2	0.00722		Mult.: α(K)exp=0.0061 *5* (1971Ri08,1996SpZZ). Other: 1972Vy04.
		830.49 *9*	7.1 *6*	815.4918	2^+	[E2]	0.00410		Mult.: α(K)exp=0.0041 (1972Vy04); J^π's require E2.
		928.21 *8*	3.4 *2*	717.663	6^+	[E2]	0.00322		E_γ: from ^{154}Eu β^- decay.
		1275.66 *12*	2 *2*	370.9998	4^+	[E2+M1]	0.0021 *5*		E_γ: from ^{154}Eu β^- decay.
		1522.8	1.0 *2*	123.0709	2^+	[E2]	0.00127		E_γ: From ^{154}Tb ε decay (9.973 h). From ^{154}Eu β^- decay, Eγ=1522.19 *16*, but this leads to a poor energy fit. I_γ: From ^{154}Tb ε decay, Iγ=3.0 *14*.
1650.34	0^+	654		996.2568	2^+				I_γ: 146 *16* for 654+650 doublet relative to 100 for 1527γ in ^{156}Gd(p,tγ) dataset (2017Al11).
		834.88 *5*	17 *5*	815.4918	2^+				
		969.67 *9*		680.6673	0^+	E0		0.7	Mult.: α(K)exp>0.027 (1996SpZZ).
		1527.1 *3*	100 *4*	123.0709	2^+				Mult.: α(K)exp=0.0007 *2* (1996SpZZ), which implies E1 or E2: J^π's require E2.
		1650.31 *4*		0.0	0^+	E0		0.3	Mult.: α(K)exp>0.01 (1996SpZZ).
1660.903	3^+	129.60 *13*	0.28 *4*	1531.305	2^+	[M1,E2]	0.975 *20*		E_γ: From ^{154}Eu β^- decay.
		228.23 *9*	0.36 *2*	1432.588	5^+	[E2]	0.1436		E_γ: From ^{154}Eu β^- decay.
		242.86 *6*	0.72 *6*	1418.160	2^+	[E2+M1]	0.14 *3*		E_γ: From ^{154}Eu β^- decay.
		263.50 *16*	0.18 *2*	1397.515	2^-	[E1]	0.0221		E_γ: From ^{154}Eu β^- decay.
		397.07 *7*	4.86 *11*	1263.778	4^+	[M1,E2]	0.036 *10*		E_γ: From ^{154}Eu β^- decay.
		409.19 *8*	0.9 *3*	1251.641	3^-	[E1]	0.00748		E_γ: From ^{154}Eu β^- decay.
		533.03 *8*	3.25 *18*	1127.8018	3^+	[E0+M1+E2]	0.017 *5*		E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.167 *22* in (n,γ) (1996SpZZ) and>1.4 in decay (1968Br20), both of which imply an E0 component, but note that in those studies, there are two closely spaced "533" γ's. Others: 1969An01 and 1972Na21.
		613.289 *10*	16.40 *18*	1047.592	4^+	E2,M1	0.012 *4*		Mult.: α(K)exp=0.008 *1* (1996SpZZ).
		664.68 *5*	4.60 *18*	996.2568	2^+	[M1,E2]	0.010 *3*		
		845.416 *7*	100.0 *18*	815.4918	2^+	E2	0.00395		E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0032 *1* (1996SpZZ).
		1289.88 *11*	3.70 *13*	370.9998	4^+	[M1,E2]	0.0021 *5*		E_γ: From ^{154}Eu β^- decay.
		1537.82 *3*	10.12 *18*	123.0709	2^+	[M1,E2]	0.0015 *3*		I_γ: From ^{154}Eu β^- decay. Other: 17.5 *18* from ^{153}Gd(n,γ).
1674.1	(7^-)	956.4	100	717.663	6^+	E1			Mult.: angular distribution and linear polarization (1982Da12). δ: δ(Q/D)=−0.04 +*8*−*5* (1978We08).
1701.40	4^+	283.0 *2*	17	1418.160	2^+	[E2]	0.0722		
		573.5 *2*	12	1127.8018	3^+				
		653.7 *2*	100	1047.592	4^+				
		705.1 *2*	<2.2	996.2568	2^+	[E2]	0.00595		

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[‡#]	E_f	J_f^π	Mult.[@&]	δ[@a]	α[c]	Comments
1701.40	4+	885.8 *2*	8.9	815.4918	2+	[E2]		0.00356	
		983.7 *2*	92	717.663	6+				
		1330.3 *2*	75	370.9998	4+				
		1578.2 *2*	9.2	123.0709	2+	[E2]		1.22×10^{-3}	
1716.050	2+	464.391 *13*	22.5 *17*	1251.641	3−				
		474.753 *13*	31.8 *25*	1241.291	1−				
		588.254 *7*	73 *3*	1127.8018	3+	E2		0.00920	Mult.: α(K)exp=0.008 *1* (1996SpZZ).
		719.80 *3*	45 *6*	996.2568	2+				
		1345.0 *5*	100 *25*	370.9998	4+				
		1593.4[d] *5*	75[d] *33*	123.0709	2+				
		1715.7 *6*	60 *22*	0.0	0+				I_γ: Reported Iγ=63 *22* divided by evaluator, based on calculation of Iγ(1716.9) from 1838 level in (n,γ) from ^{154}Eu β^- decay data for 1838 level.
1719.5593	2−	58.4	0.019 *2*	1660.903	3+				E_γ: From ^{154}Eu β^- decay.
		188.254 *4*	1.196 *9*	1531.305	2+				
		301.38 *7*	0.0616 *17*	1418.160	2+	[E1]		0.01575	E_γ: From ^{154}Eu β^- decay.
		305.14	0.1021 *19*	1414.426	1−	[M1,E2]		0.074 *18*	
		322.01 *5*	0.309 *3*	1397.515	2−	[M1,E2]		0.064 *16*	
		467.84 *5*	0.312 *4*	1251.641	3−	[M1,E2]		0.023 *7*	
		478.27 *4*	1.122 *9*	1241.291	1−	E2		0.01570	Mult.: α(K)exp=0.0124 *21* (1971Ri08,1972Na21).
		591.755 *3*	24.67 *17*	1127.8018	3+	E1(+M2)	+0.02 *3*	0.00327 *11*	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0030 *5* (1968Br20,1972Na21) or 0.062 *11* (1968Ng01,1996SpZZ); the δ value agrees with the smaller value. δ: unweighted average of +0.10 *10* (1972Go35), +0.06 *3* (1977Gu10), +0.02 *3* and −0.10 *8* (1983Gi07) and 0.01 *7* (1992Ak03). Other: 1973Ob01.
		723.3014 *22*	100.0 *7*	996.2568	2+	E1+M2	+0.022 *13*	0.00215 *4*	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0019 *1* (1968Br20,1968Ng01,1971Ru05,1972Na21, 1972Vy04,1996SpZZ). δ: unweighted average of +0.040 *11* (1969Va09), +0.015 *15* (1970Ru09), −0.04 *4* (1972Go35), +0.04 *+2−4* (1973Ob01), +0.05 *4* (1977Gu10), +0.05 *4* (1983Gi07), and 0.00 *4* (1983Le19). Other: 1960De16.
		904.064 *3*	4.43 *3*	815.4918	2+	E1(+M2)		0.008 *7*	E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.0013 *5* (1972Na21).

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
									δ: δ(M2/E1)=0.07 *17* (1983Gi07), 0.18 *15* (1992Ak03), both from ^{154}Eu β^- decay. α: value for a pure E1 transition.
1719.5593	2^-	1596.4804 *28*	8.96 *10*	123.0709	2^+	E1(+M2)		0.0021 *14*	E_γ: From ^{154}Eu β^- decay. I_γ: From ^{154}Eu β^- decay. Other: 22.8 *18* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.00037 *10* (1972Na21). δ: δ(M2/E1)=0.000 *10* (1977Gu10,1983Gi07,1989Ki10), 0.20 *7* (1992Ak03), both from ^{154}Eu β^- decay. Others: 1960De16, 1971Wh01, and 1972Go35. α: value for a pure E1 transition.
1756.46	8^+	390.6 *1*	100 *5*	1365.878	6^+	E2			Mult.: angular distribution (1972Re04, 1978We08). δ: δ(O/Q)=0.00 *5* (1978We08).
		612.1 *2*	33.0 *20*	1144.47	8^+	E0+M1+E2	−0.69 *14*	0.061 *8*	Mult.: α(K)exp=0.053 *7* (1974Go30). δ: From −0.69 *+12−14* (1978We08). Others: 1.0 *+7−6* and 1.2 *+4−3* quoted in 1974Go30. Additional information 11. α: Based on α(K)exp, compared to α(M1+E2)=0.0130 *7*.
		1038.9 *5*	74 *4*	717.663	6^+	E2			I_γ: From Sm(α,xnγ). Other: 9.8 from ^{150}Nd(^{9}Be,5nγ). Mult.: angular distribution (1972Re04, 1978We08). δ: δ(O/Q)=+0.06 *+15−13* (1978We08); γ is assumed to be E2.
1770.187	5^+	124.371 *3*	21 *1*	1645.814	4^+				
		337.35 *9*	35 *10*	1432.588	5^+	(E0+M1+E2)		0.12	E_γ: From 1994Wu01 (α,2nγ). Mult.: α(K)exp=0.10 (1972Vy04). δ: δ(E2/M1)=−0.004 (1978We08). Additional information 12. α: Based on α(K)exp, compared to α(M1,E2)=0.056 *14*.
		404.321 *9*	29[b] *3*	1365.878	6^+				I_γ: Reported only in ^{153}Gd(n,γ).
		506.44 *4*	93 *12*	1263.778	4^+	E2		0.01349	I_γ: From ^{154}Tb ε decay (9.0 h and 22.7 h). Others: 21 *5* from ^{153}Gd(n,γ), 139 *22* from ^{154}Eu β^- decay and 68 *10* from (α,2nγ). Mult.: α(K)exp=0.0100 *11* (1971Ri08,1972Vy04).
		642.40 *2*	100 *7*	1127.8018	3^+	E2		0.00742 *11*	Mult.: α(K)exp=0.0086 *8* (1996SpZZ). Other: 0.0054 (1972Vy04).
		722.59 *8*	26 *8*	1047.592	4^+				I_γ: From ^{153}Gd(n,γ) and ^{154}Tb ε decay (22.7 h). Others: 54 *14* from ^{154}Tb ε decay (9.0 h) and not observed in ^{154}Eu β^- decay.
		774.4	185	996.2568	2^+				I_γ: Reported as strongest γ from level in ^{154}Eu β^-

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
								decay, but not reported in other studies, so assignment is doubtful.
1770.187	5$^+$	1399.7[d] *3*	11[d] *3*	370.9998	4$^+$			I_γ: From ^{154}Tb ε decay (9.0 h and 22.7 h). Others: 109 *10* from ^{153}Gd(n,γ) and 70 *13* from ^{154}Eu β^- decay.
1775.430	2$^+$	647.7 *2*	3.0 *12*	1127.8018	3$^+$			I_γ: In (n,γ) this placed from this level and 1912 level.
		727.821 *16*	15.2[b] *8*	1047.592	4$^+$			
		960.05 *9*	9 *3*	815.4918	2$^+$			
		1094.91 *8*	21 *4*	680.6673	0$^+$	E2	0.00228	Mult.: α(K)exp=0.0018 *7* (1996SpZZ).
		1404.6[d] *3*	40[d] *4*	370.9998	4$^+$			Mult.: α(K)exp=0.0017 *3* (1996SpZZ), but γ is doubly placed.
		1652.36 *3*	100 *11*	123.0709	2$^+$	E0,E2,M1		Mult.: α(K)exp=0.0021 *3* (1996SpZZ). α(M1,E2)=0.00136.
		1775.7 *3*	46 *3*	0.0	0$^+$			
1788.83	(4$^+$)	740.91 *16*	19 *4*	1047.592	4$^+$	[E0+M1+E2]	0.0074 *21*	α: Value does not include contribution for an E0 component.
		975[f]		815.4918	2$^+$			
		1071.17 *24*	4.6 *6*	717.663	6$^+$	[E2]	0.00239	
		1417.88 *9*	100 *6*	370.9998	4$^+$	[M1,E2]	0.0017 *4*	
		1665.83 *12*	38 *2*	123.0709	2$^+$	[E2]	1.14×10^{-3}	
1796.961	3$^-$	378.90 *27*	1.8 *3*	1418.160	2$^+$	[E1]	0.00898	E_γ: From ^{154}Eu β^- decay.
		382.46 *27*	1.0 *3*	1414.426	1$^-$	[E2]	0.0292	E_γ: From ^{154}Eu β^- decay.
		533.11 *7*	38.4 *23*	1263.778	4$^+$			E_γ: From ^{154}Eu β^- decay. Mult.: α(K)exp=0.167 *22* in (n,γ) (1996SpZZ) and>1.4 in decay (1968Br20), both of which imply an E0 component, but note that in those studies, there are two closely spaced "533" γ's. Others: 1969An01 and 1972Na21.
		545.20 *14*	6.4 *8*	1251.641	3$^-$	[E2+M1]	0.016 *5*	E_γ: From ^{154}Eu β^- decay.
		669.154 *16*	75 *4*	1127.8018	3$^+$	E1	0.00251	I_γ: From ^{154}Eu β^- decay. Others: 120 *40* from ^{154}Tb ε decay (9.0 h) and 82 *4* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.0021 *7* (1996SpZZ).
		749.48 *9*	35.2 *21*	1047.592	4$^+$	[E1]	0.00199	E_γ: From ^{154}Eu β^- decay.
		800.731 *15*	100 *5*	996.2568	2$^+$	E1	0.00174	Mult.: α(K)exp=0.0018 *2* (1996SpZZ).
		981.59 *6*	41 *7*	815.4918	2$^+$			I_γ: From ^{154}Eu β^- decay. Other: 62 *10* from ^{153}Gd(n,γ).
		1426.03 *27*	2.0 *3*	370.9998	4$^+$			E_γ: From ^{154}Eu β^- decay. I_γ: From ^{154}Eu β^- decay. Other: 44 *4* from ^{153}Gd(n,γ).
		1673.93 *8*	9.5 *5*	123.0709	2$^+$			E_γ: From ^{154}Eu β^- decay. I_γ: From ^{154}Eu β^- decay. Other: 560 *41* from ^{154}Tb ε decay (9.0 h).
1810.22	7$^+$	203.9		1606.51	6$^+$			Mult.: angular distribution and linear polarization (1982Da12).

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
1810.22	7$^+$	378.4 *2*	25.9 *14*	1432.588	5$^+$	E2			Mult.: angular distribution (1978We08) and linear polarization (2019Ma70). δ: δ(O/Q)=−0.03 +*5*−*4* (1978We08).
		665.86 *14*	22.6 *12*	1144.47	8$^+$	E2+M1	−3.2 +*7*−*10*		Mult.: DCO and linear polarization (2019Ma70). δ: δ=−3.2 +*7*−*10* (1978We08).
		1092.46 *6*	100 *5*	717.663	6$^+$	E2+M1	−2.7 +*5*−*6*		Mult.: DCO and linear polarization (2019Ma70). δ: δ=−2.7 +*5*−*6* (1978We08).
1836.61	0$^+$	595.070[f] *13*	74.2 *16*	1241.291	1$^-$	E1		0.00321	Mult.: α(K)exp=0.003 (1996SpZZ).
		1155.75[f] *7*		680.6673	0$^+$	E0			Mult.: α(K)exp>0.008 (1996SpZZ).
		1713.4 *3*	100 *4*	123.0709	2$^+$				
		1836.8 *3*	40 *13*	0.0	0$^+$				
1900.34	(2$^+$)	63.732[d] *2*	4.3[d] *14*	1836.61	0$^+$				
		1529.6 *3*	100 *9*	370.9998	4$^+$	E2		0.00127	Mult.: α(K)exp=0.0009 *2* (1996SpZZ).
1911.545	6$^+$	141.33 *3*	100 *5*	1770.187	5$^+$	E2+M1	7 +*6*−*3*	0.729	Mult.: α(K)exp=0.95 *11* (1975So03), 0.73 (1972Vy04), and<0.52 *7* (1996SpZZ). δ: From 1978We08 (α,2nγ).
		265.83 *6*	54 *5*	1645.814	4$^+$				I_γ: From ^{154}Tb ε decay (22.7 h). Other: 40 *4* from (α,xnγ).
		304.75 *12*	19.5 *5*	1606.51	6$^+$	E2		0.0574	I_γ: From ^{154}Tb ε decay (22.7 h). Other: 39 *4* from (α,2nγ). Mult.: α(K)exp=0.042 *6* (1975So03).
		479.18 *11*	52 *5*	1432.588	5$^+$				I_γ: From ^{154}Tb ε decay (22.7 h). Other: 46 *7* from (α,2nγ).
		545.7	8 *3*	1365.878	6$^+$				
		647.57 *23*	71 *6*	1263.778	4$^+$				E_γ,I_γ: From 1994Wu01 (α,2nγ). This γ is not reported in the ε decay of 22.7 h ^{154}Tb, where, based on relative-intensity considerations, it should have been observed. In (n,γ) γ of 647.7 *2* placed here and 1775 level.
		1193.34 *24*	41 *6*	717.663	6$^+$				I_γ: From ^{154}Tb ε decay (22.7 h). Other: 33 *5* from (α,2nγ).
		1541.2 *4*	5.7	370.9998	4$^+$				
1912.08	(0,1,2)	1096.62 *17*	14 *3*	815.4918	2$^+$				
		1788.9 *3*	100 *2*	123.0709	2$^+$				
1943.95	(1,2$^+$)	761.86 *3*	301[b] *15*	1182.091	0$^+$				Mult.: α(K)exp=0.0024 *2* (1996SpZZ), but γ is doubly placed.
		1820.3 *6*	100 *20*	123.0709	2$^+$				
1948.559	(5$^-$)	151.614 *10*	5 *1*	1796.961	3$^-$				
		331.47 *2*	12 *2*	1617.125	3$^-$				
		696.82 *3*	27 *3*	1251.641	3$^-$				

$^{154}_{64}$Gd$_{90}$-23

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[‡#]	E_f	J_f^π	Mult.[@&]	α[c]	Comments
1948.559	(5⁻)	1577.7 3	100 8	370.9998	4⁺			
1964.05	(2)⁺	127.439 4	1.00 17	1836.61	0⁺	(E2)	1.049 15	Mult.: α(K)exp<0.45 13 (1996SpZZ).
		1592.8 2	100 15	370.9998	4⁺	(E2)	0.00120 17	Mult.: α(K)exp=0.0012 2 (1996SpZZ).
		1840.8 3	53.3 17	123.0709	2⁺			
		1964.7 4	33 5	0.0	0⁺			
1973.07	2⁺	1602.06 19	100 6	370.9998	4⁺			
		1849.8 7	29 11	123.0709	2⁺			
		1973.1[d] 4	19[d] 3	0.0	0⁺			
1988	(5⁺)	622[f]		1365.878	6⁺			
		940[f]		1047.592	4⁺			
2018.39	8⁺	208.3 5		1810.22	7⁺			
		412.03 14		1606.51	6⁺	E2		Mult.: DCO and linear polarization (2019Ma70).
		652.61 10		1365.878	6⁺			
		873.83 14		1144.47	8⁺			
		1300.50 16		717.663	6⁺	E2		Mult.: DCO (2019Ma70).
2023.82	1,2⁺	1900.72 11		123.0709	2⁺			
		2024.4 6		0.0	0⁺			I_γ: Values disagree; Iγ(1900)/Iγ(2024)=10 3 from ^{153}Gd(n,γ) and 0.35 17 from ^{154}Tb ε decay (9.0 h).
2040.5	(9⁻)	896.0 3	100	1144.47	8⁺	D		Mult.: angular distribution (1978We08). δ: −0.017 35 or 0.00 4 (1978We08).
2041.07	(1,2)⁺	1044.90 12	77 11	996.2568	2⁺	M1	0.00412	Mult.: α(K)exp=0.0051 8 (1996SpZZ).
		1917.4 3	100 7	123.0709	2⁺			
		2041.1[d] 3	140[d] 8	0.0	0⁺			
2073.30	(7⁺)	161.78 4	100 14	1911.545	6⁺	D+Q		Mult.: angular distribution (1978We08).
		303.22 9	62 11	1770.187	5⁺			
2080.230	4⁺	364.32 6	3.2 9	1716.050	2⁺			
		419.28 3	9 5	1660.903	3⁺	(M1)	0.0397	Mult.: α(K)exp=0.065 33 (1996SpZZ).
		434.42 4	6.9 23	1645.814	4⁺			
		952.39 4	100 7	1127.8018	3⁺	M1,E2	0.0041 11	Mult.: α(K)exp=0.0037 4 (1996SpZZ).
		1084.29[d] 12	75[d] 11	996.2568	2⁺			
		1363.1[d] 3	71[d] 6	717.663	6⁺			
		1709.7[d] 4	47[d] 7	370.9998	4⁺			
2080.792	3⁻	132.235 4	11 2	1948.559	(5⁻)			
		463.80 4	21 5	1617.125	3⁻			
		520.76 3	41 5	1559.92	(4⁻)			
		683.13 4	100 7	1397.515	2⁻	M1	0.01156	Mult.: α(K)exp=0.0126 21 (1996SpZZ).
		817.05 7	≤93	1263.778	4⁺			I_γ: Value represents an upper limit, since the peak contains α contribution from a transition in ^{153}Gd.
		1033.11[e] 3	45×10^{1}[e] 10	1047.592	4⁺			I_γ: Division for doubly placed γ in (n,γ) based on evaluator's

$^{154}_{64}Gd_{90}$-24

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡#]	E_f	J_f^π	Mult.[@&]	δ[@a]	α[c]	Comments
									estimate of limit for Iγ(1033)/Iγ(683) in ^{154}Tb ε decay (9.973 h).
2080.792	3⁻	1084.29[d] *12*	289[d] *43*	996.2568	2⁺				
		1399.7[d] *3*	188[d] *16*	680.6673	0⁺				
		1709.7[d] *4*	182[d] *27*	370.9998	4⁺				
2101.6	(1,2)	2101.6 *3*	100	0.0	0⁺				
2113.74	2⁺	872.46 *5*	73 *9*	1241.291	1⁻				
		986.21 *16*	14 *4*	1127.8018	3⁺				
		1432.9[d] *4*	38[d] *11*	680.6673	0⁺				
		1742.7 *3*	24.8 *20*	370.9998	4⁺				
		1990.4 *2*	100.0 *20*	123.0709	2⁺				
		2114.0 *5*	16 *3*	0.0	0⁺				
2116.9		205.4	100	1911.545	6⁺				
2119.55	1⁺,2⁺	587.8 *5*	5.8 *6*	1531.305	2⁺				
		701.2 *6*	6.4 *7*	1418.160	2⁺	M1		0.01083	Mult.: α(K)exp=0.011 *4* (1977Ya04).
		704.90 *11*	62 *4*	1414.426	1⁻	E1		0.00225	Mult.: α(K)exp=0.00195 *20* (1977Ya04).
		722.12 *8*	100 *6*	1397.515	2⁻				
		878.3 *2*	36.6 *22*	1241.291	1⁻				
		1123.09[d] *16*	74[d] *5*	996.2568	2⁺	E2,M1		0.0028 *7*	I_γ: From ^{154}Tb ε decay (21.5 h). Other: 152 *24* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.0020 *7* (1975So03,1996SpZZ).
		1996.61 *9*	97 *6*	123.0709	2⁺	E2+M1		0.00112 *13*	I_γ: From ^{154}Tb ε decay (21.5 h). Other: 248 *72* from ^{153}Gd(n,γ). Mult.: α(K)exp=0.00061 *25* (1975So03).
		2119.68 *15*	55 *4*	0.0	0⁺	M1,E2		0.00109 *11*	Mult.: α(K)exp=0.00077 *31* (1975So03) which implies M1,E2; J^π's require M1.
2137.48	7⁻	225.94 *3*	100 *5*	1911.545	6⁺	E1		0.0329	B(E1)(W.u.)=1.3×10^{-7} Mult.: α(K)exp=0.0241 *25* (1971Ri08). δ: δ(M2/E1)=+0.024 *48* (1978We08).
		992.92 *12*	78 *5*	1144.47	8⁺	E1(+M2)	−0.16 *+16−23*	0.00116	B(E1)(W.u.)=1.2×10^{-9}; B(M2)(W.u.)=1×10^{-4} I_γ: From Sm(α,xnγ). Other: 61 *5* from ^{154}Tb ε decay (22.7 h). Mult.: α(K)exp<0.00092 (1971Ri08). Other: 0.0063 (1972Vy04). δ: from 1978We08 (α,2nγ).
		1419.81 *8*	50 *3*	717.663	6⁺	E1		7.54×10^{-4}	B(E1)(W.u.)=2.6×10^{-10} I_γ: From Sm(α,xnγ). Other: 172 *11* from ^{154}Tb ε decay (22.7 h). Mult.: α(K)exp=0.00059 *13* (1971Ri08).
2148.81	(1,2)⁺	730.71 *6*	8 *3*	1418.160	2⁺	M1,E2		0.0076 *22*	Mult.: α(K)exp=0.0053 *23* (1996SpZZ).

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	δ[@a]	α[c]	Comments
2148.81	(1,2)$^+$	1332.4 3	44 6	815.4918	2$^+$				
		2025.1 4	74 25	123.0709	2$^+$				
		2148.6 3	100 6	0.0	0$^+$				
2176.03	(1$^+$)	62.2937 18	14 3	2113.74	2$^+$	M1+E2	1.1 4	12.0 17	Mult.: α(L3)exp=2.4 8 (1996SpZZ). δ: From α(L3)exp by evaluator.
		1359.9 2	109[b] 12	815.4918	2$^+$	(M1)		0.00225	Mult.: α(K)exp=0.0020 5 (1996SpZZ), but γ is doubly placed.
		1496.6 6	100 33	680.6673	0$^+$				
		2176.2[d] 2	567[d] 78	0.0	0$^+$				
2183.22	8$^{(-)}$	451.5 5		1731.7	(7$^-$)				
		1039.0 4		1144.47	8$^+$				
2184.75	12$^+$	547.6 1	100	1637.08	10$^+$	E2			Mult.: α(K)exp=0.0091 16 (1974Go30); DCO and linear polarization (2019Ma70).
2185.869	4$^-$	105.071[d] 8	21[d] 4	2080.792	3$^-$				
		415.85 6	10.8 7	1770.187	5$^+$	E1		0.00720	Mult.: α(K)exp=0.0064 8 (1971Ri08). δ: δ(M2/E1)=−0.061 +12−13 (1981Fe01).
		484.74 21	0.8 1	1701.40	4$^+$	[E1]		0.00505	
		540.18 6	100 5	1645.814	4$^+$	E1		0.00397	Mult.: α(K)exp=0.0039 3 (1971Ri08). Other: 0.034 (1972Vy04).
		753.1 9	1.2 6	1432.588	5$^+$				
		922.1[d] 9	2.0[d] 6	1263.778	4$^+$				δ: δ(M2/E1)=−0.02 17 (1981Fe01) which assumes γ is E1.
		1058.34 18	1.4 2	1127.8018	3$^+$				
		1814.9 3	0.7 2	370.9998	4$^+$				
2187.01	1$^+$	945.8[e] 4	3.6[e] 9	1241.291	1$^-$				I_γ: evaluator′s division of doublet with Iγ=4.1 4, based on failure to report 945 γ from 2342 level in (n,γ).
		1191.2[d] 8	9[d] 3	996.2568	2$^+$				
		1371.6 5	7.8 21	815.4918	2$^+$				
		1506.4 4	25 3	680.6673	0$^+$				Mult.: α(K)exp=0.0007 3 (1996SpZZ) which is interpreted as E1 or E2; this conflicts with J^π assignments.
		2064.11 10	72 4	123.0709	2$^+$	M1,E2		0.00111 12	Mult.: α(K)exp=0.00064 26 (1975So03).
		2187.10 16	100 6	0.0	0$^+$	M1		0.00118 17	Mult.: α(K)exp=0.00050 21 (1975So03).
2194.12	10$^+$	437.7 1	100 5	1756.46	8$^+$	E2			Mult.: α(K)exp=0.022 (1974Go30) which is interpreted as (E2) (γ is doubly placed); DCO (2019Ma70). δ: δ(M3/E2)=+0.02 8 (1978We08), which assumes γ is E2, but γ is doubly placed.
		557.1 2	9 3	1637.08	10$^+$	E0+M1+E2	1.1 +5−3	0.053 14	Mult.: α(K)exp=0.046 12 (1974Go30). α(K)exp > α(K)(M1) > α(K)(M1+E2) > α(K)(E2) signals E0

From ENSDF

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	Comments
							component. δ: From 1974Go30. α: Based on α(K)exp, for comparison α(M1+E2)=0.0145 15.
2194.12	10^+	1049.8[f] 5	5.9 6	1144.47	8^+		
2215.2	$(6^+,7,8^+)$	459.5		1756.46	8^+		
		608.0		1606.51	6^+		
2222.48	(2^+)	46.4499 8	6.4 6	2176.03	(1^+)		
		1541.5 3	61 3	680.6673	0^+		Mult.: α(K)exp=0.0007 1 (1996SpZZ), which is interpreted as E1 or E2.
		1851.0 4	54 15	370.9998	4^+		
		2099.1 3	100 4	123.0709	2^+		
		2222.2 4	52 9	0.0	0^+		
2229.77	(2^+)	42.7605 16	2.0 6	2187.01	1^+		
		1102.00 15	45 7	1127.8018	3^+		
		1233.5 4	94 18	996.2568	2^+		
		1548.8 5	60 15	680.6673	0^+		
		2229.6 8	100 38	0.0	0^+		
2230.08	$2^+,3,4^+$	1102.43 20	100 14	1127.8018	3^+		
		1234.0 9	43 21	996.2568	2^+		
		1858.4 4	79 7	370.9998	4^+		
		2106.9	57 7	123.0709	2^+		
2245	7^+	879[f]		1365.878	6^+		
2245.29		171.99 4	100	2073.30	(7^+)		
2249.02	(3)	135.271 6	0.9 3	2113.74	2^+		
		985.43 13	26 7	1263.778	4^+		
		1006.9 4	64 15	1241.291	1^-		
		1120.6 5	45 15	1127.8018	3^+		
		1201.0 5	21 5	1047.592	4^+		
		1432.9[d] 4	52[d] 15	815.4918	2^+		
		1877.8 3	52 3	370.9998	4^+		
		2126.1 2	100 21	123.0709	2^+		
2251.3	$9^{(-)}$	1107.4 8		1144.47	8^+		
2251.38	9^+	441.15 14		1810.22	7^+	(E2)	Mult.: linear polarization (2019Ma70).
		614.55 18		1637.08	10^+	M1+E2	Mult.: DCO and linear polarization (2019Ma70).
		1106.82 14		1144.47	8^+	(M1+E2)	Mult.: DCO (2019Ma70).
2254.13	(8^+)	180.87 4	53 19	2073.30	(7^+)	D	Mult.: angular distribution (1978We08).
		342.44 7	100 35	1911.545	6^+		
		886.5[f]		1365.878	6^+		
		1110.0		1144.47	8^+		
2266.13	$2^+,3,4^+$	564.9	12	1701.40	4^+		E_γ: Value is from 2001KuZS, ^{154}Tb ε decay (9.973 h). Placement and Iγ value are from J.L. Wood (priv. comm., April, 2008).

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
2266.13	$2^+,3,4^+$	1218.58 11	174[b] 12	1047.592	4^+			Mult.: α(K)exp=0.0022 3 (1996SpZZ), which implies M1, but γ is doubly placed.
		1451.7[d] 5	35[d] 10	815.4918	2^+			I_γ: From ^{153}Gd(n,γ). Other: 82 9 from ^{154}Tb ε decay (9.973 h).
		1894.5 3	100 11	370.9998	4^+			
		2142.9 3	129 12	123.0709	2^+			I_γ: From ^{154}Tb ε decay (9.973 h); not reported in ^{153}Gd(n,γ).
2272.3	$(8^+,9^+)$	199.3		2073.30	(7^+)			
		635.0		1637.08	10^+			
2277.13	3	1012.9 3	10 2	1263.778	4^+			
		1149.66 13	98 16	1127.8018	3^+			
		1229.42 20	59 10	1047.592	4^+			
		1280.8 5	18 10	996.2568	2^+			
		1905.0 12	16 2	370.9998	4^+			
		2153.81 15	100 6	123.0709	2^+			
2293.50	$(3)^+$	44.4819 14	13 4	2249.02	(3)			
		63.732[d] 2	6.4[d] 21	2229.77	(2^+)			
		71.029 5	21.4 21	2222.48	(2^+)			
		1297.32 10	64 29	996.2568	2^+	M1	0.00249	Mult.: α(K)exp=0.0027 12 (1996SpZZ).
		1922.8 3	100 15	370.9998	4^+			
2299.39	(1,2)	2176.2[d] 2	177[d] 24	123.0709	2^+			
		2299.6 3	100 7	0.0	0^+			
2300.7	(6^+)	1253[f]		1047.592	4^+			
2302.28	(1,2)	1486.4 4	39 5	815.4918	2^+			
		2179.4 3	100 3	123.0709	2^+			
2305.79	3^+	76.015 4	10[b] 2	2229.77	(2^+)	M1	4.43	I_γ: From ^{153}Gd(n,γ). Mult.: α(M1)exp=0.23 5 (1996SpZZ), which is interpreted as M1, but γ is doubly placed.
		1041.9 2	13.2 12	1263.778	4^+			
		1053.9[d] 7	13[d] 4	1251.641	3^-			
		1177.71 19	18.1 24	1127.8018	3^+			
		1258.17 14	100 7	1047.592	4^+			
		1309.05 22	7.2 12	996.2568	2^+			
		1490.37 22	64 5	815.4918	2^+			I_γ: From ^{154}Tb ε decay. Other: 25 6 relative to $I\gamma$(1934) from ^{153}Gd(n,γ) where 1490 is multiply placed.
		1934.71 14	45 4	370.9998	4^+			
		2182.6 5	10.8 24	123.0709	2^+			
2309.47	(8^-)	171.99 4		2137.48	7^-	[M1+E2]	0.40 4	Mult.: D+Q from angular distribution (1978We08), M1+E2 from level scheme. δ: 0.543 +100−7 and −0.394 +59−72 (1978We08).
		943.0		1365.878	6^+			

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
2309.53	(2)$^+$	1262.0 3	89 10	1047.592	4$^+$			
		1313.25 17	100 22	996.2568	2$^+$	M1	0.00242	Mult.: α(K)exp=0.0020 5 (1996SpZZ).
2324.3		412.8	100	1911.545	6$^+$			
2336.02	3$^-$	922.1[df] 9	<56[d]	1414.426	1$^-$			I_γ: From ^{154}Tb ε decay (9.973 h) where it is doubly placed; in (n,γ) Iγ=62 8 but is only placed from 1294 level.
		1072.37 13	35 10	1263.778	4$^+$			I_γ: Iγ=42 5 from ^{154}Tb ε decay (9.973 h) and<32 in (n,γ) from evaluator's estimate of the intensity limit for unreported γ.
		1084.29[d] 14	<55[d]	1251.641	3$^-$			I_γ: From ^{154}Tb ε decay (9.973 h) where it is doubly placed; in (n,γ) γ is placed only from two other levels.
		1208.06 14	90 30	1127.8018	3$^+$			I_γ: Average of 63 5 from ^{154}Tb ε decay (9.973 h) and 120 12 from (n,γ).
		1288.39[d] 14	≤200[d]	1047.592	4$^+$			I_γ: Reported in ^{154}Tb ε decay (9.973 h) as doubly placed, and not reported in (n,γ).
		1339.53 23	30 10	996.2568	2$^+$			I_γ: From 36 5 from ^{154}Tb ε decay (9.973 h) and<32 from evaluator's estimate of intensity limit for unreported γ from (n,γ).
		1520.69 19	85 20	815.4918	2$^+$			I_γ: Average of values from ^{154}Tb ε decay (9.973 h) and (n,γ).
		1965.03 7	≤253	370.9998	4$^+$			I_γ: From ^{154}Tb ε decay (9.973 h), but in (n,γ) level is seen but γ is placed from 1964 level.
		2212.92 15	100 4	123.0709	2$^+$			I_γ: From ^{154}Tb ε decay (9.973 h). Other: 22 2 relative to Iγ(1208) from ^{153}Gd(n,γ).
2342.53	1,2$^+$	945.8[e] 4	≤8[e]	1397.515	2$^-$			I_γ: evaluator's estimate, based on lack of reported 945 in (n,γ).
		2219.2 4	46 6	123.0709	2$^+$			
		2342.2 3	100 7	0.0	0$^+$			
2368.87	2$^+$,3,4$^+$	1105.8 8	13 9	1263.778	4$^+$			
		1553.6 6	52 9	815.4918	2$^+$			
		1997.8 7	83 22	370.9998	4$^+$			
		2245.7 2	100 9	123.0709	2$^+$			
2381.46	0$^+$,1,2	2257.7 4	100	123.0709	2$^+$			
2386.00	4$^+$	136.979 10	0.8 3	2249.02	(3)			
		1020.26 17	19 6	1365.878	6$^+$			
		1133.5 4	38 8	1251.641	3$^-$			
		1389.6 4	34 6	996.2568	2$^+$			
		1569.8 4	21 3	815.4918	2$^+$			
		2014.9 2	100 4	370.9998	4$^+$			
		2263.3 3	59 5	123.0709	2$^+$			
2392.0	(9$^+$)	636		1756.46	8$^+$			
		1247		1144.47	8$^+$			
2401.34	1,2$^+$	1404.6[d] 3	67[d] 7	996.2568	2$^+$			Mult.: α(K)exp=0.0017 3 (1996SpZZ), which is interpreted as E2, but γ is doubly placed.
		2278.4 2	100 6	123.0709	2$^+$			
		2402.0 7	76 4	0.0	0$^+$			

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
2403.1	(4+)	1355.6 4	60 15	1047.592	4+			
		2032.0 4	100 10	370.9998	4+			
2403.8	(7+)	150.6		2254.13	(8+)			
		158.0		2245.29				
		266.0		2137.48	7−			
2406.19	2+	2035.0 8	28 4	370.9998	4+			
		2283.0 3	100 6	123.0709	2+			
		2406.5 5	35 8	0.0	0+			
2410.86	4+	105.071[d] 8	10.0[d] 19	2305.79	3+			
		1363.1[d] 3	96[d] 8	1047.592	4+			
		1693.7 4	58 13	717.663	6+			
		2287.3 3	100 8	123.0709	2+			
2416.22	4+	984.3 4	21 3	1432.588	5+			
		1152.42 9	100 14	1263.778	4+			
		1288.39[d] 14	64[d] 5	1127.8018	3+			
		1419.4 7	33 6	996.2568	2+			
2430.58	1,2+	1016.0 4	19 3	1414.426	1−			
		1033.11[e] 9	20[e] 3	1397.515	2−			
		2307.49 15	67 4	123.0709	2+			
		2430.50 10	100 6	0.0	0+			
2433.78	0+,1,2	52.322 2	5.9 20	2381.46	0+,1,2			
		257.751 18	2.8 8	2176.03	(1+)			
		2311.3 3	100 10	123.0709	2+			
2440.7		131.6		2309.47	(8−)			
		302.8		2137.48	7−			
2441.70	(1,2)	2318.8 3	100 9	123.0709	2+			
		2442.3[e] 3	71[e] 3	0.0	0+			
2449.2	(1,2)	1769.4 5	100 19	680.6673	0+			
		2448.9[d] 3	326[d] 90	0.0	0+			
2453.29	(9+)	199.18 8	65 10	2254.13	(8+)			
		379.98 8	100 15	2073.30	(7+)			
2459.4	6+,7,8+	1093.6 7	≈62	1365.878	6+			
		1315.1 7	≈62	1144.47	8+			
		1741.6 6	100 9	717.663	6+			
2459.74	2+	2089.0 3	52 6	370.9998	4+			
		2336.4 5	100 23	123.0709	2+			
		2459.4 4	38 4	0.0	0+			
2468.45	1,2+	245.97 2	6.7 7	2222.48	(2+)	(M1)	0.1628	Mult.: α(K)exp=0.27 (1996SpZZ).
		1053.9[d] 7	9[d] 4	1414.426	1−			
		2345.2 3	100 7	123.0709	2+			

$^{154}_{64}Gd_{90}$-30

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [‡#]	E_f	J^π_f	Mult. [@&]	δ [@a]	α [c]	Comments
2468.45	1,2+	2467.8 *3*	53 *12*	0.0	0+				
2475.25	(9−)	165.8 *1*	100	2309.47	(8−)	D+Q	−0.44 +*13*−*26*		Mult.: angular distribution (1978We08).
		219.6		2254.13	(8+)				
		1109.0[f]		1365.878	6+				
2482.02	2+	2111.3 *3*	82 *7*	370.9998	4+				
		2358.4 *4*	100 *13*	123.0709	2+				
		2482.0 *4*	78 *8*	0.0	0+				
2482.34	(11−)	441.3	25.9 *23*	2040.5	(9−)	E2			Mult.: DCO and linear polarization (2019Ma70). δ: δ(O/Q)=+0.08 +*31*−*21* (1978We08).
		845.2 *3*	100 *6*	1637.08	10+	D			Mult.: DCO (2019Ma70). δ: δ(Q/D)=+0.05 *5* or −0.02 *4* (1978We08).
2486.42	1,2+	2363.4 *2*	30 *3*	123.0709	2+				
		2486.25 *15*	100 *6*	0.0	0+				
2490.24	10+	471.96 *14*		2018.39	8+	E2			Mult.: DCO and linear polarization (2019Ma70).
		852.83 *15*		1637.08	10+	(M1+E2)			Mult.: DCO and linear polarization (2019Ma70).
		1345.73 *19*		1144.47	8+	E2			Mult.: DCO and linear polarization (2019Ma70).
2495.76	1,2+	61.9796 *12*	4.1 *4*	2433.78	0+,1,2				
		964.9 *3*	100 *12*	1531.305	2+				
		2372.4 *4*	39 *4*	123.0709	2+				
		2496.3 *8*	29 *12*	0.0	0+				
2499.3	2+	2128.1 *3*	45 *7*	370.9998	4+				
		2377.0 *7*	77 *5*	123.0709	2+				
		2499.8 *8*	100 *4*	0.0	0+				
2502.58	1,2+	2379.3 *2*	100 *4*	123.0709	2+				
		2503.0[d] *3*	52[d] *4*	0.0	0+				
2511.52	2	2141.8 *3*	57 *6*	370.9998	4+				
		2388.82 *18*	100 *4*	123.0709	2+				
2514.8	1,2+	2391.5 *4*	100 *11*	123.0709	2+				
		2515.0[d] *4*	117[d] *12*	0.0	0+				
2533.74	0+,1,2	92.039 *4*	4.2 *17*	2441.70	(1,2)				
		2410.0 *6*	100 *25*	123.0709	2+				
2561.3	2,3−	2190.3 *4*	100 *11*	370.9998	4+				
		2438.0 *8*	39 *17*	123.0709	2+				
2569.00	2	127.305 *3*	2.1 *3*	2441.70	(1,2)	(E2,E1)			Mult.: α(K)exp<0.45 *13* (1996SpZZ).
		2197.5 *3*	100 *21*	370.9998	4+				
		2445.1 *6*	52 *15*	123.0709	2+				
2579.66	10(−)	328.4 *2*	42	2251.3	9(−)				
		942.6 *2*	100	1637.08	10+				
2585.5	0+	2462.4 *4*	100	123.0709	2+				
2590.34	(1,2)+	470.793 *7*	22.8 *9*	2119.55	1+,2+	M1		0.0295	I_γ: From ^{153}Gd(n,γ). Other: 31 *3* from ^{154}Tb ε decay

$^{154}_{64}Gd_{90}$-31

Adopted Levels, Gammas (continued)

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

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[‡#]	E_f	J^{π}_f	Mult.[@&]	α[c]	Comments
								(21.5 h). Mult.: α(K)exp=0.030 1 (1996SpZZ).
2590.34	$(1,2)^+$	1593.4[d] 3	46[d] 5	996.2568	2^+			
		1774.4 8	22 3	815.4918	2^+			
		1909.3 3	100 8	680.6673	0^+			
		2466.9	38 11	123.0709	2^+			
		2590.5 15	7.0 22	0.0	0^+			
2603	(10^+)	846[f]		1756.46	8^+			
2616.15	$10^{(-)}$	433.0 2	73	2183.22	$8^{(-)}$			
		979.5 3	100	1637.08	10^+			
2619.51	$10^{(-)}$	144.0 2	18	2475.25	(9^-)			
		436.3 2	79	2183.22	$8^{(-)}$			
		982.4 2	100	1637.08	10^+			
2622.05	12^+	428.02 13	100	2194.12	10^+	E2		Mult.: α(K)exp=0.016 2 (1971Ri08,1972Vy04,1974Go30), which is interpreted as E2 (γ is doubly placed); DCO confirms E2 (2019Ma70).
		436.73[f] 13		2184.75	12^+	(M1+E2)		α(K)exp: 0.0220 45 (1974Go30, for 437.82γ+436.73γ) and DCO (2019Ma70).
		985.3[f] 3	16	1637.08	10^+			
2633.17	$1,2^+$	99.005	2.2	2533.74	$0^+,1,2$			
		2509.7 4	73 7	123.0709	2^+			
		2633.4 3	100 28	0.0	0^+			
2637.48	$(2)^-$	1509.2 3	100 4	1127.8018	3^+	E1	7.58×10^{-4}	Mult.: α(K)exp=0.0004 2 (1996SpZZ).
		1822.2 4	37 10	815.4918	2^+			
		2515.0[d] 4	76[d] 8	123.0709	2^+			
2655.04	2^+	1123.09[d] 16	15×10^1[d] 15	1531.305	2^+			
		1391.2 3	206 18	1263.778	4^+			
		1527.2 4	82 18	1127.8018	3^+			
		1607.0[d] 5	56[d] 21	1047.592	4^+			
		1974.3	59 29	680.6673	0^+			
		2532.2 3	56 9	123.0709	2^+			I_{γ}: From ^{154}Tb ε decay (21.5 h). Other: 84 5 from ^{153}Gd(n,γ).
		2656.0 2	100 12	0.0	0^+			
2666.2	(10^+)	414.9		2251.3	$9^{(-)}$			
2686.7	2	1871.5 3	98 7	815.4918	2^+			
		2314.3 7	100 33	370.9998	4^+			
2695.4		221.0		2475.25	(9^-)			
		886.5[f]		1810.22	7^+			
		1088.1		1606.51	6^+			
2699.4	$0^+,1,2$	1703.1 4	100	996.2568	2^+			

$^{154}_{64}Gd_{90}$-32

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[‡#]	E_f	J^{π}_f	Mult.[@&]	Comments
2710.1	(11$^+$)	318		2392.0	(9$^+$)		
		516		2194.12	10$^+$		
		1073		1637.08	10$^+$		
2710.5	1,2$^+$	2587.2 4	100 8	123.0709	2$^+$		
		2710.7 5	31 5	0.0	0$^+$		
2721.5		246.2	100	2475.25	(9$^-$)		
2722.35	1,2$^+$	602.67 24	13 2	2119.55	1$^+$,2$^+$		
		1191.2[d,f] 8	47[d] 15	1531.305	2$^+$		
		1324.9 4	59 4	1397.515	2$^-$		
		1675.1 3	47 5	1047.592	4$^+$		I_γ: From ^{153}Gd(n,γ) relative to Iγ(1907), but not reported from ^{154}Tb ε decay.
		1907.0 3	68 5	815.4918	2$^+$		
		2041.1[d] 3	100[d] 5	680.6673	0$^+$		
		2599.1[d] 6	13[d] 2	123.0709	2$^+$		
		2722.8 4	6.2 5	0.0	0$^+$		I_γ: From ^{154}Tb ε decay (21.5 h). Other: 32 4 from ^{153}Gd(n,γ) relative to Iγ(1907).
2734.30	1$^+$,2$^+$	1607.0[d] 5	21[d] 8	1127.8018	3$^+$		I_γ: From ^{154}Tb ε decay (21.5 h). Other: 75 27 from ^{153}Gd(n,γ).
		1737.9 4	100 3	996.2568	2$^+$		
		2611.0 3	15 7	123.0709	2$^+$		I_γ: From ^{154}Tb ε decay (21.5 h). Other: 88 4 from ^{153}Gd(n,γ).
		2734.7 6	4.4 22	0.0	0$^+$		I_γ: From ^{154}Tb ε decay (21.5 h). Other: 63 7 from ^{153}Gd(n,γ).
2735.9		260.6		2475.25	(9$^-$)		
		695.5		2040.5	(9$^-$)		
2741.5	2$^+$,3$^-$	2370.5 4	100 13	370.9998	4$^+$		
		2618.3 4	77 6	123.0709	2$^+$		
2744.1	0$^+$	2621.0 4	100	123.0709	2$^+$		
2746.49	11$^+$	495.16 15		2251.38	9$^+$	(E2)	Mult.: linear polarization (2019Ma70).
		1109.33 18		1637.08	10$^+$	M1+E2	Mult.: DCO and linear polarization (2019Ma70).
2775.51	11$^{(-)}$	155.6 2	100	2619.51	10$^{(-)}$		
		159.6 2	34	2616.15	10$^{(-)}$		
		300.4 4	21	2475.25	(9$^-$)		
2777.41	14$^+$	592.6 1	100	2184.75	12$^+$	E2	Mult.: DCO and linear polarization (2019Ma70).
2779.9	(7,8,9$^+$)	469.9	100	2309.47	(8$^-$)		
		525.4		2254.13	(8$^+$)		
		707.5		2073.30	(7$^+$)		
2784.731	(7$^-$,8$^+$)	314.2		2475.25	(9$^-$)		
		873.1834[d] 23	198[d] 10	1911.545	6$^+$		I_γ: Most of this intensity is for γ from 996 level.
		1421.3	100.0 21	1365.878	6$^+$		
2788.46	1,2$^+$	1068.78 7	35 12	1719.5593	2$^-$		I_γ: From ^{153}Gd(n,γ); not reported in ^{154}Tb ε decay (21.5 h).
		1374.2 3	74 6	1414.426	1$^-$		I_γ: From ^{154}Tb ε decay (21.5 h). Other: 26 4 from ^{153}Gd(n,γ).

$^{154}_{64}Gd_{90}$-33

$^{154}_{64}Gd_{90}$-34

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

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
2788.46	1,2$^+$	1391.04 *11*	57 *5*	1397.515	2$^-$			I_γ: From ^{153}Gd(n,γ). Other: 72 *6* for doublet from ^{154}Tb ε decay (21.5 h).
		1792.6 *3*	24 *3*	996.2568	2$^+$			
		1973.1[d] *4*	16[d] *3*	815.4918	2$^+$			
		2108.3 *3*	46 *4*	680.6673	0$^+$			
		2666.0 *5*	60 *5*	123.0709	2$^+$			
		2788.7 *5*	100 *7*	0.0	0$^+$			
2850.3	2$^+$	1802.5 *3*	62 *6*	1047.592	4$^+$			
		2727.8 *9*	94 *6*	123.0709	2$^+$			I_γ: From ^{153}Gd(n,γ). Other: 50 *17* from ^{154}Tb ε decay (21.5 h).
		2851.2 *9*	100 *17*	0.0	0$^+$			
2872.39	2$^+$	1631.2 *3*	48 *5*	1241.291	1$^-$			
		1824.7 *6*	38 *17*	1047.592	4$^+$			
		2499.8 *8*	433 *89*	370.9998	4$^+$			I_γ: Includes contribution from 2499 γ from 2499 level.
		2750 *1*	100 *33*	123.0709	2$^+$			
		2873.1 *10*	73 *5*	0.0	0$^+$			
2934.2	1$^+$	1693	1.7 *1*	1241.291	1$^-$	[E1]	7.99×10^{-4} *11*	B(E1)(W.u.)=2.76×10^{-4} *+40−30* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		1752	2.5 *3*	1182.091	0$^+$	[M1]	1.43×10^{-3} *2*	B(M1)(W.u.)=0.034 *+6−5* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		1938	0.5 *5*	996.2568	2$^+$			E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2119	0.5 *5*	815.4918	2$^+$			E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2253	2.7 *1*	680.6673	0$^+$	[M1]	1.17×10^{-3} *2*	B(M1)(W.u.)=0.0174 *+24−17* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2811.3 *10*	36.3 *4*	123.0709	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)(W.u.)=0.120 *+16−11* E_γ: From ^{153}Gd(n,γ), Eγ=2809.8 *4*, but this is not in agreement with Eγ to the ground state. I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX). Other: 87 *7* from ^{153}Gd(n,γ).
		2934.1 *6*	100.0 *1*	0.0	0$^+$	[M1]	1.23×10^{-3} *2*	B(M1)(W.u.)=0.292 *+38−27* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
2949.29	(1$^+$)	835.54 *3*	69[b] *4*	2113.74	2$^+$			Mult.: α(K)exp=0.0026 *3* (1996SpZZ), which is interpreted as M1, but γ is doubly placed.
		1709	3.1 *11*	1241.291	1$^-$	[E1]	8.04×10^{-4} *11*	B(E1)(W.u.)=1.4×10^{-4} *+7−5* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		1768	4.9 *18*	1182.091	0$^+$	[M1]	1.42×10^{-3} *2*	B(M1)(W.u.)=0.018 *+9−7* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		1954	4.0 *2*	996.2568	2$^+$	[M1]	1.27×10^{-3} *2*	B(M1)(W.u.)=0.0109 *+33−21* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2135	3.6 *1*	815.4918	2$^+$	[M1]	1.19×10^{-3} *2*	B(M1)(W.u.)=0.0075 *+22−14* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).

From ENSDF

$^{154}_{64}Gd_{90}$-34

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

E_i(level)	J_i^π	E_γ[†]	I_γ[‡#]	E_f	J_f^π	Mult.[@&]	α[c]	Comments
2949.29	(1$^+$)	2269	1.6 *5*	680.6673	0$^+$	[M1]	1.17×10^{-3} *2*	B(M1)(W.u.)=0.0028 *+13−10* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2578.5[f] *5*	39 *7*	370.9998	4$^+$			E_γ,I_γ: from ^{153}Gd(n,γ) (1996SpZZ).
		2826.0 *6*	124 *13*	123.0709	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)(W.u.)=0.112 *+33−22* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX; authors normalized this branching ratio to 100 for 2949.5γ). Others: 47 *4* from ^{153}Gd(n,γ) (1996SpZZ).
		2949.5 *5*	100 *4*	0.0	0$^+$	[M1]	1.23×10^{-3} *2*	B(M1)(W.u.)=0.079 *+24−15* I_γ: From ^{153}Gd(n,γ). Others: 100 *11* from ^{154}Tb ε decay (21.5 h) (2014BeZX).
2950.71	12$^{(-)}$	371.1 *2*	100	2579.66	10$^{(-)}$			
		765.9 *2*	27	2184.75	12$^+$			
2955.80	12$^{(-)}$	180.3 *1*	100	2775.51	11$^{(-)}$			
		336.0 *2*	40	2619.51	10$^{(-)}$			
		339.7 *4*	28	2616.15	10$^{(-)}$			
2964.4	(12$^+$)	343[f]		2621.4	(10$^-$)			Based on ΔJ^π(levels) this could be a M2 transitions.
		770		2194.12	10$^+$			
		779		2184.75	12$^+$			
2981.35	13$^{(-)}$	498.9 *3*		2482.34	(11$^-$)			
		796.6 *2*		2184.75	12$^+$			
2989.89	1,2$^+$	653.8[d] *5*	6[d] *3*	2336.02	3$^-$			
		1458.4 *2*	100 *6*	1531.305	2$^+$			
		1808.0 *3*	157 *9*	1182.091	0$^+$			I_γ: From ^{153}Gd(n,γ); not reported in ^{154}Tb ε decay (21.5 h).
		2175 *1*	0.9 *5*	815.4918	2$^+$			
		2866.8 *7*	18.3 *14*	123.0709	2$^+$			I_γ: From ^{154}Tb ε decay (21.5 h). Other: 53 *13* from ^{153}Gd(n,γ).
		2990.3 *5*	30.3 *18*	0.0	0$^+$			I_γ: From ^{154}Tb ε decay (21.5 h). Other: 183 *13* from ^{153}Gd(n,γ).
3009.7	1,2$^+$	2887.1 *8*	27 *6*	123.0709	2$^+$			
		3009.6 *4*	100 *6*	0.0	0$^+$			
3011.11	12$^+$	520.73 *12*		2490.24	10$^+$			
		826.3 *14*		2184.75	12$^+$			
		1374.35 *18*		1637.08	10$^+$			
3022.73	2$^+$	536.11 *21*	168 *23*	2486.42	1,2$^+$			
		653.8[d] *5*	12[d] *2*	2368.87	2$^+$,3,4$^+$			
		1771.7 *5*	32 *6*	1251.641	3$^-$			
		1781.4 *3*	48 *4*	1241.291	1$^-$			
		2651.0 *7*	36 *14*	370.9998	4$^+$			
		2900.4 *6*	56 *8*	123.0709	2$^+$			
		3023.0 *4*	100 *4*	0.0	0$^+$			
3027.41	14$^+$	405.6 *2*	100	2622.05	12$^+$	E2		Mult.: DCO and linear polarization (2019Ma70).

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	Mult.[@&]	α[c]	Comments
3027.41	14$^+$	842.6		2184.75	12$^+$			I_γ: 25 *3* and<12 from Sm(α,xnγ).
3031.5	1,2$^+$	2908.2 *3*	48 *12*	123.0709	2$^+$			
		3032.1 *5*	100 *10*	0.0	0$^+$			
3090.3	1$^+$	1908	14.6 *26*	1182.091	0$^+$	[M1]	1.30×10^{-3} *2*	B(M1)(W.u.)=0.131 *+39−30* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2275	6.0 *4*	815.4918	2$^+$	[M1]	1.17×10^{-3} *2*	B(M1)(W.u.)=0.032 *+8−6* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2409	7.1 *7*	680.6673	0$^+$	[M1]	1.16×10^{-3} *2*	B(M1)(W.u.)=0.032 *+8−6* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2967.6 *15*	49.3 *4*	123.0709	2$^+$	[M1]	1.23×10^{-3} *2*	B(M1)(W.u.)=0.117 *+29−20* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		3090.5 *10*	100.0 *2*	0.0	0$^+$	[M1]	1.26×10^{-3} *2*	B(M1)(W.u.)=0.21 *+5−4* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
3122.59	1$^+$	2127	26 *2*	996.2568	2$^+$	[M1]	1.20×10^{-3} *2*	B(M1)(W.u.)=0.057 *+46−20* E_γ,I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2442.3[e] *3*	2.1[e] *5*	680.6673	0$^+$	[M1]	1.16×10^{-3} *2*	B(M1)(W.u.)=0.0031 *+26−12* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		2998.7 *4*	64.2 *4*	123.0709	2$^+$	[M1]	1.24×10^{-3} *2*	B(M1)(W.u.)=0.050 *+40−17* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
		3122.2 *15*	100.0 *9*	0.0	0$^+$	[M1]	1.27×10^{-3} *2*	B(M1)(W.u.)=0.07 *+6−2* I_γ: from ^{154}Tb ε decay (21.5 h) (2014BeZX).
3136.3	(13$^+$)	426		2710.1	(11$^+$)			
		951		2184.75	12$^+$			
3153.1		712.4		2440.7				
		843.6	100	2309.47	(8$^-$)			
3154.8		845.3 *4*	100	2309.47	(8$^-$)			
3158.86	13$^{(-)}$	203.0 *1*		2955.80	12$^{(-)}$			
		383.4 *1*		2775.51	11$^{(-)}$			
3162.7	1,2$^+$	3039.4 *15*	100 *40*	123.0709	2$^+$			
		3163 *2*	100 *60*	0.0	0$^+$			
3184.06	1,2$^+$	1786.5 *3*	84 *7*	1397.515	2$^-$			
		2503.0[d] *3*	106[d] *8*	680.6673	0$^+$			
		2813.5 *4*	100 *7*	370.9998	4$^+$			
		3061.3 *7*	44 *6*	123.0709	2$^+$			
		3185.0 *10*	17 *3*	0.0	0$^+$			I_γ: From Iγ(3185)/Iγ(3061) from ^{154}Tb ε decay (21.5 h).
3264.42	1,2$^+$	2082.4 *3*	249 *15*	1182.091	0$^+$			I_γ: From ^{153}Gd(n,γ).
		2448.9[d] *3*	154[d] *43*	815.4918	2$^+$			I_γ: From ^{153}Gd(n,γ).
		3141.0 *10*	150 *30*	123.0709	2$^+$			I_γ: From ^{154}Tb ε decay (21.5 h).
		3263.8 *10*	100 *10*	0.0	0$^+$			

$^{154}_{64}$Gd$_{90}$-36

γ(^{154}Gd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡#]	E$_f$	J$^\pi_f$	Mult.[@&]	α[c]	Comments
3284.91	13$^+$	538.42 *19*		2746.49	11$^+$	E2		Mult.: DCO and linear polarization (2019Ma70).
		1100.0 *12*		2184.75	12$^+$	D+Q		Mult.: DCO (2019Ma70).
3294.2	1,2$^+$	3170.8 *10*	92 *15*	123.0709	2$^+$			
		3294.4 *10*	100 *20*	0.0	0$^+$			
3327.32	1,2$^+$	2646.6 *2*	100 *9*	680.6673	0$^+$			
		3205 *2*	1.9 *9*	123.0709	2$^+$			
		3328.3 *15*	6 *4*	0.0	0$^+$			
3345.9	1,2$^+$	3222.9 *15*	53 *21*	123.0709	2$^+$			
		3345.8 *13*	100 *19*	0.0	0$^+$			
3350.7	1,2$^+$	3227.6 *10*	100 *18*	123.0709	2$^+$			
		3350.7 *15*	50 *13*	0.0	0$^+$			
3363.6	(2$^+$)	2546.9 *8*	44 *22*	815.4918	2$^+$			
		2683.4 *5*	100 *9*	680.6673	0$^+$			
		3240.4 *15*	28 *9*	123.0709	2$^+$			
3384.1	14$^{(-)}$	225.3 *2*		3158.86	13$^{(-)}$			
		428.2 *5*		2955.80	12$^{(-)}$			
3404.56	16$^+$	627.1 *1*	100	2777.41	14$^+$	E2	0.00786	Mult.: α(K)exp=0.006 *2* (1974Go30); DCO and linear polarization (2019Ma70).
3414.76	1,2$^+$	2232.9 *4*	89 *13*	1182.091	0$^+$			
		2599.1[d] *4*	306[d] *99*	815.4918	2$^+$			
		2734.2[d] *8*	44[d] *22*	680.6673	0$^+$			
		3291.6 *3*	100 *14*	123.0709	2$^+$			
		3414.5 *9*	99 *15*	0.0	0$^+$			
3428.1	14$^{(-)}$	477.4 *2*	100	2950.71	12$^{(-)}$			
3469.3	(14$^+$)	442		3027.41	14$^+$			
		505		2964.4	(12$^+$)			
		847		2622.05	12$^+$			
3490.96	16$^+$	463.6 *1*	100	3027.41	14$^+$	E2		Mult.: DCO (2019Ma70).
		713.5 *2*	≈40	2777.41	14$^+$			I$_\gamma$: 31 *3* and 71 *16* from Sm(α,xnγ).
3517.18	(3$^+$,4$^+$)	1330.8 *6*	30 *10*	2185.869	4$^-$			
		2084.7 *3*	63 *6*	1432.588	5$^+$			
		2251.8 *7*	40 *20*	1263.778	4$^+$			
		2389.5 *2*	100 *10*	1127.8018	3$^+$			
		2520.8 *10*	10 *5*	996.2568	2$^+$			
3519.16	(15$^-$)	537.8 *1*	65	2981.35	13$^{(-)}$			
		741.8 *2*	100	2777.41	14$^+$			
3550.3	2$^+$,3,4$^+$	2422.6 *4*	73 *5*	1127.8018	3$^+$			
		2553.8 *4*	100 *5*	996.2568	2$^+$			
3563.8	(14$^+$)	553		3011.11	12$^+$			
		1379		2184.75	12$^+$			
3599.2		444.4 *4*	100	3154.8				

$^{154}_{64}$Gd$_{90}$-37

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

E_i(level)	J^π_i	E_γ†	I_γ‡#	E_f	J^π_f	Comments
3629.56	$15^{(-)}$	245.4 *4*		3384.1	$14^{(-)}$	
		470.7 *1*		3158.86	$13^{(-)}$	
3674.8	(15^+)	539		3136.3	(13^+)	
		897		2777.41	14^+	
3852.9	(15^+)	568		3284.91	13^+	
3894.47	$16^{(-)}$	264.9 *1*	52	3629.56	$15^{(-)}$	
		510.5 *6*	100	3384.1	$14^{(-)}$	
3907.4	(16^+)	880		3027.41	14^+	
3987.4	$16^{(-)}$	559.3 *2*	100	3428.1	$14^{(-)}$	
4016.22	(18^+)	525.3 *1*	71	3490.96	16^+	I_γ: From ^{150}Nd(^{9}Be,5nγ); $I\gamma$=83 from Sm(α,xnγ).
		611.5 *2*	100	3404.56	16^+	
4087.26	(18^+)	596.3 *3*	32	3490.96	16^+	
		682.7 *2*	100	3404.56	16^+	
4099.3		500.1 *2*		3599.2		
4102.1	(17^-)	582.9 *2*	100	3519.16	(15^-)	
4146.4	(16^+)	583		3563.8	(14^+)	
		656		3490.96	16^+	
		741		3404.56	16^+	
4176.5	$17^{(-)}$	282.0 *2*	46	3894.47	$16^{(-)}$	
		547.1 *6*	100	3629.56	$15^{(-)}$	
4290.7	(17^+)	616		3674.8	(15^+)	
		886		3404.56	16^+	
4422.0	(18^+)	931		3490.96	16^+	
4473.9	(17^+)	621		3852.9	(15^+)	
4475.0	$18^{(-)}$	298.6 *3*	43	4176.5	$17^{(-)}$	
		580.5 *2*	100	3894.47	$16^{(-)}$	
4595.2	$18^{(-)}$	607.8 *2*	100	3987.4	$16^{(-)}$	
4646.42	(20^+)	630.2 *1*	100	4016.22	(18^+)	
4656.0		556.7 *5*		4099.3		
4735.6	(19^-)	633.5 *2*	100	4102.1	(17^-)	
4782.5	(20^+)	695.2 *2*	100	4087.26	(18^+)	
4788.7	$19^{(-)}$	313.7 *2*	39	4475.0	$18^{(-)}$	
		612.2 *2*	100	4176.5	$17^{(-)}$	
5116.5	$20^{(-)}$	327.9 *3*		4788.7	$19^{(-)}$	
		641.5 *2*		4475.0	$18^{(-)}$	
5209.3	$20^{(-)}$	614.1 *6*	100	4595.2	$18^{(-)}$	
5254.3		598.3 *5*		4656.0		
5350.0	(22^+)	703.6 *2*	100	4646.42	(20^+)	
5415.9	$21^{(-)}$	680.3 *3*	100	4735.6	(19^-)	
5457.6	$21^{(-)}$	341.2*f* *3*		5116.5	$20^{(-)}$	

$^{154}_{64}$Gd$_{90}$-38

Adopted Levels, Gammas (continued)

γ(^{154}Gd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f	E_i(level)	J^π_i	E_γ[†]	I_γ[‡#]	E_f	J^π_f
5457.6	$21^{(-)}$	668.9 *3*		4788.7	$19^{(-)}$	6535.6	(24^-)	687.1 *4*	100	5848.5	(22^-)
5519.7	(22^+)	737.2 *1*	100	4782.5	(20^+)	6555.5	(24^-)	744.5 *3*		5811.0	(22^-)
5811.0	(22^-)	694.5 *2*	100	5116.5	$20^{(-)}$	6883.3?	(25^-)	747.1[f] *3*		6136.3	(23^-)
5848.5	(22^-)	639.2 *3*	100	5209.3	$20^{(-)}$	6946.1?	(25^-)	768.1[f] *4*		6178.1	(23^-)
5889.4?		635.1[f] *5*		5254.3		6955.1	(26^+)	833.4 *4*	100	6121.7	(24^+)
6121.7	(24^+)	771.7 *2*	100	5350.0	(22^+)	7055.7	(26^+)	761.4 *3*	100	6294.3	(24^+)
6136.3	(23^-)	720.4 *3*	100	5415.9	$21^{(-)}$	7274.0?	(26^-)	738.4[f] *4*		6535.6	(24^-)
6178.1	(23^-)	720.5 *3*		5457.6	$21^{(-)}$	7353.1?	(26^-)	797.7[f] *4*		6555.5	(24^-)
6294.3	(24^+)	774.6 *3*	100	5519.7	(22^+)						

† Where the γ is seen in both the ^{154}Eu β^- decay and the ^{153}Gd(n,γ) reaction, the Eγ value is generally taken from the latter study, unless noted otherwise. In other cases, the values are from a combination of all available values. ^{154}Eu is a commonly used source for calibration of γ-ray detectors. A careful analysis and evaluation of the available Eγ data on the prominent γ's from the Eu β^- decay has been carried out by 2000He14. Where available, these data are adopted in this evaluation.

‡ Where the γ is seen in the ^{154}Eu decay, the Iγ values are generally taken from those data. In other cases, they are from the combination of all available values. The uncertainties in those from the ^{153}Gd(n,γ) study include only the statistical component. Significant differences between values from the various reactions and decays are noted.

For some of the Iγ values from ^{153}Gd(n,γ), which are marked as "multiply placed − intensity undivided", the second placement is in another isotope.

@ Values include the results from all types of experiments. Multipolarities and mixing ratios have been obtained from $\gamma\gamma(\theta)$ and $\gamma(\theta)$ measurements in ^{152}Sm(α,2nγ) (1978We08, 2019Ma70) and β^- decay of ^{154}Eu (1960De16,1969Ha01,1969Ha36,1969Va09,1970Ru09, 1971La11,1971Wh01,1972Go35,1973Ob01,1977Gu10,1983Gi07,1983Le19,1992Ak03 ,1996Al31) as well as from α values obtained from the γ intensities and the relative ce intensities in the ^{154}Sm(α,4nγ) reaction (1974Go30), ^{154}Tb ε decay (1971Ri08,1972Vy04,1977Ya04), ^{154}Eu β^- decay (1968Br20,1968Ha28,1968Ng01,1969An01,1971Ru05,1972Na21), and ^{153}Gd(n,γ) (1996SpZZ).

& See ^{150}Nd(^{9}Be,5nγ) for additional multipolarity assignments, deduced by evaluator, but not adopted.

a Although several of these references do not state the convention used for the sign of δ, the evaluator has tried to convert them all to the Nuclear Data Sheets convention. The signs were not changed for 1973Ob01, 1977Gu10, 1978We08, 1989Ki10; the signs were changed for 1969Ha01, 1969Ha36, 1969HaZJ, 1969Va09, 1970Ru09, 1971La11, 1971Wh01, 1972Go35, and 1982Da11.

b Value is from (n,γ) and includes contribution from ^{153}Gd.

c Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

d Multiply placed with undivided intensity.

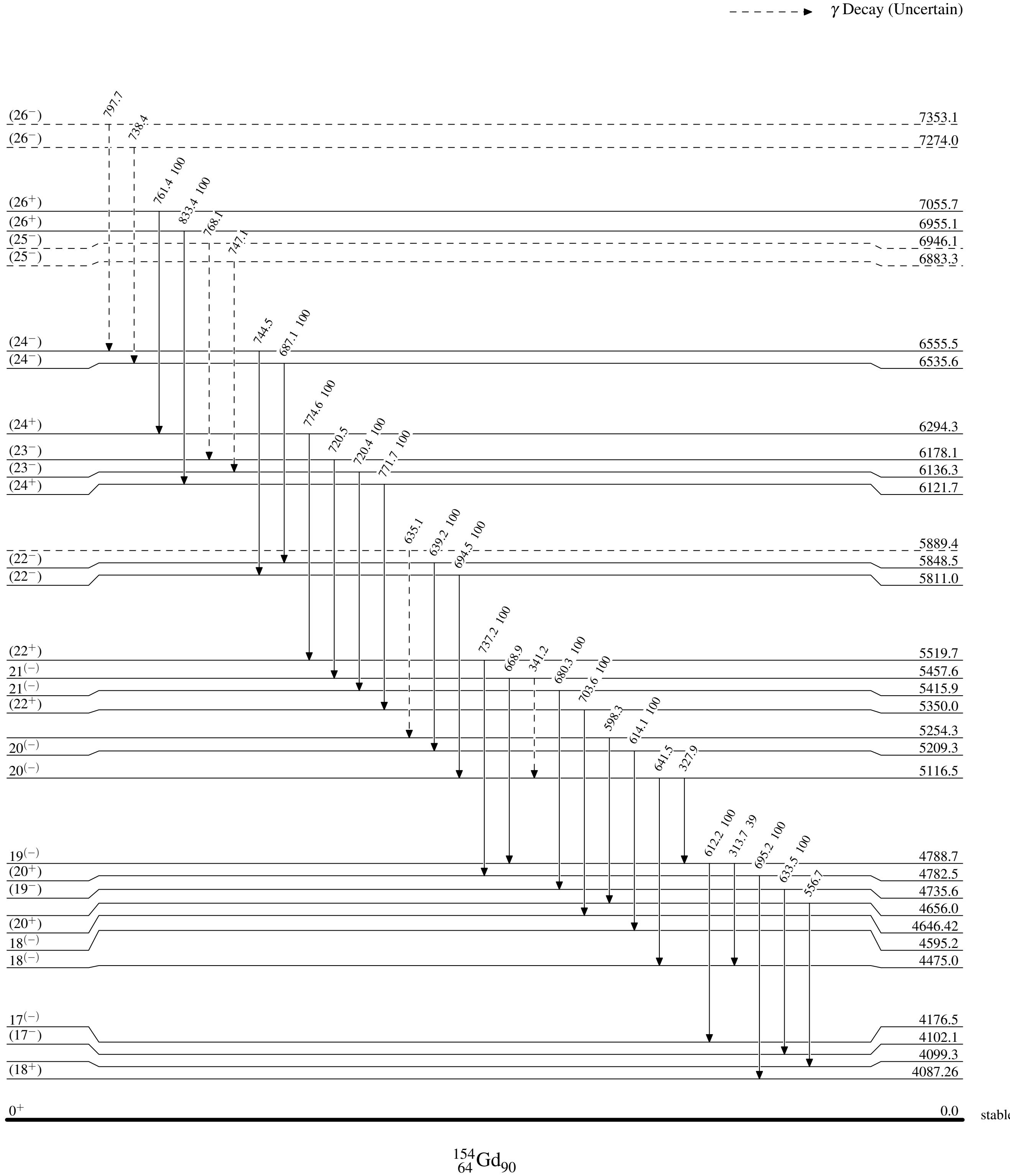
e Multiply placed with intensity suitably divided.

f Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

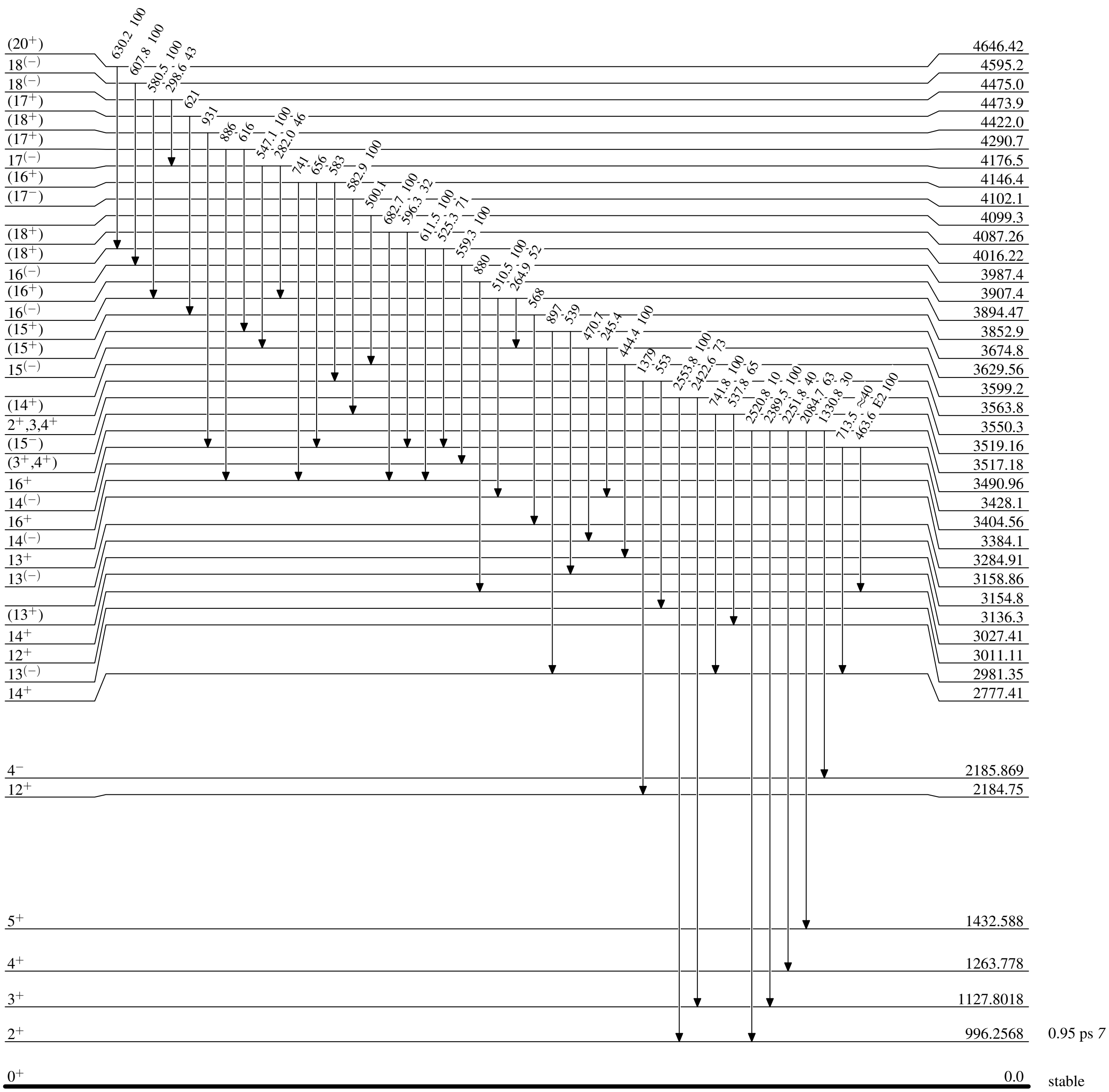
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

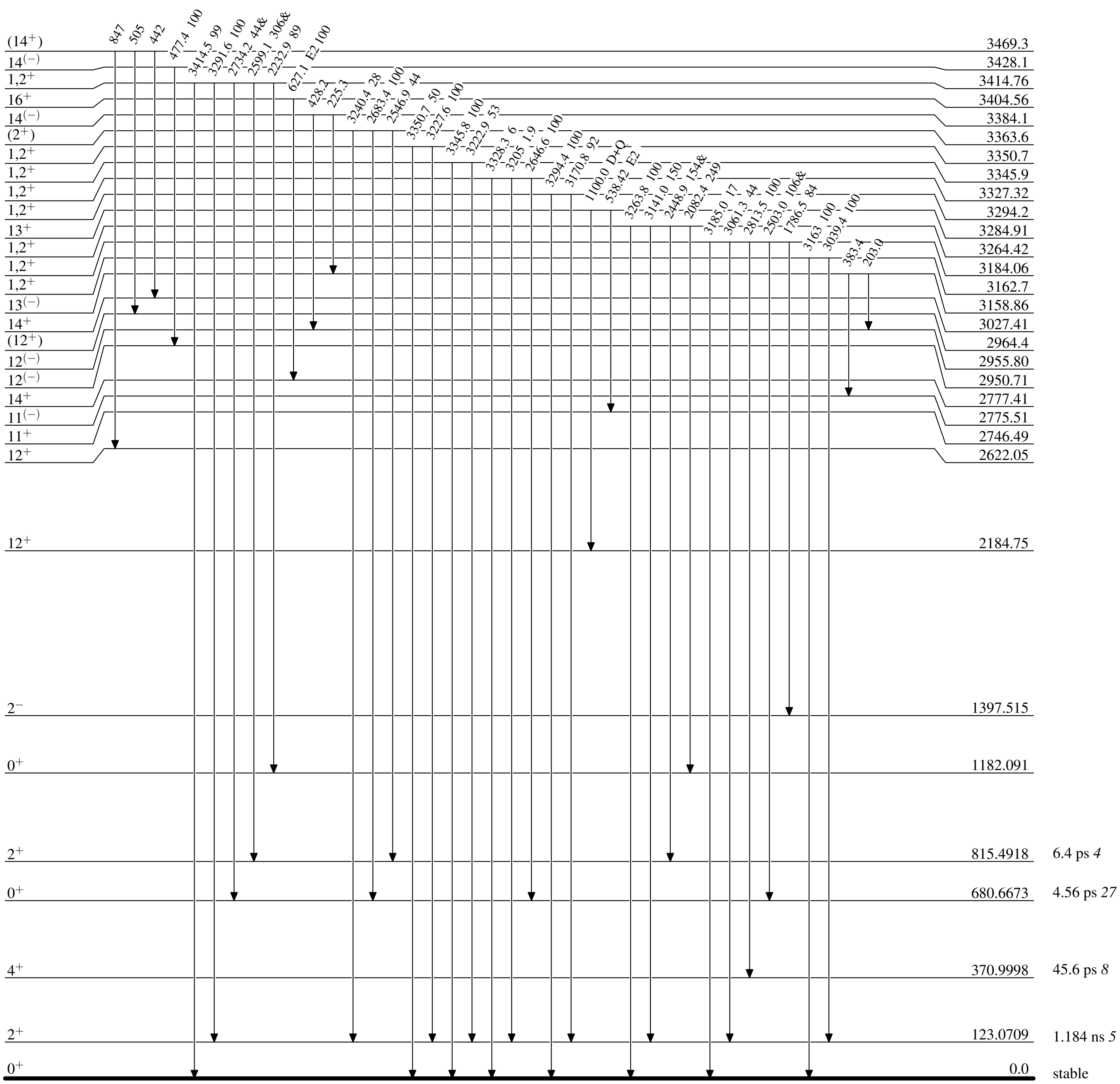


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

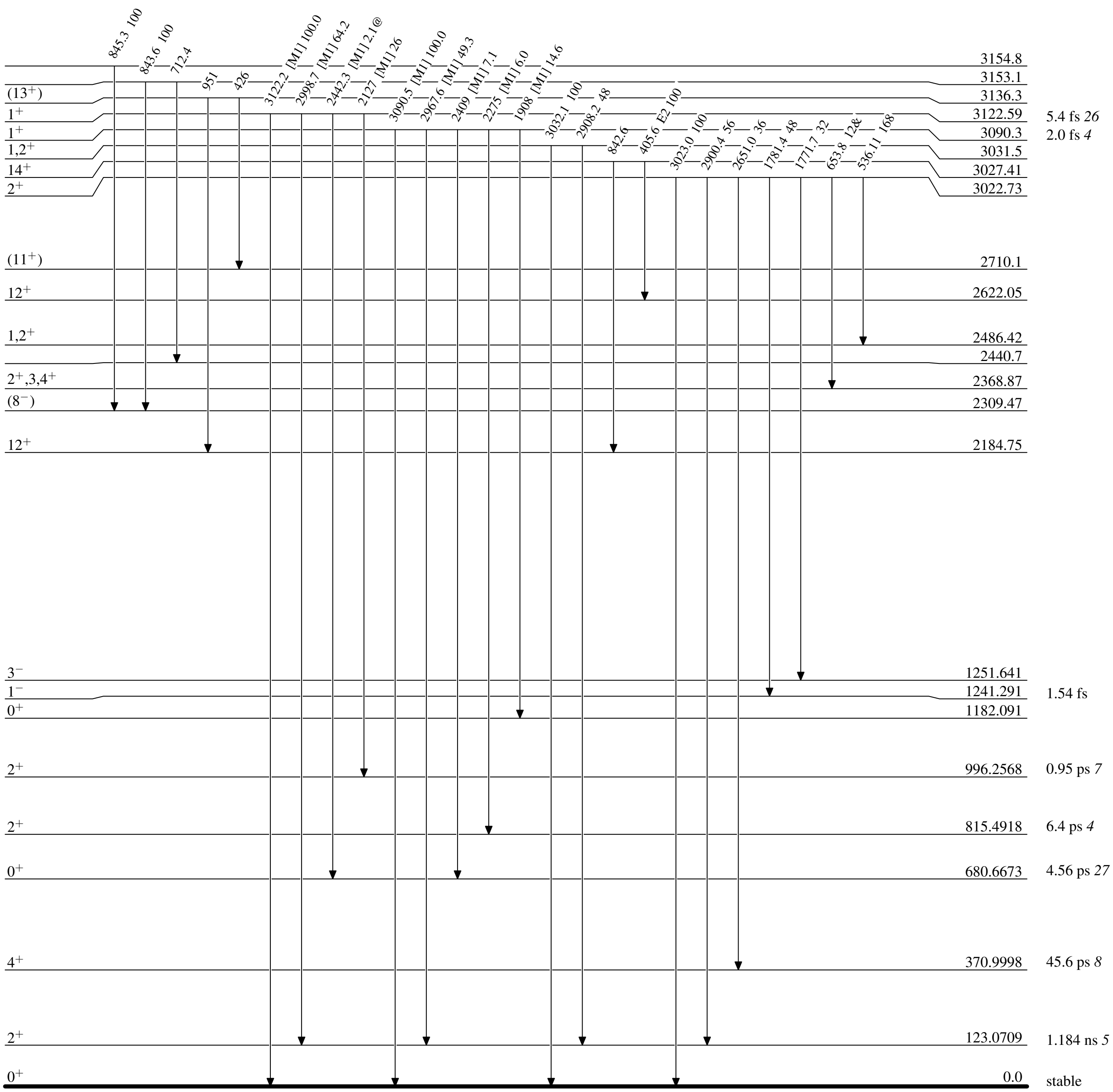


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

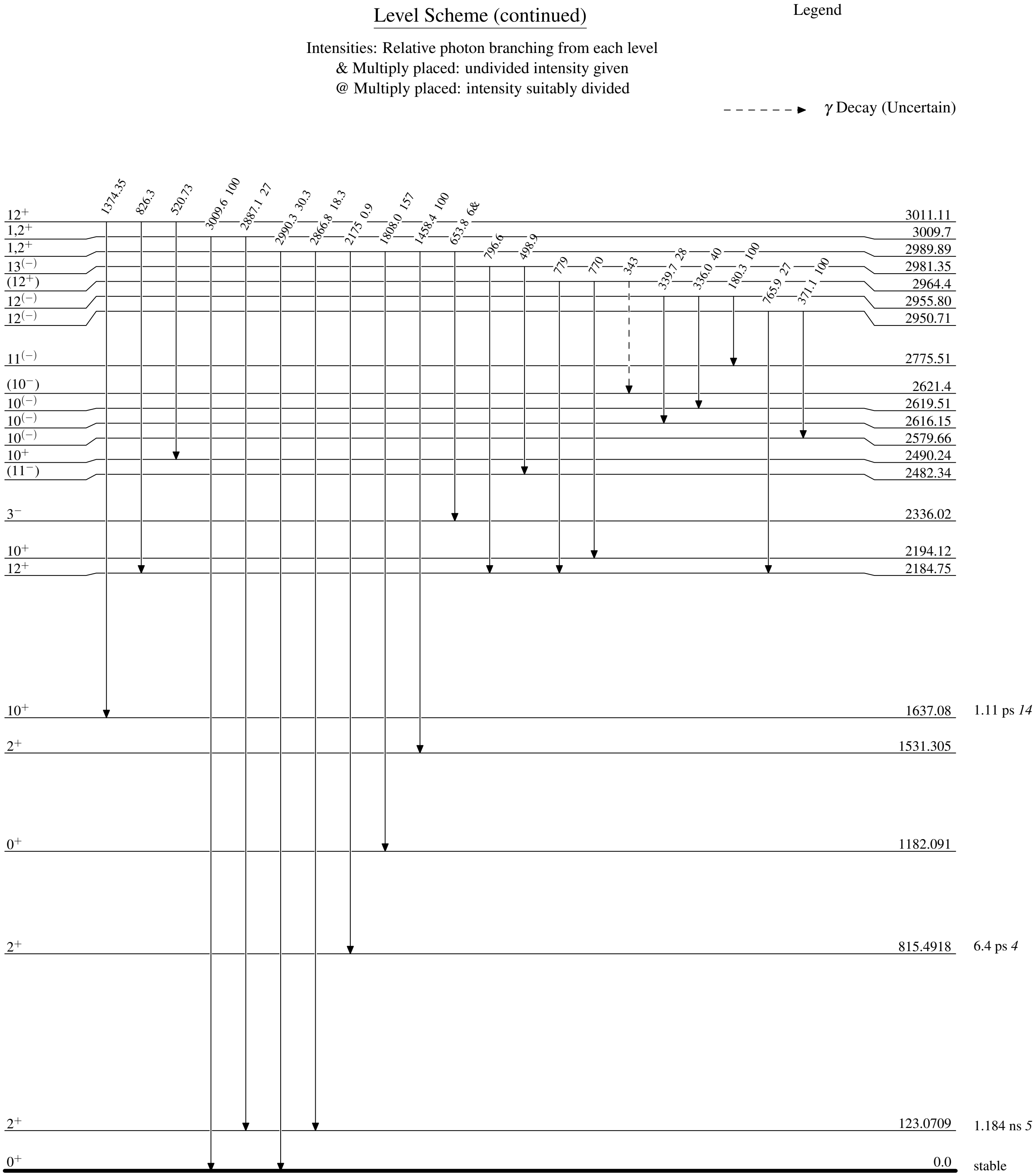


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

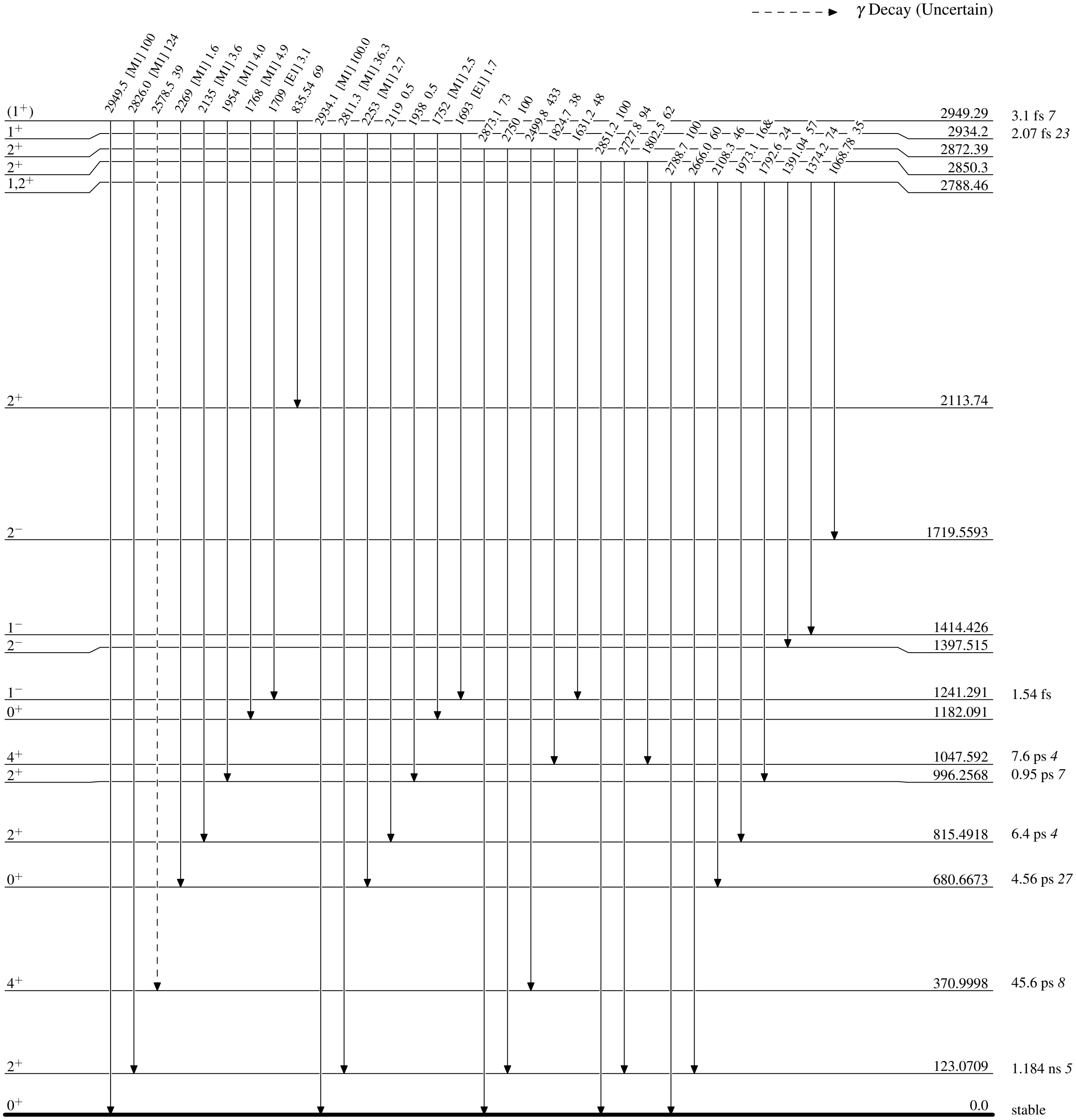


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

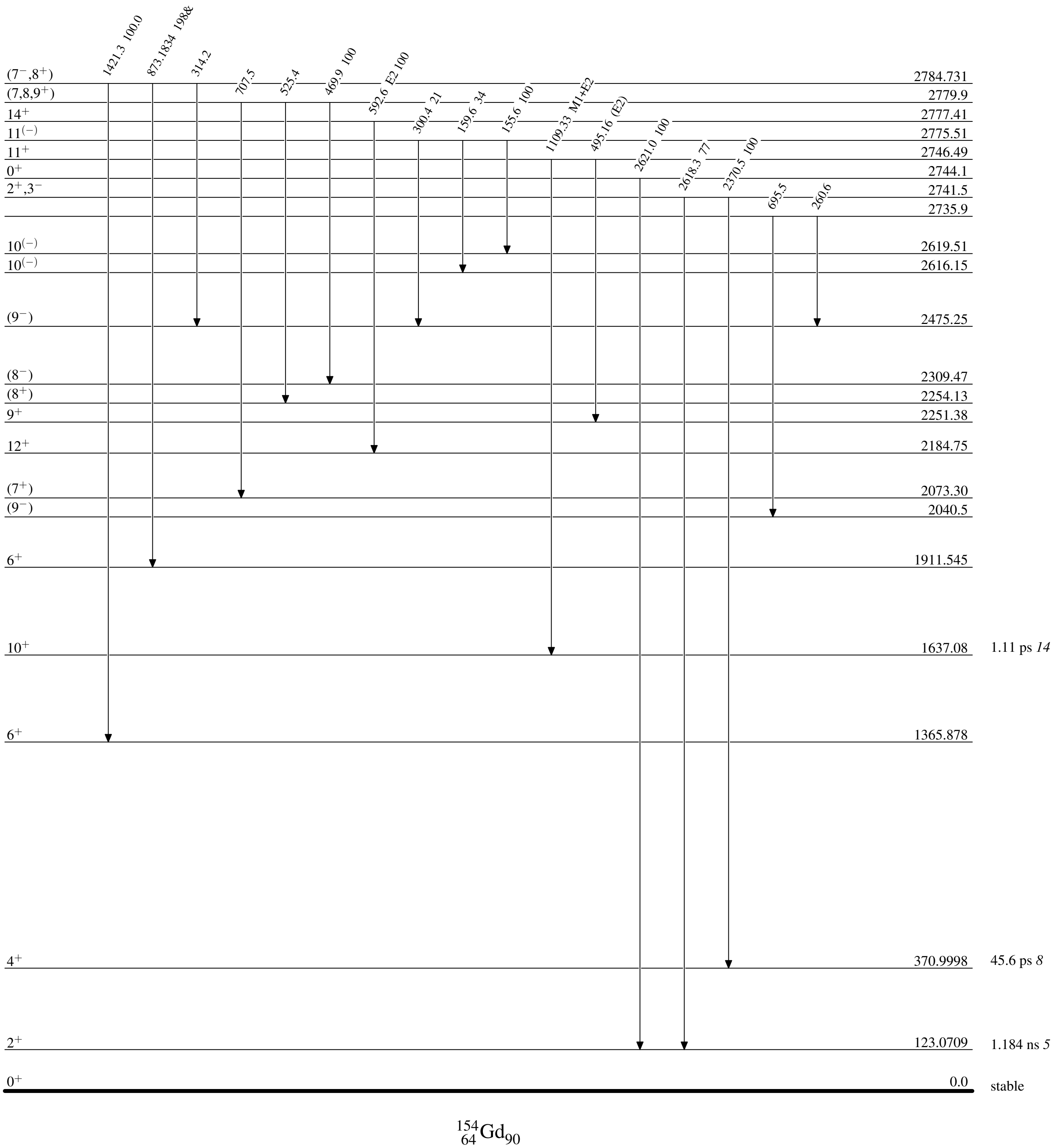


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

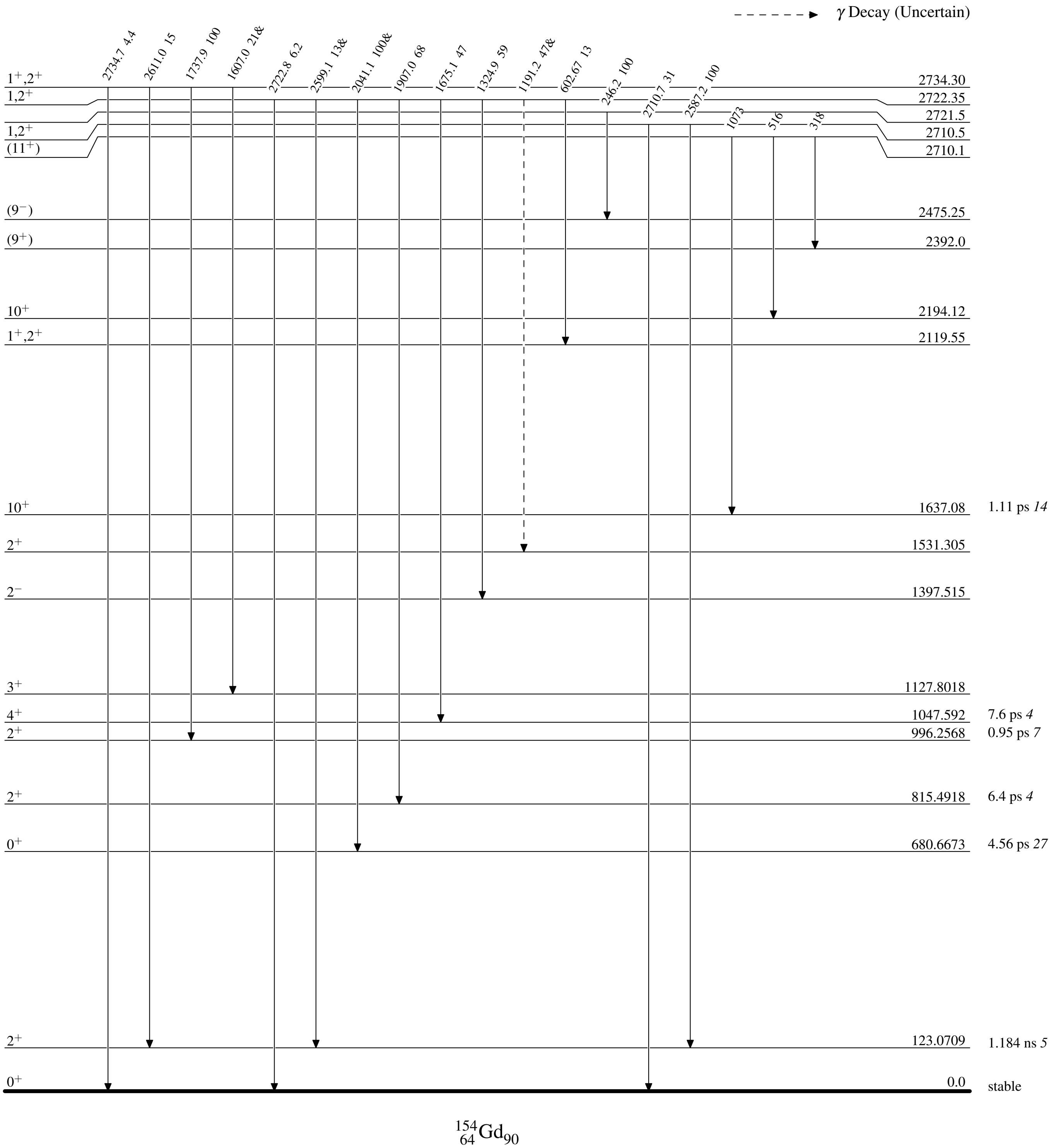


Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend



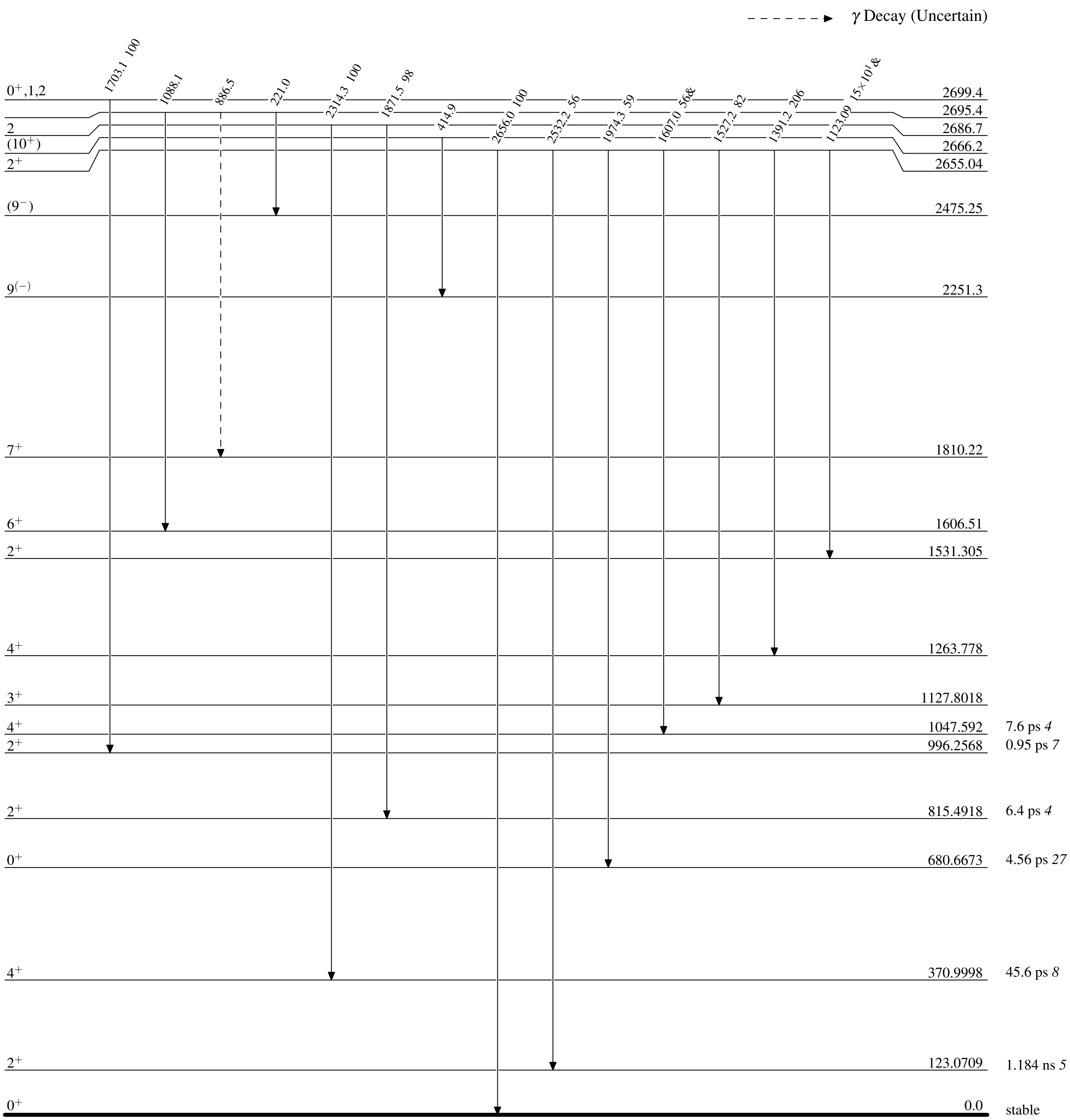
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend



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

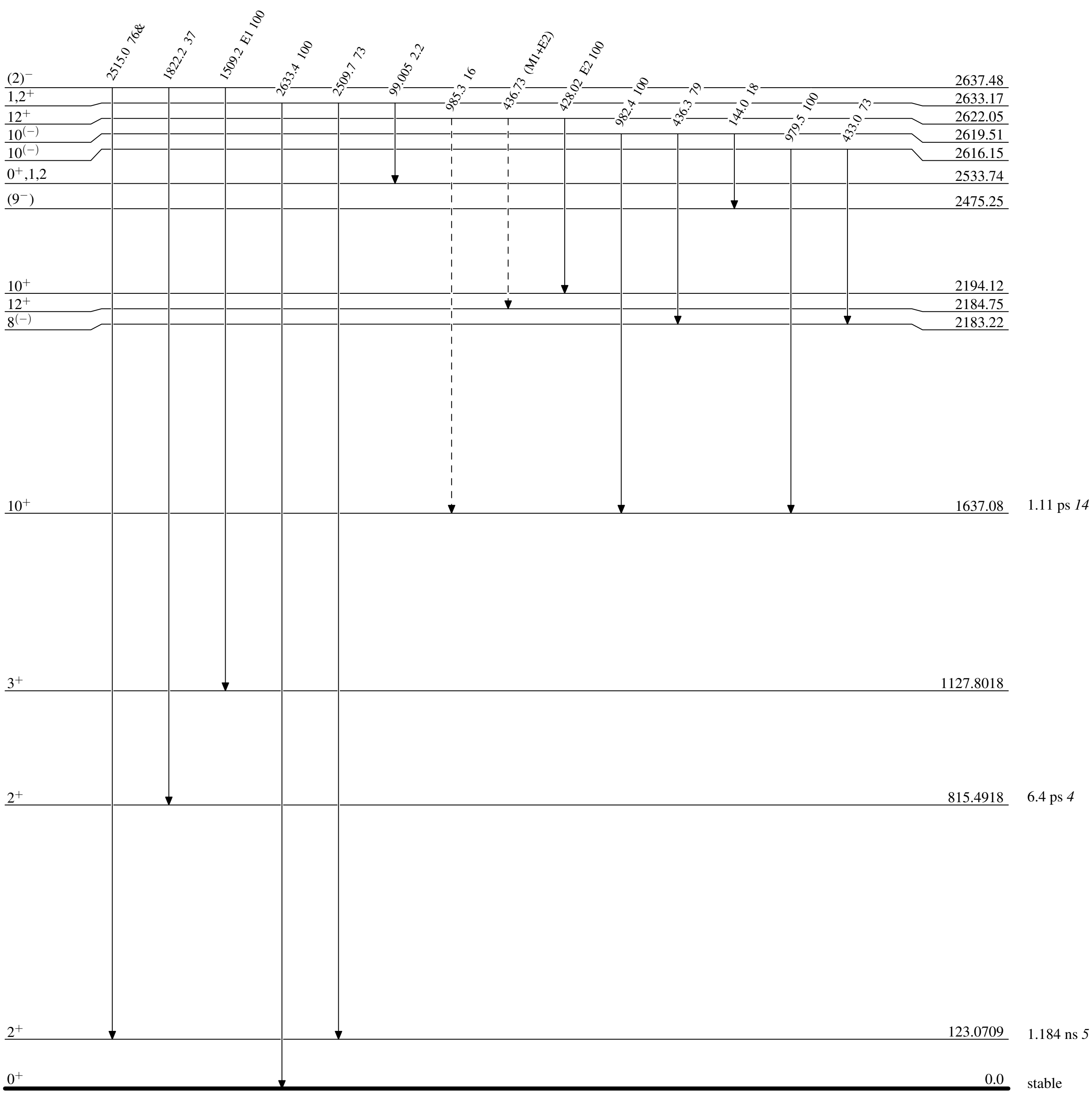
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)



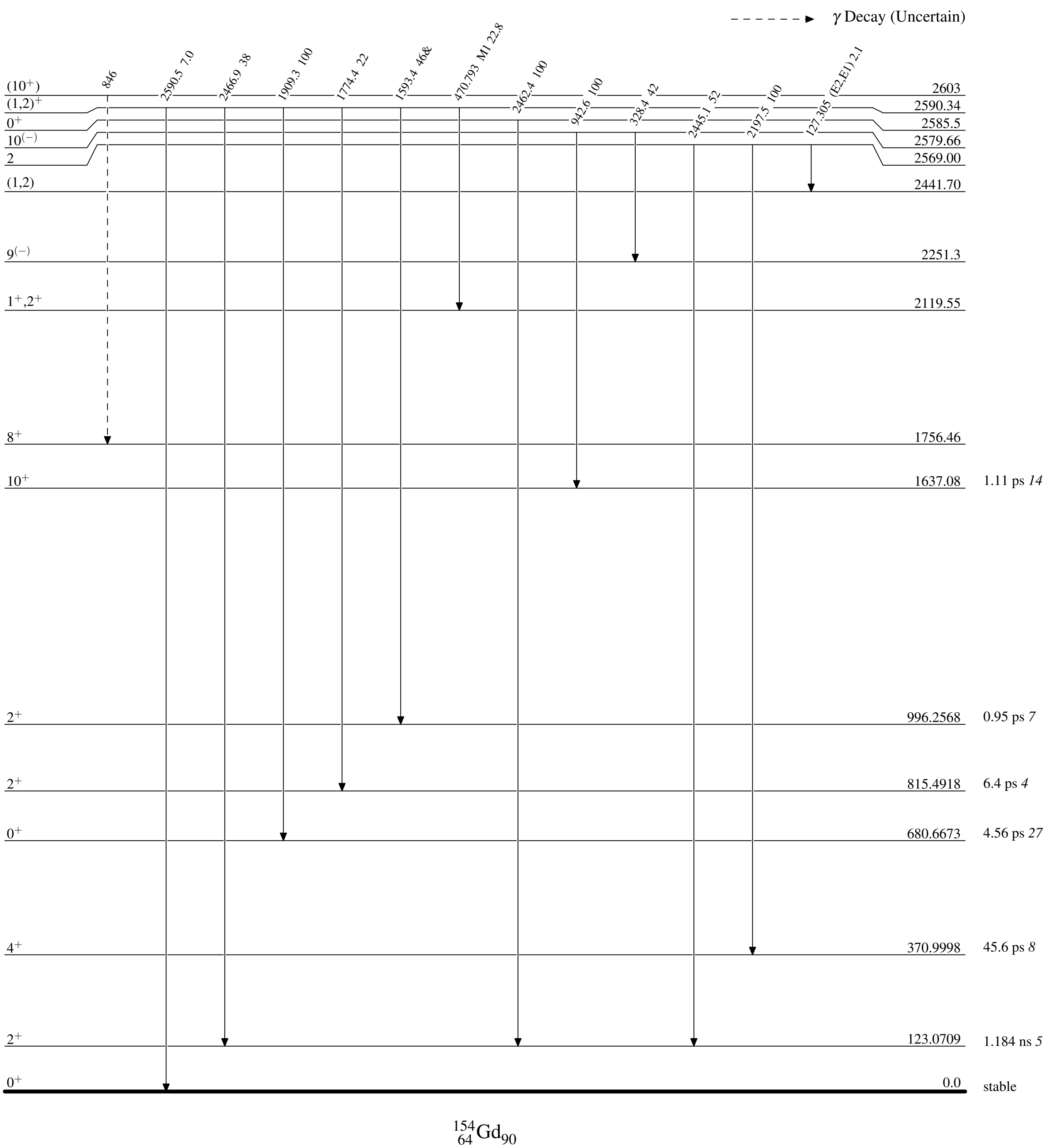
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend



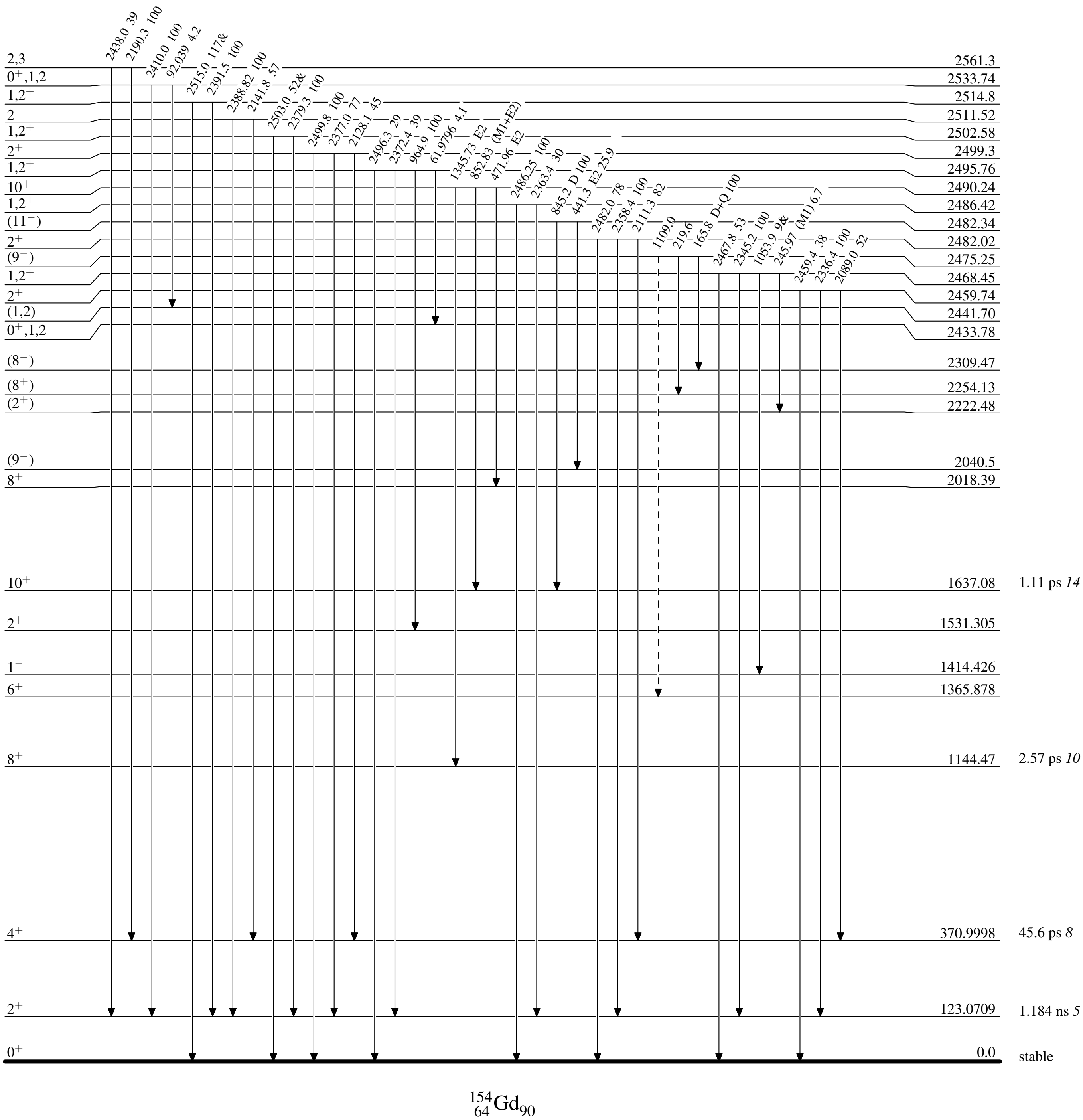
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

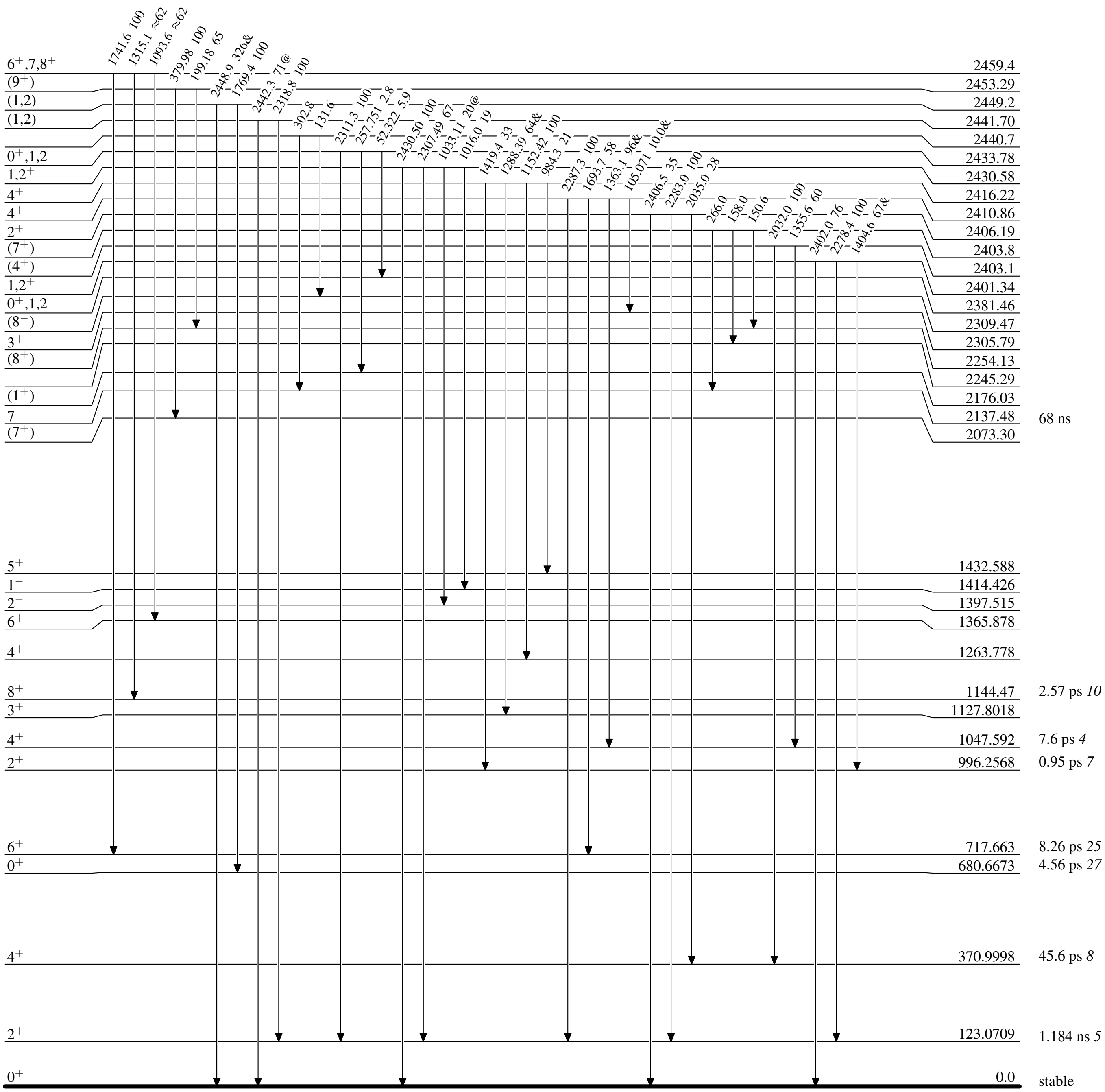
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intentities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

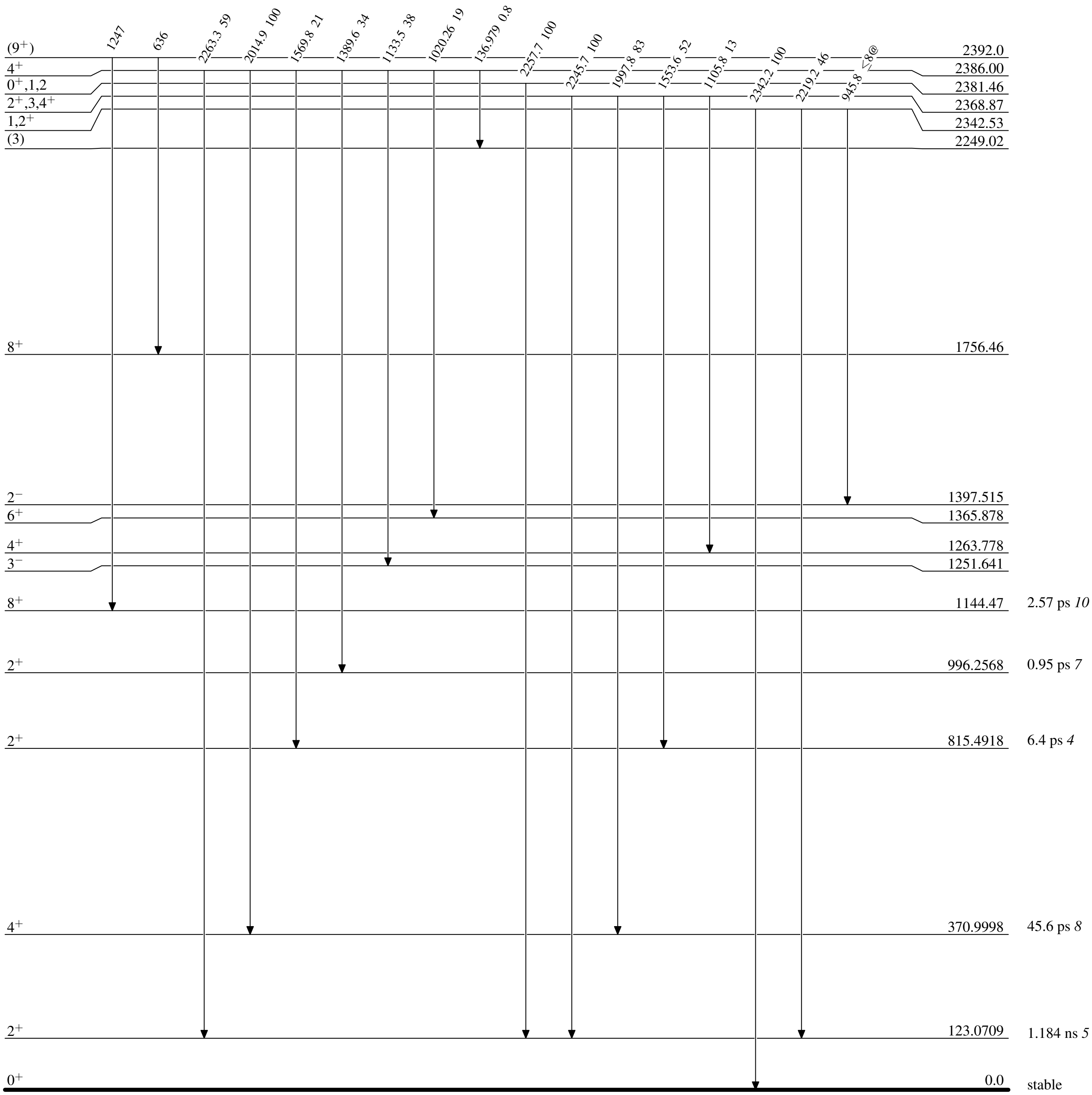


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

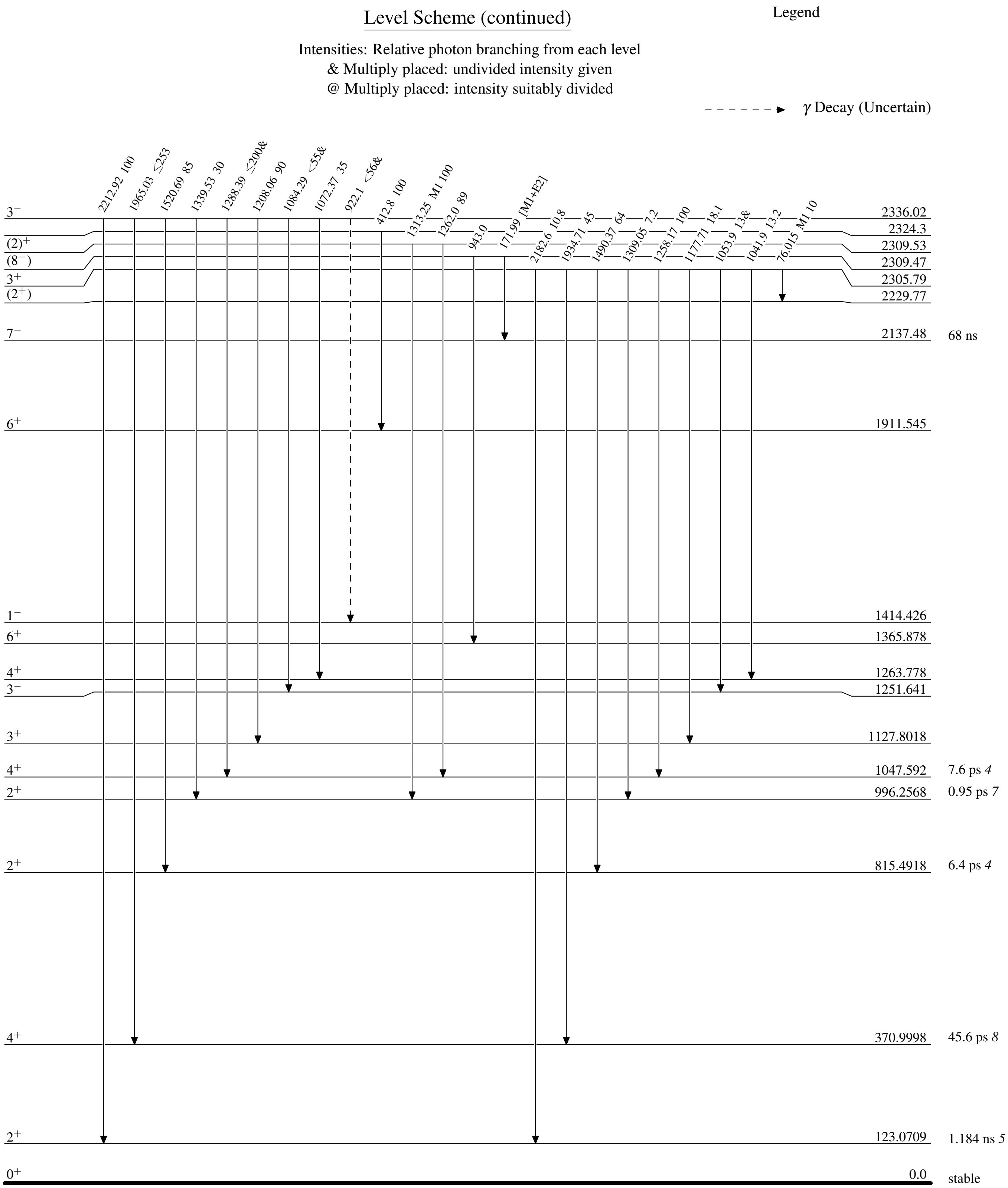


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



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

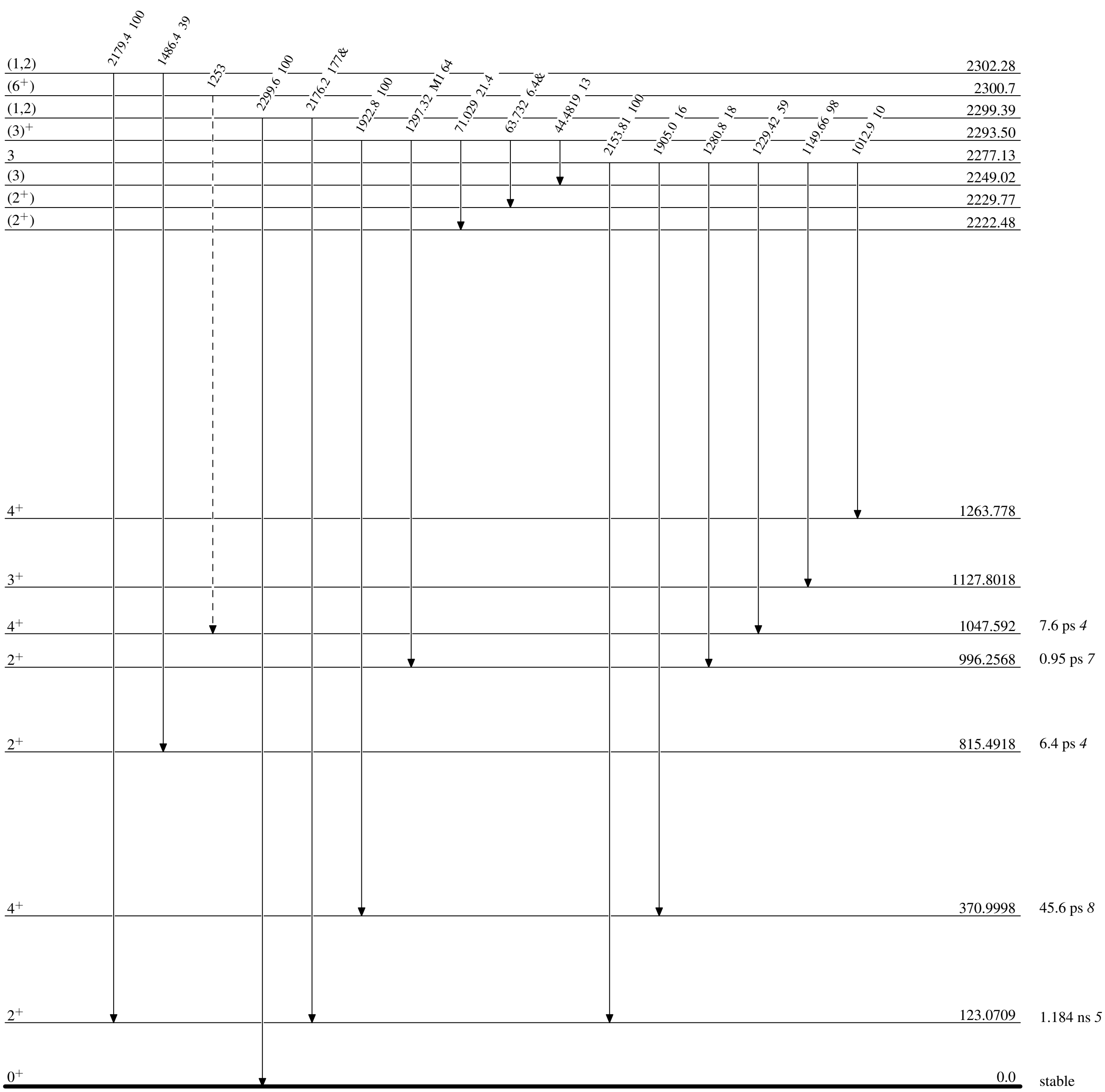
Adopted Levels, Gammas

Level Scheme (continued)

Intentities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)



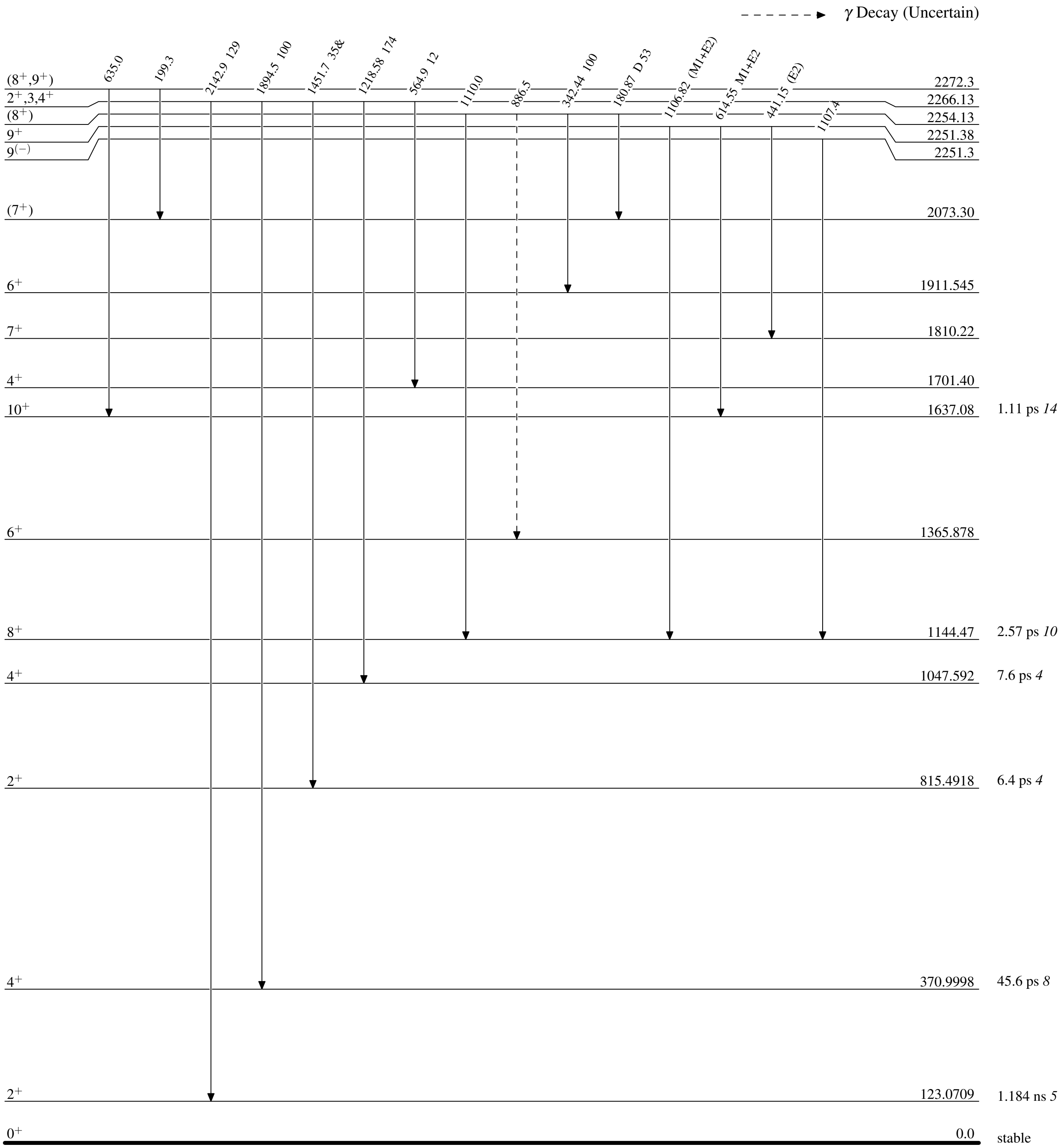
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend



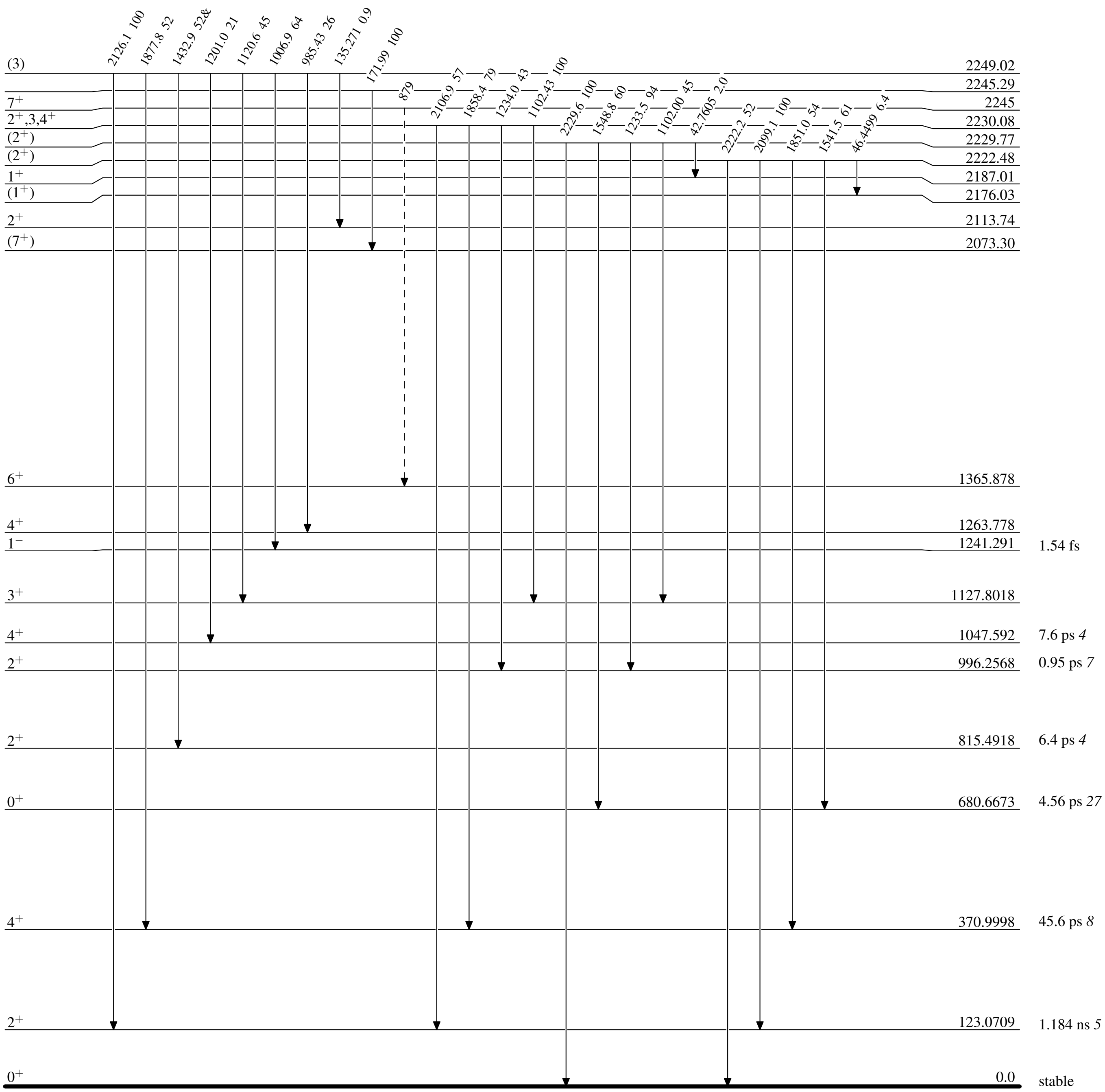
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)



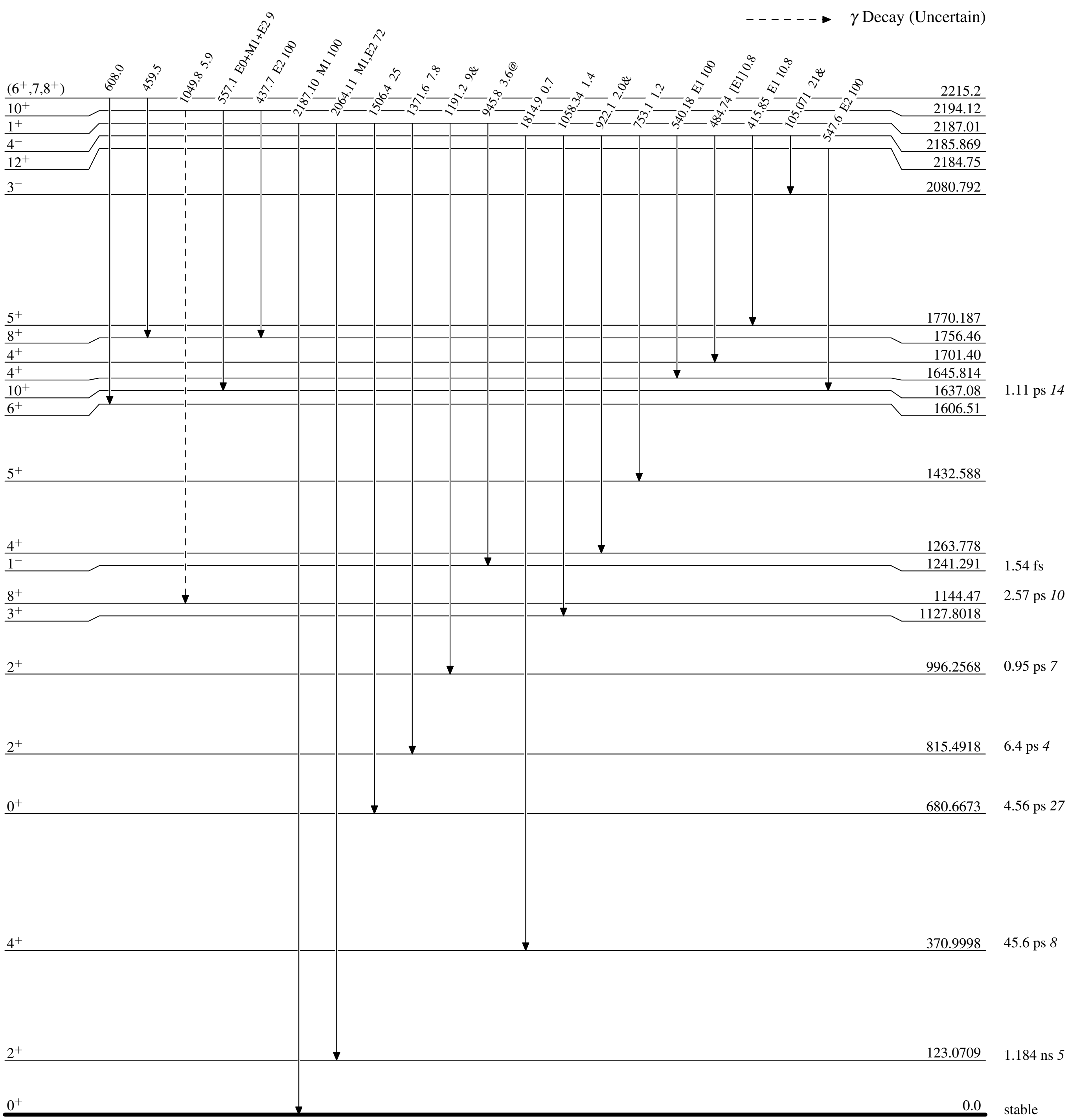
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

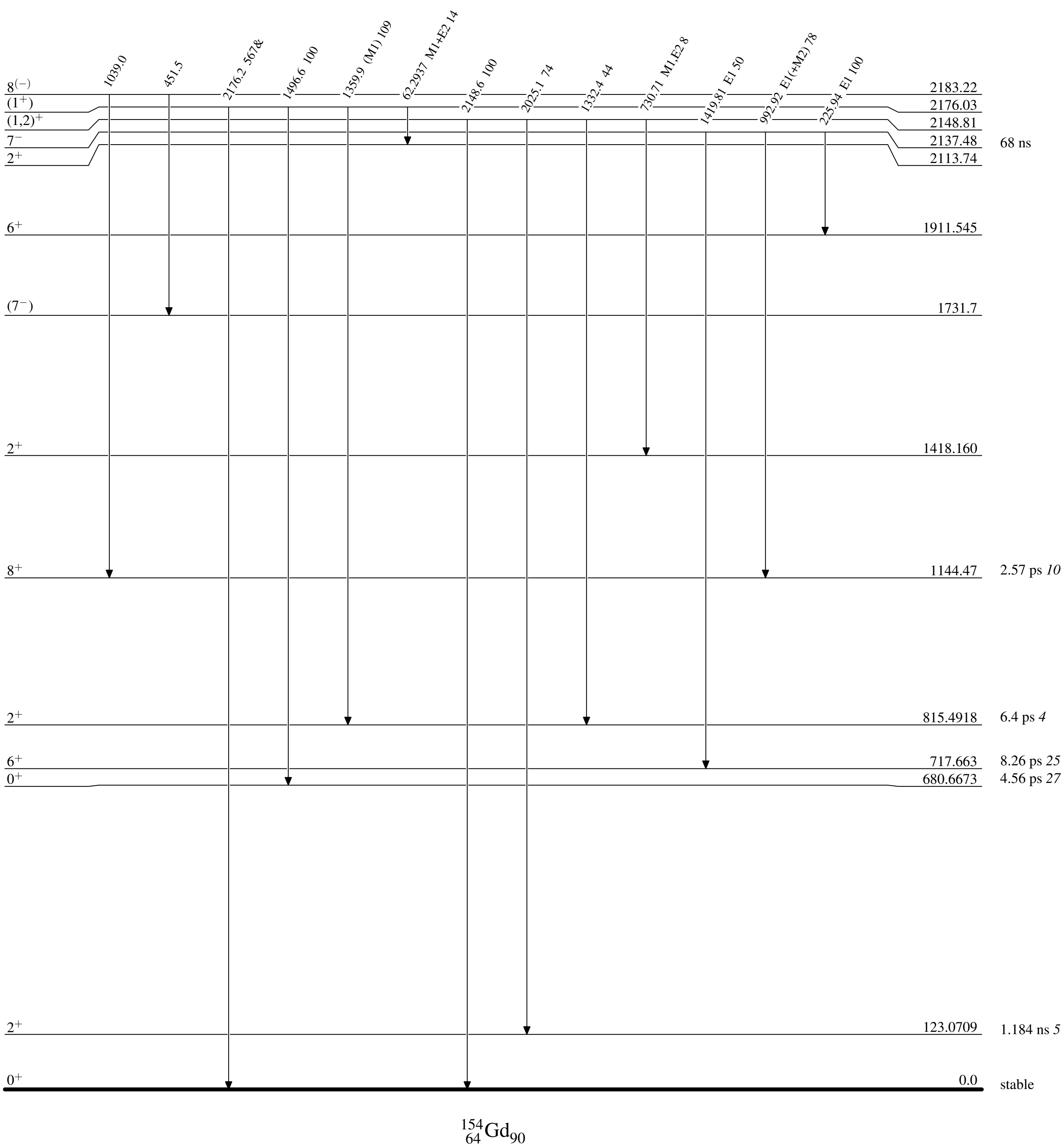


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

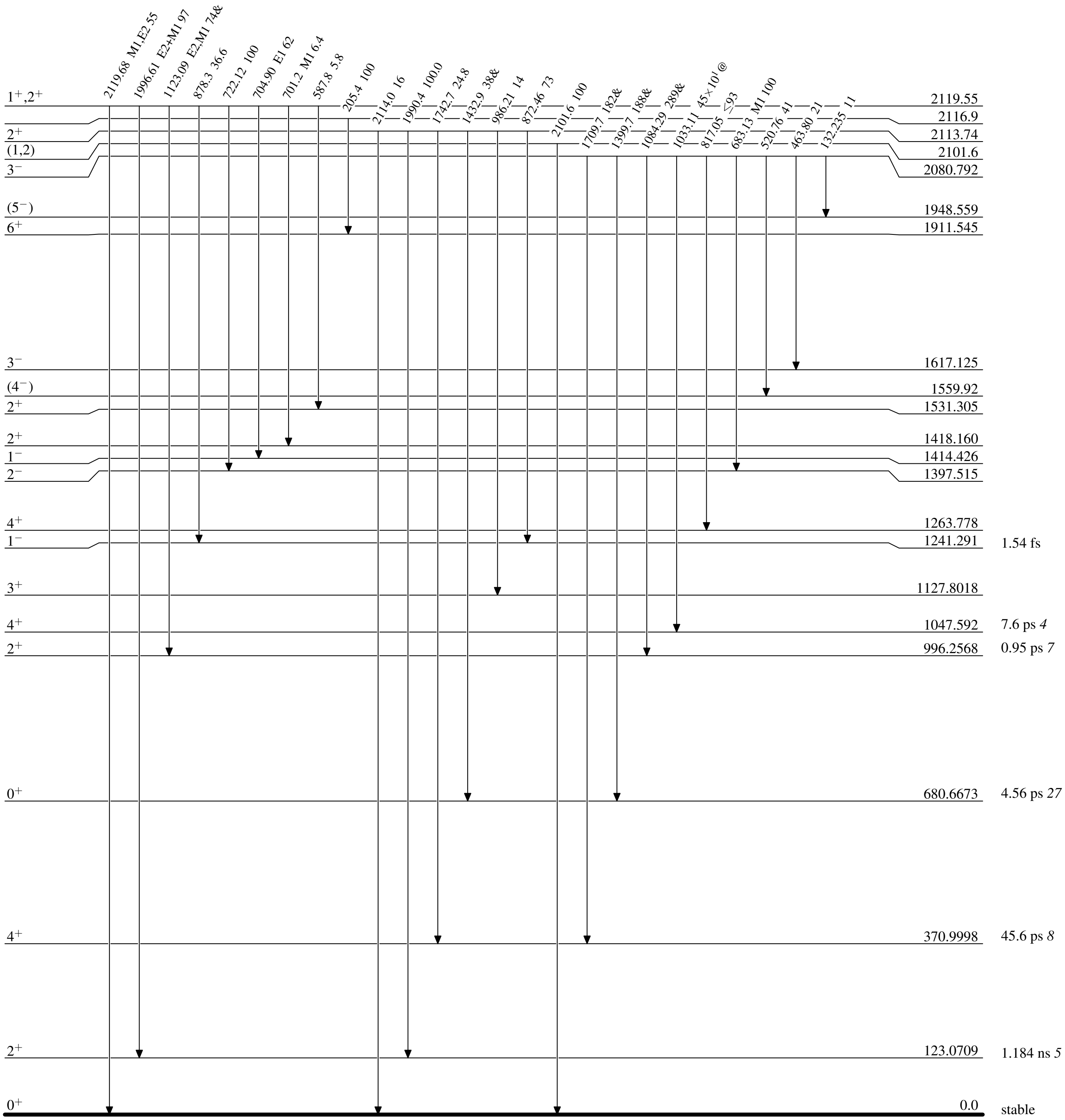
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



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

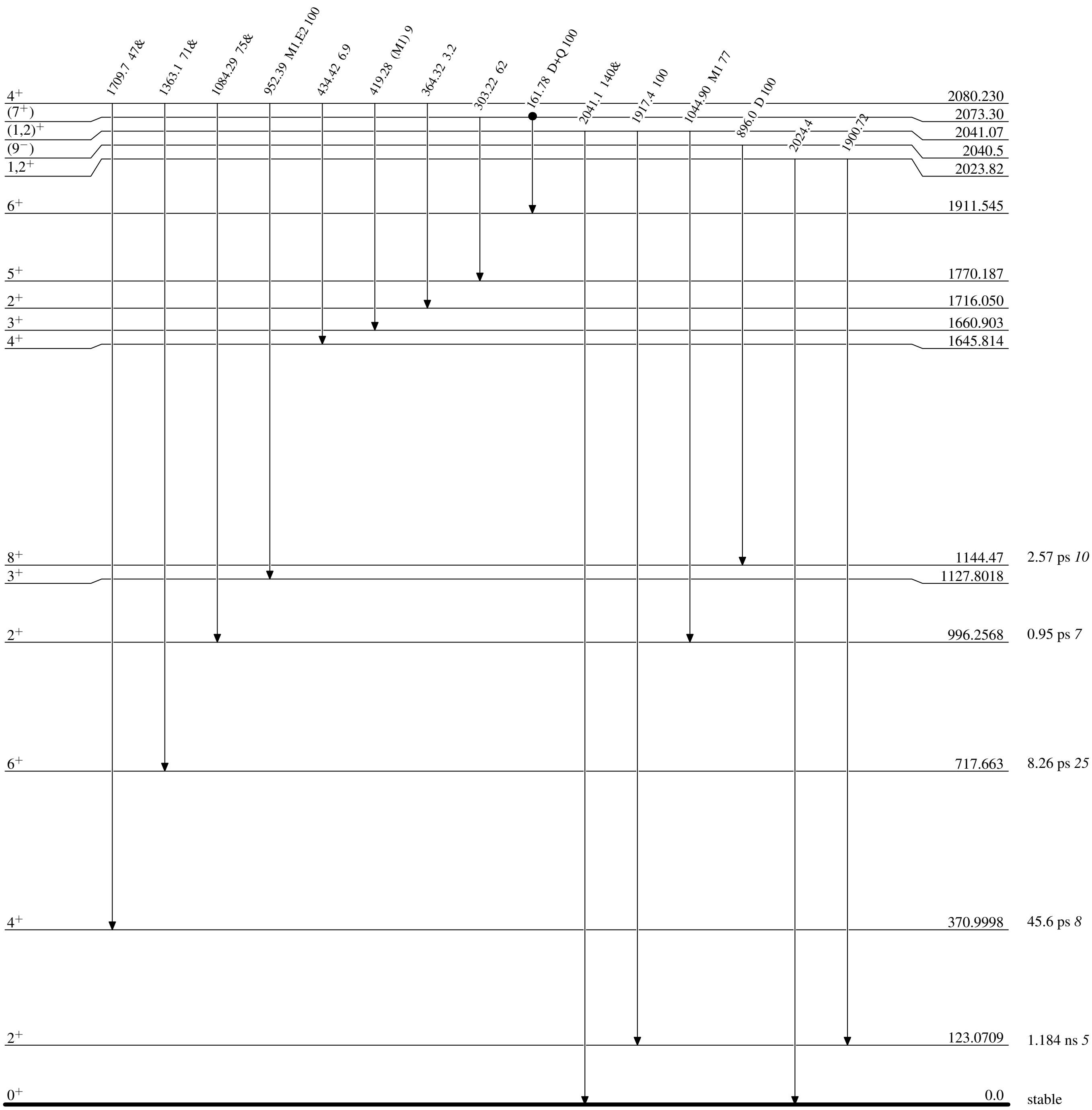
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

● Coincidence



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

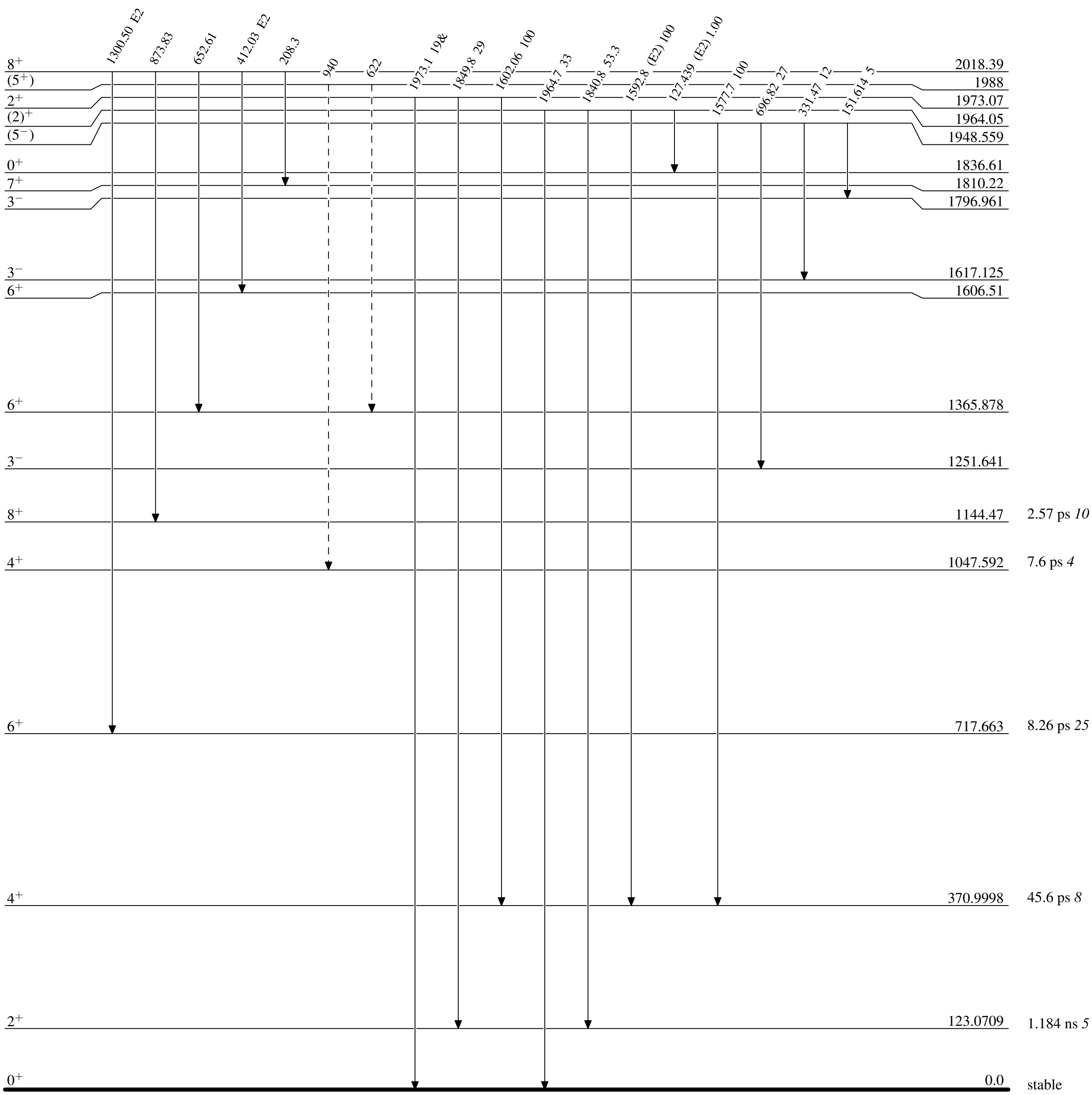
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)

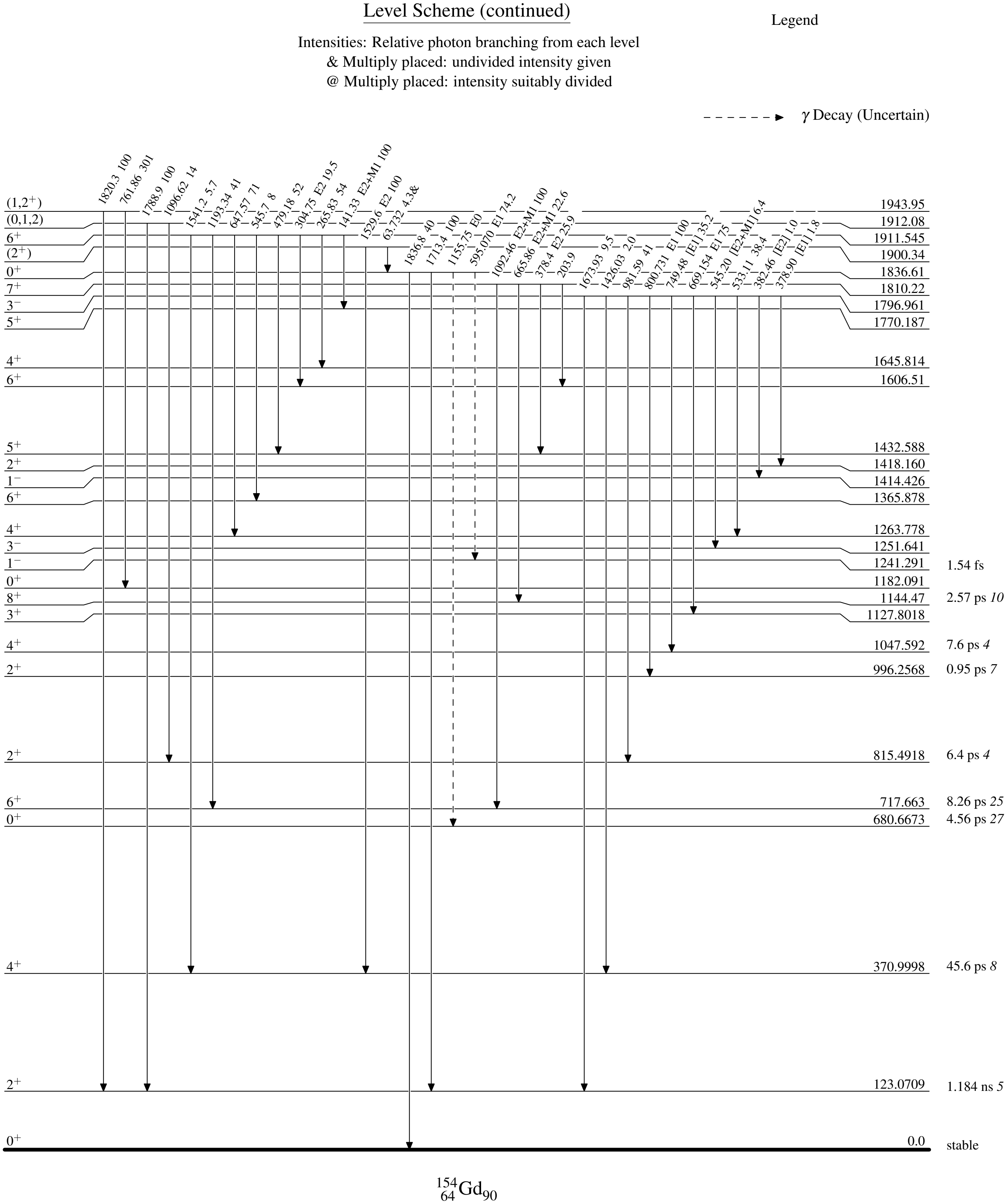


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

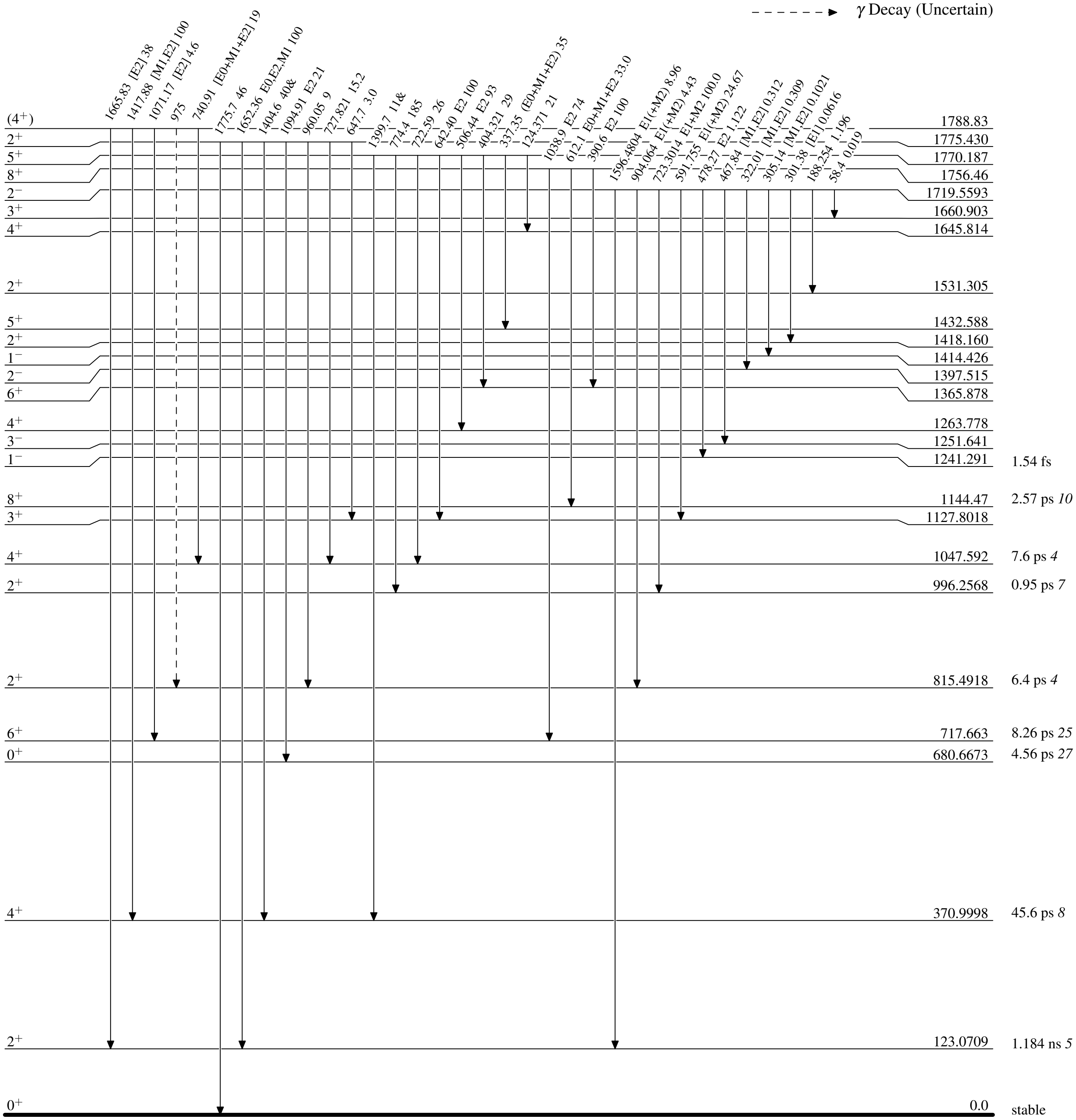


Adopted Levels, Gammas

Level Scheme (continued)

Legend

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

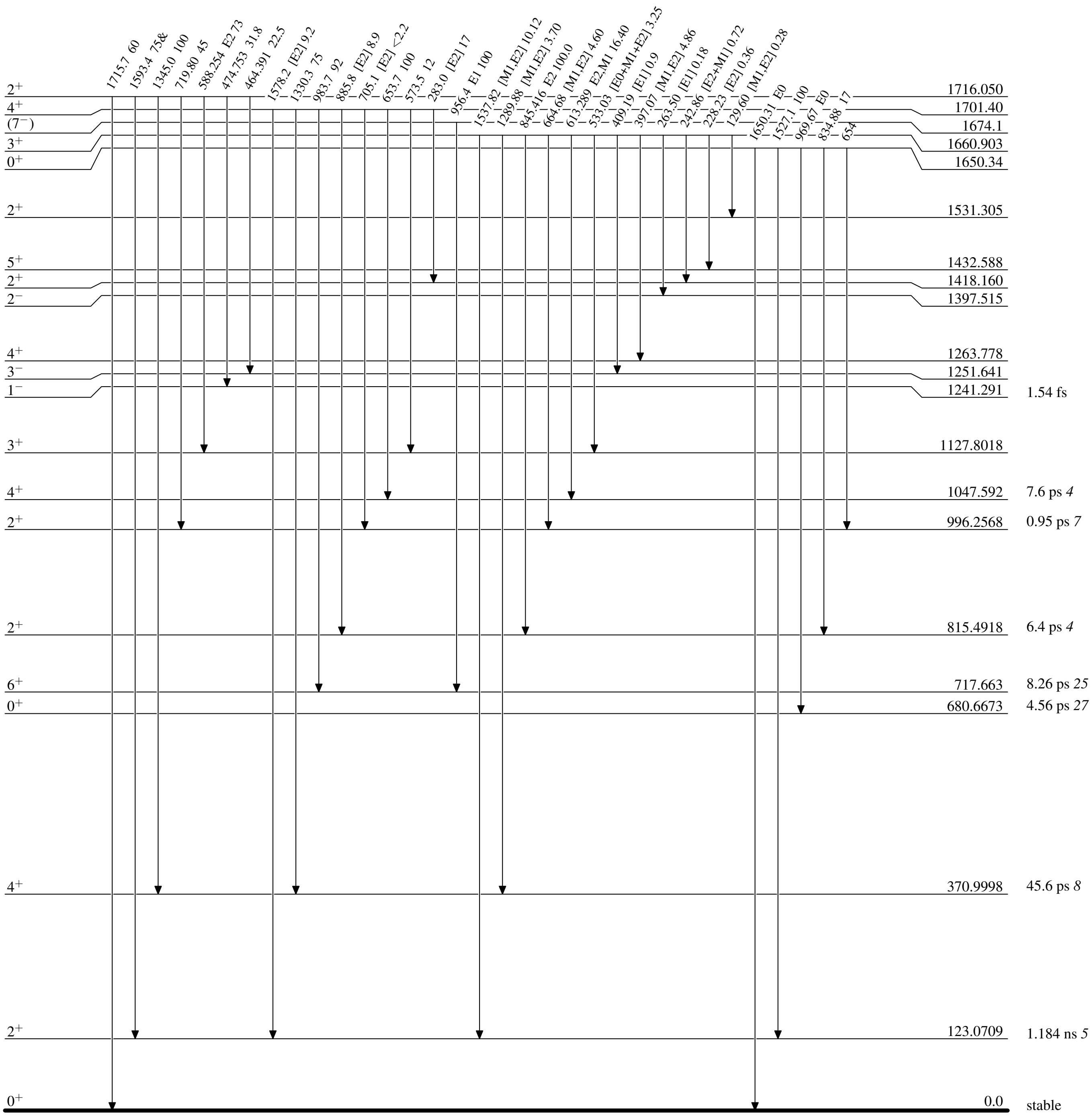


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intentsities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

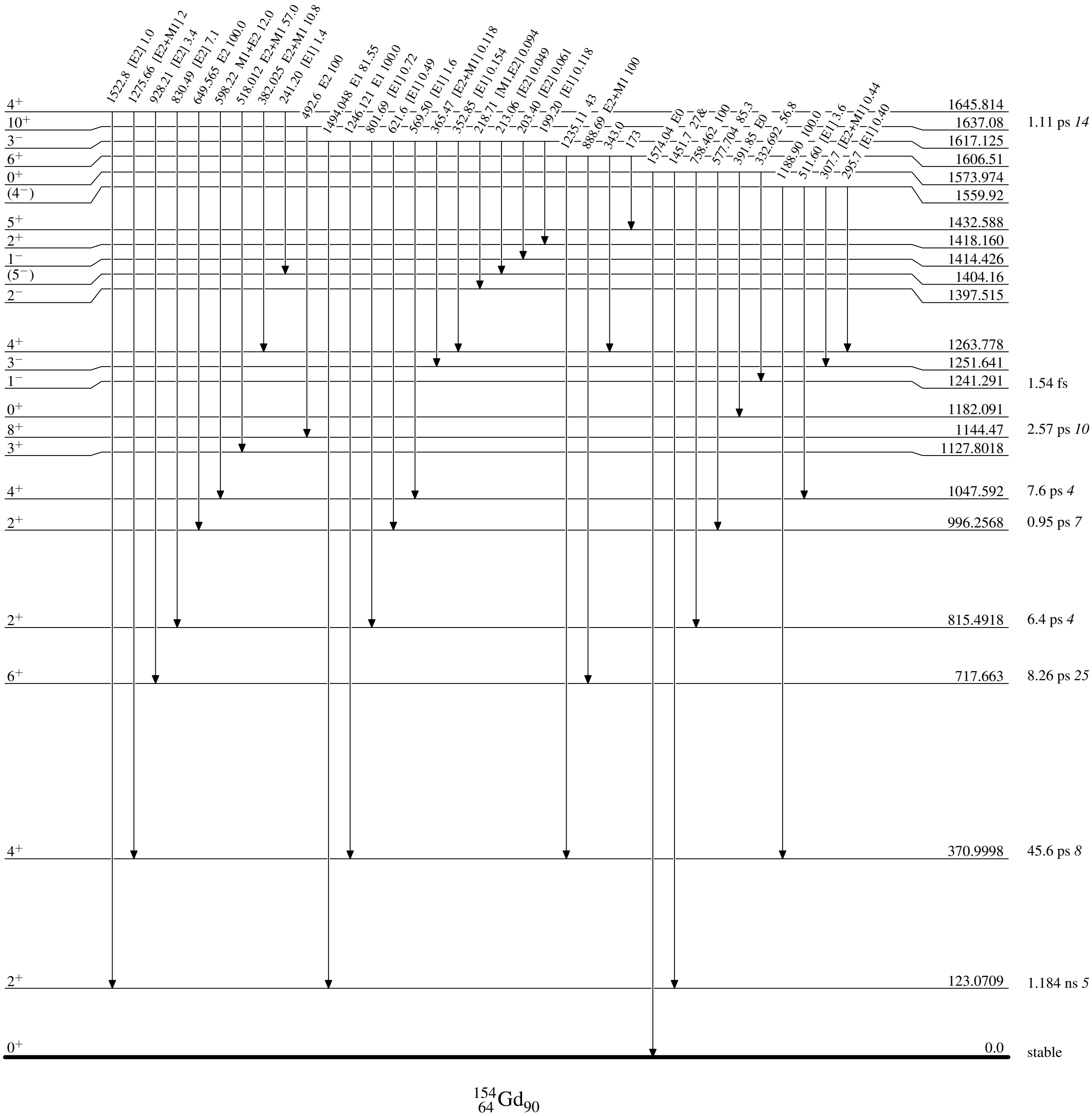


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

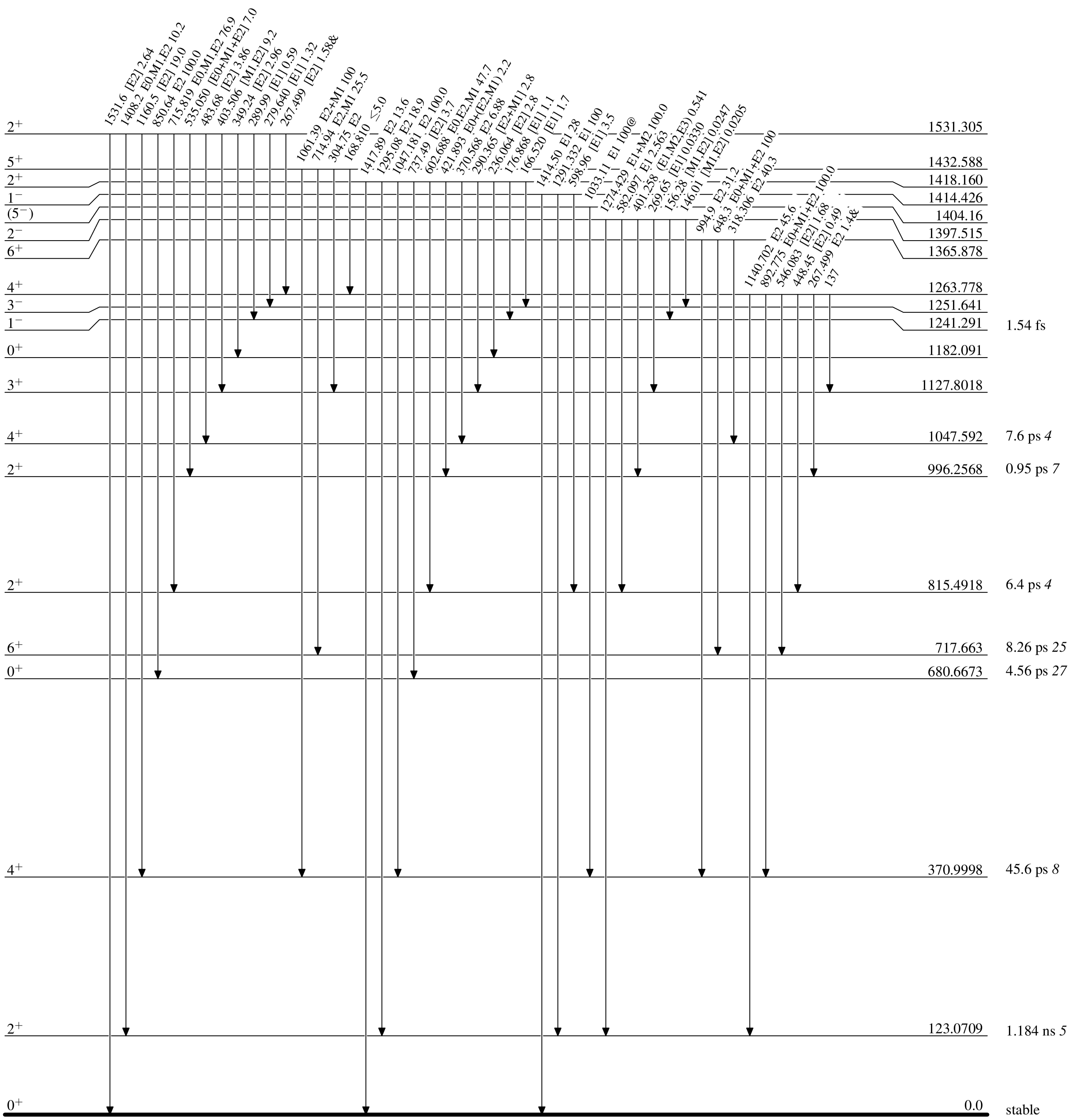
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

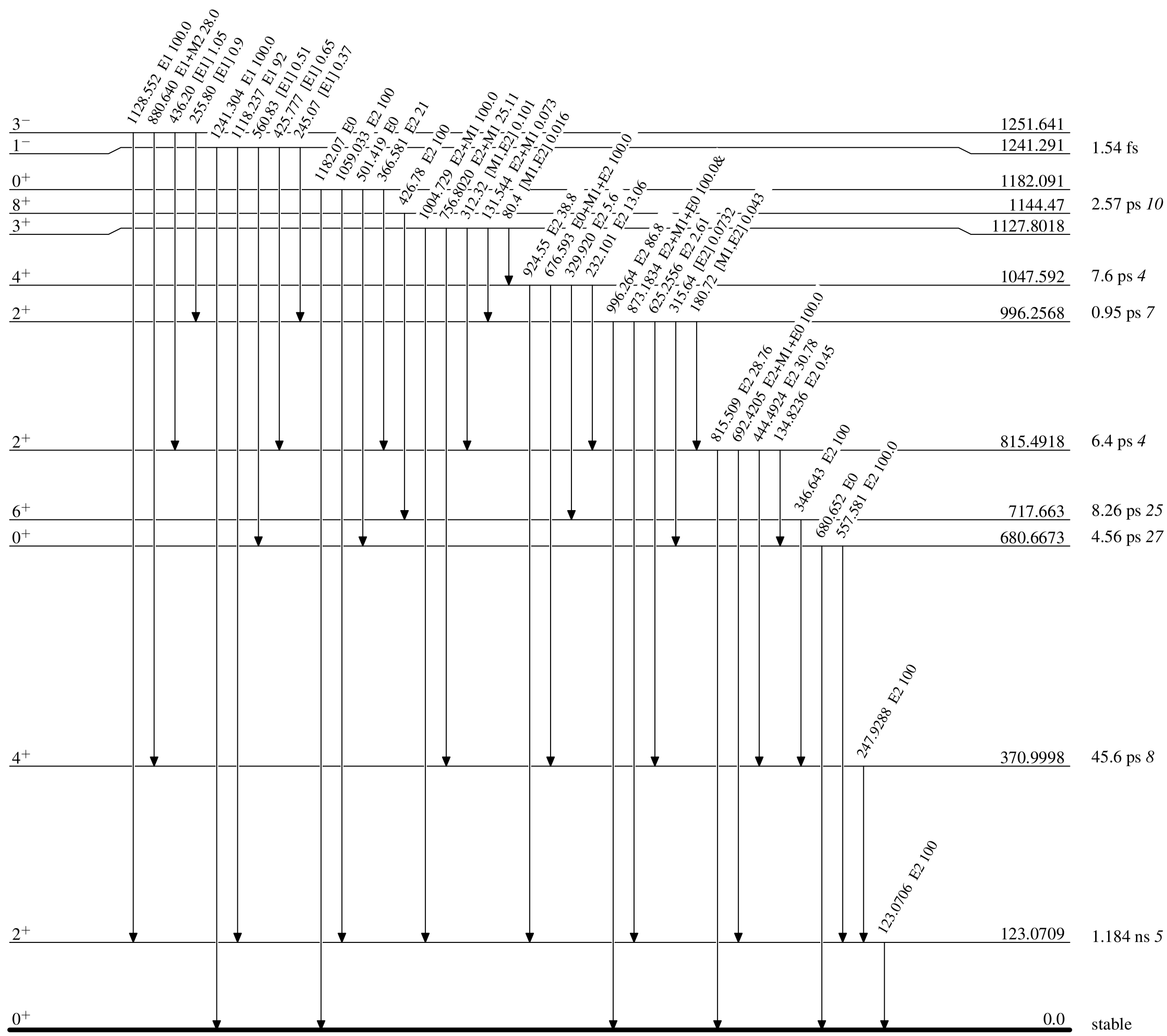


$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas

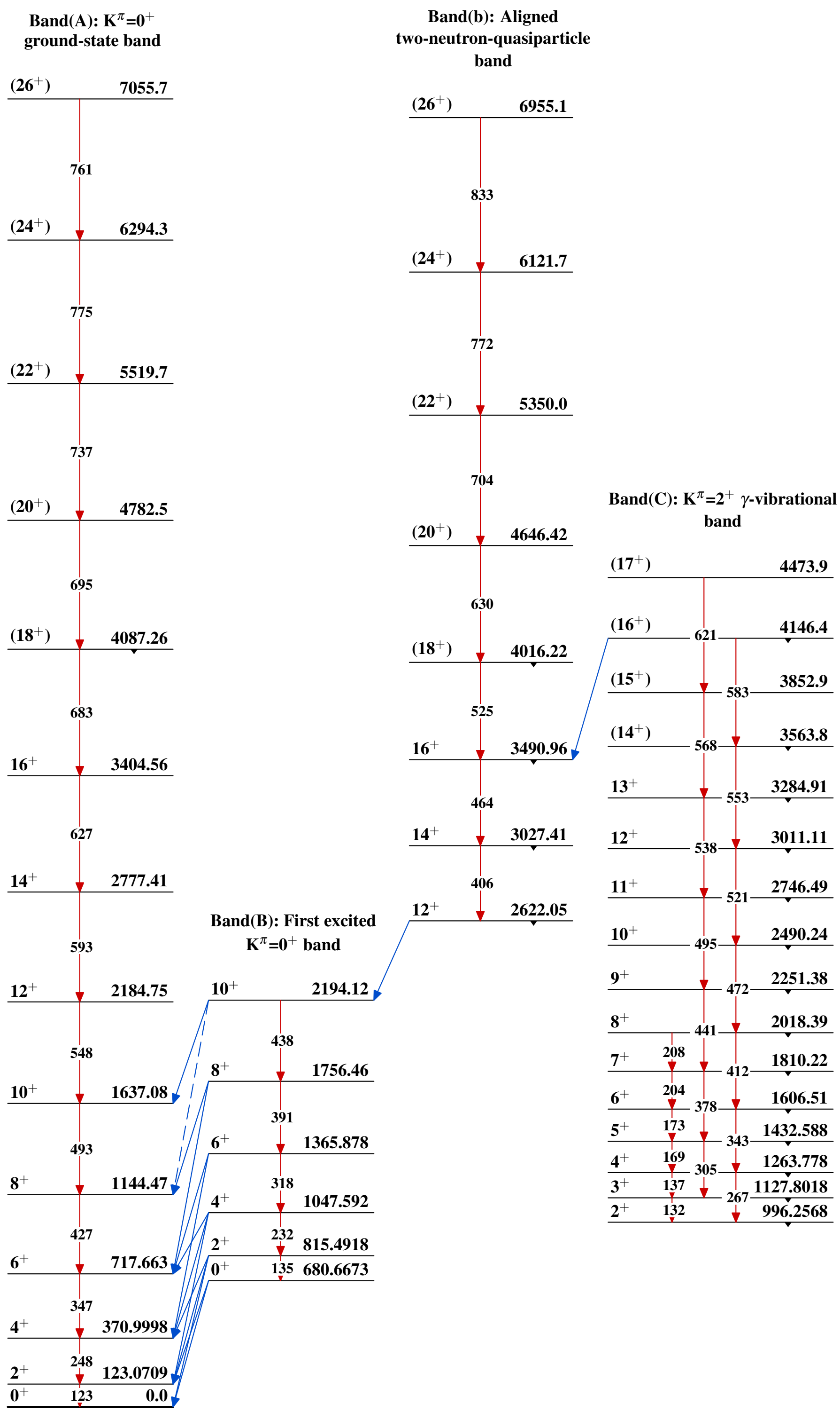
Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



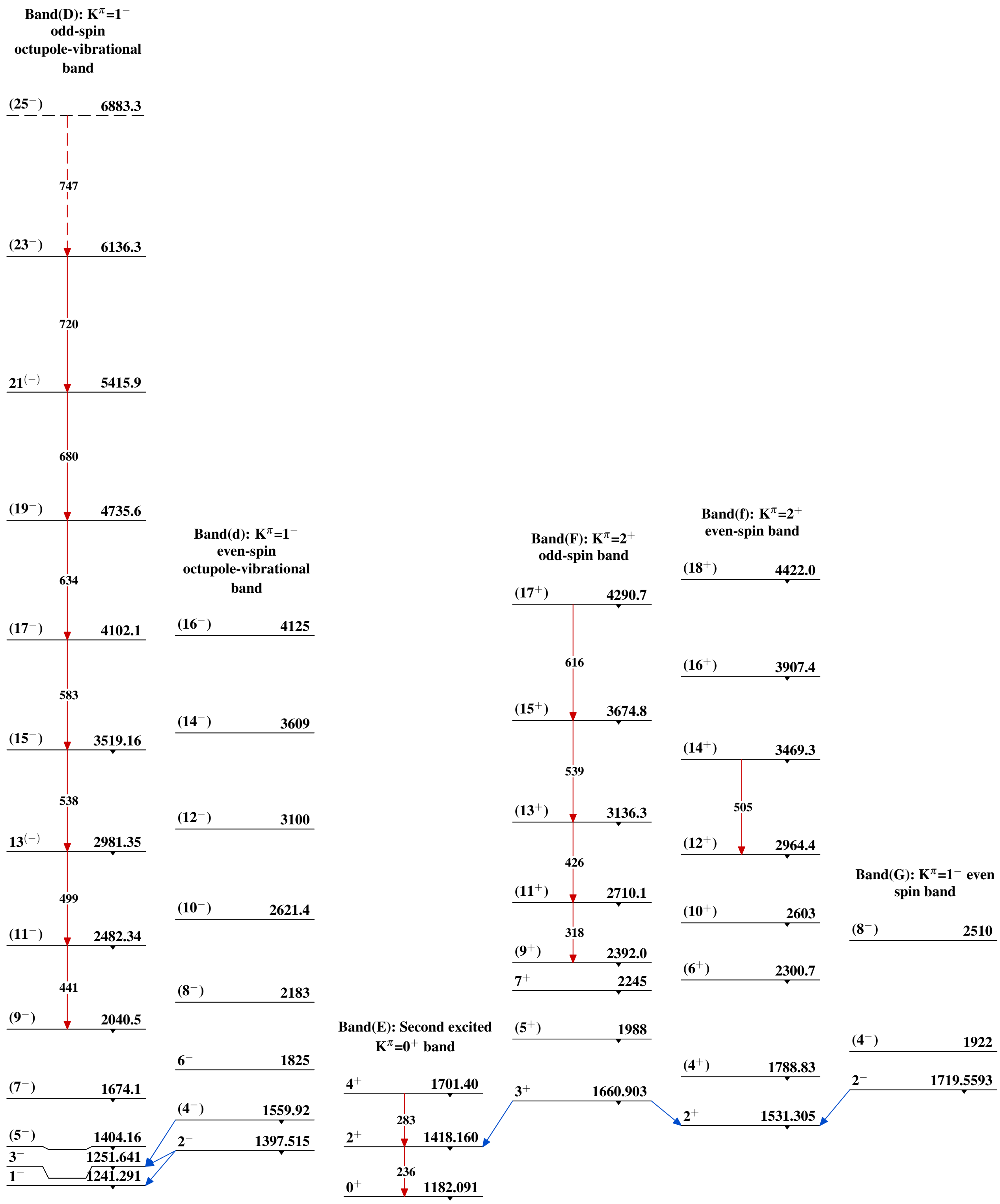
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas



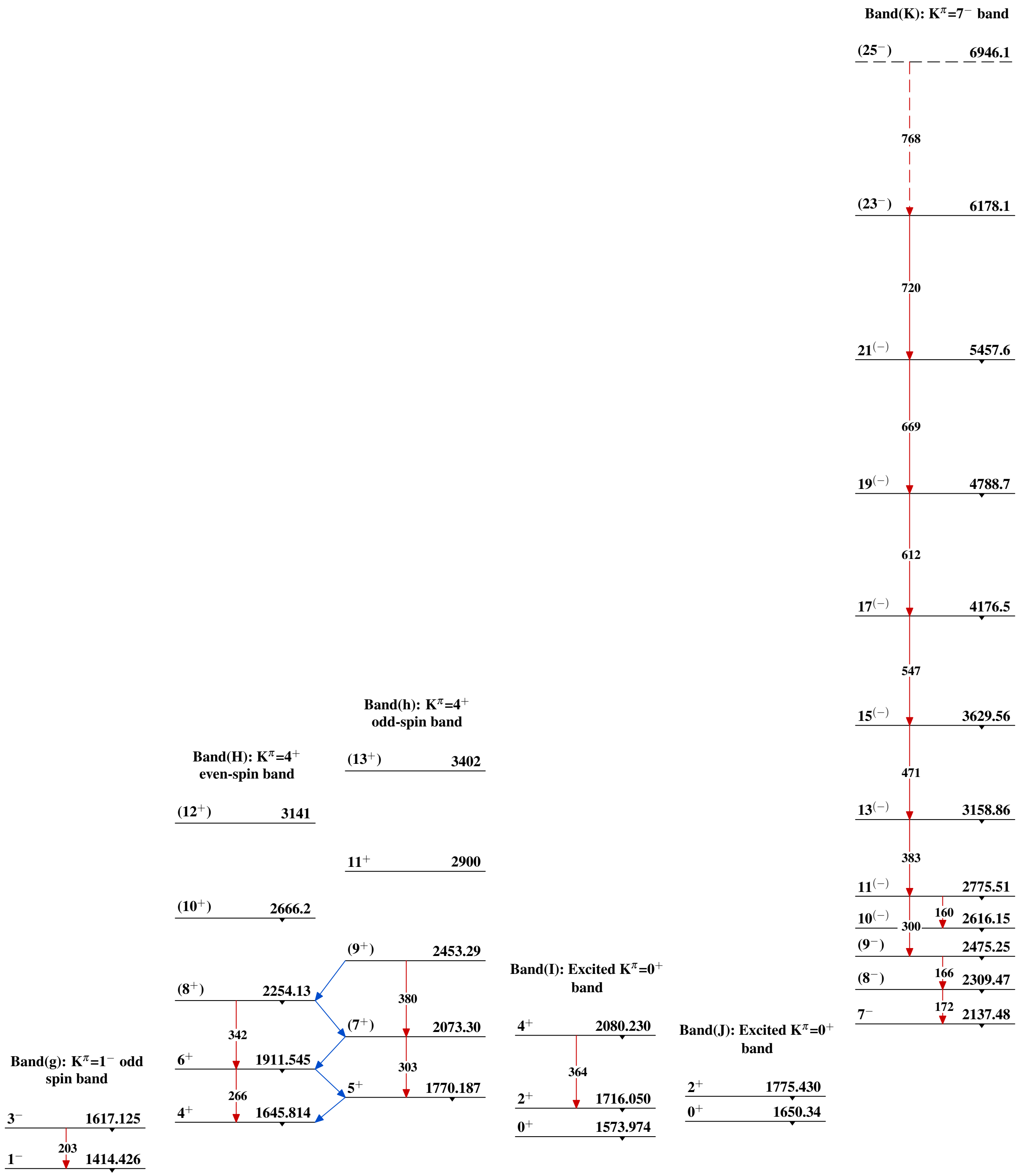
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas (continued)



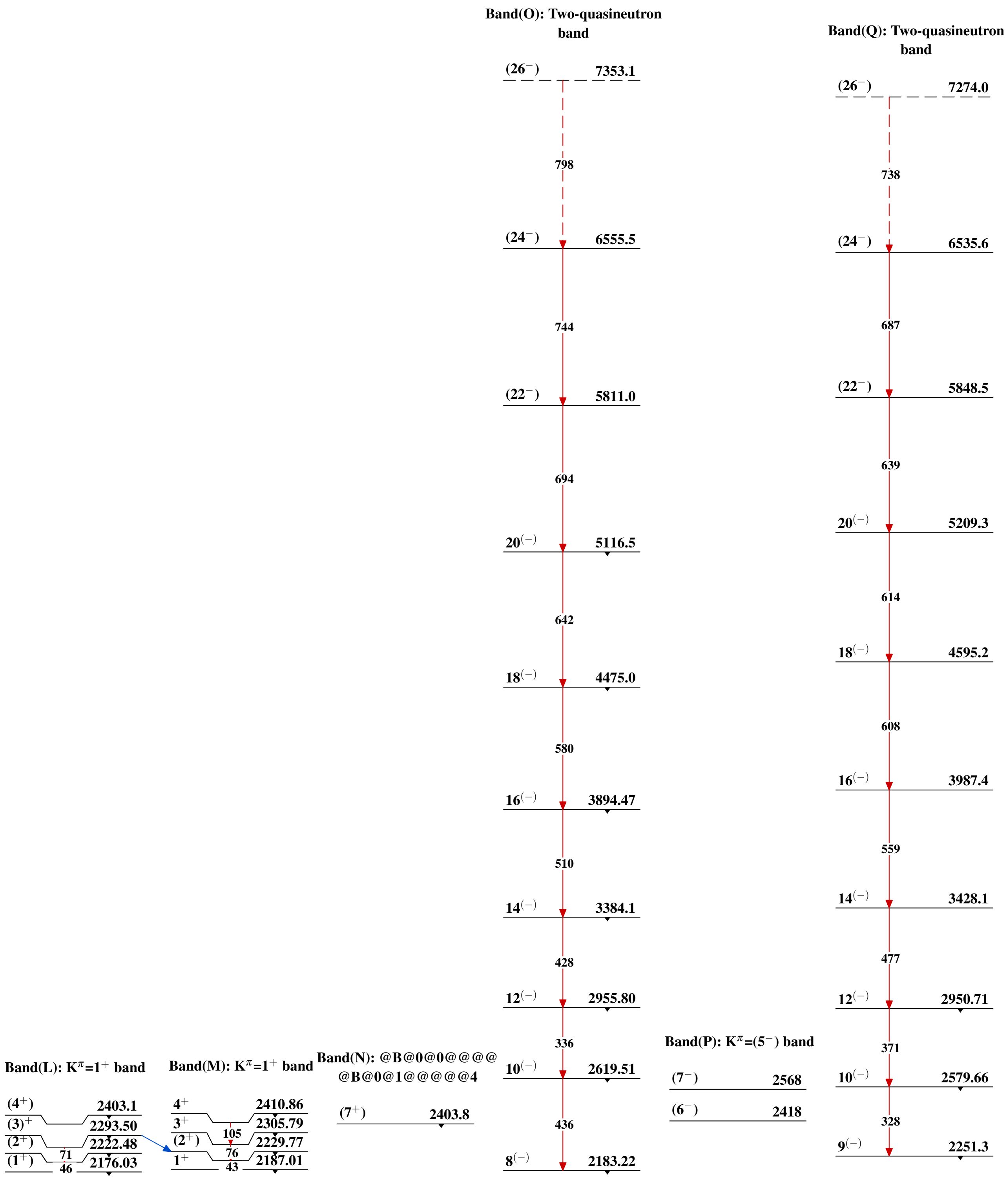
$^{154}_{64}Gd_{90}$

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas (continued)