Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

Q(β^-)=−105.6 *10*; S(n)=7451.5 *7*; S(p)=9188 *4*; Q(α)=−1006 *9* 2021Wa16
S(2n)=13394.7 *7*, S(2p)=17268 *5* (2021Wa16).
Additional information 1.
A number of studies, both experimental and theoretical, of double β-decay processes from the ^{160}Gd g.s. have been published. Some of the more recent experimental studies include those of 1995Ko14, 1995Bu18, 1996Da38, 1996De60, 1997Ge14, 2001BiZZ, and 2001Da22. The general trend with time of the results of these studies is to establish ever larger lower limits for the various processes involved (which have not yet been observed). Recent theoretical work is given by 2002Hi06, 2002Hi09, 2002Hi12, 2003Su34, 2004Ra13, 2011Ra41, 2011Ra26, 2011Fa02, 2012Ro44, 2012Ra07, 2012Ko10, 2012Fa11, 2012Fa01, 2012Ba30, 2013Da02, 2013Ba05, 2014Re05, 2015Ko15.

^{160}Gd Levels

Band structures are mostly from (n,n′γ) dataset.

Cross Reference (XREF) Flags

A	^{160}Eu β^- decay (42.6 s)	F	^{160}Gd(p,p′),(pol p,p′)
B	^{160}Eu β^- decay (30.8 s)	G	^{160}Gd(n,n′γ)
C	^{252}Cf SF decay	H	^{160}Gd(d,d′)
D	^{158}Gd(t,p)	I	Coulomb excitation
E	^{160}Gd(γ,γ')		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0[#]	0$^+$	stable	ABCDEFGHI	Values for Δ<r^2>(^{160}Gd−^{158}Gd) measured using a variety of techniques have been reported. Some of these are as follows (the values being expressed in units of fm^2): 0.161 *12*, from muonic K- and L-x-ray measurements (1983La08); 0.164 *5*, from LASER-spectroscopic measurements of optical isotope shifts (1990Du08); 0.154 *10*, from isotope shifts of electronic K-x-ray transitions (1969Bh02); and 0.146 *8*, from optical isotope-shift measurements (1987Bo58). 1990Wa25 report λ(^{160}Gd-^{158}Gd)=0.135 *7* (where $\lambda\approx\Delta$<r^2>) from optical isotope-shift measurements. Other measurements are reported by, e.g., 1976Ah04, 1988Al40, 1988Kr15. 1987Au06 give a compilation of optical isotope-shift information (expressed, however, in terms of the nuclear parameter λ). 1995Fr22 report an analysis of Δ<r^2> values from optical, muonic-atom, and electromagnetic interactions for a number of Gd-isotope pairs. For ^{160}Gd, they report Δ<r^2>(^{160}Gd−^{156}Gd)=0.335 fm^2 35. In an evaluation of nuclear rms charge radii, 2013An02 report <r^2>$^{1/2}$=5.1734 fm *44*. T$_{1/2}$: T$_{1/2}$>1.3×10^{21} y for 0ν,2β decay and >1.9×10^{19} y for 2ν,2β decay, from the survey by 2002Tr04 (these are the values reported by 2001Da22 and are quoted at the 90% confidence level).
75.263[#] *9*	2$^+$	2.72 ns *1*	ABCDEFGHI	μ=+0.72 *4*; Q=−2.08 *4* J$^\pi$: Coulomb excited; member of g.s. band. T$_{1/2}$: from Coulomb excitation. μ: from the compilation of 2014StZZ (measured by 1974Ar23 by the recoil into gas or vacuum method (reevaluated or adjusted by compiler)). Q: from the compilation of 2016St14 (measured by 1983La08 by muonic X-ray hyperfine structure method).
248.502[#] *18*	4$^+$		ABCD FGHI	μ=+1.6 *2* M(E4; 0$^+$ to 4$^+$)=0.33 *5* from Coul. ex.

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Adopted Levels, Gammas (continued)

^{160}Gd Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
				Jπ: E2 γ to 2^+, E4 Coulomb excited, member of g.s. band. μ: from the compilation of 2014StZZ (from g-factor measured by 1991St01 by transient field integral perturbed angular correlation method).
514.81[#] *4*	6^+		A CD FGHI	μ=+2.4 *3* Jπ: E2 γ to 4^+, member of g.s. band. μ: from the compilation of 2014StZZ (from g-factor measured by 1991St01 by transient field integral perturbed angular correlation method).
868.6[#] *6*	8^+		C G I	Jπ: E2 γ to 6^+, member of g.s. band.
913? *7*			D	
946?			H	
988.548[@] *15*	2^+	1.40 ps *6*	B D FGHI	Jπ: E2 γ's to 0^+ and 4^+. $T_{1/2}$: from B(E2) in Coul. ex.; other value: > 1.25 ps (2017Le04, (n,n′γ)).
1016?			H	
1057.426[@] *19*	3^+	>1525 fs	B D FG I	Jπ: M1+E2 γ's to 2^+ and 4^+.
1070.422[&] *21*	4^+		A GH	Jπ: E2 γ to 2^+ and γ to 6^+.
1147.985[@] *21*	4^+	0.75 ps *+51−22*	D FGHI	Jπ: E2 γ to 2^+ and M1+E2 γ to 4^+. B(E4)↑ value, from (pol p,p′) coupled-channel analysis, is suggestive of collective (γ-vibrational) character.
1173.09[&] *4*	$(5)^+$		A G	Jπ: 4^+,5^+ from M1+E2 γ to 4^+, γ to 6^+; member of $K^\pi=4^+$ band makes 4^+ less likely.
1224.237[b] *22*	$1^{(-)}$	14.2 fs *14*	B EFGHI	Jπ: (E1) γ's to 0^+ and 2^+. Population of this level in (d,d′) suggests natural parity, although level is only weakly excited there. Bandhead of $K^\pi=0^-$ octupole vibration. $T_{1/2}$: other value calculated by evaluator from $\Gamma^2_{\gamma0}/\Gamma$=4.5 meV 12 in (γ,γ′) (1989Pi05) and the adopted γ branching from this level: 15 fs *4*.
1260.98[@] *4*	5^+	243 fs *+83−55*	A G	Jπ: M1+E2 γ's to 4^+ and 6^+.
1289.76[b] *3*	3^-	23.6 fs *21*	B D FGHI	B(E3)↑=0.118 *7* XREF: D(1299). B(E3)↑: from Coul. Ex. (1981Mc06). Jπ: E1+M2 γ to 4^+ and (E1) γ to 2^+; E3 excitation in Coul. ex. B(E3)↑ indicates collective excitation. $T_{1/2}$: other value: 51 fs *14* (1981Mc06, based on Doppler-broadened line shape in Coul. ex.).
1295.22[&] *5*	(6^+)		A G	Jπ: (4^+,5,6^+) from γ's to 4^+ and 6^+; (6^+) adopted by 2009Go33 in (n,n′γ) dataset as member of $K^\pi=4^+$ band.
1301.3[#] *9*	10^+		G I	g(10^+)/g(2^+)=0.93 *13* (1983Ha24). Jπ: Coulomb excited, with sole observed decay mode being a γ to the 8^+ member of the g.s. band. This, together with the level energy, indicates that this is the 10^+ member of this band.
1325.7 *10*	(2^+)		G	Jπ: previous (0^+) assignment in (n,n′γ) by 1989Be48 rejected by 2015Le05 and 2009Go33 found this γ anisotropic; (2^+) was tentatively assigned by 2015Le05 based on the observed anisotropy.
1351.188[e] *20*	1^-	125 fs *14*	B G	Jπ: E1 γ to 2^+ and γ to 0^+; $K^\pi=1^-$ band head (2009Go33).
1376.73[e] *3*	2^-	>381 fs	B G	Jπ: 2^-,3^- from E1+M2 γ to 2^+ and γ to 3^+, of which 2^- is adopted by in (n,n′γ) dataset (2009Go33) as second level in $K^\pi=1^-$ band.
1379.54[c] *4*	0^+	>936 fs	D G	XREF: D(1382). Jπ: E2 γ to 2^+; spin 0^+ confirmed by isotropic pattern of 1304γ (see (n,n′γ) dataset).
1392.99[@] *8*	6^+		A G I	Jπ: stretched E2 γ to 4^+ and M1+E2 γ to 6^+. Energy spacing and

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Adopted Levels, Gammas (continued)

^{160}Gd Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
				excitation in Coul. ex. (indicating collective character) support assignment of the state as the 6^+ member of the γ-vibrational band.
1427.40[b] *5*	5^-	35 fs *7*	GHI	J^π: E1+M2 γ to 4^+; ratio of (d,d′) cross sections at 90° and 125°, together with level energy, indicate that this is the 5^- member of the K^π=0$^-$ octupole band.
1436.27[c] *3*	2^+	>236 fs	B G	J^π: E2 γ′s to 0^+ and 4^+.
1437.40[&] *19*	(7^+)		A G	J^π: member of first K^π=4$^+$ band.
1460.3 *4*	(3^-)		F H	J^π: ratio of (d,d′) cross sections at 90° and 125°. γ′s to 4^+ and, possibly, 2^+ states.
1463.83[e] *4*	3^-	5.0 fs *35*	B G	J^π: E1+M2 γ to 2^+.
1483.08[a] *7*	(4^+)		A	J^π: γ′s to 2^+ and 6^+ and proposed bandhead configuration.
1498.85[e] *5*	4^-	>277 fs	G	J^π: E1(+M2) γ to 4^+, γ to 3^+, and member of K^π=1$^-$ band.
1531.95[g] *8*	3^-		G	J^π: E1+M2 γ to 4^+, and γ′s to 2^+ and 4^+. possibly the bandhead of first K^π=3$^-$ band (2009Go33, (n,n′γ)).
1548.18[@] *9*	(7^+)		A G	J^π: γ′s to 6^+ and expected band structure of γ-vibrational band.
1558.35[d] *8*	0^+	>409 fs	G	J^π: stretched E2 γ to 2^+; $\gamma(\theta)$ confirms J=0 assignment.
1561.45[c] *5*	4^+	>222 fs	G	J^π: 4^+,5^+ from M1+E2 γ to 4^+ and γ to 6^+; 2009Go33 and 2017Le04 adopt 4^+ as member of first excited K^π=0$^+$ band; the latter superseded 2015Le05 that from Alaga rules for γ-ray branching ratios concluded that this level is not a member of the that band.
1568.67[f] *4*	1^+	0.7 ps *+13−3*	G	J^π: M1+E2 γ to 2^+ and (M1) γ to 0^+ states.
1581.81[a] *14*	(5^+)		A	J^π: M1 γ to (4^+) and proposed band assignment.
1583.59 *14*			G	
1586.56[f] *4*	2^+	>347 fs	G	J^π: M1+E2 γ to 2^+ and γ to 0^+; 2009Go33 adopt it as 2^+ member in K^π=1 band.
1597.3[&] *10*	(8^+)		G	J^π: γ to (6^+) and member of K^π=4$^+$ band.
1598.82[d] *5*	2^+	0.56 ps *+51−21*	G	J^π: E2 γ to 0^+ and M1+E2 γ to 3^+.
1608.3 *7*			B	
1621.37[h] *7*	2^-	0.2 ps *+25−1*	G	J^π: E1 γ to 3^+ and γ 2^+, bandhead of first K^π=2$^-$ band.
1644.39[b] *13*	(7^-)		G I	J^π: γ′s to 6^+ and 8^+ members of the g.s. band. Energy spacing and excitation in Coul. ex. suggest that this is the 7^- member of the 0^- octupole band.
1647.95 *8*	4^+	0.21 ps *+18−7*	G	J^π: E2 γ to 2^+ and γ to 6^+.
1653.26[e] *8*	5^-	42 fs *+14−10*	G	J^π: E1+M2 γ′s to 4^+ and 6^+.
1657.2 *5*	$(1^-,2)$		B	J^π: $(1^-,2,3^-)$ from γ′s to (1^-) and 3^-; $(1,2^-)$ from possible β feeding from (1^-) (2020Ha13).
1661.76 *5*	$(2^+,3,4^+)$	0.6 ps *+11−3*	G	J^π: γ′s to 2^+ and 4^+.
1665.09[f] *5*	3^+		G	J^π: M1+E2 γ′s to 2^+ and 4^+.
1668.4[e] *10*	(6^-)		G	J^π: member of first K^π=1$^-$ band.
1688	(3^-)		D H	XREF: D(1694). this level was related with 1687.9 in 2005Re18 evaluation based on 1989Be48; however neither of the γ′s depopulating 1687.9 level were confirmed by 2009Go33 and it was not adopted in this evaluation. J^π: ratio of the (d,d′) cross sections at 90° and 125° suggests 3^-.
1691.35[h] *6*	3^-	0.15 ps *+24−7*	G	J^π: E1 γ to 4^+ and (E1) γ to 2^+.
1692.8?[f] *6*	(4^+)		G	E(level): very close lying to well defined 1691 level; according to 2012Gr22 (in (n,n′γ) dataset) both these levels are deexcited by 1442.95γ and 1443.0γ (possibly of same intensities). J^π: γ′s to 2^+ and 4^+ and member of first K^π=1$^+$ band.

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Adopted Levels, Gammas (continued)

^{160}Gd Levels (continued)

E(level)[†]	J$^{\pi}$	T$_{1/2}$[‡]	XREF	Comments
1698.21 *22*	(5,6$^+$)		A	J$^{\pi}$: (5,6) adopted in β^- decay (42.6 s) based on direct feeding from (5$^-$) parent; (4$^+$,5,6$^+$) from γ's to (4$^+$) and 6$^+$.
1717.5[@] *6*	(8$^+$)		G I	J$^{\pi}$: γ's to 6$^+$ and 8$^+$ levels. Level energy consistent with that of the 8$^+$ member of the γ-vibrational band.
1720.48 *9*	(2$^+$)		G	J$^{\pi}$: 2$^-$,3,4$^+$ ruled out by $\gamma(\theta)$ (2009Go33, (n,n'γ)); (2$^+$,3,4$^+$) from γ's to 2$^+$ and 4$^+$.
1731.93 *7*	NOT 1		G	J$^{\pi}$: 1 is ruled out by A$_2$=+0.25 in $\gamma(\theta)$ (2009Go33, (n,n'γ)).
1748.55[c]	(6$^+$)		G	J$^{\pi}$: member of first excited K$^{\pi}$=0$^+$ band.
1782.48[h] *7*	(4)$^-$		G	J$^{\pi}$: E1 γ to 4$^+$ and member of first K$^{\pi}$=2$^-$ band.
1804.97 *6*	2$^+$	>208 fs	G	J$^{\pi}$: E2 γ to 0$^+$ and γ to 4$^+$.
1806.9[#] *11*	12$^+$		G I	J$^{\pi}$: γ to 10$^+$ member of g.s. band. Level energy and population in Coulomb excitation indicate that this is the 12$^+$ member of this band.
1884.0[h] *4*	(5$^-$)		G	J$^{\pi}$: member of first K$^{\pi}$=2$^-$ band.
1886.8 *7*	(1,2)		B	J$^{\pi}$: γ to 2$^+$ and possible β feeding from (1$^-$) (2020Ha13).
1910.7[e] *4*	(7$^-$)		G	J$^{\pi}$: member of first K$^{\pi}$=1$^-$ band.
1931.86 *10*	2$^+$	0.5 ps *+12−2*	B G	J$^{\pi}$: M1+E2 γ to 2$^+$ and γ's to 0$^+$ and 4$^+$.
1941.5[b] *10*	(9$^-$)		G I	J$^{\pi}$: γ's to 8$^+$ and 10$^+$ members of the g.s. band. Level energy consistent with assignment as the 9$^-$ member of the 0$^-$ octupole band.
1966.51 *10*	(1$^-$)	23 fs *8*	B E G	J$^{\pi}$: E1 γ's to 0$^+$ and 2$^+$, with both γ's from all three datasets which observed this level. However this contradicts (2$^+$,3,4$^+$) from other γ's coming exclusively from β^- decay (30.8 s) to 2$^+$ and 4$^+$, which suggests that this level could be a doublet. See also comments on 908.2, 977.3 and 1717.0 γ transitions. T$_{1/2}$: mean value of 20 fs *5* from $\Gamma^2_{\gamma 0}/\Gamma$=3.9 meV 9 (1989Pi05, ($\gamma$,$\gamma'$), assuming that the 1891 and 1967 γ's are the only deexciting transitions) and 26 fs *+6−5* from DSAM (2017Le04, (n,n'γ))
1969.67 *13*	2$^+$		G	J$^{\pi}$: M1+E2 γ to 2$^+$ and γ's to 0$^+$ and 4$^+$.
1973			H	this level was related with 1971.5 in 2005Re18 evaluation based on 1989Be48; however neither of the γ's depopulating 1971.5 level were confirmed by 2009Go33 and it was not adopted in this evaluation.
1996.26 *15*			G	
1998.71 *8*	(5$^-$)		A	J$^{\pi}$: γ's to 4$^+$ and 6$^+$ and proposed configuration. Possible K^{π}=5$^-$ bandhead. Proposed π^2(5/2[413],5/2[532]) configuration in β^- decay (42.6 s) (2018Ha19, 2020Ha13).
2030.61 *13*	2$^+$,3$^+$		G	J$^{\pi}$: M1+E2 γ to 2$^+$ and γ's to 4$^+$.
2059.62 *10*	2$^{(-)}$,3$^{(-)}$	159 fs *+62−35*	GH	XREF: H(2063). J$^{\pi}$: (E1+M2) γ to 4$^+$ allows J=2,3,4 and tentative negative parity; 2009Go33 in (n,n'γ) dataset explicitly exclude 2$^+$, 4$^-$, and 6$^+$ (from the A$_2$ value of angular distribution coefficient).
2109.33 *9*	1$^{(+)}$	229 fs *+83−49*	G	J$^{\pi}$: (M1) γ to 0$^+$.
2118.6[@] *8*	(10$^+$)		G I	J$^{\pi}$: γ's to 8$^+$ and 10$^+$ states. Level energy consistent with assignment as the 10$^+$ member of the γ-vibrational band.
2118.90 *18*	2$^+$		G	J$^{\pi}$: E2 γ to 0$^+$.
2135.72 *10*		0.29 ps *+61−13*	G	
2139 *7*			D H	XREF: H(2141).
2162.69 *12*	1		E G	J$^{\pi}$: dipole excitation in (γ,γ').
2236	(0$^+$)		D	J$^{\pi}$: L=(0) in (t,p) (1986Lo15).
2242.2 *6*	(1,2)		B	
2252.7 *3*			A	
2277.4 *5*	1		B E	J$^{\pi}$: stretched D γ to 0$^+$ in (γ,γ').

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Adopted Levels, Gammas (continued)

^{160}Gd Levels (continued)

E(level)[†]	J^π	XREF	Comments
2282.74 *22*	(1^+,2^+)	B G	J^π: γ's to 0^+ and 3^+.
2301.54 *16*	2^+	G	J^π: E2 γ to 0^+.
2313.3[b] *13*	(11^-)	G I	J^π: γ to the 10^+ member and possible γ to the 12^+ member of the g.s. band. Level energy consistent with assignment as the 11^- member of the 0^- octupole band.
2315.8 *10*	(1,2)	B	J^π: from possible β feeding from (1^-) (2020Ha13).
2327.5 *6*	(1^+,2)	B	J^π: (1^+,2,3^-) from γ's to 1^- and 3^+ respectively; (1^+,2) from possible β feeding from (1^-) (2020Ha13).
2333.5 *5*	(1,2^+)	B	J^π: (0^+,1,2^+) from γ's to 0^+ and 2^+ respectively; (1^+,2) from possible β feeding from (1^-) (2020Ha13).
2344.5 *4*		A	
2347.4 *4*	1^+	dE G	XREF: d(2350). J^π: M1 excitation in (γ,γ').
2361.93 *14*	(2^+,3^-)	B G	J^π: γ's to $1^{(-)}$ and 4^+.
2377.9[#] *15*	14^+	G I	J^π: sole observed decay mode is a γ to the 12^+ member of the g.s. band. Level energy and population in Coulomb excitation indicate that this is the 14^+ member of that band.
2383.6 *6*	(2^+,3,4^+)	G	J^π: γ's to 2^+ and 4^+.
2385.6 *7*	(1,2)	B	J^π: from possible β feeding from (1^-) (2020Ha13).
2432.7 *4*	(1^-,2^+)	B	J^π: γ's to 0^+ and 3^-.
2444.8 *3*	(2^+,3,4^+)	G	J^π: γ's to 2^+ and 4^+.
2456.0 *3*	(2^+,3,4^+)	G	J^π: γ's to 2^+ and 4^+.
2464.41 *10*	(1^-)	B	J^π: (1,2^+) from γ's to 0^+, 2^+ and 2^-; (1^-) from possible β feeding from (1^-) (2020Ha13).
2471.77 *10*	1^-	B E G	J^π: E1 excitation in (γ,γ'). the large B(E1) value (3.1×10^{-5} *5*) for exciting this level in (γ,γ') has been used as evidence for considering it to be a collective electric-dipole excitation arising from, for example, a reflection-asymmetric shape and/or a cluster configuration.
2489.60 *13*	(5^+,6^+)	A	J^π: γ's to (4^+) and (7^+).
2510.7 *5*	(1,2^-)	B	
2516.5 *5*	(2)	B	J^π: (2,3^-) from γ's to 1^-, 3^+ and 3^-; (2) from possible β feeding from (1^-) (2020Ha13).
2529.9 *5*	(1^-,2)	B	J^π: (1^-,2,3^-) from γ's to 1^- and 3^-; (1^-,2) from possible β feeding from (1^-) (2020Ha13).
2547.0 *5*	(0^+,1,2^+)	G	J^π: γ's to 0^+ and 2^+.
2559.54 *13*	(5^+,6^+)	A	J^π: γ's to (4^+) and (7^+).
2582.9[@] *10*	(12^+)	G I	J^π: γ's to 10^+ and 12^+ levels. Level energy consistent with assignment as the 12^+ member of the γ-vibrational band.
2670.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
2761.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
2796.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
2820.2 *7*	$1^{(+)}$	E	J^π: dipole, $\Delta\pi$=(no) excitation in (γ,γ').
2999.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3008.7[#] *18*	16^+	G I	J^π: sole observed mode of decay is a γ to the 14^+ member of the g.s. band. Level energy and population in Coulomb excitation indicate that this is the 16^+ member of that band.
3032.2 *7*	1^-	E	J^π: E1 excitation in (γ,γ').
3131.2 *7*	1^-	E	J^π: E1 excitation in (γ,γ').
3166.2 *7*	$1^{(-)}$	E	J^π: dipole, $\Delta\pi$=(yes) excitation in (γ,γ').
3170.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
3228.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3277.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
3292.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3308.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
3328.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3331.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
3340.2 *7*	1^+	E	J^π: M1 excitation in (γ,γ').
3357.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3376.2 *7*	1	E	J^π: dipole excitation in (γ,γ').
3415.2 *7*	1^-	E	J^π: E1 excitation in (γ,γ').
3460.2 *7*	1^-	E	J^π: E1 excitation in (γ,γ').

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Adopted Levels, Gammas (continued)

^{160}Gd Levels (continued)

E(level)[†]	J^π	XREF	Comments
3477.2 7	$1^{(+)}$	E	J^π: dipole, $\Delta\pi$=(no) excitation in (γ,γ').
3537.2 7	1	E	J^π: dipole excitation in (γ,γ').
3550.2 7	1	E	J^π: dipole excitation in (γ,γ').

[†] Except for levels populated only in (γ,γ'), from a least-squares fit to the γ-ray energies with ΔE_γ=1 keV for γ's with no listed uncertainties. No unc is assigned to levels when no unc is assigned to the energy values of its decaying γ's. Values from the dataset are adopted for transitions populated exclusively in (γ,γ') (see comment therein).

[‡] From $\gamma(\theta)$ and DSAM in $(n,n'\gamma)$ dataset (2017Le04 and 2015Le05) unless noted otherwise.

[#] Band(A): $K^\pi=0^+$ ground-state rotational band. A=12.60 keV, B=−8.6 eV (from 0^+, 2^+, and 4^+ levels).

[@] Band(B): $K^\pi=2^+$ γ-vibrational band. A=11.54 keV, B=−7.9 eV, and A_4=−0.89 eV (from 2^+, 3^+, 4^+, and 5^+ levels).

[&] Band(C): First $K^\pi=4^+$ band. possible hexadecapole-vibrational band. A=11.85 keV (from 4^+ and 6^+ levels). A significant odd-even shift in the level energies renders extraction of additional band parameters from only two energy differences ambiguous. The quasiparticle-phonon model calculations of 1996So19 and 1997So26 indicate that this band is predominantly hexadecapole-vibrational in makeup. Dominant 2-qp ν^2(3/2[521],5/2[523]) configuration (2018Ha19, 2020Ha13).

[a] Band(c): Second $K^\pi=4^+$ band. Dominant 2-qp π^2(3/2[411],5/2[413]) configuration (2018Ha19, 2020Ha13).

[b] Band(D): $K^\pi=0^-$ octupole-vibrational band. A=6.58 keV (from 1^- and 3^- levels). Small A-value and relatively large, positive, implied B-value probably reflects strong Coriolis mixing with other octupole bands.

[c] Band(E): first excited $K^\pi=0^+$ band.

[d] Band(F): second excited $K^\pi=0^+$ band.

[e] Band(G): first $K^\pi=1^-$ band.

[f] Band(H): first $K^\pi=1^+$ band.

[g] Band(a): first $K^\pi=3^-$ band ?

[h] Band(b): first $K^\pi=2^-$ band.

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[&h]	α[g]	Comments
75.263	2^+	75.26 *1*	100	0.0	0^+	[E2]		7.33	α(K)=2.26 *4*; α(L)=3.91 *6*; α(M)=0.925 *13* α(N)=0.206 *3*; α(O)=0.0267 *4*; α(P)=0.0001124 *16* B(E2)(W.u.)=200.5 *+25−27* E_γ: from curved crystal measurement in Coul. ex.
248.502	4^+	173.24 *3*	100	75.263	2^+	E2		0.361	α(K)=0.239 *4*; α(L)=0.0942 *14*; α(M)=0.0218 *3* α(N)=0.00490 *7*; α(O)=0.000666 *10*; α(P)=1.326×10^{-5} *19*
514.81	6^+	266.31 *4*	100	248.502	4^+	E2		0.0874	α(K)=0.0654 *10*; α(L)=0.01711 *24*; α(M)=0.00390 *6* α(N)=0.000880 *13*; α(O)=0.0001237 *18*; α(P)=4.00×10^{-6} *6*
868.6	8^+	353.19	100	514.81	6^+	E2		0.0368	α(K)=0.0289 *4*; α(L)=0.00621 *9*; α(M)=0.001397 *20* α(N)=0.000317 *5*; α(O)=4.56×10^{-5} *7*; α(P)=1.85×10^{-6} *3*
988.548	2^+	739.96 *10*	4.7 *4*	248.502	4^+	E2		0.00532	α(K)=0.00444 *7*; α(L)=0.000691 *10*; α(M)=0.0001513 *22* α(N)=3.46×10^{-5} *5*; α(O)=5.24×10^{-6} *8*; α(P)=3.05×10^{-7} *5* B(E2)(W.u.)=0.85 *8*
		913.27 *2*	100.0[@] *1*	75.263	2^+	M1+E2	−0.45 *+4−5*	0.00529 *11*	B(M1)(W.u.)=0.00884 *+46−51*; B(E2)(W.u.)=1.07 *+21−16* α(K)=0.00450 *9*; α(L)=0.000618 *12*; α(M)=0.0001336 *25* α(N)=3.07×10^{-5} *6*; α(O)=4.78×10^{-6} *10*; α(P)=3.24×10^{-7} *7* δ: from 2017Le04; other values: < −37 and −72 *+35−∞* (2009Go33).
		988.56 *2*	88.7[@] *1*	0.0	0^+	E2		0.00282	α(K)=0.00238 *4*; α(L)=0.000345 *5*; α(M)=7.50×10^{-5} *11* α(N)=1.721×10^{-5} *24*; α(O)=2.63×10^{-6} *4*; α(P)=1.647×10^{-7} *23* B(E2)(W.u.)=3.80 *16*
1057.426	3^+	808.94 *3*	20.6[@] *2*	248.502	4^+	M1+E2	−11.7 *+16−23*	0.00437	α(K)=0.00366 *6*; α(L)=0.000556 *8*; α(M)=0.0001214 *17* α(N)=2.78×10^{-5} *4*; α(O)=4.22×10^{-6} *6*; α(P)=2.53×10^{-7} *4* B(M1)(W.u.)<4.6×10^{-5}; B(E2)(W.u.)<3.6 δ: from 2009Go33; other value: 0.11 *3* (2017Le04).
		982.16 *2*	100[@] *1*	75.263	2^+	M1+E2	+47 *+18−10*	0.00286	α(K)=0.00241 *4*; α(L)=0.000350 *5*; α(M)=7.62×10^{-5} *11* α(N)=1.747×10^{-5} *25*; α(O)=2.67×10^{-6} *4*; α(P)=1.670×10^{-7} *24* B(M1)(W.u.)<9.2×10^{-6}; B(E2)(W.u.)<6.5 δ: from 2009Go33.
1070.422	4^+	555.6 *5*	1.6[@] *1*	514.81	6^+				
		821.92 *2*	100[@] *2*	248.502	4^+	M1+E2	−0.71 *3*	0.00629 *11*	α(K)=0.00534 *9*; α(L)=0.000746 *12*; α(M)=0.000162 *3* α(N)=3.71×10^{-5} *6*; α(O)=5.75×10^{-6} *10*; α(P)=3.83×10^{-7} *7* δ: from 2009Go33.
		995.16 *3*	64.2[@] *13*	75.263	2^+	E2		0.00278	α(K)=0.00235 *4*; α(L)=0.000340 *5*; α(M)=7.39×10^{-5} *11* α(N)=1.695×10^{-5} *24*; α(O)=2.60×10^{-6} *4*; α(P)=1.625×10^{-7} *23* δ: E2+M3 in (n,n′γ) with mixing ratio not given.
1147.985	4^+	899.47 *2*	100[@] *1*	248.502	4^+	M1+E2	+21 *+21−7*	0.00345	α(K)=0.00290 *5*; α(L)=0.000430 *6*; α(M)=9.36×10^{-5} *14* α(N)=2.15×10^{-5} *3*; α(O)=3.27×10^{-6} *5*; α(P)=2.01×10^{-7} *3* B(M1)(W.u.)=6×10^{-5} *+8−5*; B(E2)(W.u.)=16 *+7−6* δ: from 2009Go33.

From ENSDF

$^{160}_{64}Gd_{96}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J_i^π	E_γ [†‡]	I_γ [#]	E_f	J_f^π	Mult. [&]	δ [&h]	α [g]	Comments
1147.985	4^+	1072.74 *3*	58.5[@] *9*	75.263	2^+	E2		0.00238	α(K)=0.00201 *3*; α(L)=0.000288 *4*; α(M)=6.24×10^{-5} *9* α(N)=1.432×10^{-5} *20*; α(O)=2.20×10^{-6} *3*; α(P)=1.395×10^{-7} *20* B(E2)(W.u.)=3.8 *+16−15*
1173.09	$(5)^+$	102.7[e] *3*	30.2[e] *19*	1070.422	4^+	M1		1.87	α(K)=1.58 *3*; α(L)=0.227 *4*; α(M)=0.0494 *8* α(N)=0.01137 *19*; α(O)=0.00176 *3*; α(P)=0.0001175 *20* E_γ,I_γ,Mult.: from β^- decay (42.6 s).
		658.20 *12*	13.4 *9*	514.81	6^+				I_γ: from β^- decay (42.6 s).
		924.59 *3*	100 *3*	248.502	4^+	M1+E2	+40 *+23−11*	0.00325	α(K)=0.00274 *4*; α(L)=0.000403 *6*; α(M)=8.77×10^{-5} *13* α(N)=2.01×10^{-5} *3*; α(O)=3.07×10^{-6} *5*; α(P)=1.89×10^{-7} *3* δ: from 2009Go33.
1224.237	$1^{(-)}$	235.8[fj] *10*	2.3[f] *3*	988.548	2^+	[E1]		0.0295 *6*	α(K)=0.0250 *5*; α(L)=0.00351 *7*; α(M)=0.000758 *14* α(N)=0.000173 *4*; α(O)=2.61×10^{-5} *5*; α(P)=1.56×10^{-6} *3* B(E1)(W.u.)=0.0167 *+30−26* exceeds RUL=0.01.
		1148.98 *3*	100[@] *1*	75.263	2^+	(E1)		8.88×10^{-4}	α(K)=0.000755 *11*; α(L)=9.81×10^{-5} *14*; α(M)=2.10×10^{-5} *3* α(N)=4.83×10^{-6} *7*; α(O)=7.50×10^{-7} *11*; α(P)=5.09×10^{-8} *8*; α(IPF)=8.44×10^{-6} *12* B(E1)(W.u.)=0.0063 *+7−6* Mult.: pure dipole in Coul. ex. does not exclude M1.
		1224.21 *3*	67.5[@] *8*	0.0	0^+	(E1)		8.21×10^{-4}	α(K)=0.000674 *10*; α(L)=8.74×10^{-5} *13*; α(M)=1.87×10^{-5} *3* α(N)=4.30×10^{-6} *6*; α(O)=6.68×10^{-7} *10*; α(P)=4.54×10^{-8} *7*; α(IPF)=3.53×10^{-5} *5* B(E1)(W.u.)=0.00350 *+40−32* Mult.: pure dipole in Coul. ex. does not exclude M1.
1260.98	5^+	203.2[j] *4*	4.5 *13*	1057.426	3^+	[E2]		0.211 *4*	α(K)=0.1474 *23*; α(L)=0.0490 *8*; α(M)=0.01129 *19* α(N)=0.00254 *4*; α(O)=0.000349 *6*; α(P)=8.50×10^{-6} *13* E_γ: uncertain placement: B(E2)(W.u.)=4.7E3 *+19−18* exceeds RUL. Additional information 2.
		746.21 *8*	19.6[@] *9*	514.81	6^+	M1+E2	+8 *+13−4*	0.00528 *20*	α(K)=0.00441 *17*; α(L)=0.000682 *21*; α(M)=0.000149 *5* α(N)=3.42×10^{-5} *10*; α(O)=5.18×10^{-6} *16*;

$^{160}_{64}Gd_{96}$-8

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^{π}_i	E_γ[†‡]	I_γ[#]	E_f	J^{π}_f	Mult.[&]	δ[&h]	α[g]	Comments
									α(P)=3.04×10^{-7} *13* B(M1)(W.u.)=0.0005 *+15−5*; B(E2)(W.u.)=30 *8* δ: from 2017Le04; other values: +0.03 *3* or −22 *+11−800* (2009Go33); 0.24 *10* (2017Le04, higher χ^2 than for adopted value).
1260.98	5$^+$	1012.46 *3*	100[@] *1*	248.502	4$^+$	M1+E2	+15 *+17−6*	0.00269	α(K)=0.00227 *4*; α(L)=0.000328 *5*; α(M)=7.12×10^{-5} *11* α(N)=1.634×10^{-5} *24*; α(O)=2.50×10^{-6} *4*; α(P)=1.574×10^{-7} *23* B(E2)(W.u.)<45 δ: from 2017Le04; other value: +49 *+34−14* (2009Go33).
1289.76	3$^-$	1041.27 *3*	54.6[@] *7*	248.502	4$^+$	E1		1.05×10^{-3}	B(E1)(W.u.)=0.00304 *+30−25* α(K)=0.000904 *13*; α(L)=0.0001178 *17*; α(M)=2.53×10^{-5} *4* α(N)=5.81×10^{-6} *9*; α(O)=9.00×10^{-7} *13*; α(P)=6.08×10^{-8} *9* Mult.,δ: E1+M2, δ=+0.10 *2* (2009Go33); M2 mixing not adopted becasue B(M2)(W.u.) exceeds RUL.
		1214.43 *5*	100[@] *1*	75.263	2$^+$	(E1)		8.28×10^{-4}	α(K)=0.000684 *10*; α(L)=8.86×10^{-5} *13*; α(M)=1.90×10^{-5} *3* α(N)=4.37×10^{-6} *7*; α(O)=6.78×10^{-7} *10*; α(P)=4.61×10^{-8} *7*; α(IPF)=3.09×10^{-5} *5* B(E1)(W.u.)=0.00351 *+34−28* Mult.: from Coul. ex.
1295.22	(6$^+$)	123[j] *1*	<11	1173.09	(5)$^+$				E_γ,I_γ: from 2020Ha13 (β^- decay (4.6 s)).
		224.96 *12*	53 *4*	1070.422	4$^+$				
		780.66 *13*	35 *3*	514.81	6$^+$				
		1046.62[i] *5*	100[i] *4*	248.502	4$^+$				
1301.3	10$^+$	432.7[b]	100	868.6	8$^+$	[E2]		0.0206	α(K)=0.01654 *24*; α(L)=0.00318 *5*; α(M)=0.000709 *10* α(N)=0.0001612 *23*; α(O)=2.36×10^{-5} *4*; α(P)=1.093×10^{-6} *16*
1325.7	(2$^+$)	1250.42	100	75.263	2$^+$				γ ray initially considered isotropic by 1989Be48 was proved unisotropic by 2009Go33 and 2015Le05. Moreover 2009Go33 replaced it uniquely at 1499, while 2015Le05 found it as doublet placed at 1499 and 1326 respectively.
1351.188	1$^-$	1275.90 *2*	100[@] *2*	75.263	2$^+$	E1		7.90×10^{-4}	α(K)=0.000627 *9*; α(L)=8.11×10^{-5} *12*; α(M)=1.739×10^{-5} *25* α(N)=4.00×10^{-6} *6*; α(O)=6.20×10^{-7} *9*; α(P)=4.23×10^{-8} *6*; α(IPF)=5.99×10^{-5} *9* B(E1)(W.u.)=7.4×10^{-4} *+9−8* Mult.,δ: E1+M2, δ=+0.14 *5* (2009Go33); M2 mixing not adopted becasue B(M2)(W.u.) exceeds RUL.
		1351.30 *5*	20.0[@] *4*	0.0	0$^+$	E1		7.62×10^{-4}	α(K)=0.000567 *8*; α(L)=7.32×10^{-5} *11*; α(M)=1.570×10^{-5} *22*

$^{160}_{64}Gd_{96}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ [†‡]	I_γ [#]	E_f	J^π_f	Mult. [&]	δ [&h]	α [g]	Comments
									α(N)=3.61×10^{-6} *5*; α(O)=5.60×10^{-7} *8*; α(P)=3.83×10^{-8} *6*; α(IPF)=0.0001019 *15* B(E1)(W.u.)=1.24×10^{-4} *+16−13*

$^{160}_{64}Gd_{96}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[&h]	α[g]	Comments
1376.73	2^-	319.2 *6*	1.8[@] *1*	1057.426	3^+	E1		0.01364	α(K)=0.01160 *18*; α(L)=0.001602 *24*; α(M)=0.000346 *6* α(N)=7.90×10^{-5} *12*; α(O)=1.202×10^{-5} *18*; α(P)=7.42×10^{-7} *11* B(E1)(W.u.)<3.5×10^{-4}
		1128.3[j] *10*	≤1	248.502	4^+				E_γ: from β- decay (30.8 s), not confirmed by other studies (if placed here it would be a M2 γ which is less likely).
		1301.46 *3*	100[@] *1*	75.263	2^+	E1(+M2)	−0.08 *+5−4*	0.00081 *4*	α(K)=0.00063 *4*; α(L)=8.2×10^{-5} *5*; α(M)=1.76×10^{-5} *11* α(N)=4.05×10^{-6} *25*; α(O)=6.3×10^{-7} *4*; α(P)=4.3×10^{-8} *3*; α(IPF)=7.25×10^{-5} *12* B(E1)(W.u.)<2.7×10^{-4} δ: from 2009Go33. B(M2)(W.u.)<10 exceeds RUL=1.
1379.54	0^+	1304.27 *4*	100	75.263	2^+	E2		1.63×10^{-3}	α(K)=0.001366 *20*; α(L)=0.000189 *3*; α(M)=4.09×10^{-5} *6* α(N)=9.40×10^{-6} *14*; α(O)=1.450×10^{-6} *21*; α(P)=9.48×10^{-8} *14*; α(IPF)=2.08×10^{-5} *3* B(E2)(W.u.)<3.1
1392.99	6^+	878.17 *8*	100 *6*	514.81	6^+	M1+E2	+14 *16*	0.0036 *6*	α(K)=0.0031 *5*; α(L)=0.00046 *6*; α(M)=9.9×10^{-5} *12* α(N)=2.3×10^{-5} *3*; α(O)=3.5×10^{-6} *5*; α(P)=2.1×10^{-7} *4* δ: from 2009Go33; other value: +30<δ < −1.5 (2009Go33).
		1144.63 *25*	58 *4*	248.502	4^+	E2		0.00209	α(K)=0.001767 *25*; α(L)=0.000250 *4*; α(M)=5.41×10^{-5} *8* α(N)=1.242×10^{-5} *18*; α(O)=1.91×10^{-6} *3*; α(P)=1.225×10^{-7} *18*; α(IPF)=1.412×10^{-6} *23*
1427.40	5^-	1178.90 *4*	100	248.502	4^+	E1		8.57×10^{-4}	α(K)=0.000721 *10*; α(L)=9.36×10^{-5} *13*; α(M)=2.01×10^{-5} *3* α(N)=4.61×10^{-6} *7*; α(O)=7.15×10^{-7} *10*; α(P)=4.86×10^{-8} *7*; α(IPF)=1.681×10^{-5} *24* B(E1)(W.u.)=0.0040 *+10−7* Mult.,δ: E1+M2, δ=−0.03 *2* (2009Go33); M2 mixing not adopted becasue B(M2)(W.u.) exceeds RUL.

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ [†‡]	I_γ [#]	E_f	J^π_f	Mult. [&]	α [g]	Comments
1436.27	2+	288.21[ij] 25	8.4[i] 12	1147.985	4+	[E2]	0.0682	α(K)=0.0518 8; α(L)=0.01277 19; α(M)=0.00290 5 α(N)=0.000655 10; α(O)=9.27×10^{-5} 14; α(P)=3.21×10^{-6} 5 E_γ: uncertain placement: B(E2)(W.u.)<1419 exceeds RUL=1000. Additional information 3.
		1187.76 4	100[@] 1	248.502	4+	E2	0.00194	α(K)=0.001642 23; α(L)=0.000231 4; α(M)=4.99×10^{-5} 7 α(N)=1.146×10^{-5} 16; α(O)=1.764×10^{-6} 25; α(P)=1.138×10^{-7} 16; α(IPF)=4.30×10^{-6} 6 B(E2)(W.u.)<13
		1361.06 5	36.4[@] 4	75.263	2+	M1+E2	0.0019 4	α(K)=0.0016 4; α(L)=0.00021 4; α(M)=4.6×10^{-5} 9 α(N)=1.06×10^{-5} 20; α(O)=1.6×10^{-6} 4; α(P)=1.11×10^{-7} 25; α(IPF)=3.51×10^{-5} 20 δ: −0.02 4 or +2.46 +30−25 (2009Go33, (n,n′γ)).
		1436.16 7	13.5[@] 2	0.0	0+	E2	1.39×10^{-3}	α(K)=0.001135 16; α(L)=0.0001553 22; α(M)=3.36×10^{-5} 5 α(N)=7.71×10^{-6} 11; α(O)=1.191×10^{-6} 17; α(P)=7.87×10^{-8} 11; α(IPF)=5.39×10^{-5} 8 B(E2)(W.u.)<0.67
1437.40	(7+)	264.5[e] 3	100	1173.09	(5)+			
1460.3	(3−)	1385.0 4	100 14	75.263	2+			
		1461.7[j] 6	64 7	0.0	0+			
1463.83	3−	1215.3[f] 8	100[f] 5	248.502	4+	[E1]	8.27×10^{-4}	α(K)=0.000683 10; α(L)=8.85×10^{-5} 13; α(M)=1.90×10^{-5} 3 α(N)=4.36×10^{-6} 7; α(O)=6.77×10^{-7} 10; α(P)=4.60×10^{-8} 7; α(IPF)=3.13×10^{-5} 6 B(E1)(W.u.)=0.016 +18−7
		1388.56 4	64.1[f] 14	75.263	2+	E1	7.56×10^{-4}	α(K)=0.000541 8; α(L)=6.98×10^{-5} 10; α(M)=1.496×10^{-5} 21 α(N)=3.44×10^{-6} 5; α(O)=5.34×10^{-7} 8; α(P)=3.65×10^{-8} 6; α(IPF)=0.0001263 18 B(E1)(W.u.)=0.007 +7−3 Mult.,δ: E1+M2, δ=−0.050 20 (2009Go33); M2 mixing not adopted because B(M2)(W.u.) exceeds RUL.
1483.08	(4+)	187.5[e] 3	2.0[e] 7	1295.22	(6+)			
		310.0[e] 2	7.6[e] 5	1173.09	(5)+			
		412.7[e] 1	100[e] 5	1070.422	4+			
		968.4[e] 3	4.6[e] 6	514.81	6+			
		1234.6[e] 2	13.4[e] 7	248.502	4+			
		1408.1[e] 3	1.3[e] 5	75.263	2+			
1498.85	4−	441.51 22	7.8 12	1057.426	3+	[E1]	0.00626	α(K)=0.00534 8; α(L)=0.000725 11; α(M)=0.0001562 22 α(N)=3.58×10^{-5} 5; α(O)=5.48×10^{-6} 8; α(P)=3.49×10^{-7} 5 B(E1)(W.u.)<8.2×10^{-4}

$^{160}_{64}Gd_{96}$-12

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[&h]	α[g]	Comments
1498.85	4^-	1250.34 *4*	100 *3*	248.502	4^+	E1(+M2)	+0.05 *6*	0.00082 *6*	α(K)=0.00066 *5*; α(L)=8.6×10^{-5} *7*; α(M)=1.84×10^{-5} *15* α(N)=4.2×10^{-6} *4*; α(O)=6.6×10^{-7} *6*; α(P)=4.5×10^{-8} *4*; α(IPF)=4.74×10^{-5} *8* B(E1)(W.u.)<4.0×10^{-4} δ: from 2009Go33. B(M2)(W.u.)<14 exceeds RUL=1.
1531.95	3^-	384.02 *10*	100 *6*	1147.985	4^+	E1+M2	−0.14 *5*	0.012 *3*	α(K)=0.0101 *23*; α(L)=0.00148 *38*; α(M)=3.22×10^{-4} *85* α(N)=7.4×10^{-5} *20*; α(O)=1.13×10^{-5} *30*; α(P)=7.2×10^{-7} *20* δ: from 2009Go33.
		543.37[i] *11*	62[i] *5*	988.548	2^+				
		1283.1 *3*	6 *3*	248.502	4^+				
1548.18	(7^+)	286.9[e] *3*	20[e] *10*	1260.98	5^+				
		1033.40 *8*	100	514.81	6^+				
1558.35	0^+	1483.08 *8*	100	75.263	2^+	E2		1.32×10^{-3}	α(K)=0.001068 *15*; α(L)=0.0001456 *21*; α(M)=3.14×10^{-5} *5* α(N)=7.22×10^{-6} *11*; α(O)=1.117×10^{-6} *16*; α(P)=7.41×10^{-8} *11*; α(IPF)=6.86×10^{-5} *10* B(E2)(W.u.)<3.7
1561.45	4^+	1046.62[i] *5*	100[i@] *1*	514.81	6^+	[E2]		0.00250	α(K)=0.00212 *3*; α(L)=0.000304 *5*; α(M)=6.59×10^{-5} *10* α(N)=1.512×10^{-5} *22*; α(O)=2.32×10^{-6} *4*; α(P)=1.466×10^{-7} *21* B(E2)(W.u.)<23
		1312.99 *7*	74.8[@] *3*	248.502	4^+	M1+E2	+0.28 *+34−12*	0.00237 *17*	B(M1)(W.u.)<0.018; B(E2)(W.u.)<1.5 α(K)=0.00200 *15*; α(L)=0.000269 *19*; α(M)=5.8×10^{-5} *4* α(N)=1.34×10^{-5} *10*; α(O)=2.08×10^{-6} *15*; α(P)=1.43×10^{-7} *12*; α(IPF)=2.48×10^{-5} *7* δ: from 2017Le04; other value: +0.57 *+17−44* (2009Go33).
1568.67	1^+	217.4[i] *3*	8.8[i@] *15*	1351.188	1^-	E1		0.0364	α(K)=0.0309 *5*; α(L)=0.00436 *7*; α(M)=0.000941 *14* α(N)=0.000215 *4*; α(O)=3.23×10^{-5} *5*; α(P)=1.91×10^{-6} *3* B(E1)(W.u.)=0.0010 *+8−5*
		580.11 *7*	89.2[@] *16*	988.548	2^+	M1+E2	+0.28 *+25−18*	0.0168 *12*	α(K)=0.0143 *11*; α(L)=0.00199 *11*; α(M)=0.000431 *23* α(N)=9.9×10^{-5} *6*; α(O)=1.54×10^{-5} *9*;

$^{160}_{64}Gd_{96}$-13

Adopted Levels, Gammas (continued)

γ(^{160}Gd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†‡]	I$_\gamma$[#]	E$_f$	J$^\pi_f$	Mult.[&]	δ[&h]	α[g]	Comments
									α(P)=1.04×10^{-6} 9 B(M1)(W.u.)=0.045 +33−25; B(E2)(W.u.)=5 +13−4 δ: from 2017Le04; other values: +0.45 +50−24 or +2<δ < −11 (2009Go33).
1568.67	1$^+$	1493.39 7	94.4[@] 16	75.263	2$^+$	M1+E2	+1.34 +16−6	0.00151 4	α(K)=0.00122 3; α(L)=0.000165 4; α(M)=3.56×10^{-5} 9 α(N)=8.19×10^{-6} 19; α(O)=1.27×10^{-6} 3; α(P)=8.60×10^{-8} 22; α(IPF)=7.52×10^{-5} 12 B(M1)(W.u.)=0.0011 +8−7; B(E2)(W.u.)=0.43 +36−24 δ: from 2017Le04; other values: +12.5 122 and +0.3<δ<+24.6 (2009Go33).
		1568.70 7	100[@] 2	0.0	0$^+$	(M1)		1.70×10^{-3}	α(K)=0.001359 19; α(L)=0.000182 3; α(M)=3.91×10^{-5} 6 α(N)=9.01×10^{-6} 13; α(O)=1.407×10^{-6} 20; α(P)=9.74×10^{-8} 14; α(IPF)=0.0001115 16 B(M1)(W.u.)=0.0028 +22−15 Mult.: pure dipole in (n,n′γ) (2009Go33) does not exclude E1.
1581.81	(5$^+$)	98.8[e] 3	8.9[e] 22	1483.08	(4$^+$)	M1		2.08 4	α(K)=1.76 3; α(L)=0.254 5; α(M)=0.0552 10 α(N)=0.01271 21; α(O)=0.00197 4; α(P)=0.0001313 22 Mult.: from β^- decay (42.6 s).
		286[ej]	<1.4[e]	1295.22	(6$^+$)				
		408.9[e] 2	100[e] 5	1173.09	(5)$^+$				
1583.59		293.76 17	100	1289.76	3$^-$				
1586.56	2$^+$	1511.40 7	33.0 15	75.263	2$^+$	M1+E2	−0.24 5	0.00179	α(K)=0.001455 23; α(L)=0.000195 3; α(M)=4.20×10^{-5} 7 α(N)=9.67×10^{-6} 15; α(O)=1.509×10^{-6} 24; α(P)=1.043×10^{-7} 17; α(IPF)=8.75×10^{-5} 13 B(M1)(W.u.)<0.0047; B(E2)(W.u.)<0.082 δ: from 2017Le04; other values: −0.24 5 or +5.8 +24−13 (2009Go33).
		1586.50[i] 5	100[i] 4	0.0	0$^+$	[E2]		1.21×10^{-3}	α(K)=0.000940 14; α(L)=0.0001273 18; α(M)=2.75×10^{-5} 4 α(N)=6.31×10^{-6} 9; α(O)=9.77×10^{-7} 14; α(P)=6.52×10^{-8} 10; α(IPF)=0.0001051 15 B(E2)(W.u.)<2.4
1597.3	(8$^+$)	302.1		1295.22	(6$^+$)				
		729.8[j]		868.6	8$^+$				E$_\gamma$: from 2012Gr22 in (n,n′γ) dataset where is unclear if this placement or that at 1437.2 level is valid (the latter would populate an inexiting level).
1598.82	2$^+$	309.0 5	8.9[@] 4	1289.76	3$^-$	E1		0.01479	α(K)=0.01258 19; α(L)=0.00174 3; α(M)=0.000375 6

From ENSDF

$^{160}_{64}Gd_{96}$-14

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[&h]	α[g]	Comments
									α(N)=8.58×10^{-5} *13*; α(O)=1.304×10^{-5} *19*; α(P)=8.03×10^{-7} *12* B(E1)(W.u.)=0.00051 *+31−25*
1598.82	2$^+$	374.6 *4*	14.8[@] *3*	1224.237	1$^{(-)}$	E1		0.00923	α(K)=0.00786 *12*; α(L)=0.001076 *16*; α(M)=0.000232 *4* α(N)=5.31×10^{-5} *8*; α(O)=8.10×10^{-6} *12*; α(P)=5.09×10^{-7} *8* B(E1)(W.u.)=0.00048 *+29−22*
		541.40 *12*	36.8[@] *3*	1057.426	3$^+$	M1		0.0207	α(K)=0.01757 *25*; α(L)=0.00243 *4*; α(M)=0.000527 *8* α(N)=0.0001212 *17*; α(O)=1.89×10^{-5} *3*; α(P)=1.284×10^{-6} *18* B(M1)(W.u.)=0.038 *+23−18* δ: −0.06 *10* or −4.3 *+13−29* (2009Go33); −0.01 *9* or −5.6 *+19−50* (2017Le04).
		1523.54 *6*	100[@] *1*	75.263	2$^+$	M1+E2	−1.0 *+2−21*	0.00153 *22*	α(K)=0.00123 *18*; α(L)=0.000166 *23*; α(M)=3.6×10^{-5} *5* α(N)=8.2×10^{-6} *12*; α(O)=1.28×10^{-6} *19*; α(P)=8.7×10^{-8} *14*; α(IPF)=8.8×10^{-5} *5* B(M1)(W.u.)=0.0023 *+16−15*; B(E2)(W.u.)=0.50 *+36−25* δ: from 2017Le04; other values: −0.83 *+10−15* or −3.4 *+8−11* (2009Go33).
		1598.81 *7*	78.7[@] *1*	0.0	0$^+$	E2		1.20×10^{-3}	α(K)=0.000927 *13*; α(L)=0.0001254 *18*; α(M)=2.70×10^{-5} *4* α(N)=6.21×10^{-6} *9*; α(O)=9.63×10^{-7} *14*; α(P)=6.43×10^{-8} *9*; α(IPF)=0.0001098 *16* B(E2)(W.u.)=0.61 *+37−28*
1608.3		384.1[f] *10*	100[f]	1224.237	1$^{(-)}$				
1621.37	2$^-$	397.10 *17*	16.4 *15*	1224.237	1$^{(-)}$	[M1]		0.0457	α(K)=0.0388 *6*; α(L)=0.00543 *8*; α(M)=0.001177 *17* α(N)=0.000271 *4*; α(O)=4.21×10^{-5} *6*; α(P)=2.85×10^{-6} *4* B(M1)(W.u.)=0.20 *+22−11*
		563.99 *15*	29.0[@] *7*	1057.426	3$^+$	E1		0.00361	α(K)=0.00308 *5*; α(L)=0.000413 *6*; α(M)=8.90×10^{-5} *13* α(N)=2.04×10^{-5} *3*; α(O)=3.14×10^{-6} *5*; α(P)=2.04×10^{-7} *3* B(E1)(W.u.)=0.0013 *+14−7*
		632.82 *8*	100[@] *2*	988.548	2$^+$	E1		0.00282	α(K)=0.00241 *4*; α(L)=0.000321 *5*; α(M)=6.92×10^{-5} *10* α(N)=1.586×10^{-5} *23*; α(O)=2.44×10^{-6} *4*; α(P)=1.602×10^{-7} *23* B(E1)(W.u.)=0.0031 *+33−17*
1644.39	(7$^-$)	217.4[i] *3*	35[i] *11*	1427.40	5$^-$				observed only in (n,n′γ).
		775		868.6	8$^+$				observed only in Coul. ex.
		1129.51 *13*	100 *11*	514.81	6$^+$				observed in both Coul. ex. and (n,n′γ).
1647.95	4$^+$	1132.7 *8*	3.9 *15*	514.81	6$^+$	[E2]		0.00213	α(K)=0.00180 *3*; α(L)=0.000255 *4*; α(M)=5.54×10^{-5} *8*

$^{160}_{64}Gd_{96}$-15

γ(^{160}Gd) (continued)

E_i(level)	J^π_i	E_γ †‡	I_γ #	E_f	J^π_f	Mult. &	δ &h	α g	Comments
									α(N)=1.270×10^{-5} *18*; α(O)=1.95×10^{-6} *3*; α(P)=1.251×10^{-7} *18*; α(IPF)=9.7×10^{-7} *3* B(E2)(W.u.)=1.0 *+7−6*
1647.95	4$^+$	1399.4 *4*	7.5 *23*	248.502	4$^+$	[M1,E2]		0.0018 *4*	α(K)=0.0015 *3*; α(L)=0.00020 *4*; α(M)=4.3×10^{-5} *8* α(N)=9.9×10^{-6} *19*; α(O)=1.5×10^{-6} *3*; α(P)=1.05×10^{-7} *23*; α(IPF)=4.6×10^{-5} *3*
		1572.68 *8*	100 *5*	75.263	2$^+$	E2		1.22×10^{-3}	α(K)=0.000956 *14*; α(L)=0.0001295 *19*; α(M)=2.79×10^{-5} *4* α(N)=6.42×10^{-6} *9*; α(O)=9.94×10^{-7} *14*; α(P)=6.63×10^{-8} *10*; α(IPF)=0.0001000 *14* B(E2)(W.u.)=4.9 *+25−21*
1653.26	5$^-$	1138.44 *16*	100 *7*	514.81	6$^+$	E1(+M2)	−0.06 *5*	0.00093 *7*	α(K)=0.00079 *6*; α(L)=0.000103 *8*; α(M)=2.21×10^{-5} *17* α(N)=5.1×10^{-6} *4*; α(O)=7.9×10^{-7} *6*; α(P)=5.3×10^{-8} *4*; α(IPF)=6.34×10^{-6} *11* B(E1)(W.u.)=0.0018 *+6−5* δ: from 2009Go33. B(M2)(W.u.)=23 *+63−19* exceeds RUL=1.
		1404.75 *8*	100 *5*	248.502	4$^+$	E1		7.55×10^{-4}	α(K)=0.000530 *8*; α(L)=6.84×10^{-5} *10*; α(M)=1.466×10^{-5} *21* α(N)=3.37×10^{-6} *5*; α(O)=5.24×10^{-7} *8*; α(P)=3.58×10^{-8} *5*; α(IPF)=0.0001372 *20* B(E1)(W.u.)=0.00098 *+31−25* Mult.,δ: E1+M2, δ=−0.08 *4* (2009Go33); M2 mixing not adopted becasue B(M2)(W.u.) exceeds RUL.
1657.2	(1$^-$,2)	367.4[f] *10*	95[f] *4*	1289.76	3$^-$				
		433.2[f] *10*	100[f] *7*	1224.237	1$^{(-)}$				
1661.76	(2$^+$,3,4$^+$)	1412.95 *25*	5.6[@] *2*	248.502	4$^+$				
		1586.50[i] *5*	100[i@] *1*	75.263	2$^+$				
1665.09	3$^+$	288.21[i] *25*	43[i] *6*	1376.73	2$^-$				
		1416.66 *6*	100 *6*	248.502	4$^+$	M1+E2	+1.5 *10*	0.0016 *4*	α(K)=0.0013 *3*; α(L)=0.00018 *4*; α(M)=3.9×10^{-5} *8* α(N)=9.0×10^{-6} *18*; α(O)=1.4×10^{-6} *3*; α(P)=9.4×10^{-8} *21*; α(IPF)=5.0×10^{-5} *3* δ: from 2009Go33.
		1589.69 *8*	98 *5*	75.263	2$^+$	M1+E2	−0.9 *5*	0.00146 *15*	α(K)=0.00115 *12*; α(L)=0.000154 *16*; α(M)=3.3×10^{-5} *4* α(N)=7.6×10^{-6} *8*; α(O)=1.19×10^{-6} *13*; α(P)=8.1×10^{-8} *10*; α(IPF)=0.000114 *5* δ: from 2009Go33.
1668.4	(6$^-$)	1153.54	100	514.81	6$^+$				

$^{160}_{64}$Gd$_{96}$-16

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†‡]	I_{γ}[#]	E_f	J^{π}_f	Mult.[&]	α[g]	Comments
1691.35	3⁻	466.95 *12*	37 *4*	1224.237	1$^{(-)}$	[E2]	0.01674	α(K)=0.01353 *19*; α(L)=0.00250 *4*; α(M)=0.000557 *8* α(N)=0.0001268 *18*; α(O)=1.87×10^{-5} *3*; α(P)=9.01×10^{-7} *13* B(E2)(W.u.)=4.0×10^{2} *+36−22*
		543.37[i] *11*	60.8[i@] *15*	1147.985	4⁺	E1	0.00392	α(K)=0.00334 *5*; α(L)=0.000449 *7*; α(M)=9.68×10^{-5} *14* α(N)=2.22×10^{-5} *4*; α(O)=3.41×10^{-6} *5*; α(P)=2.21×10^{-7} *3* B(E1)(W.u.)=0.0019 *+17−10*
		634.18[i] *20*	99.5[i@] *25*	1057.426	3⁺	E1	0.00281	α(K)=0.00240 *4*; α(L)=0.000320 *5*; α(M)=6.88×10^{-5} *10* α(N)=1.578×10^{-5} *23*; α(O)=2.43×10^{-6} *4*; α(P)=1.595×10^{-7} *23* B(E1)(W.u.)=0.0019 *+18−11*
		702.82 *8*	100[@] *2*	988.548	2⁺	(E1)	0.00227	α(K)=0.00194 *3*; α(L)=0.000257 *4*; α(M)=5.53×10^{-5} *8* α(N)=1.269×10^{-5} *18*; α(O)=1.96×10^{-6} *3*; α(P)=1.293×10^{-7} *19* B(E1)(W.u.)=0.0014 *+13−8* Mult.,δ: E1+M2, δ=+0.06 *4* (2009Go33); M2 mixing not adopted becasue B(M2)(W.u.) exceeds RUL.
		1443.0 *3*	8.6[@] *6*	248.502	4⁺	E1	7.53×10^{-4}	α(K)=0.000507 *7*; α(L)=6.53×10^{-5} *10*; α(M)=1.399×10^{-5} *20* α(N)=3.21×10^{-6} *5*; α(O)=5.00×10^{-7} *7*; α(P)=3.42×10^{-8} *5*; α(IPF)=0.0001638 *23* B(E1)(W.u.)=1.4×10^{-5} *+13−8*
1692.8?	(4⁺)	1442.95[j]	<86	248.502	4⁺			E_{γ},I_{γ}: almost identical with 1443.0γ from 1691 level (in (n,n′γ)).
		1617.5 *6*	100 *21*	75.263	2⁺			
1698.21	(5,6⁺)	215[ej]	41[e] *9*	1483.08	(4⁺)			
		1183.5[e] *3*	100[e] *27*	514.81	6⁺			
1717.5	(8⁺)	325		1392.99	6⁺			
		849		868.6	8⁺			
		1202		514.81	6⁺			
1720.48	(2⁺)	663.4 *6*	9 *5*	1057.426	3⁺			
		731.93 *9*	100 *7*	988.548	2⁺			δ: −0.67 *+15−24* or −6 *+3−11* for J(1720)=2.
		1471.9 *3*	8 *3*	248.502	4⁺			
1731.93	NOT 1	743.39 *7*	100 *6*	988.548	2⁺			
		1656.4 *4*	12.7 *19*	75.263	2⁺			
1782.48	(4)⁻	521.44 *17*	19 *3*	1260.98	5⁺			E_{γ},I_{γ}: from (n,n′γ) (2012Gr22).
		634.18[i] *20*	100[i]	1147.985	4⁺	E1	0.00281	α(K)=0.00240 *4*; α(L)=0.000320 *5*; α(M)=6.88×10^{-5} *10* α(N)=1.578×10^{-5} *23*; α(O)=2.43×10^{-6} *4*; α(P)=1.595×10^{-7} *23* E_{γ},I_{γ}: from (n,n′γ) (2012Gr22).
		725.12 *8*	69 *5*	1057.426	3⁺			E_{γ},I_{γ}: from (n,n′γ) (2012Gr22).
1804.97	2⁺	734.50 *13*	44.3[@] *14*	1070.422	4⁺	E2	0.00541	α(K)=0.00451 *7*; α(L)=0.000704 *10*; α(M)=0.0001542 *22* α(N)=3.53×10^{-5} *5*; α(O)=5.33×10^{-6} *8*; α(P)=3.10×10^{-7} *5* B(E2)(W.u.)<54
		747.8 *3*	25 *4*	1057.426	3⁺	[M1]	0.00925	α(K)=0.00788 *11*; α(L)=0.001078 *16*; α(M)=0.000233 *4* α(N)=5.36×10^{-5} *8*; α(O)=8.36×10^{-6} *12*; α(P)=5.72×10^{-7} *8* B(M1)(W.u.)<0.034

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^{π}_i	E_γ[†‡]	I_γ[#]	E_f	J^{π}_f	Mult.[&]	δ[&h]	α[g]	Comments
1804.97	2^+	816.43 *7*	100[@] *2*	988.548	2^+	M1+E2	−1.8 +*9*−*8*	0.0050 *11*	α(K)=0.0042 *9*; α(L)=0.00062 *11*; α(M)=0.000134 *22* α(N)=3.1×10^{-5} *6*; α(O)=4.7×10^{-6} *9*; α(P)=3.0×10^{-7} *7* B(M1)(W.u.)<0.052; B(E2)(W.u.)<61 δ: from 2009Go33; other values: −0.76 +*10*−*13* or −3.90 +*97*−*134* (2017Le04).
		1729.2 *4*	20 *4*	75.263	2^+	[M1,E2]		0.00128 *18*	α(K)=0.00094 *15*; α(L)=0.000126 *19*; α(M)=2.7×10^{-5} *4* α(N)=6.3×10^{-6} *10*; α(O)=9.7×10^{-7} *15*; α(P)=6.7×10^{-8} *12*; α(IPF)=0.000175 *12*
		1805.51[j] *25*	33 *4*	0.0	0^+	E2		1.06×10^{-3}	α(K)=0.000739 *11*; α(L)=9.89×10^{-5} *14*; α(M)=2.13×10^{-5} *3* α(N)=4.89×10^{-6} *7*; α(O)=7.60×10^{-7} *11*; α(P)=5.13×10^{-8} *8*; α(IPF)=0.000197 *3* B(E2)(W.u.)<0.47
1806.9	12^+	505.5[b]	100	1301.3	10^+	[E2]		0.01356	α(K)=0.01104 *16*; α(L)=0.00197 *3*; α(M)=0.000437 *7* α(N)=9.95×10^{-5} *14*; α(O)=1.472×10^{-5} *21*; α(P)=7.41×10^{-7} *11*
1884.0	(5^-)	622.3 *8*	47 *24*	1260.98	5^+				
		736.2 *4*	100 *24*	1147.985	4^+				
1886.8	(1,2)	898.2[f] *10*	6.9[f] *6*	988.548	2^+				
		1811.6[f] *8*	100.0[f] *18*	75.263	2^+				
1910.7	(7^-)	1395.9 *4*	100	514.81	6^+				
1931.86	2^+	874.4 *3*	50[f] *3*	1057.426	3^+	M1+E2		0.0050 *14*	α(K)=0.0042 *12*; α(L)=0.00060 *14*; α(M)=0.00013 *3* α(N)=3.0×10^{-5} *7*; α(O)=4.6×10^{-6} *11*; α(P)=3.01×10^{-7} *89*
		943.7[f] *10*	24.9[f] *22*	988.548	2^+				
		1683.22 *21*	65[f] *3*	248.502	4^+	E2		1.13×10^{-3}	α(K)=0.000842 *12*; α(L)=0.0001133 *16*; α(M)=2.44×10^{-5} *4* α(N)=5.61×10^{-6} *8*; α(O)=8.70×10^{-7} *13*; α(P)=5.84×10^{-8} *9*; α(IPF)=0.0001438 *21* B(E2)(W.u.)=0.38 +*27*−*20*
		1856.63 *13*	100[f] *3*	75.263	2^+	M1+E2	+0.92 +*41*−*64*	0.00120 *12*	α(K)=0.00082 *9*; α(L)=0.000110 *12*; α(M)=2.36×10^{-5} *25* α(N)=5.4×10^{-6} *6*; α(O)=8.5×10^{-7} *9*; α(P)=5.8×10^{-8} *7*; α(IPF)=0.000237 *13*

Adopted Levels, Gammas (continued)

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†‡]	I_{γ}[#]	E_f	J^{π}_f	Mult.[&]	δ[&h]	α[g]	Comments
									B(M1)(W.u.)=0.0013 +*12*−*8*; B(E2)(W.u.)=0.16 +*15*−*13* δ: from 2017Le04; other values: +0.50 +*87*−*24* (2017Le04); +0.16 +*18*−*13* or +1.5 *5* (2009Go33).
1931.86	2^+	1931.9 *3*	36.2[f] *22*	0.0	0^+	E2		1.02×10^{-3}	α(K)=0.000653 *10*; α(L)=8.68×10^{-5} *13*; α(M)=1.87×10^{-5} *3* α(N)=4.30×10^{-6} *6*; α(O)=6.68×10^{-7} *10*; α(P)=4.53×10^{-8} *7*; α(IPF)=0.000255 *4* B(E2)(W.u.)=0.11 +*8*−*6*
1941.5	(9^-)	640		1301.3	10^+				
		1073		868.6	8^+				
1966.51	(1^-)	908.2[f j] *10*	62[f] *6*	1057.426	3^+				E_{γ}: uncertain placement. If this γ originates from (1^-), 1966.5 level it would be M2, but B(M2)(W.u.)=1.7E4 +*9*−*5* exceeds RUL=1, so M2 is very unlikely. Consequently most likely this γ originates from a close lying $(2^+,3,4^+)$ level (see J^{π} comment on 1966 level). Additional information 4.
		977.3[f j] *10*	34[f] *3*	988.548	2^+				E_{γ}: uncertain placement. This transition is part of the group of three γ's that more likely originate from a $(2^+,3,4^+)$ level, which makes unlikely its placement to this (1^-) level.
		1717.0[f j] *10*	32[f] *3*	248.502	4^+				E_{γ}: uncertain placement. If this γ originates from (1^-), 1966.5 level it would be E3, but B(E3)(W.u.)=1.0E5 +*5*−*3* exceeds RUL=100, so E3 is very unlikely. Consequently most likely this γ originates from a close lying $(2^+,3,4^+)$ level (see J^{π} comment on 1966 level). Additional information 5.
		1891.26 *12*	35[f] *3*	75.263	2^+	(E1(+M2))	−0.03 +*25*−*31*	0.00087 *16*	α(K)=3.3×10^{-4} *17*; α(L)=4.2×10^{-5} *24*; α(M)=8.9×10^{-6} *51* α(N)=2.0×10^{-6} *12*; α(O)=3.2×10^{-7} *19*; α(P)=2.2×10^{-8} *13*; α(IPF)=0.00050 *4* B(E1)(W.u.)=0.00020 +*15*−*8* Mult.: relatively pure dipole was adopted as E1(+M2), however M1(+E2) cannot be excluded. δ: from 2009Go33.
		1966.52 *15*	100[f] *5*	0.0	0^+	E1		9.04×10^{-4}	α(K)=0.000304 *5*; α(L)=3.88×10^{-5} *6*; α(M)=8.31×10^{-6} *12* α(N)=1.91×10^{-6} *3*; α(O)=2.98×10^{-7} *5*;

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	δ[&h]	α[g]	Comments
									α(P)=2.06×10^{-8} *3*; α(IPF)=0.000551 *8* B(E1)(W.u.)=0.00050 *+26−13* Mult.: from (γ,γ′).
1969.67	2$^+$	1721.2 *9*	13 *5*	248.502	4$^+$				
		1894.39 *16*	98 *9*	75.263	2$^+$	M1+E2		0.00117 *14*	α(K)=0.00078 *11*; α(L)=0.000104 *14*; α(M)=2.2×10^{-5} *3* α(N)=5.1×10^{-6} *7*; α(O)=8.0×10^{-7} *11*; α(P)=5.5×10^{-8} *9*; α(IPF)=0.000255 *18* δ: >+5 or −0.33 *+11−13* (2009Go33, (n,n′γ)).
		1969.65 *20*	100 *9*	0.0	0$^+$				
1996.26		412.66 *7*	100.0 *19*	1583.59					
		560.0 *7*	4.7 *19*	1436.27	2$^+$				
		1007.86 *24*	11.2 *19*	988.548	2$^+$				
1998.71	(5$^-$)	300.6[e] *3*	0.56[e] *23*	1698.21	(5,6$^+$)				
		417.1[e] *2*	17.2[e] *9*	1581.81	(5$^+$)				
		450.7[e] *3*	2.3[e] *5*	1548.18	(7$^+$)				
		515.7[e] *1*	100[e] *5*	1483.08	(4$^+$)				
		605.7[e] *3*	2.5[e] *6*	1392.99	6$^+$				
		737.6[e] *2*	16.4[e] *9*	1260.98	5$^+$				
		825.6[e] *3*	2.2[e] *2*	1173.09	(5)$^+$				
		928.0[e] *3*	2.1[e] *7*	1070.422	4$^+$				
		1483.6[e] *3*	0.64[e] *30*	514.81	6$^+$				
		1750.2[e] *3*	1.3[e] *5*	248.502	4$^+$				
2030.61	2$^+$,3$^+$	973.4 *3*	45 *6*	1057.426	3$^+$				
		1782.1 *4*	16.1[@] *22*	248.502	4$^+$				
		1955.28 *14*	100[@] *3*	75.263	2$^+$	M1+E2		0.00114 *13*	α(K)=0.00073 *10*; α(L)=9.7×10^{-5} *13*; α(M)=2.1×10^{-5} *3* α(N)=4.8×10^{-6} *7*; α(O)=7.5×10^{-7} *10*; α(P)=5.2×10^{-8} *8*; α(IPF)=0.000285 *20* δ: −0.03 *+12−11* or +2.4 *+11−6* (2009Go33).
2059.62	2$^{(-)}$,3$^{(-)}$	1811.11 *9*	100	248.502	4$^+$	(E1+M2)	+0.07 *6*	8.49×10^{-4} *25*	α(K)=0.000356 *22*; α(L)=4.6×10^{-5} *3*; α(M)=9.8×10^{-6} *7* α(N)=2.25×10^{-6} *16*; α(O)=3.50×10^{-7} *24*; α(P)=2.41×10^{-8} *17*; α(IPF)=0.000435 *8* B(E1)(W.u.)=2.4×10^{-4} *7* Mult.: rather pure dipole in (n,n′γ) does not exclude (M1+E2).
2109.33	1$^{(+)}$	1051.72 *20*	47.4[@] *18*	1057.426	3$^+$	E2		0.00248	α(K)=0.00210 *3*; α(L)=0.000300 *5*; α(M)=6.52×10^{-5} *10*

From ENSDF

$^{160}_{64}Gd_{96}$-20

γ(^{160}Gd) (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	α[g]	Comments
								α(N)=1.496×10^{-5} *21*; α(O)=2.30×10^{-6} *4*; α(P)=1.452×10^{-7} *21* B(E2)(W.u.)=6.3 *+18−17*
2109.33	1$^{(+)}$	1120.52 *21*	58[@] *3*	988.548	2$^+$	M1+E2	0.0028 *7*	α(K)=0.0024 *6*; α(L)=0.00033 *7*; α(M)=7.2×10^{-5} *15* α(N)=1.6×10^{-5} *4*; α(O)=2.6×10^{-6} *6*; α(P)=1.71×10^{-7} *44*; α(IPF)=6.8×10^{-7} *4*
		2034.17[a] *12*	100[@] *2*	75.263	2$^+$	M1+E2	0.00111 *12*	α(K)=0.00067 *8*; α(L)=8.9×10^{-5} *11*; α(M)=1.92×10^{-5} *23* α(N)=4.4×10^{-6} *6*; α(O)=6.9×10^{-7} *9*; α(P)=4.7×10^{-8} *7*; α(IPF)=0.000326 *23*
		2109.36 *17*	73.3[@] *21*	0.0	0$^+$	(M1)	1.20×10^{-3}	α(K)=0.000695 *10*; α(L)=9.21×10^{-5} *13*; α(M)=1.98×10^{-5} *3* α(N)=4.57×10^{-6} *7*; α(O)=7.13×10^{-7} *10*; α(P)=4.96×10^{-8} *7*; α(IPF)=0.000389 *6* B(M1)(W.u.)=0.0027 *7* Mult.: pure dipole in (n,n′γ) does not exclude (E1).
2118.6	(10$^+$)	401		1717.5	(8$^+$)			
		817		1301.3	10$^+$			
		1250		868.6	8$^+$			
2118.90	2$^+$	2043.6 *3*	35 *8*	75.263	2$^+$			
		2118.89 *21*	100 *11*	0.0	0$^+$	E2	9.88×10^{-4}	α(K)=0.000552 *8*; α(L)=7.29×10^{-5} *11*; α(M)=1.569×10^{-5} *22* α(N)=3.61×10^{-6} *5*; α(O)=5.61×10^{-7} *8*; α(P)=3.82×10^{-8} *6*; α(IPF)=0.000343 *5*
2135.72		2060.44[a] *10*	100 *8*	75.263	2$^+$			
		2135.7[i] *3*	47[i] *6*	0.0	0$^+$			
2162.69	1	2087.45 *14*	100 *9*	75.263	2$^+$			
		2162.58 *22*	89 *9*	0.0	0$^+$			
2242.2	(1,2)	865.4[f] *10*	14.7[f] *25*	1376.73	2$^-$			
		891.0[f] *10*	37[f] *4*	1351.188	1$^-$			
		1017.9[f] *10*	100[f] *9*	1224.237	1$^{(-)}$			
2252.7		769.6[e] *3*	100[e]	1483.08	(4$^+$)			
2277.4	1	841.1[f] *10*	6.8[f] *7*	1436.27	2$^+$			
		1288.9[f] *10*	4.6[f] *5*	988.548	2$^+$			
		2202.1[f] *9*	73.7[f] *20*	75.263	2$^+$			
		2277.5[f] *8*	100[f] *2*	0.0	0$^+$	D		
2282.74	(1$^+$,2$^+$)	1057.9 *7*	37 *11*	1224.237	1$^{(-)}$			
		1226.1[f] *10*	29[f] *3*	1057.426	3$^+$			
		1295.0[f] *10*	61[f] *7*	988.548	2$^+$			
		2207.5[i] *3*	100[i] *15*	75.263	2$^+$			
		2282.6 *4*	96 *15*	0.0	0$^+$			
2301.54	2$^+$	1153.5 *4*	42 *6*	1147.985	4$^+$			
		2301.53[a] *17*	100 *8*	0.0	0$^+$	E2	9.86×10^{-4}	α(K)=0.000476 *7*; α(L)=6.25×10^{-5} *9*; α(M)=1.344×10^{-5} *19*

$^{160}_{64}Gd_{96}$-21

γ(^{160}Gd) (continued)

E_i(level)	J^{π}_i	E_γ[†‡]	I_γ[#]	E_f	J^{π}_f	Mult.[&]	α[g]	Comments
								α(N)=3.09×10^{-6} *5*; α(O)=4.81×10^{-7} *7*; α(P)=3.29×10^{-8} *5*; α(IPF)=0.000430 *6*
2313.3	(11$^-$)	507[j]		1806.9	12$^+$			
		1012		1301.3	10$^+$			
2315.8	(1,2)	1327.2[f] *10*	100	988.548	2$^+$			
2327.5	(1$^+$,2)	976.3[f] *10*	8.4[f] *8*	1351.188	1$^-$			
		1269.9[f] *10*	66.9[f] *24*	1057.426	3$^+$			
		1339.0[f] *9*	100[f] *3*	988.548	2$^+$			
2333.5	(1,2$^+$)	897.1[f] *10*	20.2[f] *19*	1436.27	2$^+$			
		982.5[f] *10*	9.0[f] *19*	1351.188	1$^-$			
		1109.3[f] *10*	100[f] *10*	1224.237	1$^{(-)}$			
		1344.9[f] *10*	30[f] *4*	988.548	2$^+$			
		2333.3[f] *10*	4.1[f] *11*	0.0	0$^+$			
2344.5		646[ej]	6[e] *3*	1698.21	(5,6$^+$)			
		762.7[e] *3*	100[e] *6*	1581.81	(5$^+$)			
2347.4	1$^+$	2272.5[d] *7*	63 *13*	75.263	2$^+$	[M1]	1.17×10^{-3}	B(M1)(W.u.)=0.023 *3* α(K)=0.000589 *9*; α(L)=7.79×10^{-5} *11*; α(M)=1.677×10^{-5} *24* α(N)=3.86×10^{-6} *6*; α(O)=6.03×10^{-7} *9*; α(P)=4.20×10^{-8} *6*; α(IPF)=0.000479 *7*
		2347.3[d] *4*	100 *13*	0.0	0$^+$	[M1]	1.16×10^{-3}	B(M1)(W.u.)=0.042 *3* α(K)=0.000548 *8*; α(L)=7.25×10^{-5} *11*; α(M)=1.559×10^{-5} *22* α(N)=3.59×10^{-6} *5*; α(O)=5.61×10^{-7} *8*; α(P)=3.90×10^{-8} *6*; α(IPF)=0.000521 *8*
2361.93	(2$^+$,3$^-$)	705.1[f] *10*	1.55[f] *21*	1657.2	(1$^-$,2)			
		898.4[f] *10*	3.3[f] *3*	1463.83	3$^-$			
		985.3[f] *10*	1.55[f] *21*	1376.73	2$^-$			
		1138.1[f] *9*	21.6[f] *7*	1224.237	1$^{(-)}$			
		1304.9[f] *10*	10.8[f] *7*	1057.426	3$^+$			
		1373.9[f] *10*	1.28[f] *14*	988.548	2$^+$			
		2113.40 *16*	100 *10*	248.502	4$^+$			
		2286.5 *3*	85.0[f] *12*	75.263	2$^+$			
2377.9	14$^+$	571.0[b]	100	1806.9	12$^+$	[E2]	0.00991	α(K)=0.00815 *12*; α(L)=0.001383 *20*; α(M)=0.000305 *5* α(N)=6.97×10^{-5} *10*; α(O)=1.039×10^{-5} *15*; α(P)=5.52×10^{-7} *8*
2383.6	(2$^+$,3,4$^+$)	2135.7[ij] *3*	100[i] *13*	248.502	4$^+$			
		2308.3[a] *6*	52 *13*	75.263	2$^+$			
2385.6	(1,2)	1034.5[f] *10*	50[f] *4*	1351.188	1$^-$			
		1161.2[f] *10*	100[f] *7*	1224.237	1$^{(-)}$			

$^{160}_{64}$Gd$_{96}$-22

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†‡]	I_γ[#]	E_f	J_f^π	Mult.[&]	α[g]	Comments
2432.7	$(1^-,2^+)$	968.9[f] *10*	16.0[f] *11*	1463.83	3^-			
		1055.8[f] *10*	22.1[f] *22*	1376.73	2^-			
		1081.6[f] *10*	8.7[f] *9*	1351.188	1^-			
		1142.8[f] *8*	100.0[f] *21*	1289.76	3^-			
		1208.5[f] *10*	38.8[f] *16*	1224.237	$1^{(-)}$			
		2357.5[f] *9*	56.6[f] *16*	75.263	2^+			
		2432.9[f] *10*	5.3[f] *9*	0.0	0^+			
2444.8	$(2^+,3,4^+)$	2196.0 *6*	61 *13*	248.502	4^+			
		2369.6 *3*	100 *13*	75.263	2^+			
2456.0	$(2^+,3,4^+)$	2207.5[i] *3*	100[i] *15*	248.502	4^+			
		2380.3 *8*	41 *11*	75.263	2^+			
2464.41	(1^-)	807.2[f] *10*	1.85[f] *15*	1657.2	$(1^-,2)$			
		856.1[f] *10*	4.48[f] *30*	1608.3				
		1027.8[f] *10*	0.96[f] *7*	1436.27	2^+			
		1087.5[f] *9*	18.9[f] *4*	1376.73	2^-			
		1113.1[f] *9*	14.6[f] *4*	1351.188	1^-			
		1240.1[f] *8*	22.6[f] *16*	1224.237	$1^{(-)}$			
		1475.9[f] *10*	1.22[f] *7*	988.548	2^+			
		2389.2[f] *10*	6.6[f] *3*	75.263	2^+			
		2464.4[f] *1*	100.00[f] *11*	0.0	0^+			
2471.77	1^-	2395.2[ac] *5*	29.1[f] *23*	75.263	2^+	[E1]	1.10×10^{-3}	B(E1)(W.u.)=9.0×10^{-04} *17* α(K)=0.000223 *4*; α(L)=2.83×10^{-5} *4*; α(M)=6.07×10^{-6} *9* α(N)=1.395×10^{-6} *20*; α(O)=2.17×10^{-7} *3*; α(P)=1.509×10^{-8} *22*; α(IPF)=0.000840 *12*
		2471.8[ic] *1*	100.0[if] *5*	0.0	0^+	E1	1.13×10^{-3}	B(E1)(W.u.)=5.4×10^{-04} *8* α(K)=0.000213 *3*; α(L)=2.70×10^{-5} *4*; α(M)=5.78×10^{-6} *8* α(N)=1.328×10^{-6} *19*; α(O)=2.07×10^{-7} *3*; α(P)=1.437×10^{-8} *21*; α(IPF)=0.000887 *13* Mult.: from (γ,γ').
2489.60	$(5^+,6^+)$	491.1[e] *2*	100[e] *6*	1998.71	(5^-)			
		1006.5[e] *3*	70[e] *4*	1483.08	(4^+)			
		1052.1[e] *3*	17.7[e] *24*	1437.40	(7^+)			
		1194.1[e] *3*	4.9[e] *18*	1295.22	(6^+)			
		1316.4[e] *3*	63[e] *4*	1173.09	$(5)^+$			
2510.7	$(1,2^-)$	1046.7[f] *10*	50[f] *3*	1463.83	3^-			
		1159.6[f] *10*	17.2[f] *12*	1351.188	1^-			
		1286.5[f] *9*	100.0[f] *24*	1224.237	$1^{(-)}$			

$^{160}_{64}Gd_{96}$-23

γ(^{160}Gd) (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	α[g]	Comments
2510.7	(1,2⁻)	1522.3[f] *10*	9.4[f] *10*	988.548	2⁺			
		2435.2[f] *9*	67.7[f] *22*	75.263	2⁺			
2516.5	(2)	1052.6[f] *9*	100[f] *4*	1463.83	3⁻			
		1165.3[f] *10*	46[f] *5*	1351.188	1⁻			
		1226.7[f] *10*	41[f] *4*	1289.76	3⁻			
		1292.4[f] *10*	84[f] *7*	1224.237	1⁽⁻⁾			
		1459.0[f] *10*	38[f] *3*	1057.426	3⁺			
2529.9	(1⁻,2)	1153.2[f] *10*	6.8[f] *8*	1376.73	2⁻			
		1178.7[f] *10*	22.3[f] *15*	1351.188	1⁻			
		1240.0[f] *9*	100[f] *6*	1289.76	3⁻			
		1305.7[f] *10*	15.0[f] *12*	1224.237	1⁽⁻⁾			
2547.0	(0⁺,1,2⁺)	2471.8[ij] *4*	100[i] *15*	75.263	2⁺			
		2547.0 *5*	46 *9*	0.0	0⁺			
2559.54	(5⁺,6⁺)	560.8[e] *2*	100[e] *5*	1998.71	(5⁻)			
		1076.4[e] *3*	57[e] *4*	1483.08	(4⁺)			
		1122.4[e] *3*	9.5[e] *11*	1437.40	(7⁺)			
		1264.1[e] *3*	16.0[e] *22*	1295.22	(6⁺)			
		1386.5[e] *3*	42[e] *5*	1173.09	(5)⁺			
2582.9	(12⁺)	464		2118.6	(10⁺)			
		776		1806.9	12⁺			
		1282		1301.3	10⁺			
2670.2	1⁺	2595[d] *1*	53 *4*	75.263	2⁺	[M1]	1.17×10^{-3}	B(M1)(W.u.)=0.021 *2* α(K)=0.000440 *7*; α(L)=5.80×10^{-5} *9*; α(M)=1.248×10^{-5} *18* α(N)=2.87×10^{-6} *4*; α(O)=4.49×10^{-7} *7*; α(P)=3.13×10^{-8} *5*; α(IPF)=0.000656 *10*
		2670[d] *1*	100	0.0	0⁺	M1	1.18×10^{-3}	B(M1)(W.u.)=0.036 *3* α(K)=0.000414 *6*; α(L)=5.45×10^{-5} *8*; α(M)=1.172×10^{-5} *17* α(N)=2.70×10^{-6} *4*; α(O)=4.22×10^{-7} *6*; α(P)=2.94×10^{-8} *5*; α(IPF)=0.000696 *10*
2761.2	1	2686 *1*	100	75.263	2⁺			
		2761 *1*	56 *12*	0.0	0⁺	D		
2796.2	1⁺	2721[d] *1*	56.8 *22*	75.263	2⁺	[M1]	1.19×10^{-3}	B(M1)(W.u.)=0.086 *6* α(K)=0.000397 *6*; α(L)=5.23×10^{-5} *8*; α(M)=1.124×10^{-5} *16* α(N)=2.59×10^{-6} *4*; α(O)=4.04×10^{-7} *6*; α(P)=2.82×10^{-8} *4*; α(IPF)=0.000722 *11*
		2796[d] *1*	100	0.0	0⁺	M1	1.20×10^{-3}	B(M1)(W.u.)=0.14 *1* α(K)=0.000375 *6*; α(L)=4.93×10^{-5} *7*; α(M)=1.059×10^{-5} *15* α(N)=2.44×10^{-6} *4*; α(O)=3.81×10^{-7} *6*; α(P)=2.66×10^{-8} *4*; α(IPF)=0.000761 *11*

$^{160}_{64}$Gd$_{96}$-24

$\gamma(^{160}Gd)$ (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	α[g]	Comments
2820.2	$1^{(+)}$	2745[d] *1*	100 *14*	75.263	2^+	[M1]	1.19×10^{-3}	B(M1)(W.u.)=0.053 *13* α(K)=0.000390 *6*; α(L)=5.13×10^{-5} *8*; α(M)=1.103×10^{-5} *16* α(N)=2.54×10^{-6} *4*; α(O)=3.97×10^{-7} *6*; α(P)=2.77×10^{-8} *4*; α(IPF)=0.000735 *11*
		2820[d] *1*	76	0.0	0^+	(M1)	1.20×10^{-3}	B(M1)(W.u.)=0.037 *7* α(K)=0.000368 *6*; α(L)=4.84×10^{-5} *7*; α(M)=1.040×10^{-5} *15* α(N)=2.39×10^{-6} *4*; α(O)=3.74×10^{-7} *6*; α(P)=2.61×10^{-8} *4*; α(IPF)=0.000773 *11*
2999.2	1	2924 *1*	36 *12*	75.263	2^+			
		2999 *1*	100	0.0	0^+	D		
3008.7	16^+	630.8[b]	100	2377.9	14^+	[E2]	0.00775	α(K)=0.00641 *9*; α(L)=0.001049 *15*; α(M)=0.000231 *4* α(N)=5.27×10^{-5} *8*; α(O)=7.91×10^{-6} *11*; α(P)=4.37×10^{-7} *7*
3032.2	1^-	2957[c] *1*	100 *11*	75.263	2^+	[E1]	1.35×10^{-3}	B(E1)(W.u.)=3.7×10^{-04} *6* α(K)=0.0001622 *23*; α(L)=2.05×10^{-5} *3*; α(M)=4.39×10^{-6} *7* α(N)=1.010×10^{-6} *15*; α(O)=1.575×10^{-7} *22*; α(P)=1.097×10^{-8} *16*; α(IPF)=0.001160 *17*
		3032[c] *1*	67	0.0	0^+	E1	1.38×10^{-3}	B(E1)(W.u.)=2.3×10^{-04} *3* α(K)=0.0001563 *22*; α(L)=1.98×10^{-5} *3*; α(M)=4.23×10^{-6} *6* α(N)=9.72×10^{-7} *14*; α(O)=1.517×10^{-7} *22*; α(P)=1.057×10^{-8} *15*; α(IPF)=0.001199 *17*
3131.2	1^-	3056[c] *1*	84 *7*	75.263	2^+	[E1]	1.39×10^{-3}	B(E1)(W.u.)=3.5×10^{-04} *7* α(K)=0.0001545 *22*; α(L)=1.95×10^{-5} *3*; α(M)=4.18×10^{-6} *6* α(N)=9.61×10^{-7} *14*; α(O)=1.499×10^{-7} *21*; α(P)=1.045×10^{-8} *15*; α(IPF)=0.001213 *17*
		3131[c] *1*	100	0.0	0^+	E1	1.43×10^{-3}	B(E1)(W.u.)=3.8×10^{-04} *4* α(K)=0.0001491 *21*; α(L)=1.88×10^{-5} *3*; α(M)=4.03×10^{-6} *6* α(N)=9.27×10^{-7} *13*; α(O)=1.446×10^{-7} *21*; α(P)=1.008×10^{-8} *15*; α(IPF)=0.001256 *18*
3166.2	$1^{(-)}$	3091[c] *1*	64 *11*	75.263	2^+	[E1]	1.41×10^{-3}	B(E1)(W.u.)=2.7×10^{-04} *6* α(K)=0.0001520 *22*; α(L)=1.92×10^{-5} *3*; α(M)=4.11×10^{-6} *6* α(N)=9.45×10^{-7} *14*; α(O)=1.474×10^{-7} *21*; α(P)=1.027×10^{-8} *15*; α(IPF)=0.001233 *18*
		3166[c] *1*	100	0.0	0^+	(E1)	1.45×10^{-3}	B(E1)(W.u.)=4.0×10^{-04} *5* α(K)=0.0001467 *21*; α(L)=1.85×10^{-5} *3*; α(M)=3.97×10^{-6} *6* α(N)=9.12×10^{-7} *13*; α(O)=1.422×10^{-7} *20*; α(P)=9.92×10^{-9} *14*; α(IPF)=0.001275 *18*
3170.2	1^+	3095[d] *1*	60 *6*	75.263	2^+	[M1]	1.26×10^{-3}	B(M1)(W.u.)=0.049 *7* α(K)=0.000302 *5*; α(L)=3.95×10^{-5} *6*; α(M)=8.50×10^{-6} *12* α(N)=1.96×10^{-6} *3*; α(O)=3.06×10^{-7} *5*; α(P)=2.13×10^{-8} *3*; α(IPF)=0.000911 *13*
		3170[d] *1*	100	0.0	0^+	M1	1.28×10^{-3}	B(M1)(W.u.)=0.077 *8*

$^{160}_{64}Gd_{96}$-25

γ(^{160}Gd) (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	α[g]	Comments
								α(K)=0.000287 *4*; α(L)=3.76×10^{-5} *6*; α(M)=8.07×10^{-6} *12* α(N)=1.86×10^{-6} *3*; α(O)=2.90×10^{-7} *4*; α(P)=2.03×10^{-8} *3*; α(IPF)=0.000948 *14*
3228.2	1	3153 *1*	100 *19*	75.263	2$^+$			
		3228 *1*	96	0.0	0$^+$	D		
3277.2	1$^+$	3202[d] *1*	53 *4*	75.263	2$^+$	[M1]	1.29×10^{-3}	B(M1)(W.u.)=0.061 *5* α(K)=0.000281 *4*; α(L)=3.68×10^{-5} *6*; α(M)=7.90×10^{-6} *11* α(N)=1.82×10^{-6} *3*; α(O)=2.84×10^{-7} *4*; α(P)=1.99×10^{-8} *3*; α(IPF)=0.000964 *14*
		3277[d] *1*	100	0.0	0$^+$	M1	1.31×10^{-3}	B(M1)(W.u.)=0.106 *8* α(K)=0.000267 *4*; α(L)=3.50×10^{-5} *5*; α(M)=7.52×10^{-6} *11* α(N)=1.731×10^{-6} *25*; α(O)=2.71×10^{-7} *4*; α(P)=1.89×10^{-8} *3*; α(IPF)=0.001002 *14*
3292.2	1	3217 *1*	31 *9*	75.263	2$^+$			
		3292 *1*	100	0.0	0$^+$	D		
3308.2	1$^+$	3233[d] *1*	58 *3*	75.263	2$^+$	[M1]	1.30×10^{-3}	B(M1)(W.u.)=0.050 *5* α(K)=0.000275 *4*; α(L)=3.60×10^{-5} *5*; α(M)=7.74×10^{-6} *11* α(N)=1.782×10^{-6} *25*; α(O)=2.78×10^{-7} *4*; α(P)=1.94×10^{-8} *3*; α(IPF)=0.000980 *14*
		3308[d] *1*	100	0.0	0$^+$	M1	1.32×10^{-3}	B(M1)(W.u.)=0.080 *7* α(K)=0.000262 *4*; α(L)=3.43×10^{-5} *5*; α(M)=7.37×10^{-6} *11* α(N)=1.697×10^{-6} *24*; α(O)=2.65×10^{-7} *4*; α(P)=1.85×10^{-8} *3*; α(IPF)=0.001017 *15*
3328.2	1	3253 *1*		75.263	2$^+$			I_γ: see the comment for this transition in the (γ,γ') data set.
		3328 *1*		0.0	0$^+$	D		I_γ: see the comment for this transition in the (γ,γ') data set.
3331.2	1$^+$	3256[d] *1*	46 *5*	75.263	2$^+$			
		3331[d] *1*	100	0.0	0$^+$	M1	1.33×10^{-3}	α(K)=0.000258 *4*; α(L)=3.38×10^{-5} *5*; α(M)=7.26×10^{-6} *11* α(N)=1.672×10^{-6} *24*; α(O)=2.61×10^{-7} *4*; α(P)=1.83×10^{-8} *3*; α(IPF)=0.001028 *15*
3340.2	1$^+$	3265[d] *1*	59 *5*	75.263	2$^+$	[M1]	1.31×10^{-3}	B(M1)(W.u.)=0.029 *4* α(K)=0.000269 *4*; α(L)=3.53×10^{-5} *5*; α(M)=7.58×10^{-6} *11* α(N)=1.745×10^{-6} *25*; α(O)=2.73×10^{-7} *4*; α(P)=1.90×10^{-8} *3*; α(IPF)=0.000996 *14*
		3340[d] *1*	100	0.0	0$^+$	M1	1.33×10^{-3}	B(M1)(W.u.)=0.047 *5* α(K)=0.000257 *4*; α(L)=3.36×10^{-5} *5*; α(M)=7.22×10^{-6} *11* α(N)=1.662×10^{-6} *24*; α(O)=2.60×10^{-7} *4*; α(P)=1.82×10^{-8} *3*; α(IPF)=0.001033 *15*
3357.2	1	3282 *1*	40 *6*	75.263	2$^+$			
		3357 *1*	100	0.0	0$^+$	D		
3376.2	1	3301 *1*	43 *5*	75.263	2$^+$			
		3376 *1*	100	0.0	0$^+$	D		
3415.2	1$^-$	3340[c] *1*	47 *3*	75.263	2$^+$	[E1]	1.51×10^{-3}	B(E1)(W.u.)=3.6×10^{-04} *4* α(K)=0.0001357 *19*; α(L)=1.713×10^{-5} *24*; α(M)=3.66×10^{-6} *6* α(N)=8.42×10^{-7} *12*; α(O)=1.314×10^{-7} *19*; α(P)=9.17×10^{-9} *13*; α(IPF)=0.001357 *19*
		3415[c] *1*	100	0.0	0$^+$	E1	1.54×10^{-3}	B(E1)(W.u.)=7.2×10^{-4} *7* α(K)=0.0001314 *19*; α(L)=1.658×10^{-5} *24*; α(M)=3.55×10^{-6} *5* α(N)=8.15×10^{-7} *12*; α(O)=1.272×10^{-7} *18*; α(P)=8.88×10^{-9} *13*; α(IPF)=0.001388 *20*
3460.2	1$^-$	3385[c] *1*	40 *3*	75.263	2$^+$	[E1]	1.53×10^{-3}	B(E1)(W.u.)=2.6×10^{-04} *4*

$^{160}_{64}$Gd$_{96}$-26

γ(^{160}Gd) (continued)

E_i(level)	J^π_i	E_γ[†‡]	I_γ[#]	E_f	J^π_f	Mult.[&]	α[g]	Comments
								α(K)=0.0001331 *19*; α(L)=1.680×10^{-5} *24*; α(M)=3.59×10^{-6} *5* α(N)=8.26×10^{-7} *12*; α(O)=1.289×10^{-7} *18*; α(P)=8.99×10^{-9} *13*; α(IPF)=0.001376 *20*
3460.2	1$^-$	3460 *1*	100	0.0	0$^+$	E1	1.56×10^{-3}	B(E1)(W.u.)=6.0×10^{-04} *7* α(K)=0.0001290 *18*; α(L)=1.627×10^{-5} *23*; α(M)=3.48×10^{-6} *5* α(N)=8.00×10^{-7} *12*; α(O)=1.248×10^{-7} *18*; α(P)=8.71×10^{-9} *13*; α(IPF)=0.001408 *20*
3477.2	1$^{(+)}$	3402[d] *1*	43 *4*	75.263	2$^+$	[M1]	1.35×10^{-3}	B(M1)(W.u.)=0.028 *5* α(K)=0.000247 *4*; α(L)=3.23×10^{-5} *5*; α(M)=6.94×10^{-6} *10* α(N)=1.599×10^{-6} *23*; α(O)=2.50×10^{-7} *4*; α(P)=1.746×10^{-8} *25*; α(IPF)=0.001061 *15*
		3477[d] *1*	100	0.0	0$^+$	(M1)	1.37×10^{-3}	B(M1)(W.u.)=0.060 *10* α(K)=0.000236 *4*; α(L)=3.09×10^{-5} *5*; α(M)=6.63×10^{-6} *10* α(N)=1.526×10^{-6} *22*; α(O)=2.39×10^{-7} *4*; α(P)=1.667×10^{-8} *24*; α(IPF)=0.001092 *16*
3537.2	1	3462 *1*	47 *5*	75.263	2$^+$			
		3537 *1*	100	0.0	0$^+$	D		
3550.2	1	3475 *1*	40 *7*	75.263	2$^+$			
		3550 *1*	100	0.0	0$^+$	D		

† From (n,n′γ), except as noted.

‡ 2020Ur03 measured the following values for the γ rays from 8$^+$ to g.s. of the g.s. band: 70.70 *20*, 173.86 *5*, 267.10 *5*, 353.15 *5*.

From (n,n′γ), 2009Go33 (reported originally as relative intensities) unless noted otherwise.

@ From (n,n′γ), 2017Le04 (reported originally as relative photon branching from each level, reason for which they could not be listed together with the relative intensities from 2009Go33 in (n,n′γ) but being more precise are adopted here).

& From (n,n′γ), except as noted, measured by 2009Go33 and 2017Le04 based on angular distribution measurements combined with multiplet analysis and intensity arguments. Based on these arguments they assigned E2 for ΔJ=2 transitions, and used the values of measured ΔJ=2 mixing ratios of the D+Q transitions to distinguish in between M1 and E1 character (high mixing ratio values implying M1 rather than E1).

a Doublet or multiplet.

b Calculated by the evaluator from the level-energy differences reported by 1993Su16, in Coulomb excitation. These authors report Eγ to only the nearest keV, but report level energies to the nearest 0.1 keV. This allows the level-energy spacings within the g.s. band given by 1993Su16 to be retained here.

c B(E1)(W.u.) value computed by the evaluator from $\Gamma_{\gamma 0}$ in (γ,γ') and the listed γ branching.

d B(M1)(W.u.) value computed by the evaluator from $\Gamma_{\gamma 0}$ in (γ,γ') and the listed γ branching.

e From β^- decay (42.6 s).

f From β^- decay (30.8 s).

g Additional information 6.

h Additional information 7.

i Multiply placed with undivided intensity.

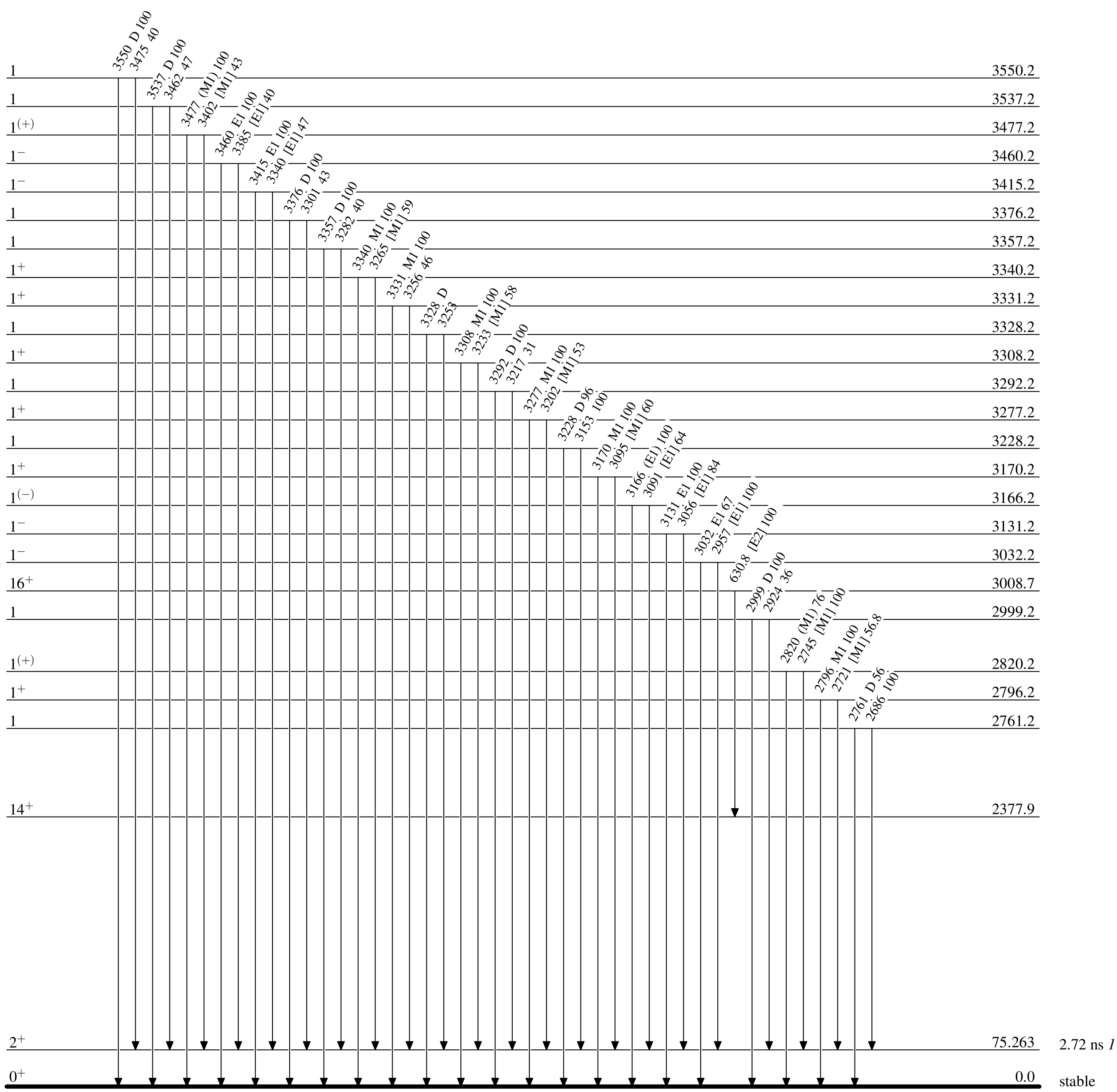
j Placement of transition in the level scheme is uncertain.

$^{160}_{64}$Gd$_{96}$-27

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

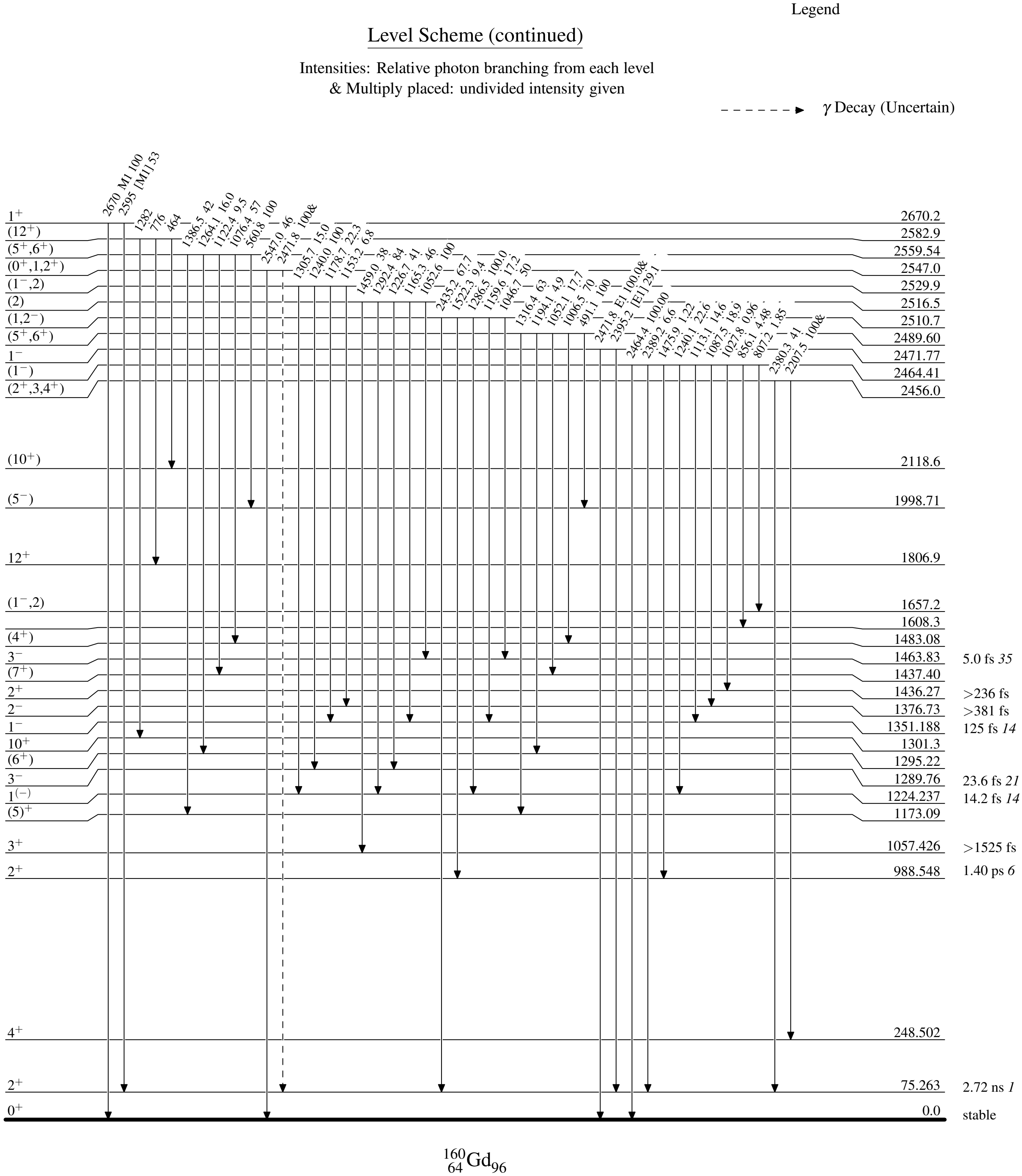


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

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



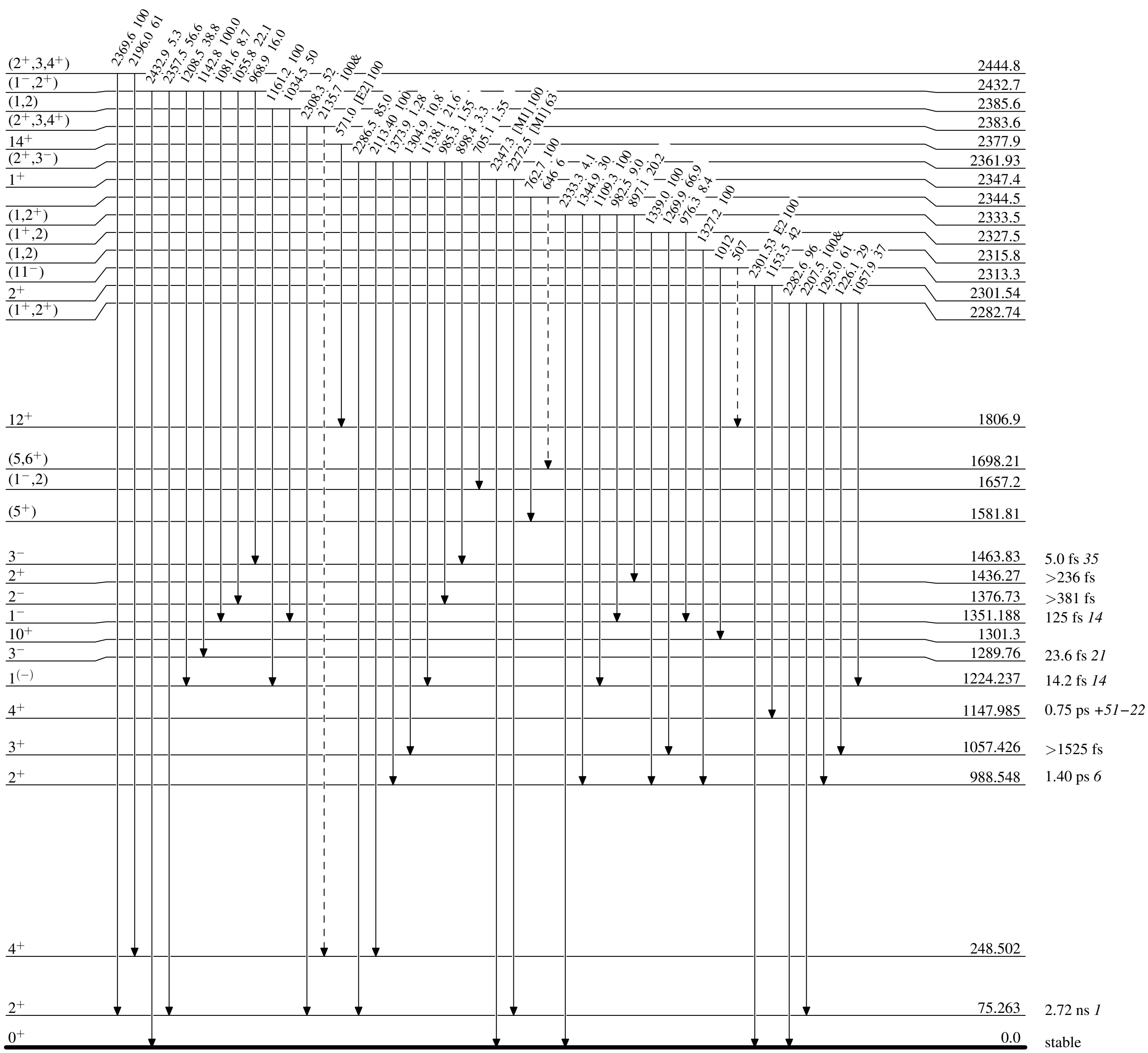
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

γ Decay (Uncertain)

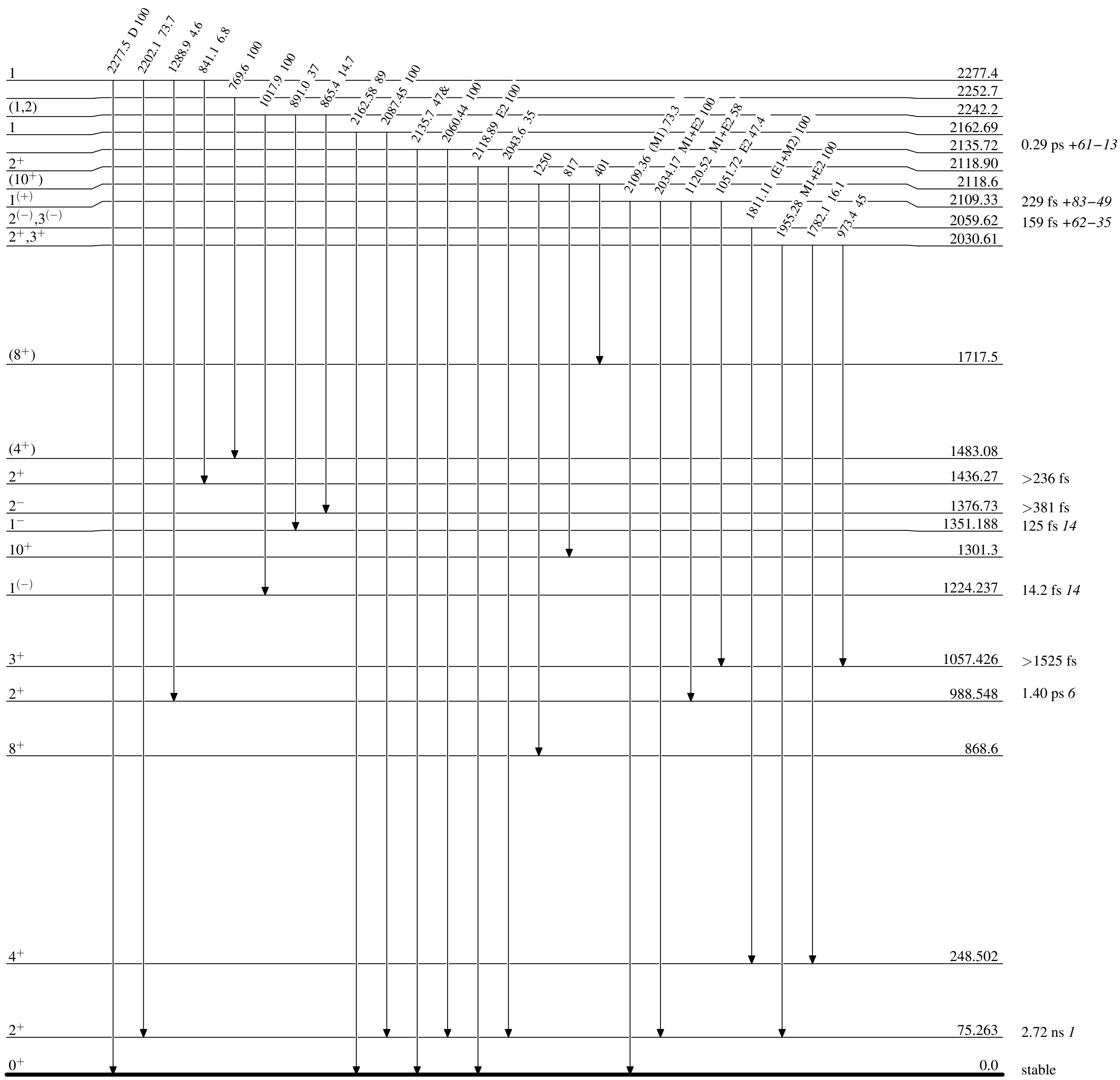


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

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

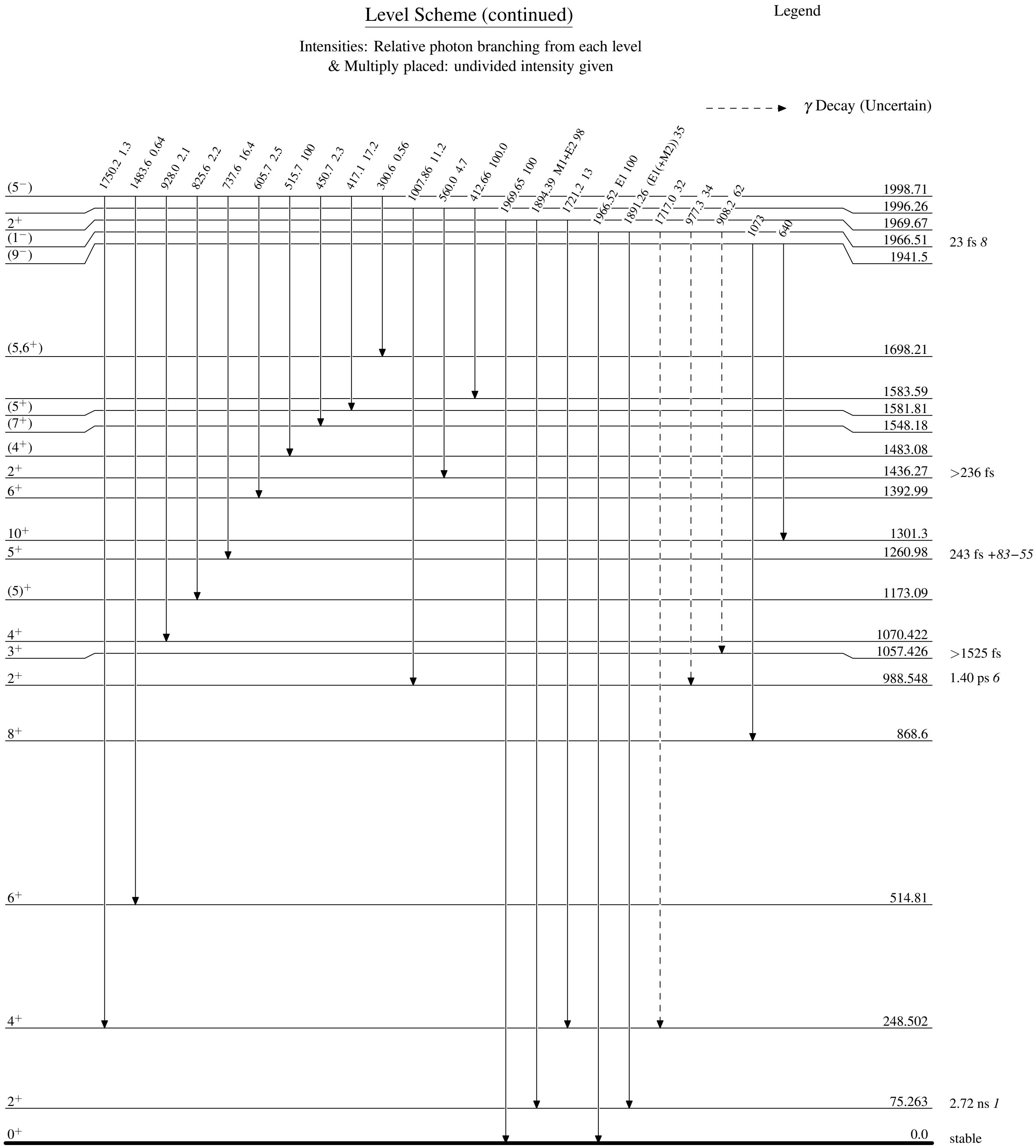


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

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

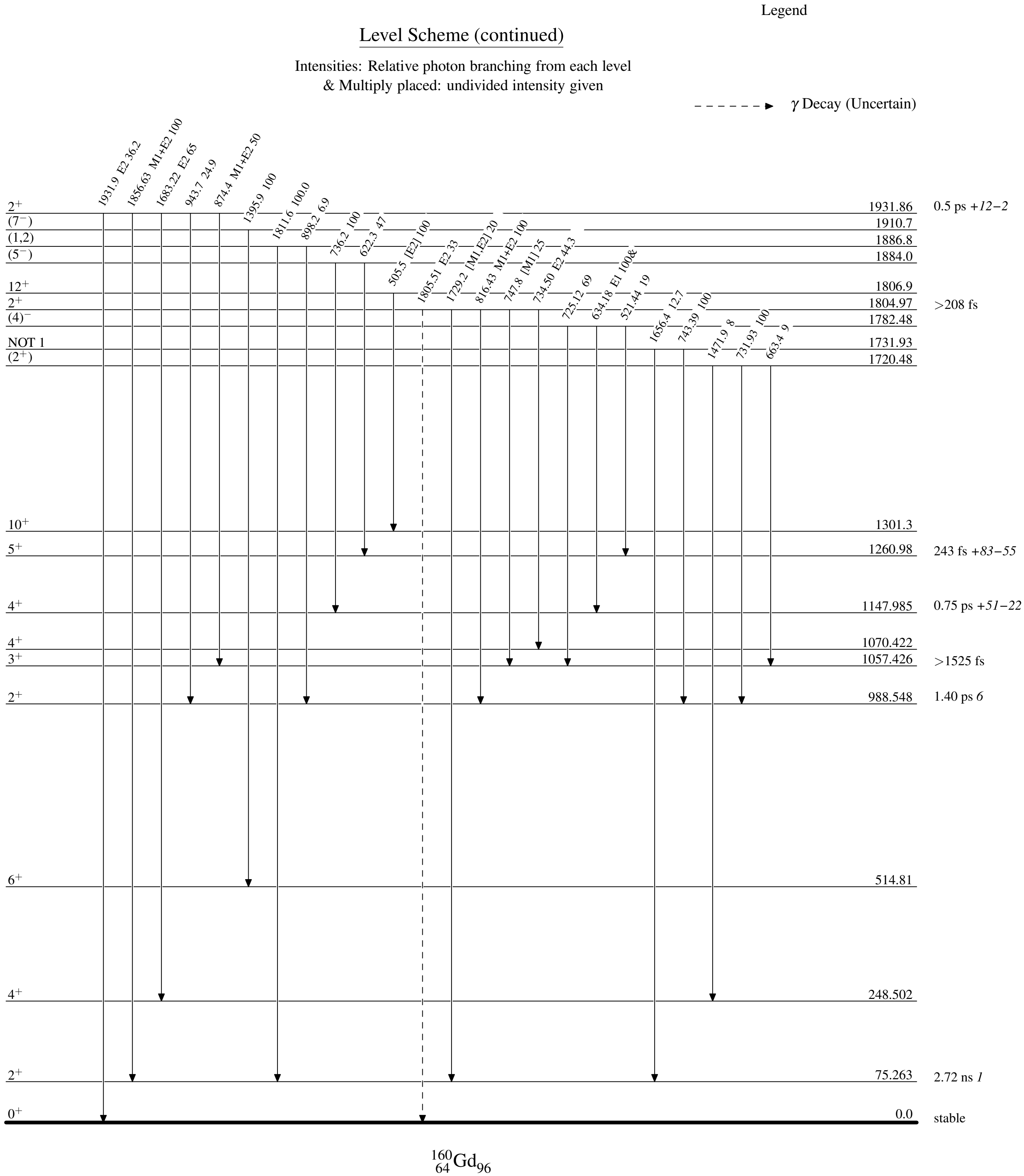


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

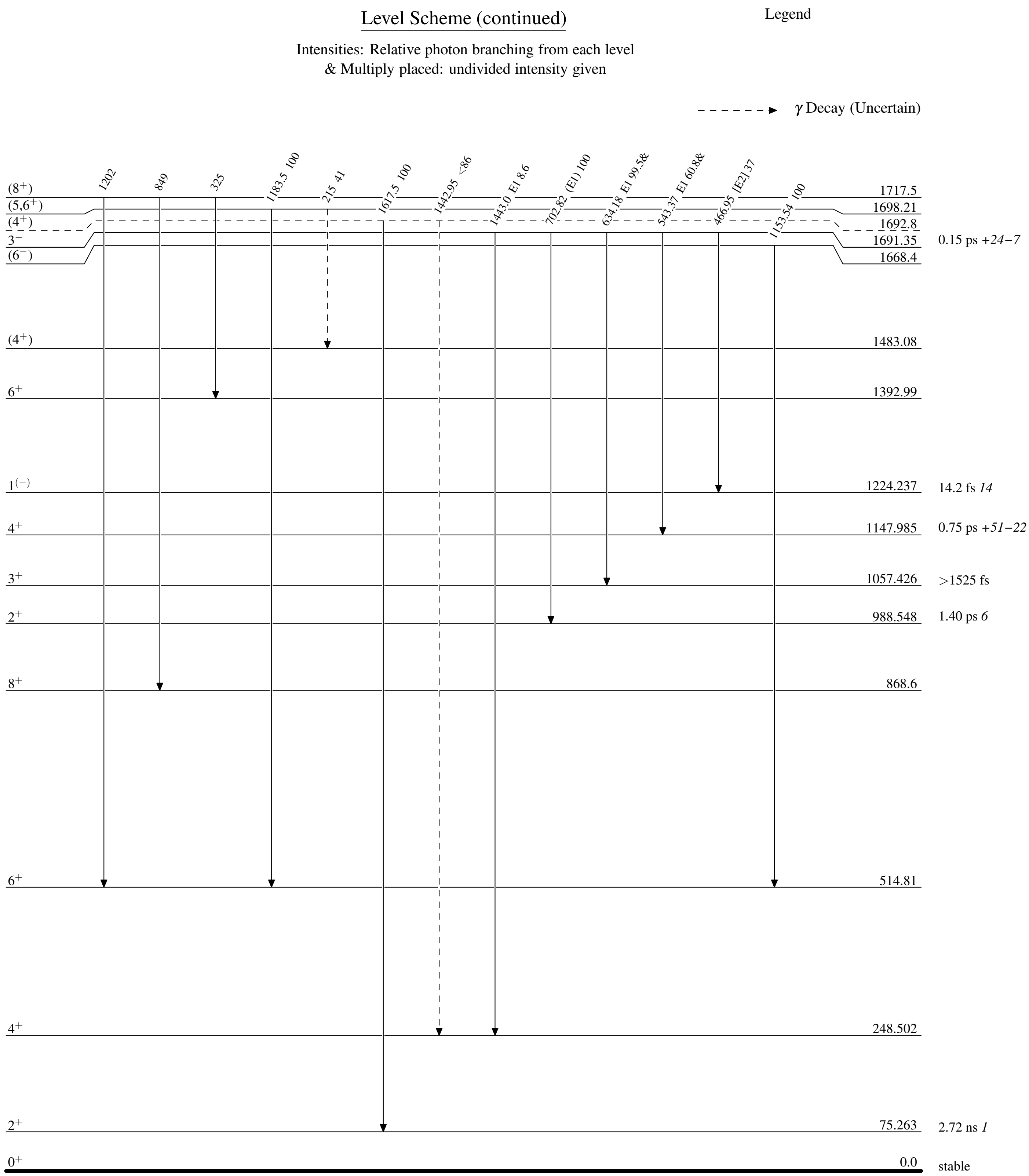
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

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

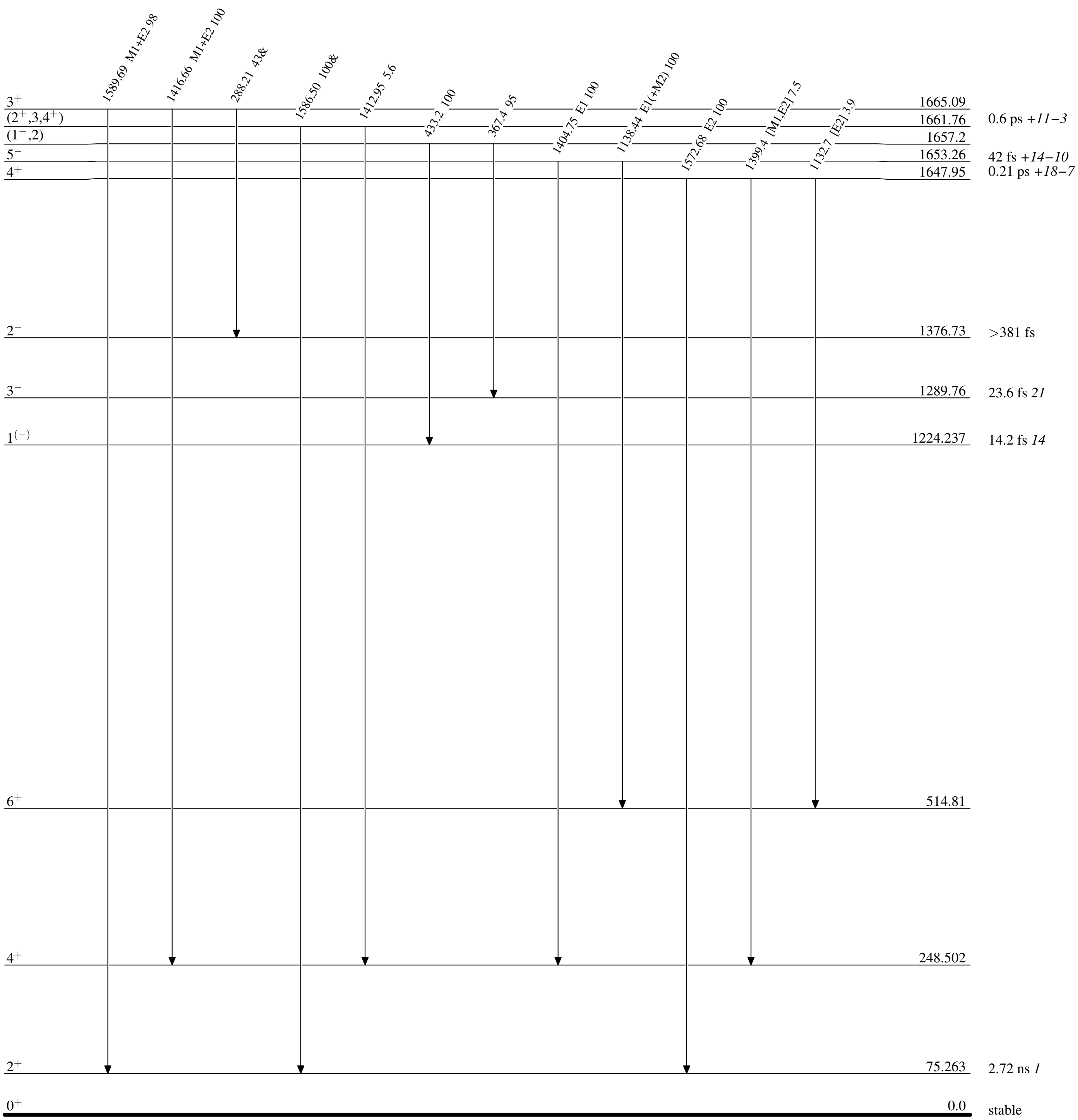


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{160}_{64}Gd_{96}$

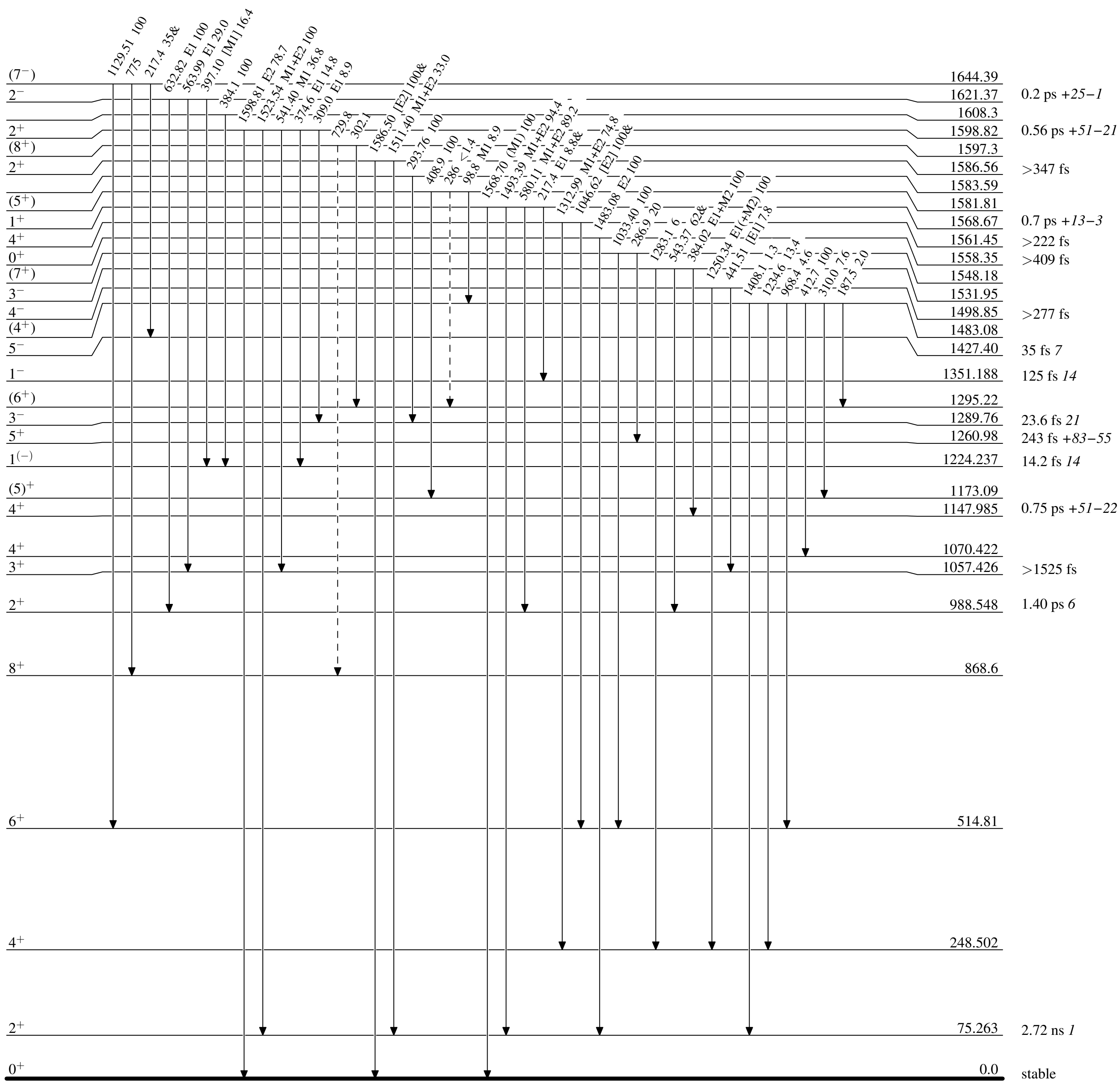
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

- - - - - ► γ Decay (Uncertain)



$^{160}_{64}Gd_{96}$

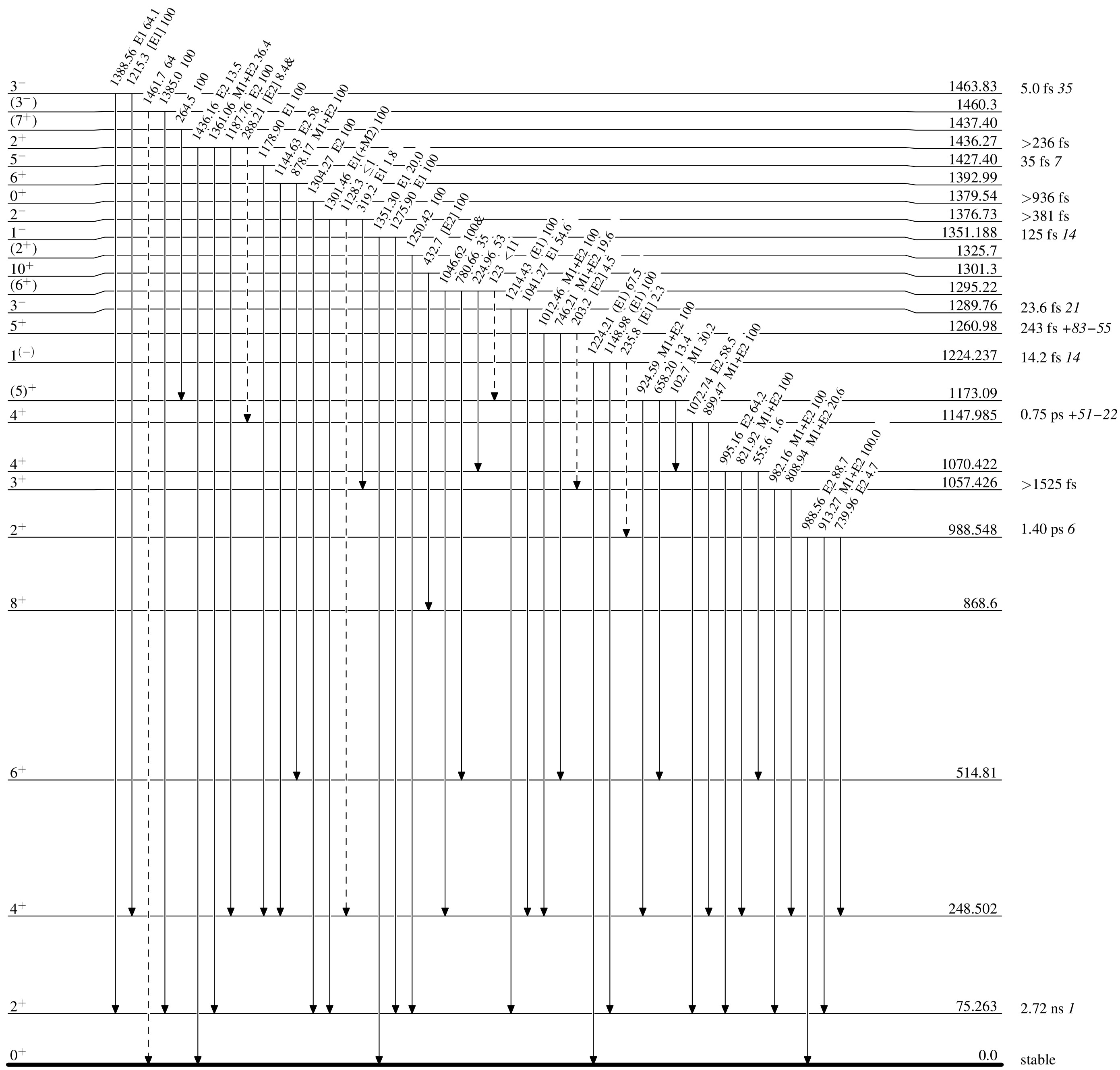
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

- - - - - -► γ Decay (Uncertain)

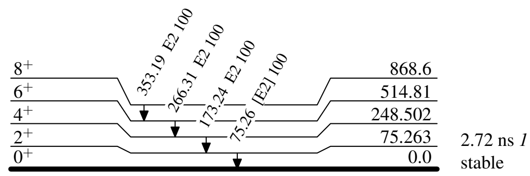


$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas

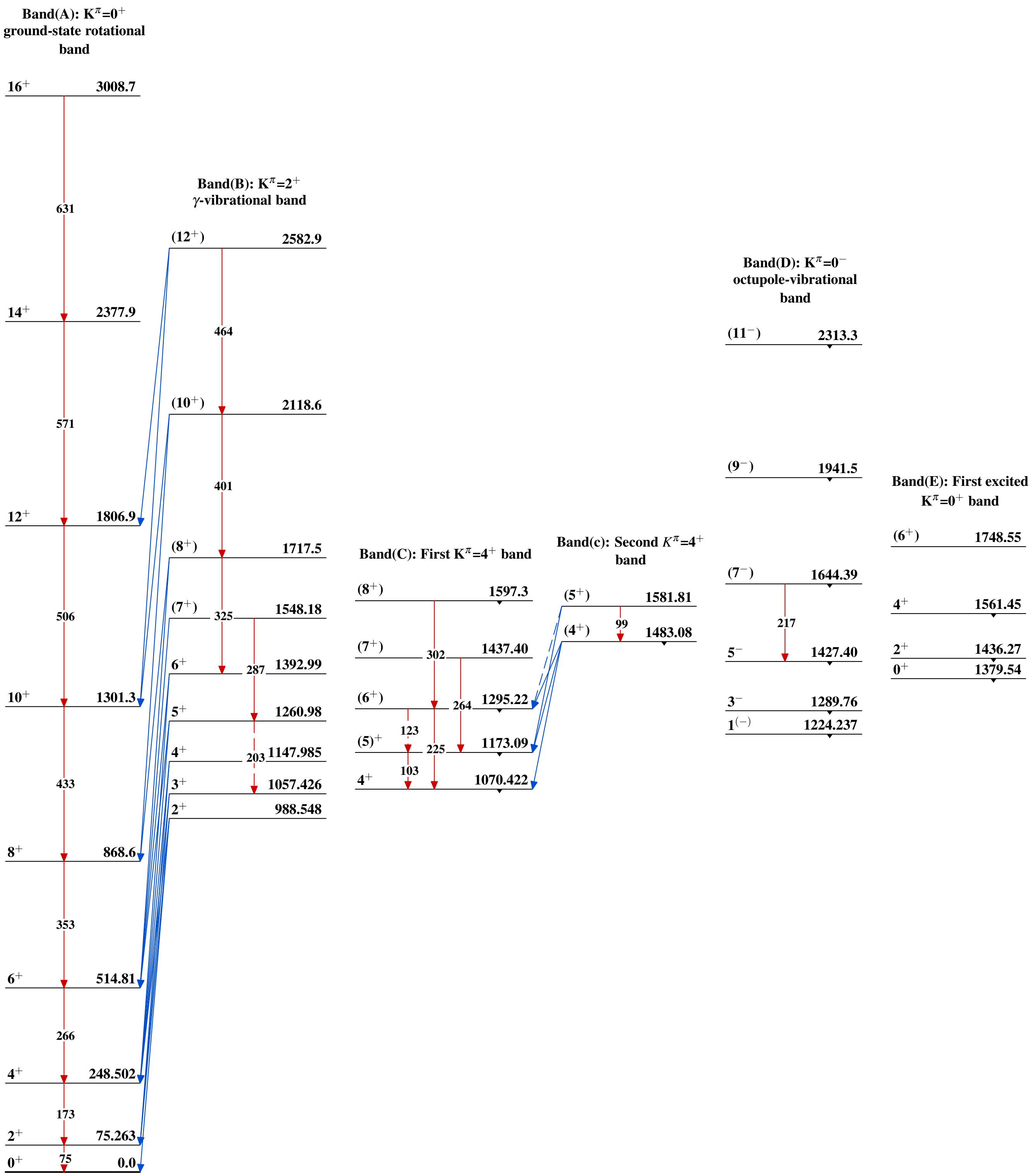
Level Scheme (continued)

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



$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas



$^{160}_{64}Gd_{96}$

Adopted Levels, Gammas (continued)