Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109,1103 (2008)	1-Mar-2008

Q(β^-)=−3038 *12*; S(n)=8476.5 *13*; S(p)=7316.3 *9*; Q(α)=829.7 *12* 2012Wa38
Note: Current evaluation has used the following Q record −3038 12 *8474.6 19* 7316.0 *9* 830.3 *12* 2003Au03.
For fine structure, hyperfine structure and isotope shift data see, e.g., 1989Kr16, 2000As04.

Other Reactions:

^{167}Er(^{3}He,$\alpha\gamma$), E=45 MeV: measured primary γ spectra; deduced level density and γ-ray strength function; see, e.g., 2001Me07. Observed pygmy resonance at E=2.98 *8* MeV with Γ=1.3 *3* MeV.

^{148}Nd(^{18}O,γ), E=78 MeV: measured $\gamma(\theta)$ for gammas emitted by the GDR in hot ^{166}Er at moderate excitation energy and spin (1993Br09, 1994Ca11).

^{166}Er Levels

The evaluator has not included the 1784.8 level from (n,n′γ). A comparison of branching of 1704γ and 1889γ, placed from 1969 level in ε decay, suggests that this level is being seen in both reactions and that entire Iγ(1704γ) in (n,n′γ) can be assigned to the 1969 level. The 1784γ is placed only from the 1865 level in ε decay with assignment of the 1704γ entirely to the 1969 level, the alternative placement of the 1784γ from a possible 1785 level is less convincing.

For discussion of structure of one-phonon states see, e.g., 2006De30.

Band (f) $K^\pi=(4)^-$ band. $K^\pi=4^-$ two−quasiproton 7/2[523]+1/2[411] states strongly mixed with $K^\pi=2^-$ octupole vibration states (please see comment on that band). Attribution of predominant K=4 character has been based on mixing calculations from 1989Ad12.

Cross Reference (XREF) Flags

A	^{166}Tm ε decay	F	^{165}Ho(^{3}He,d),(α,t)	K	^{164}Er(t,p)
B	^{166}Ho β^- decay (1.20×10^3 y)	G	^{166}Er(γ,γ')	L	^{168}Er(p,t)
C	^{166}Ho β^- decay (26.824 h)	H	^{166}Er(d,d′)	M	^{166}Er(pol p,p′),(^{3}He,^{3}He′),
D	^{166}Er(n,n′γ)	I	^{167}Er(d,t),(^{3}He,α)		
E	Coulomb excitation	J	^{164}Dy(α,2nγ)		

E(level)†	J$^\pi$	T$_{1/2}$‡	XREF	Comments
0.0[b]	0$^+$#	stable	ABCDEFGHIJKLM	
80.5776[b] *20*	2$^+$#	1.815 ns *23*	ABCDEFGHIJKLM	μ=+0.641 *10*; Q=−1.9 *4* (1965Hu01) μ: Mean of +0.649 *10* (1981Ho31) and +0.632 *10* (1968Mu01); Mossbauer effect. Q: From Mossbauer effect; Sternheimer correction applied. Others: −2.7 *9* (1970McZQ), −2.9 *10* (1970Ka45); from Coulomb excitation reorientation. <r^2>$^{1/2}$(charge)=5.251 *3* (2004An14). T$_{1/2}$: weighted average of 1.76 ns *5* (1963De21), 1.80 ns *5* (1963Fo02) in β^- decay (26.824 h); 1.83 ns *6* (1963Li04), 1.83 ns *5* (1968Ku03) in β^- decay (1.20 E3 y); 1.86 ns *5* from B(E2) in Coulomb excitation and adopted γ properties. Others: 1.98 ns *21* (1961Bo05) in β decay(26.824 h), 1961Ge14, 1967Ku07. J$^\pi$: E2 91γ to 0$^+$ g.s.
264.990[b] *3*	4$^+$#	118 ps *4*	ABCDEF HIJKLM	μ=+1.19 *4*; Q=−2.7 *9* (1969McZS) T$_{1/2}$: from $\gamma\gamma$(t) (^{166}Ho β^- decay (1200 y)). Other: 120 ps *7* from measured B(E2) and adopted γ properties. μ: Unweighted average of +1.26 *6* (1985Al22, IPAC), and +1.14 *8* (1996Br09) and 1.18 *5* (1986Do13), transient field IPAC.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
				Q: From Coulomb excitation reorientation. Jπ: E2 184γ to 2+ 81.
545.454[b] *4*	6+#	15.0 ps *8*	AB DEF HIJKLM	μ=+1.60 *6* $T_{1/2}$: from RDM in Coulomb excitation. Other value: 17.7 ps *+10−14* from measured B(E2) and adopted γ properties. μ: Weighted average of +1.55 *7* (1985Al22, IPAC), +1.51 *16* (1986Do13, transient field IPAC) and +1.72 *9* (1996Br09, transient field IPAC).
785.905[c] *6*	2+[a]	3.12 ps *10*	A CDEF HIJKLM	μ=0.69 *8*; Q=2.13 *15* μ: Weighted average of +0.54 *9* (1986Do13, transient field IPAC) and +0.74 *5* (1996Br09, transient field IPAC). Q: Weighted average of 2.2 *2* (1983Hu01), 2.1 *4* (1977Mc11) and 2.0 *3* (1970McZQ); from Coulomb excitation reorientation. $T_{1/2}$: from B(E2)↑=0.140 *4* in Coulomb excitation and adopted γ properties. Jπ: E2 786γ to 0+ g.s.
859.389[c] *5*	3+[a]	4.5 ps *8*	AB DEF IJKL	Jπ: M1 73γ to 2+ 786, E2+M1 594γ to 4+ 265. $T_{1/2}$: from B(E2)(594γ) in Coulomb excitation and adopted γ properties.
911.208[b] *6*	8+#	4.12 ps *15*	B DEF IJ M	μ=+2.1 *2* $T_{1/2}$: from Coulomb excitation. μ: Weighted average of +2.1 *4* (1985Al22, IPAC), +1.8 *3* (1986Do13, transient field IPAC) and +2.2 *2* (1996Br09, transient field IPAC).
956.232[c] *5*	4+[a]	3.5 ps *2*	AB DEF HIJKLM	Jπ: E2 170γ to 2+, E2 411γ to 6+. $T_{1/2}$: from Coulomb excitation (measured B(E2) and RDM).
1075.277[c] *4*	5+[a]	2.7 ps *3*	AB DEF IJ	Jπ: γ's to 4+ and 6+ are E2+M1. $T_{1/2}$: from measured B(E2) in Coulomb excitation and adopted transition properties. Other datum: ≤60 ps from γγ(t) (^{166}Ho β− decay (1200 y)).
1215.968[c] *5*	6+[a]	4.4 ps *3*	B DEF IJ	μ=+1.52 *19* (1985Al22) Jπ: M1+E2 671γ to 6+, E2 951γ to 4+ 265. γγ(θ) data of 1965Re02 consistent with J=6. μ: From 1985Al22 (IPAC). $T_{1/2}$: from Coulomb excitation (RDM).
1349.53[b] *7*	10+#	1.62 ps *7*	E J	μ=+2.6 *3* Jπ: continuation of established g.s. band. $T_{1/2}$: from Coulomb excitation; weighted average of 1.59 ps *8* (RDM) and 1.72 ps *14* (B(E2) and adopted γ properties). μ: Weighted average of +1.9 *7* (1986Do13) and +2.8 *4* (1996Br09); from transient field IPAC.
1376.035[c] *5*	7+[a]	4.9 ps *9*	B DE IJ	Jπ: γ's to 6+ and 8+ are E2+M1. $T_{1/2}$: from B(E2)(301γ) in Coulomb excitation and adopted transition properties.
1458.154[d] *9*	(2)−		A D F I	XREF: F(1452). Jπ: γ to 2+ and 3+ are E1, fit to a band.
1460.031[e] *6*	0+	0.76 ps *28*	CD JKL	Jπ: the 1460γ is E0 to 0+ g.s. $T_{1/2}$: from DSAM in (n,n′γ).
1513.751[d] *9*	3−		A DE H JKLM	B(E3)↑=0.061 *10* (1978Mc02) XREF: J(1515). B(E3)↑: From Coulomb excitation; B(E3)(W.u.)↑=37 *6*. Jπ: γ's to 2+ and 4+ are E1.
1528.401[e] *10*	2+	45 fs *6*	A CDEF JKL	Jπ: γ to 0+ is E2. $T_{1/2}$: from B(E2)↑=0.018 *2* in Coulomb excitation and adopted transition properties assuming negligible 572.2 branch.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
1555.737[c] *10*	8+[a]	3.7 ps *3*	B DEF J	Jπ: E2 γ's to 6+ and 8+. $T_{1/2}$: from Coulomb excitation (RDM).
1572.183 *7*	(4)−		AB D F I	Jπ: γ to 3+ is E1, γ to 5+ is (E1).
1596.241[d] *7*	(4)−		AB D F IJ	Jπ: E1 γ from 3+; γ from 6−.
1662.435[f] *5*	1−	5.2 fs *5*	A CD FGH	XREF: F(1651). Jπ: E1 γ to 0+. $T_{1/2}$: from $\Gamma^2_{\gamma 0}/\Gamma$=13.9 *16* in (γ,γ′) and adopted $\Gamma_{\gamma 0}/\Gamma$=0.397 *7*. K=(0) (1996Ma18) from (γ,γ′).
1665.799 *6*	5(−)		B D F IJKL	Jπ: J=5 from γγ(θ) (^{166}Ho β− decay (1200 y)).
1673.70 *10*			D J	
1678.765[e] *24*	(4)+[a]		A D F IJ	XREF: F(1680)I(1679)J(1674). Jπ: M1(+E2+E0) 1414γ to 4+ 265.
1692.297[d] *5*	5−		B D F HIJK	XREF: H(1698). Jπ: J=5 from γγ(θ) (^{166}Ho β− decay (1200 y)); E1(+M2) γ 1427 to 4+ 265.
1703.050 *18*	(2,3,4)+		A D I KL	XREF: I(1700)K(1704). Jπ: M1 γ from 3+.
1713.4 *7*	0+	>0.97 ps	D KL	Jπ: L(p,t)=0. $T_{1/2}$: from DSAM in (n,n′γ) (1997Ga13).
1721.7[f] *6*	3−[a]		DEF HI	B(E3)↑=0.032 *5* (1978Mc02) XREF: F(1720). B(E3)↑: From Coulomb excitation; B(E3)(W.u.)↑=20 *3*. Jπ: E1(+M2) 1641γ to 2+ 81, D(+Q) 1457γ to 4+ 265.
1751.36[c] *7*	9+[a]	2.4 ps *5*	E J	Jπ: γ to 8+ is (E2+M1); band assignment. $T_{1/2}$: from B(E2)(375γ) in Coulomb excitation and adopted transition properties.
1760.9 *4*			D F HI KL	XREF: F(1757)H(1759)I(1762).
1786.975 *5*	6−		B D F IJ	Jπ: J=6 from γγ(θ) in ^{166}Ho β− decay (1200 y), π=− from E1+(M2) 711.68γ to 5+.
1813.2[k] *3*	1(+)	39 fs *7*	A D FG I	Jπ: D, Δπ=(no) γ to 0+. $T_{1/2}$: from $\Gamma^2_{\gamma 0}/\Gamma$ in (γ,γ′) and adopted branching. K=1 (1996Ma18) from (γ,γ′).
1827.557[d] *5*	6−		B D F IJ	XREF: I(1829). Jπ: γ's to 5+ and 7+ levels are E1+M2.
1830.425 *12*	1−	45 fs *8*	A CD G L	Jπ: log *ft*=5.1 from 0−, γ to 0+. $T_{1/2}$: from (γ,γ′) assuming adopted branching.
1846.53[b] *12*	12+#	0.91 ps *5*	E J	Jπ: continuation of established g.s. band. $T_{1/2}$: from RDM in Coulomb excitation.
1865.17 *4*			A D F I KL	
1894.355 *21*	2+,3+,4+		A	Jπ: M1 238γ from 3+ 2132 level.
1897.27[e] *10*	(6+)[a]		D IJ	XREF: I(1896).
1901[f]	(5−)[a]		H KL	
1904.8? *5*	2,3,4		D	Jπ: D+Q γ to 2+ 81.
1908.2[q] *4*	(6−)		D I	Jπ: σ in (d,t).
1917.758[g] *8*	3−		A D F	XREF: F(1915). Jπ: γ's to 2+ and 4+ are E1.
1934.1 *5*	0+	54 fs *6*	D KL	XREF: K(1928). Jπ: L(p,t)=0. $T_{1/2}$: from DSAM in (n,n′γ).
1938.263 *11*	(3)+		A D F I	XREF: I(1940). Jπ: γ's to 2+ and 3+ are M1, J^π=(3,4)+ from (d,t).
1942.6 *4*	(0+)	0.24 ps *7*	DE	Jπ: Possible K^π=0+, γγ bandhead.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
				$T_{1/2}$: from DSAM in (n,n′γ) (1997Ga11).
1948			K	
1964.04[c] *8*	10+[a]	1.78 ps *17*	E J	Jπ: γ to 10+ is E2. $T_{1/2}$: from Coulomb excitation (RDM and B(E2)(409γ)).
1969.71 *17*	(2,3,4)		A D I K	Jπ: γ's to 2+ and 4+.
1978.422[h] *13*	4+	2.2 ps *+11−9*	A DEF HI L	XREF: F(1976)H(1973)I(1979). Jπ: M1+E2 154.5γ from 3+ level; (α,t) σ fingerprint for assigned band. Decay pattern to γ band states consistent with that for a state carrying a portion of the $K^\pi=4^+$ γγ vibration strength expected at roughly this energy (1998Fa15). $T_{1/2}$: from B(E2)(1193γ) in Coulomb excitation and adopted transition properties assuming 521-keV branch is negligible.
1985.629 *12*	3−		A I	XREF: I(1987). Jπ: γ to 3− is M1, γ's to 4+ and 2+.
1986.2 *7*	(4+)		E	Jπ: γ to 2+ and 3+ levels; decay pattern to γ band states consistent with that for a state carrying a portion of the $K^\pi=4^+$ γγ vibration strength expected at roughly this energy (1998Fa15).
1992.70[i] *10*	(7)−		F J	XREF: F(1988). Jπ: E1 1082γ to 8+ 911; band assignment. Suggested as possible J=7 member of $K^\pi=4^-$ band (1989Ad12), but E is too high for that.
2001.865 *12*	(3)−		A D I L	XREF: I(2003). Jπ: E1 1046γ to 4+ 956, γ to 2+.
2002[&g]	(4−)[@]		F	
2021.348 *12*	(2,3)−		A D f	Jπ: E1(+M2) 1235γ to 2+ 786, E1 1162γ to 3+ 859.
2022[r]	(4−)		f I	E(level): from (d,t),(^{3}He,α). Jπ: band assignment from (d,t).
2022.59 *12*	(4+)		A D f l	Jπ: gammas to 2+ and 6+.
2027.9[t] *5*	(4+)	0.22 ps *8*	DE l	Jπ: D+Q 1169γ to 3+ 859; Q 1243γ to 2+ 786, γ to (4)− 1572; possible γγ band assignment. $T_{1/2}$: from DSAM in (n,n′γ) (1997Ga11). Other value: 0.33 ps *12* from B(E2)(1243γ) and adopted transition properties, assuming negligible 1070 branch.
2031.5 *10*	(5+)		D I	Jπ: σ in (d,t).
2045[&h]	5+		D F	Jπ: from (α,t) σ fingerprint for assigned band. The 1089γ in (n,n′γ) may Be a doublet which deexcites this level as well as the 2047 level.
2046.87 *4*	2+,3+		A D	Jπ: ε decay from 2+ is allowed or first−forbidden, M1(+E2) 1188γ to 3+ 859.
2050[q]	(7−)		I	Jπ: σ in (d,t).
2055[p]	(1−)[@]		FG	E(level): from (γ,γ′); 2057-keV J=1, $K^\pi=1^-$ and J=2, $K^\pi=2^-$ doublet in (^{3}He,d), (α,t).
2057[&l]	(2−)[@]		F	E(level): 2057-keV J=1, $K^\pi=1^-$ and J=2, $K^\pi=2^-$ doublet in (^{3}He,d), (α,t).
2062.1 *17*			I KL	E(level): weighted average from (t,p) and (p,t).
2073.20[d] *7*	(8)−		I	Jπ: γ to 7+ is E1, fit to a band.
2074[&]	(2−)		F	Jπ: σ in (^{3}He,d).
2076.294[s] *20*	(3−)		A I	XREF: I(2080). Jπ: σ in (d,t).
2082.8 *4*			D	
2092.31 *10*	(7,8,9)−		IJKL	XREF: I(2090). Jπ: E1 1181γ to 8+ 911; band assignment. Suggested as possible J=7 member of $K^\pi=2^-$ octupole band (1989Ad12), but E is too high for that assignment.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
2101.6 *3*	(4+)	0.27 ps *19*	A C	Jπ: transitions to J=2,3 and possibly 4 members of γ band; candidate for $K^\pi=4^+$ γγ vibration state (1994OsZZ). $T_{1/2}$: from B(E2)(1316γ) in Coulomb excitation and adopted transition properties assuming negligible 1145γ branch.
2116[&]	(6+)		F	Jπ: σ in (^{3}He,d).
2117.8 *8*	(2+,3,4+)		A	Jπ: γ's to 2+ and 4+.
2117.8 *8*			D	
2124.7[r] *7*	(5−)		D I	Jπ: σ in (d,t).
2132[&l]	(3−)[@]		F	
2132[&h]	6+		F	Jπ: from (α,t) σ fingerprint for assigned band.
2132.941[m] *7*	3+		A D F I	XREF: F(2132)I(2128). Jπ: γ's to 2+ and 4+ are M1+E2.
2144.64 *10*	(8−)[a]		J	
2148.6[s] *5*	(4−)		D I	Jπ: σ in (d,t).
2152[&p]	(2−)		F	Jπ: σ in (^{3}He,d).
2155.8 *7*	(6+)		E	Jπ: γ to 4+ and 5+; possible member of band built on the 4+ 1978 level.
2160.114 *9*	3+		A D I L	XREF: I(2161). Jπ: γ's to 2+ and 4+ are M1+E2.
2167[&]	(2−)		F	Jπ: σ in (^{3}He,d).
2172.751 *17*	3+		A D K	XREF: K(2174). Jπ: γ to 2+ is M1+E2, γ to 5+ is E2.
2182			I	
2187	0+		K	Jπ: from L(p,t)=0.
2189.70[c] *10*	(11+)[a]		J	
2194.61[e] *10*	(8+)[a]		J	
2196.3 *17*	0+		KL	Jπ: L(p,t)=0. E(level): weighted average from (t,p) and (p,t).
2201.3 *6*	1(+)	9.7 fs *12*	D fG	XREF: f(2204). Jπ: D, Δπ=(no) γ to 0+. $T_{1/2}$: assuming negligible 743γ branch. K=0 (1996Ma18) from (γ,γ').
2207 *3*			f L	XREF: f(2204). E(level): from (p,t); 2204 in (^{3}He,d),(α,t).
2212.95 *12*			A	
2215.963 *13*	2−,3−		A F I	XREF: F(2217). Jπ: 298γ to 3− is M1, 386γ to 1− is E2.
2226[&l]	(4−)[@]		F	
2226[&p]	(3−)[@]		F	
2239[&m]	4+		F	Jπ: from (α,t) σ fingerprint for assigned band.
2240.1[j] *10*	(5−)		HI	XREF: H(2238)I(2242). Jπ: σ in (d,t). The 2240 level $J^\pi=(4^+)$ from (^{3}He,d) might be a separate level.
2243.087 *20*	3−		A L	Jπ: γ's to 2+ and 4+ are E1.
2246.31[d] *10*	(9−)[a]		J	
2260.3[t] *7*	(6+)		E	Jπ: from band assignment.
2260.65 *3*	2(+),3		A L	Jπ: ε decay from 2+ is allowed or first-forbidden, γ to 4+.
2264.31 *6*	(1,2+)		A D I	Jπ: γ's to 0+ and 2+.
2266[&h]	7+		F	Jπ: from (α,t) σ fingerprint for assigned band.
2273.01 *3*	3−		A I	XREF: I(2274). Jπ: γ's to 2+ and 4+ are E1.
2282.68 *5*	2(+),3		A D F	XREF: F(2279).

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
				J^π: ε decay from 2^+ is allowed or first-forbidden, γ to 4^+.
2290.959 *23*	$(3)^+$		A D F I L	XREF: F(2289)I(2295). J^π: $(3,4)^+$ from σ in (d,t), M1(+E2) γ to to 2^+ and 4^+.
2302 *3*			L	E(level): from (p,t).
2315	$(3,4)^+$		F I	XREF: F(2312). J^π: σ in (d,t).
2328.51 *10*	$(9)^-$		J	J^π: 1417γ to 8^+ 911; band assignment.
2328.69 *9*	(1,2)		A	J^π: γ's to 0^+ and 2^+.
2333[&]			F I	XREF: I(2336).
2352.91 *8*	$2^{(+)},3$		A F I	XREF: F(2347)I(2353). J^π: ε decay from 2^+ is allowed or first forbidden, γ to 4^+.
2359[&m]	5^+		F	J^π: from (α,t) σ fingerprint for assigned band.
2368[&j]	(6^-)		F I	J^π: σ in (d,t).
2377.77 *5*	1^+		A I	XREF: I(2377). J^π: γ to 0^+ is M1.
2382.26 *4*	$(3)^+$		A F I	XREF: F(2387)I(2386). J^π: M1(+E2) 1523γ to 3^+ 859, 924γ to $(2)^-$ 1458, $J^\pi=(3,4)^+$ from σ in (d,t).
2389.33[b] *16*	14^+[#]	0.55 ps *7*	E J	J^π: continuation of established g.s. band. $T_{1/2}$: from Coulomb excitation (RDM).
2393.129 *15*	$2^+,3^+$		A	J^π: γ to 2^+ is M1, γ to 4^+.
2402[&]			F I	
2413.67 *8*	(2,3,4)		A D F I	XREF: F(2418)I(2417). J^π: γ's to 2^+ and 4^+. If the 1630γ in (n,n'γ) is correctly placed from this level, its D+Q multipolarity would rule out J=4.
2427			I	
2428.4?[d] *4*	(10^-)[a]		J	
2428.77[c] *13*	(12^+)[a]	1.18 ps *21*	E J	$T_{1/2}$: from RDM in Coulomb excitation.
2435.10 *10*	$(3,4)^+$		A F I	XREF: F(2438)I(2438). J^π: σ in (d,t).
2442.0? *10*	$(3^+,4^+,5^+)$		D	J^π: significantly mixed D+Q 2177γ to 4^+ 265.
2444.16 *24*			A I	XREF: I(2449).
2453[&]			F	
2459.0? *10*			D	
2464.51 *10*	1^+	43 fs *6*	A G	J^π: M1 γ to 0^+. $T_{1/2}$: from $\Gamma^2_{\gamma 0}/\Gamma$=5.1 *5* in ($\gamma,\gamma'$) and adopted $\Gamma_{\gamma 1}/\Gamma_{\gamma 0}$=0.44 *7*. K=1 (1996Ma18) from (γ,γ').
2475.39 *4*	$(1,2)^+$		A F I	XREF: F(2476)I(2478). J^π: γ to 0^+; E2,M1 γ to 2^+.
2479.74?[e] *12*	(10^+)[a]		J	
2495	(9^-)		I	J^π: σ in (d,t).
2504.6 *10*	$(3,4)^+$		D F I	XREF: F(2504)I(2499). J^π: σ in (d,t).
2512	$(3,4)^+$		I	J^π: σ in (d,t).
2525	1	23 fs *3*	G I	XREF: I(2522). J^π: D γ to 0^+. E(level): from (γ,γ'). K=1 from (γ,γ') (1996Ma18).
2534			F I	XREF: F(2536).
2542.87 *5*			A I	XREF: I(2542).
2563[m]	6^+		F I	XREF: F(2568). J^π: from (α,t) σ fingerprint for assigned band.
2574.0[t] *10*	(8^+)		E	J^π: band assignment.

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
2578			I	
2586.06 *12*	$(3,4)^+$		A F I	XREF: F(2583). Jπ: σ in (d,t).
2600.63 *3*	1^+		A G I	XREF: G(2601)I(2603). Jπ: M1 γ to 0^+. $T_{1/2}$: 12 fs *3* from (γ,γ′), if I(1142γ) is negligible. K=1 from (γ,γ′) (1996Ma18).
2608[&]	(6^-)		F	Possible configuration: π^2(7/2[523]+5/2[402]) (1993Li12). Jπ: σ in (^{3}He,d).
2613.50 *17*			A	
2619.6 *6*	(2^+)		A I	XREF: I(2622). Jπ: γ′s to 0^+ and 4^+.
2624.8 *3*	$(1,2^+)$		A	Jπ: γ′s to 0^+ and 2^+.
2628.5 *3*	$(1,2^+)$		A	Jπ: γ′s to 0^+ and 2^+.
2632.66 *17*	$(3,4)^+$		A F I	XREF: F(2632)I(2631). Jπ: σ in (d,t).
2649			I	
2654.40?[c] *14*	(13^+)[a]		J	
2655			F	
2656.9?[e] *4*	(12^+)[a]		J	
2671.98 *17*			A F I	XREF: F(2671)I(2670).
2679.05 *18*	1^+	20 fs *3*	A G I	XREF: I(2677). Jπ: M1 γ to 0^+. K=1 from (γ,γ′) (1996Ma18).
2687			F I	XREF: F(2684).
2713[&m]	7^+		F	Jπ: from (α,t) σ fingerprint for assigned band.
2729.090 *17*	$(3,4)^+$		A I	XREF: I(2734). Jπ: σ in (d,t).
2742[&]			F	
2767.8 *7*	1	22 fs *4*	FG	Jπ: from γ(θ) in (γ,γ′). K=0 (1996Ma18) from (γ,γ′).
2783.69 *19*	1^+	49 fs *14*	A FG	Jπ: M1 γ to 0^+. $T_{1/2}$: from $\Gamma^2_{\gamma 0}/\Gamma$=2.6 *5* from (γ,γ′) and adopted $\Gamma_{\gamma 0}/\Gamma$=0.53 *6*.
2797.5 *4*	$(1,2^+)$		A F	XREF: F(2808). Jπ: γ′s to 0^+ and 2^+.
2811.98 *11*	1	3.1 fs *3*	A G	Jπ: from γ(θ) in (γ,γ′). $T_{1/2}$: if 2026γ branch is negligible. K=0 (1996Ma18) from (γ,γ′).
2858.16 *18*	$(1,2^+)$		A	Jπ: γ′s to 0^+ and 2^+.
2880.07?[c] *17*	(14^+)[a]		F J	
2912[&]			F	
2954[&]			F	
2967.3[b] *6*	(16^+)[#]	0.49 ps *27*	E J	
2993?[&]			F	
3000[&]			F	
3043[&]			F	
3073	1	11 fs *4*	G	Jπ: D γ to 0^+ g.s. E(level): from (γ,γ′). K=0 (1996Ma18) from (γ,γ′).
3077[&n]	(8^+)		F	Jπ: σ in (^{3}He,d).
3087[&]			F	
3123	1	17 fs *6*	G	Jπ: D γ to 0^+ g.s. E(level): from (γ,γ′).

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	S	XREF	Comments
					K=(0) (1996Ma18) from (γ,γ′).
3144	1	5.4 fs *5*		G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). Other E: 3141 from (γ,γ′). K=1 (1996Ma18) from (γ,γ′).
3147[&]				F	
3160[&]				F	
3175	1	11.8 fs *15*	14.9 *16*	G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=(1) (1996Ma18) from (γ,γ′).
3187	1	11.4 fs *10*		G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=1 (1996Ma18) from (γ,γ′).
3197	1	7.4 fs *7*		G	K=1 (1996Ma18) from (γ,γ′). Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). Other E: 3193 in (γ,γ′) (1973Me17).
3211[&]				F	
3239[&]				F	
3253[&]				F	
3273[&n]	(9+)			F	Jπ: σ in (^{3}He,d).
3288	1	6.0 fs *9*		G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=(0) (1996Ma18) from (γ,γ′).
3296[&]				F	
3322	1	5.8 fs *14*		FG	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=0 (1996Ma18) from (γ,γ′).
3329	1	15.0 fs *25*		G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=1 (1996Ma18) from (γ,γ′).
3345[&]				F	
3371[&]				F	
3386	1	5.3 fs *12*		G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=(0) (1996Ma18) from (γ,γ′).
3394[&]				F	
3425	1	38 fs *19*		fG	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′).
3430	1	13 fs *3*		fG	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′). K=1 (1996Ma18) from (γ,γ′).
3440	1	3.4 fs *13*		G	$T_{1/2}$: from (γ,γ′).
3459[&]				F	
3476[&]				F	
3493	1			G	Jπ: D γ to 0+ g.s. E(level): from (γ,γ′).
3498	1			FG	XREF: F(3501). Jπ: D γ to 0+ g.s. E(level): from (γ,γ′).
3554[&]				F	
3577?[b]	(18+)[#]			E	E(level): from Coulomb excitation.
3579[&]				F	
3600[&]				F	

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Adopted Levels, Gammas (continued)

^{166}Er Levels (continued)

E(level)†	XREF	E(level)†	XREF	E(level)†	XREF
3627&	F	3978&	F	4256&	F
3663&	F	4002&*o*	F	4274&	F
3721&	F	4026&	F	4297&	F
3751&	F	4045&	F	4329&	F
3783&	F	4064&	F	4359&	F
3808&	F	4087&*o*	F	4381&	F
3838&	F	4106&	F	4407&	F
3856&	F	4126&	F	4418&	F
3881&	F	4149&	F	4442&	F
3907&	F	4174&	F		
3932&	F	4227&	F		

† From least-squares fit to Eγ, omitting the 646.8γ from the 2160 level, the 1053γ from the 1964 level, and all three placements for the 1216.173γ because these transitions have Eγ values that deviate from the expected value by at least 5σ. Exceptions are noted.

‡ Deduced from measured $\Gamma^2_{\gamma 0}/\Gamma$ and $\Gamma_{\gamma 1}/\Gamma_{\gamma 0}$, in (γ,γ') assuming $\Gamma=\Gamma_{\gamma 1}+\Gamma_{\gamma 0}$. Thus, deduced $T_{1/2}$ will Be an upper limit if branches exist to levels other than the g.s. and the 81-keV level.

Assignments for J<16 g.s. band members are based on known J^π of g.s., the E2 transition between J=2 and 0 members and large B(E2) for excitation of levels in multiple Coulomb excitation.

@ Assignments based on (^{3}He,d) or (α,t) cross section and (^{3}He,d) to (α,t) cross section ratios.

& From ^{165}Ho(^{3}He,d),(α,t).

a Fit to a band, unless otherwise noted.

b Band(A): $K^\pi=0^+$ g.s. band. A=13.9, B=−12.8×10^{-3}.

c Band(B): $K^\pi=2^+$ γ-vibrational band. A=12.44, B=−10.4×10^{-3}.

d Band(C): $K^\pi=(2)^-$ octupole vibrational band. K=2 octupole-vibrational states are strongly Coriolis mixed with $K^\pi=4^-$ two−quasiproton 7/2[523]+1/2[411] states for J≥4. K=2 dominates in 1458, 1514,1596 and 1692 levels, K=4 dominates in 1572 and 1666 levels and K=2 and K=4 amplitudes are comparable in E>1692 levels (see 1974Ka02 and 1989Ad12; see also 2000Gr33). Attribution of predominant K=2 character has been based on mixing calculations from 1989Ad12. The 1458, 1514 and 1596 level energies imply A=10.75, B=−0.034.

e Band(D): $K^\pi=0^+$ band. A=11.7, B=−0.05.

f Band(E): $K^\pi=0^-$ band.

g Band(F): $K^\pi=3^-$ band (1993Li12). Configuration: 7/2[523]−1/2[411].

h Band(G): $K^\pi=4^+$ band (1993Li12). Configuration: 7/2[523]+1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.

i Band(H): $K^\pi=7^-$ band (1993Li12). Configuration: 7/2[523]+7/2[404].

j Band(I): $K^\pi=(5^-)$ band (1975Pa15). Configuration: 7/2[633]+3/2[521].

k Band(J): $K^\pi=1^+$ band.

l Band(K): $K^\pi=2^-$ band. Configuration: 7/2[523]−3/2[411].

m Band(L): $K^\pi=3^+$ band. Configuration: 7/2[523]−1/2[541]; established from (α,t), (^{3}He,d) cross section fingerprint for observed band members.

n Band(M): $K^\pi=8^+$ band. Configuration: 7/2[523]+9/2[514].

o Band(N): $K^\pi=1+?$ band (1993Li12). Possible configuration: 7/2[523]−9/2[514].

p Band(O): $K^\pi=1^-$ band. Configuration: 7/2[523]−5/2[402].

q Band(P): $K^\pi=(6^-)$ band (1975Pa15). Configuration: 7/2[633]+5/2[523].

r Band(Q): $K^\pi=(4^-)$ band (1975Pa15). Configuration: 7/2[633]+1/2[521].

s Band(R): $K^\pi=(3^-)$ band (1975Pa15). Configuration: 7/2[633]−1/2[521].

t Band(S): possible $K^\pi=4^+$, $\gamma\gamma$ vibration band (1998Fa15).

Adopted Levels, Gammas (continued)

γ(^{166}Er)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
80.5776	2+	80.576 *2*	100	0.0	0+	E2		6.78	B(E2)(W.u.)=217 *5* E_γ: from ^{166}Ho β^- decay (26.824 h). Mult.: based on ce data from ^{166}Ho β^- decay (26.824 h).
264.990	4+	184.4113[&] *24*	100	80.5776	2+	E2		0.331	B(E2)(W.u.)=312 *11*
545.454	6+	280.464[&] *2*	100	264.990	4+	E2		0.0849	B(E2)(W.u.)=370 *20*
785.905	2+	520.945[&] *15*	1.72 *4*	264.990	4+	E2		0.01481	B(E2)(W.u.)=0.78 *4*
		705.333 *20*	100.0 *21*	80.5776	2+	E2+M1	−5 *+3−14*	0.0074 *12*	B(M1)(W.u.)=0.0004 *+5−4*; B(E2)(W.u.)=9.6 *6* δ: from ε decay (1987Kr12). Other δ: −22 *+13−7*, −7 *+23−3* in ε decay; >50 from (n,n′γ); −19 *+9−38*, −38 *+24−∞*, >25 in Coulomb excitation.
		785.904 *15*	88.9 *18*	0.0	0+	E2		0.00561	B(E2)(W.u.)=5.17 *21* I_γ: weighted average of 86.3 *15* from β^- decay (26.824 h), 81 *4* from (n,n′γ) and 90.5 *10* from ε decay.
859.389	3+	73.45 *2*	0.04	785.905	2+	M1		6.92	I_γ: from Coulomb excitation.
		594.409 *15*	18.82 *17*	264.990	4+	E2+M1	−12 *2*	0.01076 *16*	B(M1)(W.u.)=2.5×10^{-5} *10*; B(E2)(W.u.)=4.8 *9* δ: from ^{166}Tm ε decay; −45 *+19−137* from (n,n′γ), −8 *+3−15* from Ho β^- decay (1200 y).
		778.839[&] *11*	100.0 *24*	80.5776	2+	E2+M1	−20 *+2−4*	0.00574	E_γ: from β^- decay (1200 y). δ: from β^- decay (1200 y). Other δ include: −45 *+8−13* from β^- decay (1200 y), <−7 from (α,2nγ), −75 *+26−134* from (n,n′γ); however, data from ε decay range from +8.4 *7* to −6.2 *+10−8* and source of discrepancy is not known.
		859.3[&] *1*	1.18 *24*	0.0	0+				E_γ: from β^- decay (1200 y).
911.208	8+	365.760[&] *5*	100	545.454	6+	E2		0.0385	B(E2)(W.u.)=373 *14* Mult.: from ce data in ^{164}Dy(α,2nγ).
956.232	4+	96.85 *5*	0.166[&] *8*	859.389	3+	E2		3.32	B(E2)(W.u.)=3.7×10^2 *3*
		170.325 *16*	1.05[&] *3*	785.905	2+	E2		0.433	B(E2)(W.u.)=138 *9*
		410.797 *16*	1.25[&] *4*	545.454	6+	E2		0.0278	B(E2)(W.u.)=2.01 *14*
		691.251[&] *16*	100.0[&] *6*	264.990	4+	E2+M1	−3.7 *5*	0.00802 *20*	B(M1)(W.u.)=0.00082 *22*; B(E2)(W.u.)=11.1 *7* δ: from ^{166}Tm ε decay. Other δ: ≥50 from (n,n′γ), −3.3 *+12−30* from Coulomb excitation, 3.8 *+34−12* and −10 *+4−27* from β^- decay (1200 y). However, discrepant data exist, e.g., +5.5 *+28−14* in ε decay or −16 +427 and +566 −522-616 in β^- decay (1200 y).
		875.650 *15*	54.2[&] *4*	80.5776	2+	E2		0.00444	B(E2)(W.u.)=1.98 *12* Other Iγ: 55.0 *10* from ε decay, 57 from Coulomb excitation, 43.9 *24* from (n,n′γ), 70 *7* from (α,2nγ).

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
1075.277	5$^+$	119.041[&] *3*	0.298[&] *6*	956.232	4$^+$	(M1+E2)	+1.94 *+23−21*	1.578 *24*	B(M1)(W.u.)=0.0024 *6*; B(E2)(W.u.)=3.1×10^2 *4* Mult.,δ: D+Q from 119γ-876γ(θ) for intraband γ in ^{166}Ho β$^-$ decay (1200 y).
		215.8887[&] *21*	4.52[&] *1*	859.389	3$^+$	[E2]		0.196	B(E2)(W.u.)=3.0×10^2 *4* Iγ(215.9γ)/Iγ(810.3γ)=0.0502 *22* (^{166}Tm ε decay), 0.109 *11* in (α,2nγ), 0.0432 in Coulomb excitation, <0.029 in (n,n′γ).
		529.807[&] *11*	16.63[&] *27*	545.454	6$^+$	E2+M1[&]	−25 *+4−5*	0.01421	B(M1)(W.u.)=1.2×10^{-5} *4*; B(E2)(W.u.)=12.4 *15* Iγ(529.8γ)/Iγ(810.3γ)=0.164 *7* (^{166}Tm ε decay). 0.167 *23* in (α,2nγ), 0.156 in Coulomb excitation, 0.300 *23* in (n,n′γ). δ: other values: see β$^-$ decay (1200 y) and (n,n′γ) data sets.
		810.293[&] *10*	100.0[&] *19*	264.990	4$^+$	E2+M1[&]	−21.2 *+18−21*	0.00526	B(M1)(W.u.)=2.8×10^{-5} *6*; B(E2)(W.u.)=8.9 *11* Other δ: −27 *+4−6* in (n,n′γ); <−17 in ε decay.
1215.968	6$^+$	140.692[&] *6*	0.78[&] *1*	1075.277	5$^+$	[M1,E2]		0.96 *12*	
		259.740[&] *3*	19.60[&] *11*	956.232	4$^+$	[E2]		0.1079	B(E2)(W.u.)=225 *16* Other Iγ: 25.9 *24* in (α,2nγ), 24.8 in Coulomb excitation.
		304.91[&] *5*	0.36[&] *5*	911.208	8$^+$	[E2]		0.06574	B(E2)(W.u.)=1.9 *3*
		670.516[&] *14*	100.0[&] *17*	545.454	6$^+$	E2+M1[&]	+10.0 *+16−12*	0.00811	B(M1)(W.u.)=9.E−5 *3*; B(E2)(W.u.)=9.9 *7* Other δ: ≥+11 in (n,n′γ); −6 +∞−3 in (α,2nγ).
		950.964[&] *9*	50.40[&] *24*	264.990	4$^+$	E2		0.00373	B(E2)(W.u.)=0.88 *6* Mult.: from ce data (^{164}Dy(α,2nγ)).
1349.53	10$^+$	438.2[ib] *1*	100[i]	911.208	8$^+$	[E2]		0.0233	B(E2)(W.u.)=390 *17*
1376.035	7$^+$	160.076[&] *5*	0.98[&] *6*	1215.968	6$^+$	[M1,E2]		0.64 *11*	
		300.755[&] *4*	39.16[&] *23*	1075.277	5$^+$	E2(+M3)	−0.018 *+15−16*	0.0691 *19*	B(E2)(W.u.)=2.2×10^2 *4* δ: B(M3)(W.u.) exceeds RUL, unless δ<0.00003.
		464.832[&] *6*	12.8[&] *6*	911.208	8$^+$	E2+M1[&]	−63 *+12−19*	0.0200 *4*	B(M1)(W.u.)=9.E−7 *4*; B(E2)(W.u.)=8.0 *16* δ: from 1985Al22; however δ=−13 *+5−3* (1981Kr12) also reported.
		830.585[&] *9*	100.0[&] *23*	545.454	6$^+$	E2+M1	−16.6 *+15−18*	0.00499	B(M1)(W.u.)=1.8×10^{-5} *5*; B(E2)(W.u.)=3.4 *7* δ: from β$^-$ decay (1200 y). Other δ: <−20 in (α,2nγ); −34 *+14−51* in (n,n′γ).
1458.154	(2)$^-$	598.764 *19*	34.4 *7*	859.389	3$^+$	E1(+M2)	−0.02 *6*	0.0038 *4*	Other Iγ: 51 *9* in (n,n′γ). Mult.,δ: E1 from ε decay; D(+Q), δ=−0.02 *6* or −5.4 *+13−30* from (n,n′γ).
		672.242 *20*	100.0 *22*	785.905	2$^+$	E1		0.00297	δ: −0.01<δ(D,Q)<0 from ^{166}Tm ε decay; mult=D+Q and δ(D,Q)=+0.01 *+7−5* or +2.2 *+3−4* from (n,n′γ).

$^{166}_{68}Er_{98}$-11

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	$I_{(\gamma+ce)}$	Comments
1458.154	(2)$^-$	1378.6 *10*	0.12 *6*	80.5776	2$^+$					
1460.031	0$^+$	674.188[a] *15*	2.07[a] *10*	785.905	2$^+$					
		1379.437[a] *6*	100[a]	80.5776	2$^+$	E2		0.00181		B(E2)(W.u.)=2.7 *10* Mult.: from ^{166}Ho β^- decay (26.824 h).
		1460.0[a]		0.0	0$^+$	E0			≈0.030	Mult.: from ^{166}Ho β^- decay (26.824 h). ρ^2(E0)=0.0020 *10* (1999Wo07).
1513.751	3$^-$	557.514 *18*	67.0 *13*	956.232	4$^+$	E1		0.00440		
		654.358 *16*	85.7 *17*	859.389	3$^+$	E1		0.00314		Other Iγ: 52 *6* in (n,n′γ). Mult.: from ε decay; δ(D,Q)=−0.08 *+9−6* or +1.55 *+21−23* from (n,n′γ).
		727.858 *20*	91 *4*	785.905	2$^+$	E1		0.00253		Other Iγ: 78 *7* in (n,n′γ). δ(D,Q)=+0.01 *+3−4* from (n,n′γ).
		1248.78 *3*	51.1 *11*	264.990	4$^+$	E1+M2	+0.13 *3*	0.00109 *7*		Other Iγ: 41 *7* in (n,n′γ). Mult.,δ: from (n,n′γ).
		1433.42 *25*	100 *17*	80.5776	2$^+$	E1+M2	+0.054 *+19−27*	8.85×10^{-4} *18*		E_γ: from ^{166}Ho β^- decay (1200 y). Mult.,δ: from (n,n′γ).
1528.401	2$^+$	572.2		956.232	4$^+$					
		742.59 *10*	2.89 *25*	785.905	2$^+$					
		1263.412 *16*	100.0 *21*	264.990	4$^+$	E2		0.00212		B(E2)(W.u.)=39 *6* Mult.: from γ(θ) and linear polarization in (n,n′γ); M1,E2 from α(K)exp in ε decay.
		1447.820 *25*	71.1 *17*	80.5776	2$^+$	M1+E2+E0	+0.5 *3*	0.00242 *18*		B(M1)(W.u.)=0.013 *13* δ: from (n,n′γ).
		1528.38 *4*	4.3 *4*	0.0	0$^+$	E2		1.54×10^{-3}		B(E2)(W.u.)=0.66 *8* Other Iγ: 5.8 *7* from ^{166}Ho β^- decay (26.824 h), 18 *7* from (n,n′γ). B(E2)(W.u.): from measured B(E2)=0.018 *2* in Coulomb excitation.
1555.737	8$^+$	179.3[b] *1*	<16[b]	1376.035	7$^+$					
		206.0		1349.53	10$^+$	[E2]		0.2282		B(E2)(W.u.)≈1.5 E_γ: from Coulomb excitation. B(E2)(W.u.) from measured B(E2)(↓)≈0.008 in Coulomb excitation.

$^{166}_{68}Er_{98}$-12

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
1555.737	8$^+$	339.751[&] *21*	100.0[&] *10*	1215.968	6$^+$	(E2)		0.0476	B(E2)(W.u.)=250 *23*
		644.60[&] *5*	86.9[&] *27*	911.208	8$^+$	E2+M1	+4.9 *+23−11*	0.0092 *3*	B(M1)(W.u.)=0.0003 *3*; B(E2)(W.u.)=8.5 *9* Mult.: from α(K)exp in (α,2nγ) and γ(θ,H,t) in β$^-$ decay (1200 y). δ: from γ(θ,H,t) ^{166}Ho β$^-$ decay (1200 y). Other δ: ≤−1 or ≥+4, >+1.4 or <−6 in β$^-$ decay (1200 y); +1.6 *+10−6* or −0.75 *20* in (α,2nγ).
		1010.288[&] *11*	48.3[&] *6*	545.454	6$^+$	E2		0.00329	B(E2)(W.u.)=0.52 *5* Other Iγ: 41 *4* from (α,2nγ), 38 from Coulomb excitation. Mult.: from ce data (^{164}Dy(α,2nγ)).
1572.183	(4)$^-$	114.09		1458.154	(2)$^-$	E2		1.80	
		496.935 *16*	45.2 *9*	1075.277	5$^+$	(E1)		0.00566	Other Iγ: 26 *5* in (n,n′γ).
		615.963 *15*	34.8 *8*	956.232	4$^+$	(E1(+M2))			Other Iγ: 22 *4* in (n,n′γ). Mult.: D(+Q) from (n,n′γ); Δπ=yes from level scheme. δ(D,Q)=−0.03 *+10−6* or +1.02 *+14−18* from (n,n′γ).
		712.817 *22*	100 *2*	859.389	3$^+$	E1		0.00264	
		1307.17 *15*	1.1 *3*	264.990	4$^+$				
1596.241	(4)$^-$	520.94[&] *3*	66.8 *18*	1075.277	5$^+$				Iγ: from β$^-$ decay (1200 y). Other Iγ: 44 *6* from ε decay, 36 *7* from (n,n′γ).
		640.015[&] *9*	37.2 *7*	956.232	4$^+$				Iγ: weighted average of 37.7 *9* from β$^-$ decay (1200 y) and 36.5 *11* from ε decay. Other Iγ: 48 *7* from (n,n′γ).
		736.832 *22*	100[&] *6*	859.389	3$^+$	E1		0.00247	Mult.,δ: from (n,n′γ); δ(D,Q)=+0.002 *+19−25*.
		1331.17[&] *11*	1.7[&] *2*	264.990	4$^+$				Iγ: based on Iγ(1331.2γ)/Iγ(640γ)=0.041 *6* (^{166}Ho β$^-$ decay (1200 y)).
1662.435	1$^-$	1581.834[a] *7*	100.0[a] *11*	80.5776	2$^+$	E1(+M2)	−0.027 *27*	8.69×10^{-4} *15*	B(E1)(W.u.)=0.0066 *7*; B(M2)(W.u.)=9 *+18−9* Mult.,δ: from ^{166}Ho β$^-$ decay (26.824 h). Other δ: −0.04 *+8−9* or −3.0 *+7−11* from (n,n′γ).
		1662.439[a] *6*	65.3[a] *7*	0.0	0$^+$	E1		8.77×10^{-4}	B(E1)(W.u.)=0.0037 *4* Iγ: other Iγ: 65.8 *17* in (γ,γ′), 80 *10* in ε decay, 73 *7* in (n,n′γ). Mult.: from (γ,γ′).
1665.799	5$^{(-)}$	590.56[&] *3*	4.6[&] *4*	1075.277	5$^+$				
		1120.330[&] *11*	39.2[&] *4*	545.454	6$^+$				Other Iγ: 48 *5* from (α,2nγ), 95 *10* from (n,n′γ).

$^{166}_{68}Er_{98}$-13

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
1665.799	5(−)	1400.770[&] *15*	100.0[&] *7*	264.990	4+	E1(+M2)	+0.025 *+18−26*	8.81×10^{-4} *14*	Mult.,δ: from (n,n′γ).
1673.70		1408.7 *1*	100	264.990	4+				
1678.765	(4)+	819.0[c]	49[c] *15*	859.389	3+				
		892[c]	<9[c]	785.905	2+				
		1413.81 *4*	100 *5*	264.990	4+	M1(+E2+E0)	+0.35 *30*	0.0062 *21*	δ: from (n,n′γ).
		1598.2[c]	<21[c]	80.5776	2+				
1692.297	5−	476.378[&] *19*	7.3[&] *4*	1215.968	6+				
		617.0[&] *5*	4.5[&] *13*	1075.277	5+				
		736.02[&] *8*	28[&] *3*	956.232	4+				
		1146.825[&] *12*	41.1[&] *4*	545.454	6+				
		1427.227[&] *21*	100.0[&] *7*	264.990	4+	E1(+M2)	−0.002 *+22−31*	8.72×10^{-4} *14*	Mult.,δ: from (n,n′γ).
1703.050	(2,3,4)+	1622.45 *3*	100	80.5776	2+	E2,M1		0.0018 *4*	
1713.4	0+	927.4[c]	12.4[c] *6*	785.905	2+				
		1632.9[c]	100.0[c] *6*	80.5776	2+	[E2]			B(E2)(W.u.)<0.83
1721.7	3−	935[k]		785.905	2+				Tentative γ reported in Coulomb excitation only.
		1456.6[c] *10*	78[c] *12*	264.990	4+	D(+Q)			Mult.: from (n,n′γ). δ: −0.01 *10* or −8 *+13−12* from (n,n′γ).
		1641.2[c] *7*	100[c] *13*	80.5776	2+	E1(+M2)	+0.01 *+3−4*	8.74×10^{-4} *14*	Mult.,δ: from (n,n′γ).
1751.36	9+	375.2[b] *1*	100[b] *10*	1376.035	7+	E2		0.0358	B(E2)(W.u.)=3.7×10^2 *15* Mult.: from ce data in ^{164}Dy(α,2nγ).
		401.9[b] *1*	5	1349.53	10+				I_γ: from Coulomb excitation. Other: <16 from (α,2nγ).
		840.2[ib] *1*	90[ib] *9*	911.208	8+	(E2+M1)		0.0072 *23*	Mult.: from α(K)exp in ^{164}Dy(α,2nγ). δ(D,Q)=−11 *+3*- infinity from γ(θ) in ^{164}Dy(α,2nγ) for γ that may Be doubly placed.
1760.9		1215.5[c] *5*	<95[c]	545.454	6+				E_γ,I_γ: for doubly-placed γ.
		1495.7[c] *7*	100[c] *16*	264.990	4+	D+Q			E_γ: Eγ=1495.57 *18* for unplaced γ in ^{166}Tm ε decay. Mult.: from (n,n′γ). δ: +0.41 *+7−4* or +4.2 *8* from (n,n′γ).
1786.975	6−	94.674[&] *3*	0.259[&] *4*	1692.297	5−	[M1]		3.33	
		121.175[&] *3*	0.465[&] *7*	1665.799	5(−)	[E2]		1.443	
		190.774[&] *23*	0.395[&] *4*	1596.241	(4)−	[E2]		0.295	
		214.807[&] *8*	0.803[&] *11*	1572.183	(4)−	[E2]		0.199	

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	δ@	α h	Comments
1786.975	6⁻	410.944& *8*	20.69& *8*	1376.035	7⁺	E1+M2&	−0.010 *5*	0.00873	
		570.976& *18*	9.99& *27*	1215.968	6⁺	E1+M2&	+0.06 *3*	0.0044 *4*	
		711.681& *6*	100.0& *16*	1075.277	5⁺	E1(+M2)	+0.002 *3*	0.00264	Mult.: from α(K)exp in ^{164}Dy(α,2nγ).
		1241.500& *14*	1.53& *8*	545.454	6⁺	E1+M2&	+0.21 *5*	0.00129 *17*	
		1521.86& *5*	0.0298& *11*	264.990	4⁺				
1813.2	1(+)	1731.9 *5*	45 *8*	80.5776	2⁺	(M1+E2)		0.0016 *3*	I_γ: unweighted average of 32 *11* from ε decay, 48 *5* and 67 *6* from (γ,γ′), and 33 *8* from (n,n′γ) (weighted average is 50 *7*). Mult.: D+Q from (n,n′γ), Δπ=(no) from level scheme. δ: −1.6<δ(D,Q)<−0.28 from (n,n′γ).
		1813.4 *3*	100	0.0	0⁺	(M1)		1.74×10^{-3}	B(M1)(W.u.)=0.065 *13* I_γ: from (γ,γ′). Mult.: D, Δπ=(no) from (γ,γ′).
1827.557	6⁻	135.260& *4*	0.812& *11*	1692.297	5⁻	[E2]		0.971	
		161.731& *8*	0.893& *24*	1665.799	5(−)	[M1,E2]		0.62 *11*	
		231.318& *8*	1.702& *18*	1596.241	(4)⁻	[E2]		0.1561	
		255.20& *12*	0.035& *8*	1572.183	(4)⁻	[E2]		0.1140	
		451.542& *7*	24.05& *24*	1376.035	7⁺	E1+M2&	−0.0023 *22*	0.00702	
		611.555& *26*	11.31& *11*	1215.968	6⁺	E1+M2&	−0.18 *7*	0.0054 *16*	
		752.313& *12*	100.0& *10*	1075.277	5⁺	E1(+M2)	+0.005 *4*	0.00237	Mult.: from α(K)exp in ^{164}Dy(α,2nγ).
		1282.058& *15*	1.524& *24*	545.454	6⁺	E1+M2&	0.20 *11*	0.0012 *4*	
		1562.31 *14*	0.0280& *24*	264.990	4⁺				
1830.425	1⁻	1749.836a *14*	100.0a *14*	80.5776	2⁺	(E1(+M2))		0.0023 *15*	Mult.,δ: D(+Q), δ=+0.09 *+25−15* or 1/δ=−0.20 *+25−16* from (n,n′γ); Δπ=yes from level scheme.
		1830.419a *23*	30.7a *5*	0.0	0⁺	(E1)		9.20×10^{-4}	B(E1)(W.u.)=0.00019 *4* Mult.: D from (n,n′γ), Δπ=yes from level scheme..
1846.53	12⁺	497.0b *1*	100	1349.53	10⁺	E2		0.01670	B(E2)(W.u.)=372 *21* Mult.: from α(K)exp in ^{164}Dy(α,2nγ).
1865.17		1079.5ck *8*	27c *12*	785.905	2⁺				E_γ,I_γ: for doubly-placed transition; Iγ not divided.
		1784.58c *4*	100 *13*	80.5776	2⁺				
1894.355	2⁺,3⁺,4⁺	1034.79 *13*	100 *17*	859.389	3⁺				

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
1894.355	2+,3+,4+	1629.4[i] *3*	<620[i]	264.990	4+				
		1813.4 *3*	<1448	80.5776	2+				I_γ: undivided intensity for doublet.
1897.27	(6+)	1351.8[b] *1*	72[c] *20*	545.454	6+				
		1632.7[c] *7*	100[c] *32*	264.990	4+				
		1817.0[c] *10*	60[c] *32*	80.5776	2+				
1904.8?	2,3,4	1824.2[k] *5*	100	80.5776	2+	D+Q			E_γ,Mult.: from (n,n′γ). δ: −0.22 *+4−3* or +4.9 *+7−8* from (n,n′γ).
1908.2	(6−)	312.0[c]	<14[c]	1596.241	(4)−				
		336.0[c] *4*	100[c] *21*	1572.183	(4)−				
1917.758	3−	86.84		1830.425	1−	E2		5.05	
		255.44 *6*	0.21 *2*	1662.435	1−				
		345.569 *15*	18.3 *5*	1572.183	(4)−	M1+E2	−0.57 *+21−25*	0.080 *8*	
		404.004 *13*	31.1 *8*	1513.751	3−	M1+E2	−0.34 *+17−19*	0.057 *4*	Other Iγ: 21 *4* from (n,n′γ).
		459.600 *15*	100 *2*	1458.154	(2)−	M1+E2	−0.16 *4*	0.0428 *7*	Mult.: D+Q from (n,n′γ); M1 from ε decay. δ: weighted average of −0.11 *+5−8* from γ(θ) in (n,n′γ), −0.17 *5* and −0.21 *9* from γγ(θ) in ε decay. Other solution in (n,n′γ) (−2.7 *5*) rejected.
		1131.872 *25*	9.65 *23*	785.905	2+	E1		1.09×10^{-3}	
		1652.76 *3*	42.2 *11*	264.990	4+	E1		8.75×10^{-4}	δ(D,Q)<−0.03 and −0.05 *8* from ^{166}Tm ε decay.
		1837.17 *3*	29.8 *7*	80.5776	2+	E1		9.22×10^{-4}	
1934.1	0+	1853.5[c] *5*	100	80.5776	2+	[E2]			B(E2)(W.u.)=8.8 *10*
1938.263	(3)+	982.00 *15*	0.62 *11*	956.232	4+				
		1078.876 *22*	30.6 *6*	859.389	3+	M1		0.00513	−0.007<δ(D,Q)<+1.3 in (n,n′γ) for γ which may have an additional placement.
		1152.350 *16*	100.0 *26*	785.905	2+	M1		0.00438	δ(D,Q)=+0.01 *+3−4* from (n,n′γ).
		1673.5 *4*	0.95 *24*	264.990	4+				
		1857.62 *17*	1.2 *4*	80.5776	2+				
1942.6	(0+)	1156.7 *4*	100	785.905	2+	[E2]		0.00251	B(E2)(W.u.)=21 *7* E_γ: from Coulomb excitation. Mult.: γ(θ) isotropic in Coulomb excitation.
1964.04	10+	408.5[b] *1*	100[b] *10*	1555.737	8+	[E2]		0.0282	B(E2)(W.u.)=2.9×10^2 *6*
		614.3[b] *1*	<30[b]	1349.53	10+				
		1053.7[bf] *1*	58[b] *6*	911.208	8+	[E2]		0.00302	B(E2)(W.u.)=1.5 *3*
1969.71	(2,3,4)	1704.7 *3*	100[c] *19*	264.990	4+				
		1889.12 *20*	84[c] *16*	80.5776	2+				
1978.422	4+	464.5 *3*	3.4 *9*	1513.751	3−				
		903.01 *13*	3.2 *6*	1075.277	5+				
		1022.175 *23*	33.4 *13*	956.232	4+				

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
1978.422	4^+	1119.5[j]	≈77[j]	859.389	3^+				Other Iγ: Iγ(1120γ):Iγ(1193γ)=29 *10*:100 *25* in Coulomb excitation.
		1192.516 *16*	100.0 *23*	785.905	2^+	E2		0.00236	B(E2)(W.u.)=0.9 *+4−5*
1985.629	3^-	389.38 *3*	45.5 *13*	1596.241	$(4)^-$	M1		0.0668	
		413.430 *18*	57.4 *18*	1572.183	$(4)^-$	E2		0.0273	
		471.871 *23*	100.0 *23*	1513.751	3^-	M1		0.0405	
		527.58 *10*	27.6 *9*	1458.154	$(2)^-$				
		1720.87 *20*	47 *5*	264.990	4^+	(E1)		8.89×10^{-4}	
		1905.43 *23*	41 *11*	80.5776	2^+				
1986.2	(4^+)	1127		859.389	3^+				E_γ: from Coulomb excitation.
		1200		785.905	2^+				E_γ: from Coulomb excitation.
1992.70	$(7)^-$	1081.5[b] *1*	100[b] *10*	911.208	8^+	E1		1.18×10^{-3}	
		1447.0[b] *5*	<312[b]	545.454	6^+				
2001.865	$(3)^-$	84.11 *2*	7.6 *20*	1917.758	3^-	M1		4.68	
		488.19 *8*	7.2 *16*	1513.751	3^-				Other Iγ: 27 *10* in (n,n′γ).
		543.69 *3*	15.5 *4*	1458.154	$(2)^-$	E2,M1		0.021 *8*	
		1045.648 *20*	36.0 *8*	956.232	4^+	E1		1.26×10^{-3}	
		1142.45[i] *3*	<23.6[i]	859.389	3^+				
		1216.173[f] *17*	100 *20*	785.905	2^+				
		1737.09 *20*	16.4 *8*	264.990	4^+	(E1)		8.93×10^{-4}	
		1921.40 *15*	14.4 *12*	80.5776	2^+				
2021.348	$(2,3)^-$	563.21 *3*	3.24 *10*	1458.154	$(2)^-$	E2,M1		0.019 *7*	
		1161.955 *16*	38.6 *9*	859.389	3^+	E1		1.05×10^{-3}	
		1235.433 *16*	100 *2*	785.905	2^+	E1(+M2)	+0.04 *+9−6*	0.00098 *12*	Mult.,δ: from (n,n′γ). Other δ: +0.05 *10* from ε decay.
2022.59	(4^+)	1475.5[c] *10*	18[c] *7*	545.454	6^+				
		1758.06 *20*	46 *4*	264.990	4^+				
		1941.78 *15*	100 *14*	80.5776	2^+				
2027.9	(4^+)	455.7[c]	14.9[c] *21*	1572.183	$(4)^-$				
		1070		956.232	4^+				E_γ: from Coulomb excitation.
		1168.8[c]	97.9[c] *21*	859.389	3^+	D+Q	4.5 *10*		Mult.,δ: from (n,n′γ). Other Iγ: Iγ(1169γ):Iγ(1243γ)=68 *14*:100 *14* in Coulomb excitation.
		1243.2[c]	100.0[c] *21*	785.905	2^+	(E2)		0.00218	B(E2)(W.u.)=8 *3* Mult.: Q from γ(θ) in Coulomb excitation; Δπ=no from level scheme.
2031.5	(5^+)	1486.0[c] *10*	100	545.454	6^+				
2046.87	$2^+,3^+$	1090.70 *6*	20.2 *11*	956.232	4^+				
		1187.49 *4*	100.0 *25*	859.389	3^+	M1(+E2)		0.0032 *9*	δ: −0.03 *+12−6* or +1.40 *+23−27* from (n,n′γ).
		1781.40 *15*	19.6 *21*	264.990	4^+				

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
2073.20	(8)$^-$	286.2[b] *1*	<63[b]	1786.975	6$^-$				
		697.2[b] *1*	100[b] *10*	1376.035	7$^+$	E1		0.00276	
2076.294	(3$^-$)	1119.5[j]	≈100[j]	956.232	4$^+$				
		1216.173[fk] *17*		859.389	3$^+$				
		1290.368 *22*	62.1 *16*	785.905	2$^+$				
		1810.6 *5*	15 *4*	264.990	4$^+$				
		1996.10 *15*	6.1 *8*	80.5776	2$^+$				
2082.8		569.2[c] *4*	100[c] *24*	1513.751	3$^-$				
		1126.0[c] *8*	32[c] *16*	956.232	4$^+$				
2092.31	(7,8,9)$^-$	1181.10[b] *10*	100	911.208	8$^+$	E1		1.03×10^{-3}	
2101.6	(4$^+$)	1145.4[k]		956.232	4$^+$				E_γ: from one Coulomb excitation study only.
		1242.2 *3*	39 *8*	859.389	3$^+$				
		1315.6 *8*	100 *10*	785.905	2$^+$	[E2]		0.00197	B(E2)(W.u.)=7 *5*
2117.8	(2$^+$,3,4$^+$)	1853.1 *10*	100 *24*	264.990	4$^+$				
		2036.8 *12*	40 *8*	80.5776	2$^+$				
2117.8		1161.6[i] *8*	100[i]	956.232	4$^+$				E_γ: for doubly-placed γ.
2124.7	(5$^-$)	1168.5[c] *7*	100	956.232	4$^+$				
2132.941	3$^+$	130.90 *20*	3.0 *3*	2001.865	(3)$^-$	E1		0.1590	
		147.301 *20*	1.97 *8*	1985.629	3$^-$	E1		0.1162	
		154.508 *25*	1.19 *10*	1978.422	4$^+$	M1+E2	0.75 *25*	0.75 *4*	
		194.678 *15*	≈4.4	1938.263	(3)$^+$	M1		0.433	
		215.185 *14*	30.4 *10*	1917.758	3$^-$	E1+M2	−0.09 *+7−6*	0.056 *23*	δ: from ^{166}Tm ε decay.
		238.581 *20*	0.21 *1*	1894.355	2$^+$,3$^+$,4$^+$	M1		0.248	
		429.885 *20*	0.45 *1*	1703.050	(2,3,4)$^+$	M1		0.0516	
		454.20 *3*	0.189 *22*	1678.765	(4)$^+$	(E2)		0.0211	
		536.67 *3*	0.737 *20*	1596.241	(4)$^-$	E1		0.00478	
		560.77 *3*	0.399 *13*	1572.183	(4)$^-$				
		604.553 *15*	1.15 *3*	1528.401	2$^+$	E2		0.01025	
		619.49[i] *25*	<0.03[i]	1513.751	3$^-$				
		674.788 *22*	15.0 *3*	1458.154	(2)$^-$	E1		0.00295	
		1057.67 *4*	4.02 *13*	1075.277	5$^+$	E2		0.00300	
		1176.704 *16*	55.5 *11*	956.232	4$^+$	M1+E2	+0.20 *4*	0.00410 *7*	δ: from ^{166}Tm ε decay.
		1273.540 *16*	86.4 *18*	859.389	3$^+$	M1+E2	−0.11 *8*	0.00344 *6*	δ: from ^{166}Tm ε decay.
		1347.035 *18*	6.36 *13*	785.905	2$^+$	M1		0.00304	
		1867.94 *3*	23.5 *6*	264.990	4$^+$	M1+E2	+3.49 *+10−3*	1.26×10^{-3}	δ: from ^{166}Tm ε decay (1980Bu26).
		2052.36 *3*	100.0 *20*	80.5776	2$^+$	M1+E2	+7.0 *5*	1.16×10^{-3}	δ: from ^{166}Tm ε decay.
2144.64	(8$^-$)	768.60[b] *10*	100	1376.035	7$^+$				
2148.6	(4$^-$)	1192.5[b] *7*	<127[c]	956.232	4$^+$				E_γ: for doubly-placed γ.

$^{166}_{68}Er_{98}$-18

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
2148.6	(4⁻)	1883.5[b] *6*	100[c] *33*	264.990	4⁺				
2155.8	(6⁺)	1080		1075.277	5⁺				E_γ: from Coulomb excitation.
		1200		956.232	4⁺				E_γ: from Coulomb excitation.
2160.114	3⁺	158.269 *25*	0.56 *3*	2001.865	(3)⁻	E1		0.0961	
		481.33 *10*	0.27 *2*	1678.765	(4)⁺				
		587.90 *16*	0.81 *15*	1572.183	(4)⁻				
		631.62 *10*	1.14 *3*	1528.401	2⁺	(E2)		0.00924	
		646.75[f] *4*	≈0.12	1513.751	3⁻				
		1084.826 *17*	5.77 *12*	1075.277	5⁺	E2		0.00285	
		1203.873 *20*	16.5 *3*	956.232	4⁺	M1+E2		0.0031 *9*	
		1300.725 *16*	21.2 *4*	859.389	3⁺	M1		0.00330	
		1374.194 *25*	88.9 *21*	785.905	2⁺	M1+E2	−0.11 *4*	0.00290 *5*	δ: from ^{166}Tm ε decay.
		1895.12 *3*	19.2 *6*	264.990	4⁺	M1+E2	+2.63 *4*	1.27×10^{-3}	δ: from ^{166}Tm ε decay.
		2079.53 *3*	100.0 *21*	80.5776	2⁺	M1+E2	+5.2 *+15−5*	1.16×10^{-3}	δ: from ^{166}Tm ε decay.
2172.751	3⁺	659.04 *20*	0.35 *7*	1513.751	3⁻				
		1097.46 *5*	3.66 *11*	1075.277	5⁺	E2		0.00278	
		1216.173[f] *17*	15 *6*	956.232	4⁺				
		1313.37 *3*	13.7 *4*	859.389	3⁺	E2,M1		0.0026 *7*	
		1907.71 *6*	22 *1*	264.990	4⁺	E2,M1		0.00141 *21*	
		2092.13 *3*	100.0 *22*	80.5776	2⁺	M1+E2	+3.7 *+19−7*	1.16×10^{-3} *2*	δ: from ^{166}Tm ε decay.
2189.70	(11⁺)	438.2[ibk] *1*	100.0[ib] *13*	1751.36	9⁺				
		840.2[ibk] *1*	24.4[ib] *27*	1349.53	10⁺				
2194.61	(8⁺)	1283.4[b] *1*	100	911.208	8⁺				
2201.3	1(+)	742.6[c]	<37	1458.154	(2)⁻				E_γ: for doubly-placed γ.
		2120.5[c] *10*	100 *5*	80.5776	2⁺	D+Q			Mult.: from (n,n′γ). I_γ: from (γ,γ′).
		2202[dc]	54[e]	0.0	0⁺	(M1)		1.42×10^{-3}	B(M1)(W.u.)=0.067 *11* Mult.: D, Δπ=(no) from (γ,γ′).
2212.95		166.26[i] *20*	<20[i]	2046.87	2⁺,3⁺				
		1256.7 *3*	34 *14*	956.232	4⁺				
		1353.27 *25*	36 *11*	859.389	3⁺				
		1427.06 *20*	100 *29*	785.905	2⁺				
		1948.2[k] *3*	51 *6*	264.990	4⁺				
2215.963	2⁻,3⁻	139.64 *4*	0.54 *3*	2076.294	(3⁻)				
		194.678	≈2.8	2021.348	(2,3)⁻	M1		0.433	
		298.207 *20*	7.70 *16*	1917.758	3⁻	M1		0.1355	
		385.54 *4*	0.62 *2*	1830.425	1⁻	E2		0.0331	
		619.49[i] *25*	<0.17[i]	1596.241	(4)⁻				
		643.90 *10*	0.97 *5*	1572.183	(4)⁻				

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[h]	Comments
2215.963	2⁻,3⁻	702.28 *10*	22.0 *6*	1513.751	3⁻	M1		0.01475	
		757.798 *17*	100 *2*	1458.154	(2)⁻	M1		0.01220	
		1356.62 *4*	0.7 *5*	859.389	3⁺				
		1430.2 *3*	6.7 *16*	785.905	2⁺				
		2135.36 *4*	1.56 *6*	80.5776	2⁺				
2243.087	3⁻	257.36 *10*	3.8 *11*	1985.629	3⁻				
		646.75 *4*	≈18	1596.241	(4)⁻				
		729.38 *3*	100 *9*	1513.751	3⁻	M1		0.01342	
		1287.1 *3*	5.1 *13*	956.232	4⁺				
		1383.5 *3*	13 *7*	859.389	3⁺				
		1457.17 *5*	78 *11*	785.905	2⁺				
		1978.12 *20*	96 *7*	264.990	4⁺	E1		9.71×10^{-4}	
		2162.54 *5*	61.8 *24*	80.5776	2⁺	E1		1.04×10^{-3}	
2246.31	(9⁻)	1335.1[b] *1*	100	911.208	8⁺				
2260.3	(6⁺)	1185		1075.277	5⁺				E_γ: from Coulomb excitation.
		1304		956.232	4⁺				E_γ: from Coulomb excitation.
2260.65	2(+),3	1401.16 *4*	66 *5*	859.389	3⁺				
		1474.84 *4*	100 *3*	785.905	2⁺	M1,E2		0.0021 *5*	
2264.31	(1,2⁺)	2183.68 *7*	100 *6*	80.5776	2⁺	Q(+D)			Mult.,δ: from (n,n′γ). δ=−0.47 *+14−19* or 1/δ=0.02 *+12−13*.
		2264.34 *8*	32 *3*	0.0	0⁺				
2273.01	3⁻	225.9 *5*	0.58 *25*	2046.87	2⁺,3⁺				
		287.1 *3*	0.50 *17*	1985.629	3⁻				
		610.8[i] *3*	<1.7[i]	1662.435	1⁻				
		814.82 *20*	5.1 *10*	1458.154	(2)⁻				
		1487.01 *15*	3.8 *7*	785.905	2⁺				
		2008.00 *4*	100.0 *25*	264.990	4⁺	E1		9.82×10^{-4}	
		2192.43 *4*	90.1 *25*	80.5776	2⁺	E1		1.06×10^{-3}	
2282.68	2(+),3	824.52[i] *11*	<13.8[i]	1458.154	(2)⁻				
		2017.67 *7*	84 *8*	264.990	4⁺				
		2202.09 *6*	100 *4*	80.5776	2⁺	E1,E2			
2290.959	(3)⁺	118.18 *3*	3.7 *11*	2172.751	3⁺	[M1]		1.765	
		312.58 *20*	0.14 *7*	1978.422	4⁺				
		832.88 *7*	1.17 *9*	1458.154	(2)⁻				
		1334.74 *21*	0.96 *16*	956.232	4⁺	M1(+E2)		0.0025 *6*	
		1431.6 *3*	41 *7*	859.389	3⁺				
		1505.00 *4*	100.0 *23*	785.905	2⁺	M1(+E2)	−0.2 *+2−3*	0.00237 *14*	δ: from ^{166}Tm ε decay. Other:−0.15 *+5−10* from (n,n′γ).
		2026.06[i] *11*	<3.2[i]	264.990	4⁺				
		2210.49 *6*	7.4 *3*	80.5776	2⁺				

$^{166}_{68}Er_{98}$-20

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[h]	Comments
2328.51	(9)$^-$	1417.3[b] *1*	100	911.208	8$^+$			
2328.69	(1,2)	2247.90 *20*	52 *8*	80.5776	2$^+$			
		2328.72 *10*	100 *9*	0.0	0$^+$			
2352.91	2$^{(+)}$,3	824.52[i] *11*	<41[i]	1528.401	2$^+$			
		1396.8 *4*	19 *10*	956.232	4$^+$			
		1493.43 *16*	100 *15*	859.389	3$^+$			
		2272.33 *15*	28 *3*	80.5776	2$^+$			
2377.77	1$^+$	1518.8 *9*	3.2 *7*	859.389	3$^+$			
		1591.77 *6*	100.0 *22*	785.905	2$^+$	E2,M1	0.0018 *4*	
		2297.26 *10*	9.7 *5*	80.5776	2$^+$	E2,M1	0.00125 *14*	
		2377.84 *8*	12.3 *12*	0.0	0$^+$	M1	1.37×10^{-3}	
2382.26	(3)$^+$	166.26[i] *20*	<5[i]	2215.963	2$^-$,3$^-$			
		868.47 *12*	9.4 *16*	1513.751	3$^-$			
		924.21 *11*	11.4 *16*	1458.154	(2)$^-$			
		1522.85 *4*	100 *4*	859.389	3$^+$	M1(+E2)	0.0019 *4*	
		1596.7 *5*	8 *4*	785.905	2$^+$			
2389.33	14$^+$	542.8[b] *1*	100	1846.53	12$^+$	E2	0.01335	B(E2)(W.u.)=4.0×10^2 *5* Mult.: from ce data in ^{164}Dy(α,2nγ).
2393.129	2$^+$,3$^+$	797.02 *20*	2.9 *6*	1596.241	(4)$^-$			
		1437.3 *3*	38 *5*	956.232	4$^+$			
		1533.80 *19*	3.0 *8*	859.389	3$^+$			
		1607.18 *3*	100 *5*	785.905	2$^+$	E2,M1	0.0018 *4*	
		2128.19 *5*	11.1 *8*	264.990	4$^+$			
		2312.57 *9*	10.4 *5*	80.5776	2$^+$	M1	1.38×10^{-3}	
2413.67	(2,3,4)	475.36 *25*	34 *6*	1938.263	(3)$^+$			
		899.80 *18*	12.5 *25*	1513.751	3$^-$			
		1554.33 *20*	19 *9*	859.389	3$^+$			
		1627.8 *3*	100 *19*	785.905	2$^+$			If this is the same transition as the 1630γ in (n,n′γ), mult=D+Q, δ=+15 *+31−5*.
		2148.6 *3*	7.5 *19*	264.990	4$^+$			
		2333.11 *10*	15.4 *16*	80.5776	2$^+$			
2428.4?	(10$^-$)	352.0[bk] *5*		2076.294	(3$^-$)			Existence of transition is questionable.
		677.0[bk] *5*		1751.36	9$^+$			Existence of transition is questionable.
2428.77	(12$^+$)	464.7[b] *1*		1964.04	10$^+$	[E2]	0.01990	
		1081.2		1349.53	10$^+$			E_γ: from from level energy difference in Coulomb excitation.
2435.10	(3,4)$^+$	1575.65 *26*	42 *9*	859.389	3$^+$			
		1649.19 *10*	100 *18*	785.905	2$^+$			
2442.0?	(3$^+$,4$^+$,5$^+$)	2177[k]	100	264.990	4$^+$	D+Q		E_γ,Mult.: from (n,n′γ).
2444.16		1658.4 *3*	100 *21*	785.905	2$^+$			

$^{166}_{68}Er_{98}$-21

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[h]	Comments
2444.16		2363.3 *4*	19.2 *23*	80.5776	2^+			
		2444.0 *10*	8.9 *26*	0.0	0^+			
2459.0?		2459[ck]	100	0.0	0^+			
2464.51	1^+	2383.91 *10*	44 *7*	80.5776	2^+	E2,M1	0.00124 *13*	I_γ: weighted average of I(2384γ):I(2465γ)=52 *5*:100 *8* in ε decay. And 38 *6*:100 in (γ,γ′).
		2464.7 *5*	100	0.0	0^+	M1	1.35×10^{-3}	B(M1)(W.u.)=0.024 *4* Mult.: E2,M1 from α(K)exp in ε decay; D from (γ,γ′).
2475.39	$(1,2)^+$	1017.29 *6*	50 *3*	1458.154	$(2)^-$			
		1615.88 *7*	99 *7*	859.389	3^+			
		1690.2 *4*	28 *10*	785.905	2^+			
		2394.81 *8*	100 *5*	80.5776	2^+	E2,M1	0.00124 *13*	
2479.74?	(10^+)	1130.2[b] *1*	100	1349.53	10^+			Existence of transition is questionable.
2504.6	$(3,4)^+$	2424[c]	100	80.5776	2^+			δ: δ(D,Q)=+0.36 *+6−4* or +9 *+7−3* in (n,n′γ) (1992Be29) if J(2506 level)=3, but γ(θ) does not rule out stretched Q.
2525	1	2444[d]	51[e] *5*	80.5776	2^+			
		2525[d]	100[e]	0.0	0^+	D[g]		
2542.87		946.57 *8*	27 *4*	1596.241	$(4)^-$			
		1586.68 *8*	100 *17*	956.232	4^+			
		1683.3 *3*	56 *21*	859.389	3^+			
		2277.88 *8*	39.2 *14*	264.990	4^+			
		2462.5 *5*	59 *6*	80.5776	2^+			
2574.0	(8^+)	1358	100	1215.968	6^+			E_γ: from Coulomb excitation.
2586.06	$(3,4)^+$	1629.4[i] *3*	<804[i]	956.232	4^+			
		1726.3 *5*	94 *36*	859.389	3^+			
		2321.18 *18*	54 *8*	264.990	4^+			
		2505.58 *20*	100 *8*	80.5776	2^+			
2600.63	1^+	1142.45[i] *3*	<263[i]	1458.154	$(2)^-$			
		2520.20 *10*	49 *3*	80.5776	2^+			
		2600.76 *20*	100 *11*	0.0	0^+	M1	1.34×10^{-3}	Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ′).
2613.50		2532.3 *3*	41 *7*	80.5776	2^+			
		2613.75 *20*	100 *10*	0.0	0^+			
2619.6	(2^+)	2354.6 *10*	43 *19*	264.990	4^+			
		2538.8 *10*	69 *12*	80.5776	2^+			
		2619.7 *8*	100 *67*	0.0	0^+			
2624.8	$(1,2^+)$	2544.3 *3*	97 *17*	80.5776	2^+			
		2624.4 *7*	100 *10*	0.0	0^+			
2628.5	$(1,2^+)$	2547.1 *10*	37 *14*	80.5776	2^+			
		2628.5 *3*	100 *10*	0.0	0^+			
2632.66	$(3,4)^+$	1846.6 *3*	100 *38*	785.905	2^+			
		2552.12 *20*	26 *2*	80.5776	2^+			

$^{166}_{68}Er_{98}$-22

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[h]	Comments
2654.40?	(13$^+$)	464.7[bk] *1*	100	2189.70	(11$^+$)			Existence of transition is questionable.
2656.9?	(12$^+$)	810.3[bk] *1*	100	1846.53	12$^+$			
2671.98		2591.4 *3*	50 *15*	80.5776	2$^+$			
		2671.95 *20*	100 *7*	0.0	0$^+$			
2679.05	1$^+$	2598.2 *4*	52 *10*	80.5776	2$^+$			
		2679.09 *20*	100 *7*	0.0	0$^+$	M1	1.34×10^{-3}	B(M1)(W.u.)=0.038 *7* Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ′).
2729.090	(3,4)$^+$	143.2 *6*	0.8 *3*	2586.06	(3,4)$^+$			
		743.8 *5*	2.2 *8*	1985.629	3$^-$			
		1200.66 *3*	100 *3*	1528.401	2$^+$	E2,M1	0.0032 *9*	
		1943.6 *15*	3.6 *24*	785.905	2$^+$			
		2648.50 *2*	5.5 *4*	80.5776	2$^+$	E2,M1	0.00123 *12*	
		2728.9 *10*	0.39 *12*	0.0	0$^+$			
2767.8	1	2687	100 *12*	80.5776	2$^+$			
		2768	67	0.0	0$^+$	D[g]		
2783.69	1$^+$	610.8[i] *3*	<60[i]	2172.751	3$^+$			
		2703.1 *4*	53 *6*	80.5776	2$^+$			I_γ: from (γ,γ′). 58 *7* from ε decay.
		2783.8 *3*	100 *5*	0.0	0$^+$	M1	1.35×10^{-3}	B(M1)(W.u.)=0.011 *4* Mult.: E2,M1 from α(K)exp in ε decay; D from γ(θ) in (γ,γ′).
2797.5	(1,2$^+$)	2716.8 *4*	100 *12*	80.5776	2$^+$			
		2798.2 *10*	31 *13*	0.0	0$^+$			
2811.98	1	2026.06[i] *11*	<2340[i]	785.905	2$^+$			I_γ: from ε decay (for doublet).
		2732.0 *10*	100	80.5776	2$^+$			
		2811.7 *10*	55 *3*	0.0	0$^+$	D[g]		I_γ: from (γ,γ′). Other Iγ: 68 *20* in ε decay.
2858.16	(1,2$^+$)	2777.56 *18*	100 *9*	80.5776	2$^+$			
		2858.1 *10*	28 *12*	0.0	0$^+$			
2880.07?	(14$^+$)	451.3[bk] *1*	100	2428.77	(12$^+$)			Existence of transition is questionable.
2967.3	(16$^+$)	578.0[b] *5*	100	2389.33	14$^+$	E2	0.01143	B(E2)(W.u.)=3.3×10^2 *18* Other Eγ: 579.2 in Coulomb excitation.
3073	1	2992[d]	100[e] *19*	80.5776	2$^+$			
		3073[d]	31.3[e]	0.0	0$^+$	D[g]		
3123	1	3042[d]	100[e] *33*	80.5776	2$^+$			
		3123[d]	95[e]	0.0	0$^+$	D[g]		
3144	1	3063	48 *3*	80.5776	2$^+$			
		3144	100	0.0	0$^+$	D[g]		
3175	1	3094[d]	61[e] *6*	80.5776	2$^+$			

$^{166}_{68}Er_{98}$-23

Adopted Levels, Gammas (continued)

γ(^{166}Er) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#
3175	1	3175[d]	100[e]	0.0	0^+	D[g]	3329	1	3329[d]	100[e]	0.0	0^+	D[g]
3187	1	3106[d]	49[e] *4*	80.5776	2^+		3386	1	3305[d]	100[e] *11*	80.5776	2^+	
		3187[d]	100[e]	0.0	0^+	D[g]			3386[d]	68[e]	0.0	0^+	D[g]
3197	1	3116[d]	51[e] *3*	80.5776	2^+		3425	1	3425[d]	100[e]	0.0	0^+	D[g]
		3197[d]	100[e]	0.0	0^+	D[g]	3430	1	3349[d]	24[e] *6*	80.5776	2^+	
3288	1	3207[d]	100[e] *9*	80.5776	2^+				3430[d]	100[e]	0.0	0^+	D[g]
		3288[d]	66[e]	0.0	0^+	D[g]	3440	1	3359[d]	100[e] *18*	80.5776	2^+	
3322	1	3241[d]	100[e] *14*	80.5776	2^+				3440[d]	36[e]	0.0	0^+	D[g]
		3322[d]	45[e]	0.0	0^+	D[g]	3493	1	3493[d]	100[e]	0.0	0^+	D[g]
3329	1	3248[d]	40[e] *7*	80.5776	2^+		3498	1	3498[d]	100[e]	0.0	0^+	D[g]

† From ^{166}Tm ε decay, unless otherwise noted.
‡ Relative photon intensity normalized to 100 for strongest photon deexciting each level; based on data from ^{166}Tm ε decay, unless otherwise noted.
# From ce data of 1979Ad06 in ε decay, unless otherwise noted.
@ From ^{166}Ho β^- decay (1200 y), unless otherwise noted.
& From ^{166}Ho β^- decay (1200 y).
[a] From ^{166}Ho β^- decay (26.824 h).
[b] From ^{164}Dy(α,2nγ).
[c] From (n,n′γ).
[d] From level energy difference.
[e] From $\Gamma_{\gamma 1}+\Gamma_{\gamma 0}$ in (γ,γ′).
[f] Eγ deviates by at least 5σ from value expected for this placement. Datum excluded from least-squares fit.
[g] From γ(θ) in (γ,γ′).
[h] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[i] Multiply placed with undivided intensity.
[j] Multiply placed with intensity suitably divided.
[k] Placement of transition in the level scheme is uncertain.

$^{166}_{68}Er_{98}$-24

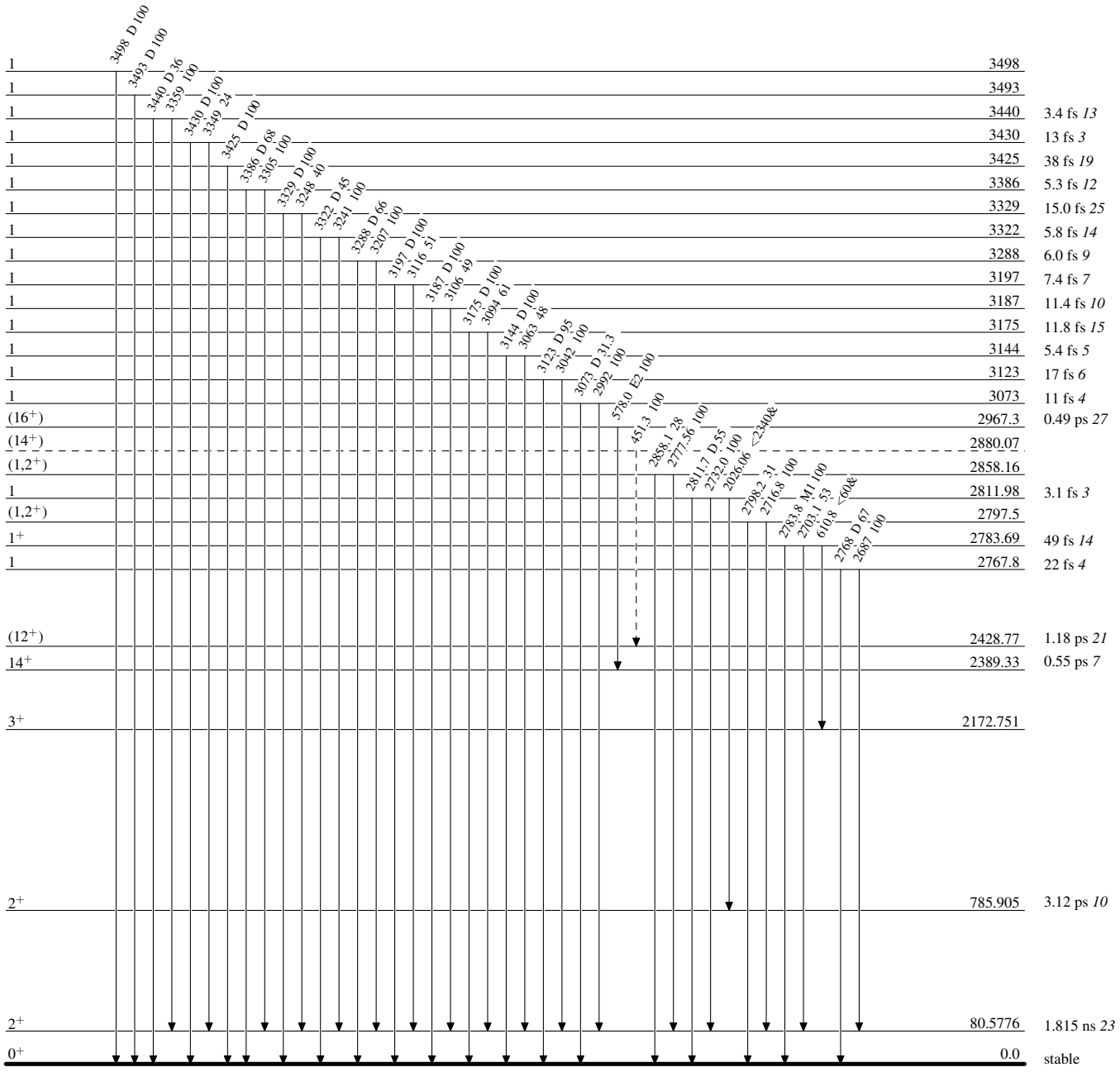
Adopted Levels, Gammas

Legend

Level Scheme

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

– – – – – – ► γ Decay (Uncertain)



$^{166}_{68}Er_{98}$

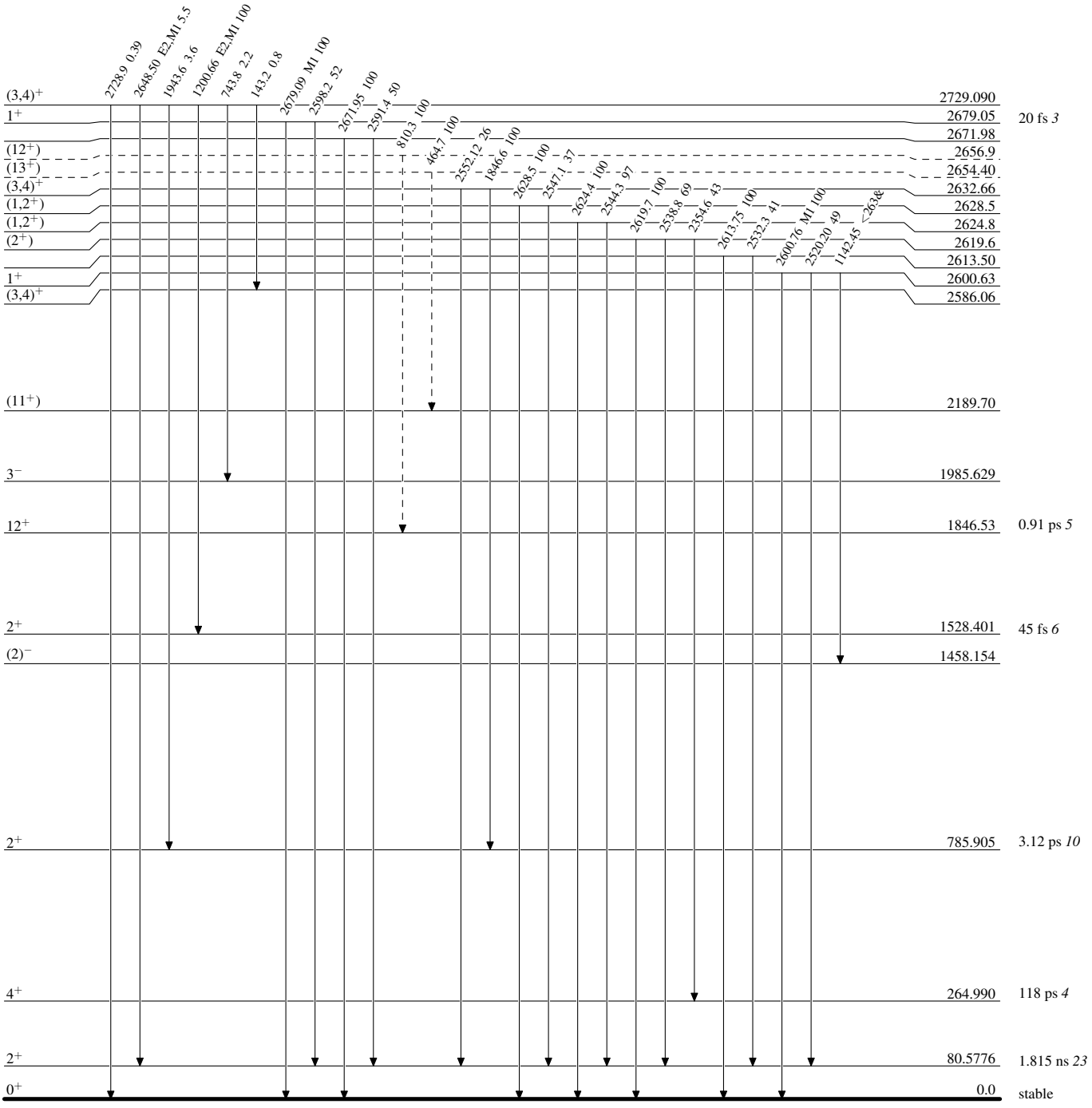
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



$^{166}_{68}Er_{98}$

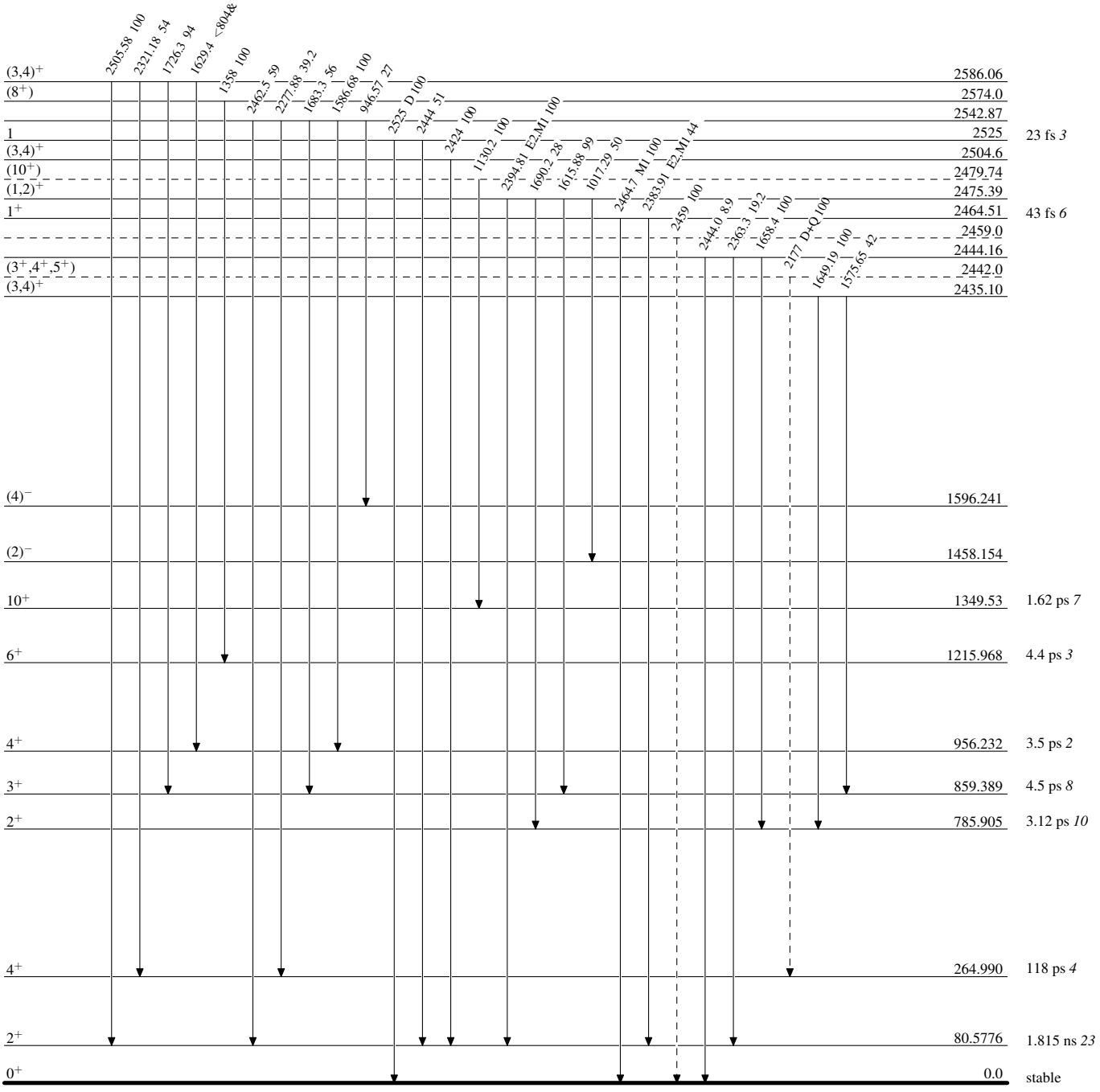
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



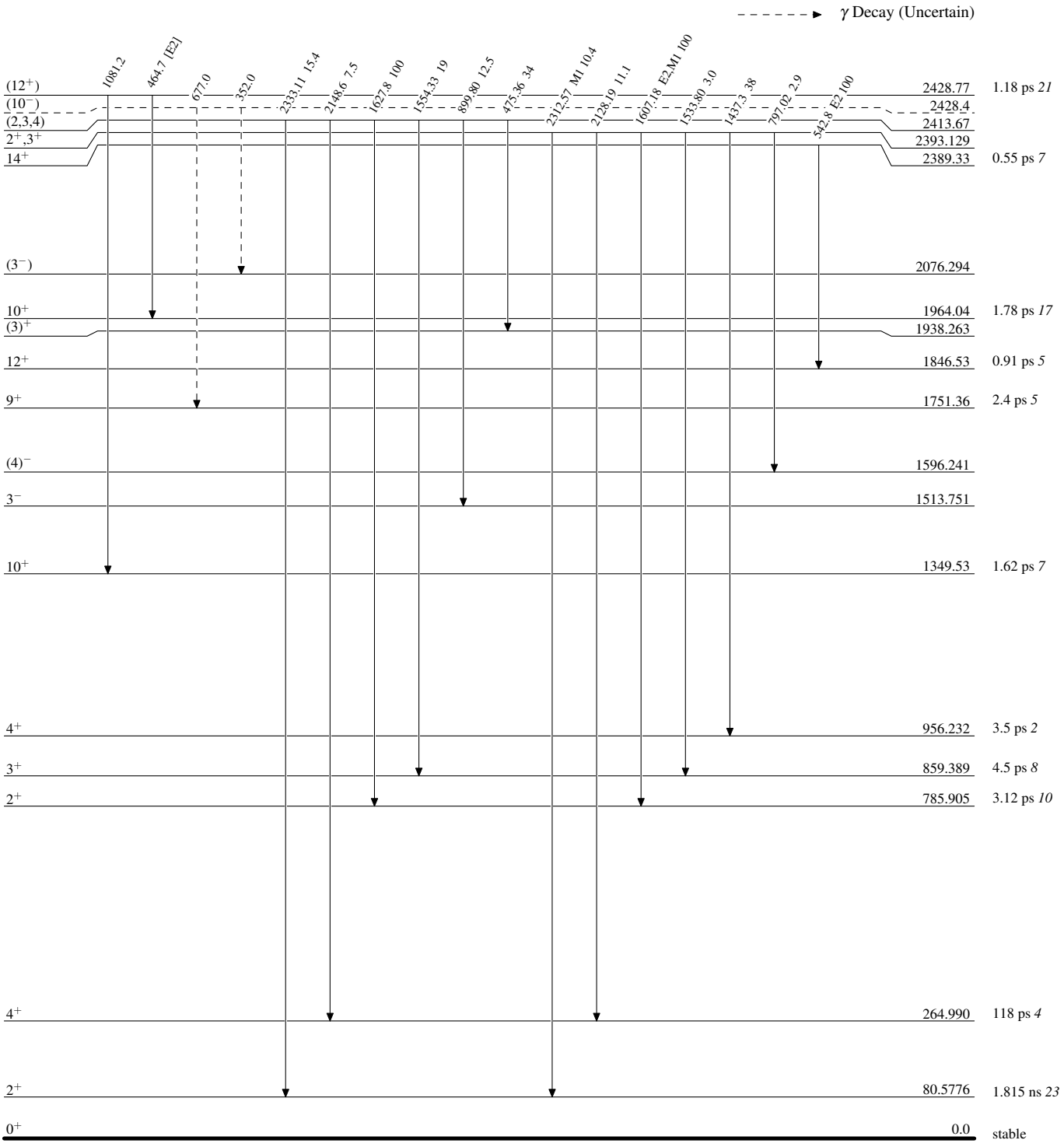
$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

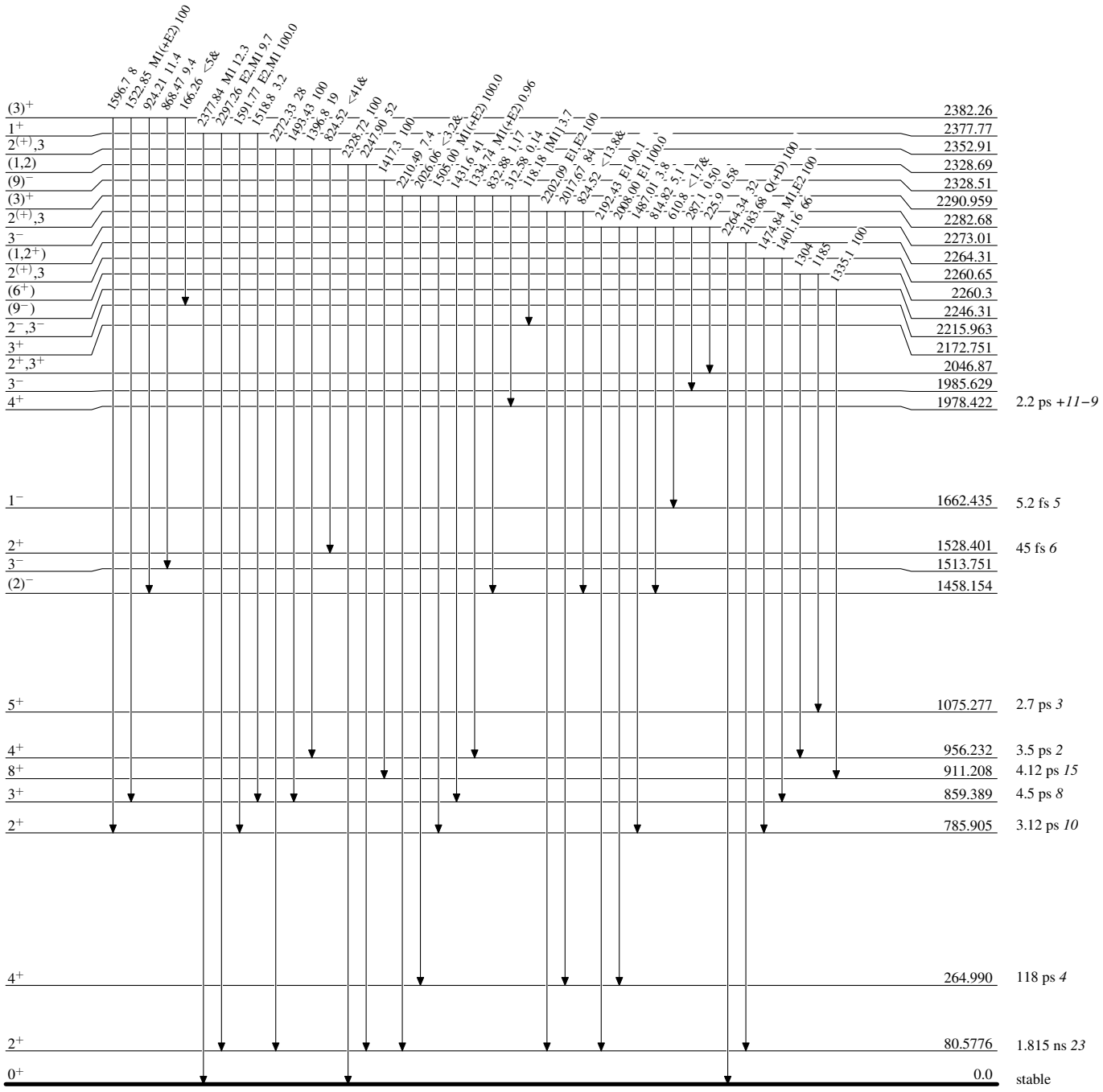


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{166}_{68}Er_{98}$

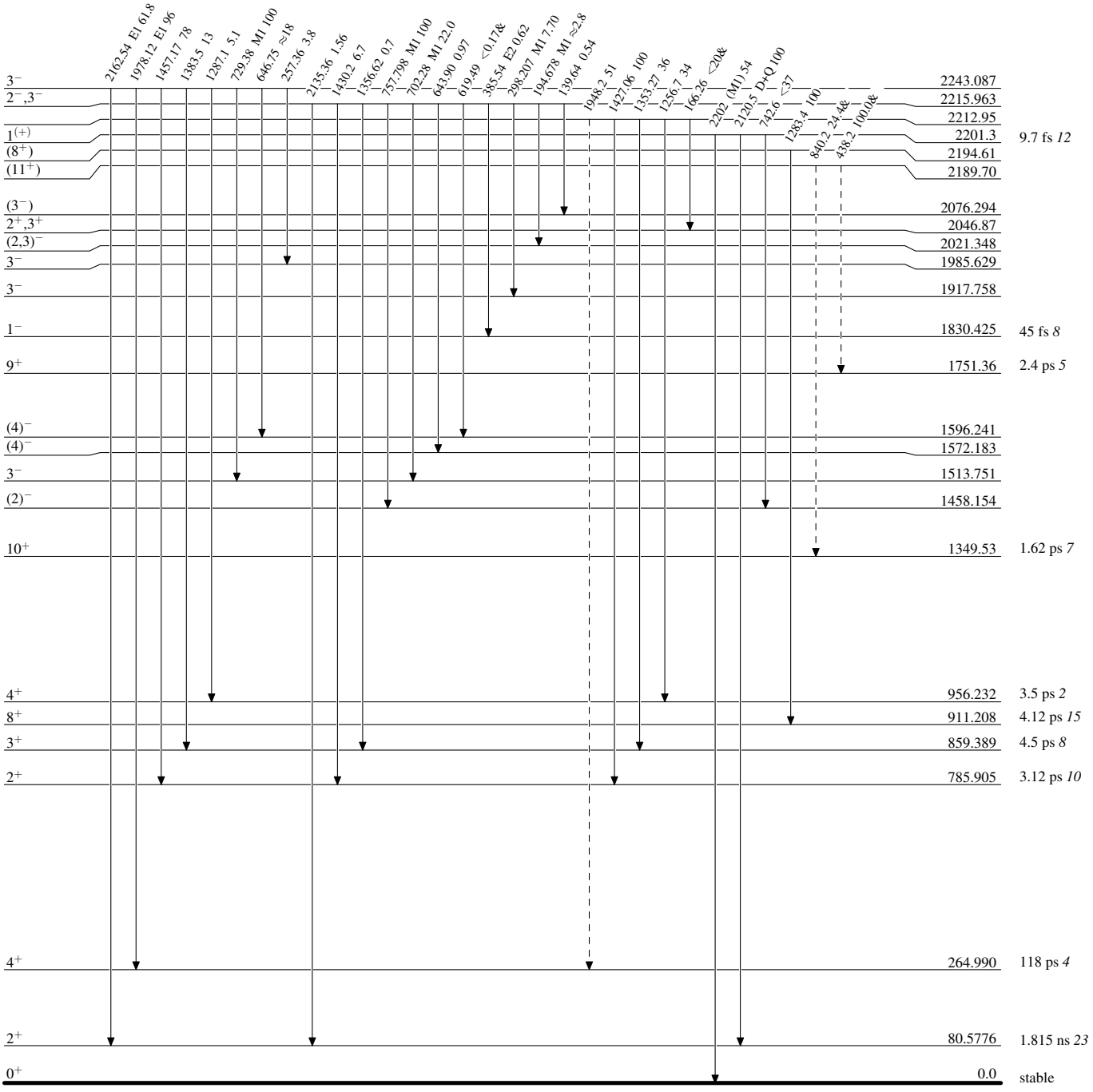
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)

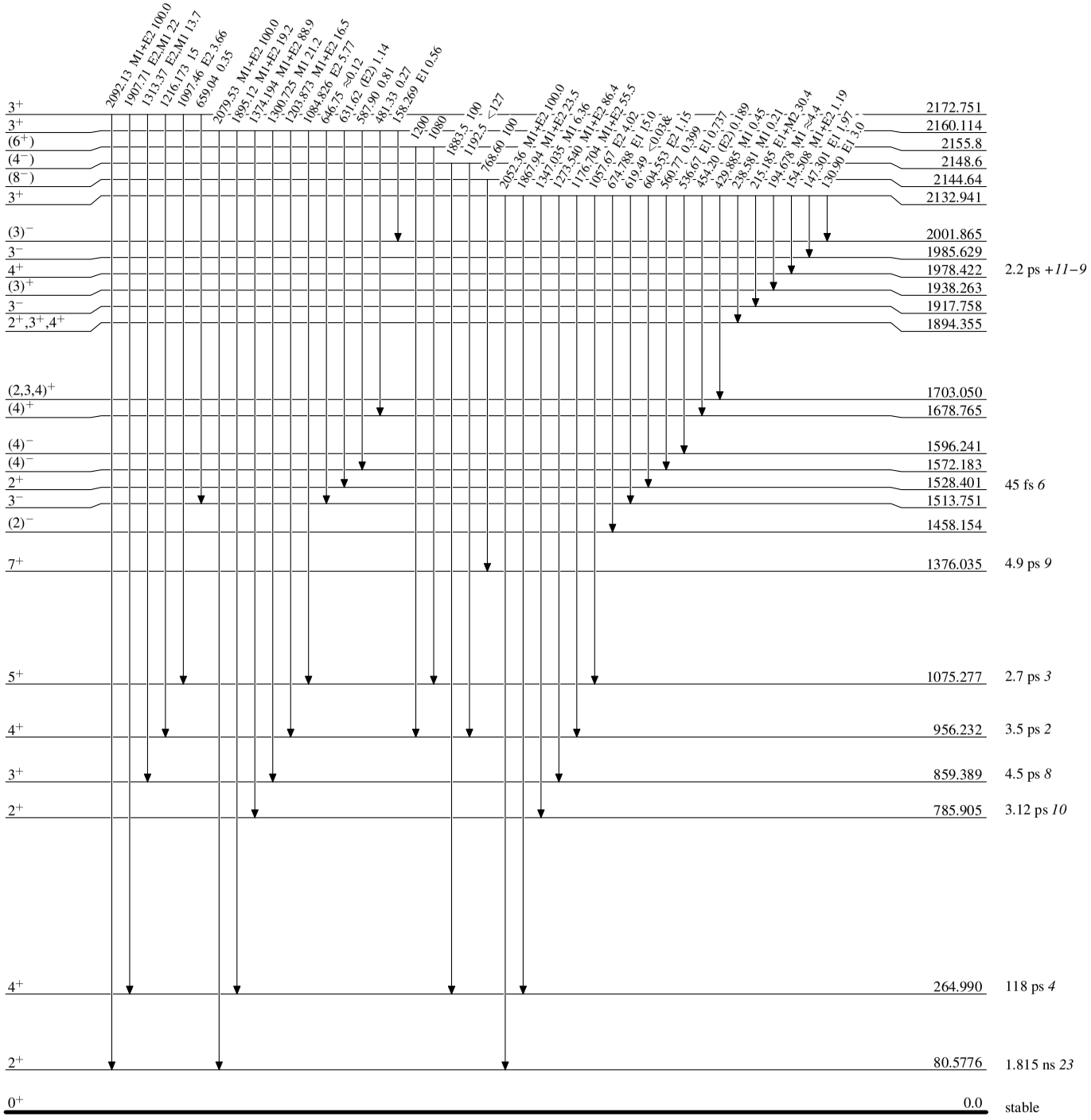


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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



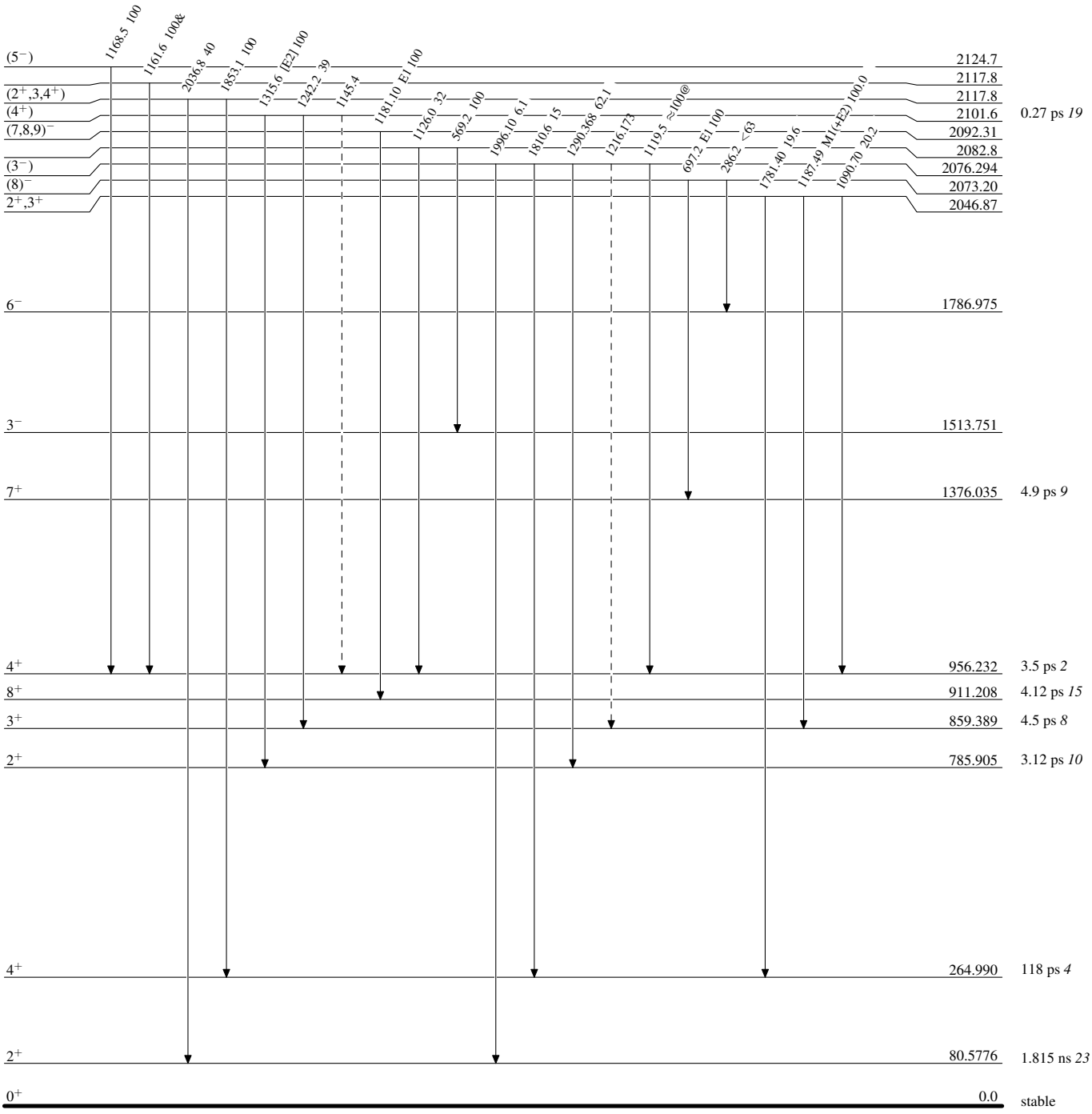
$^{166}_{68}Er_{98}$

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)

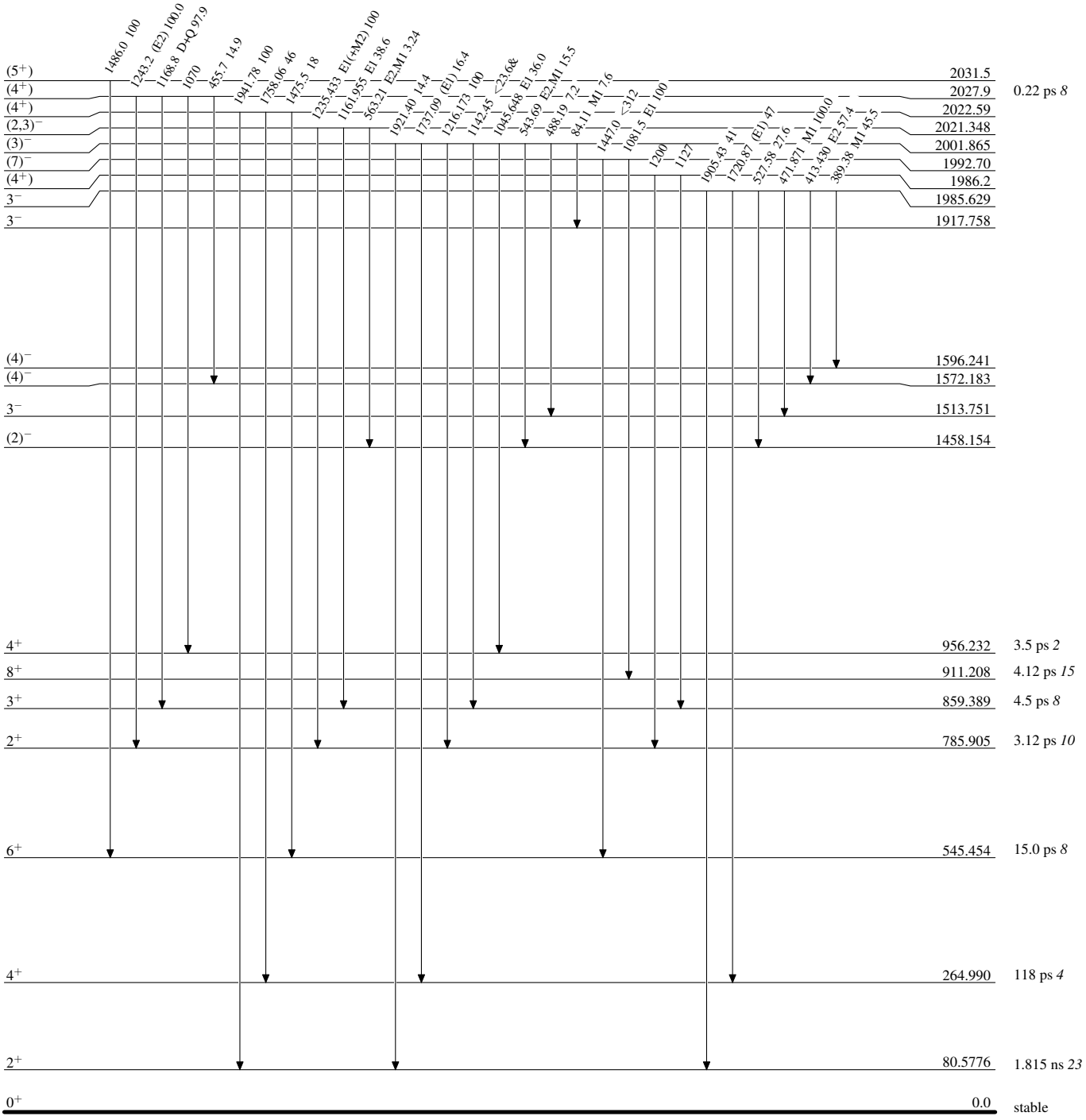


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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



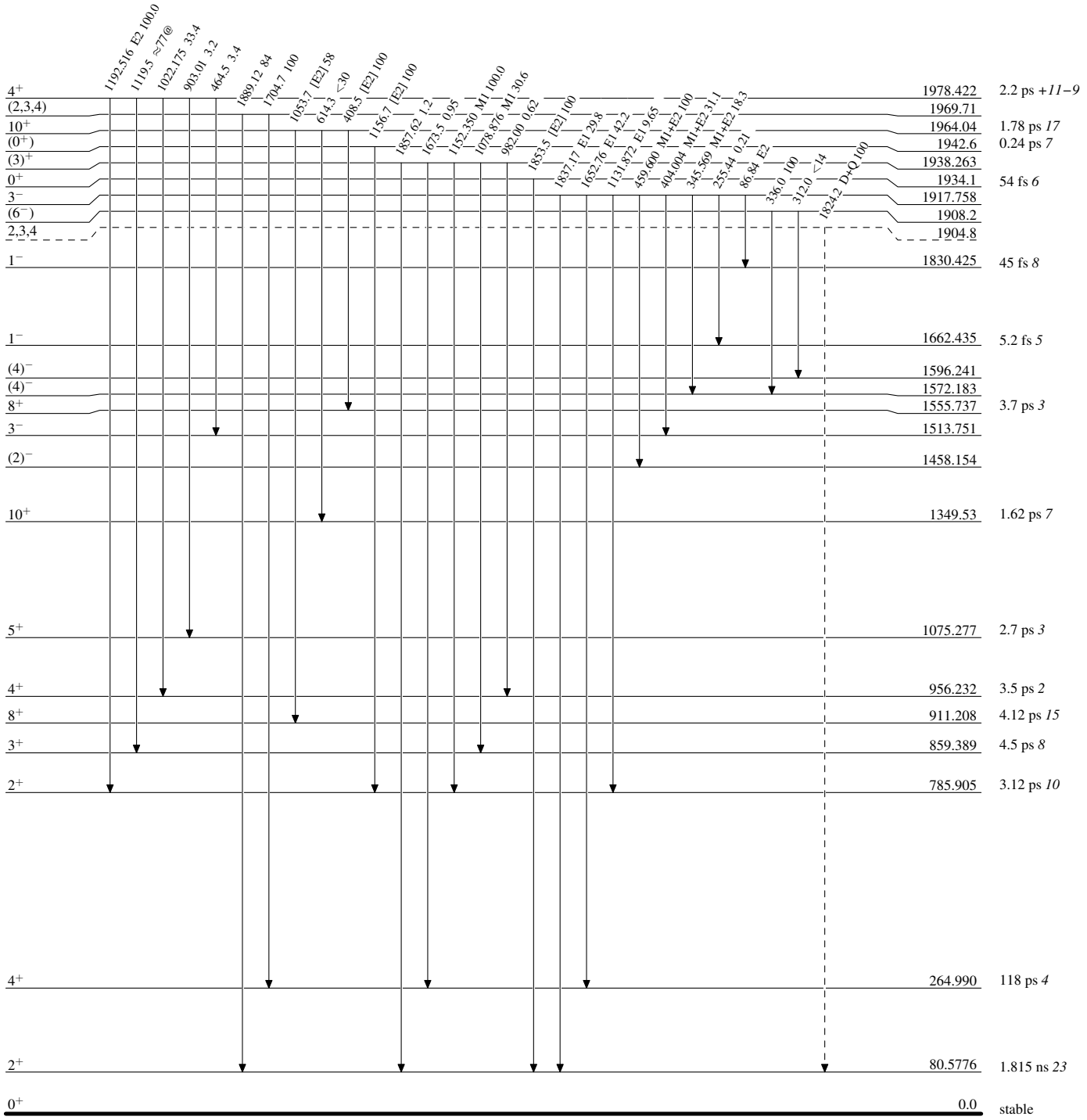
$^{166}_{68}Er_{98}$

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)

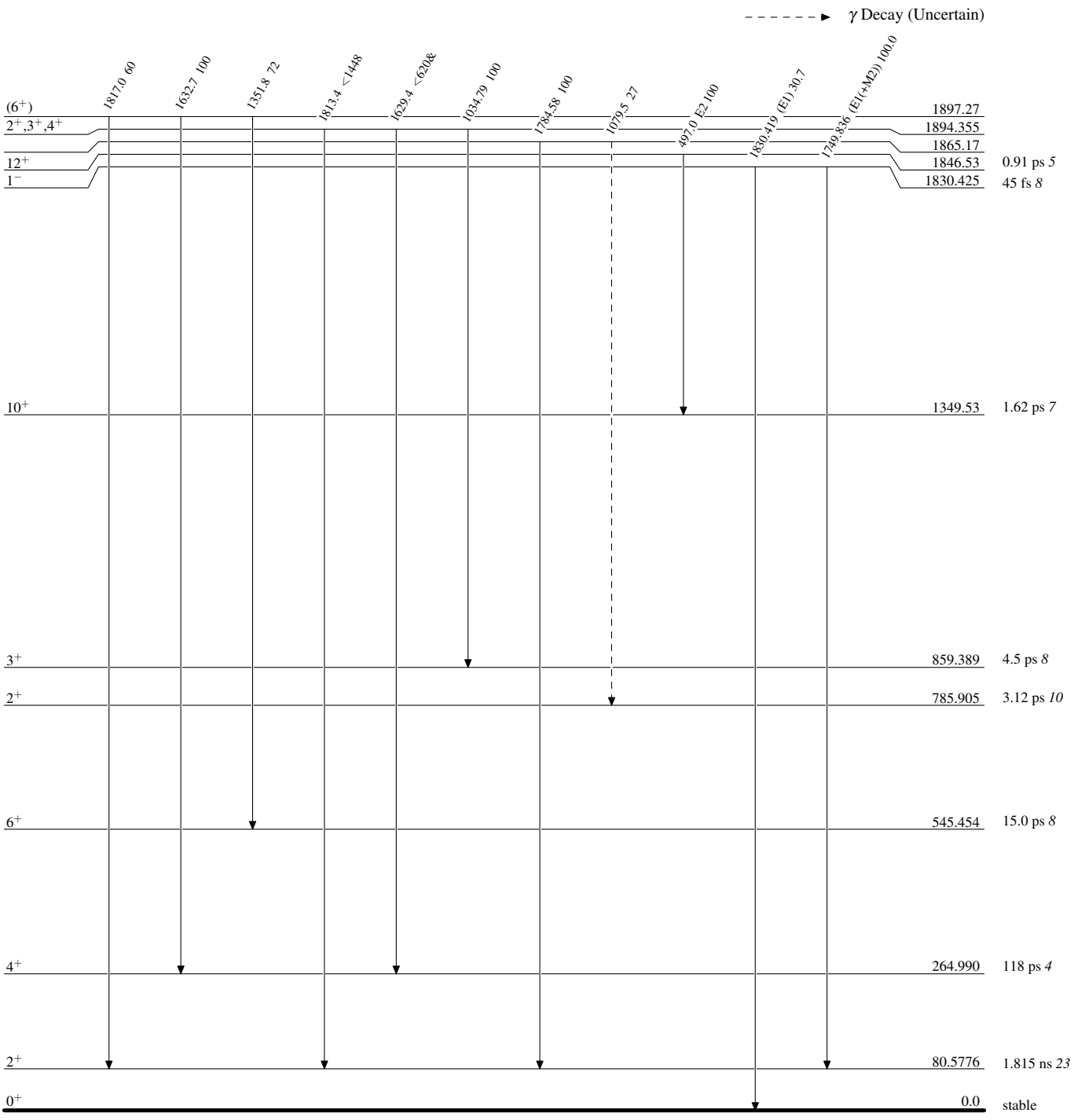


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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

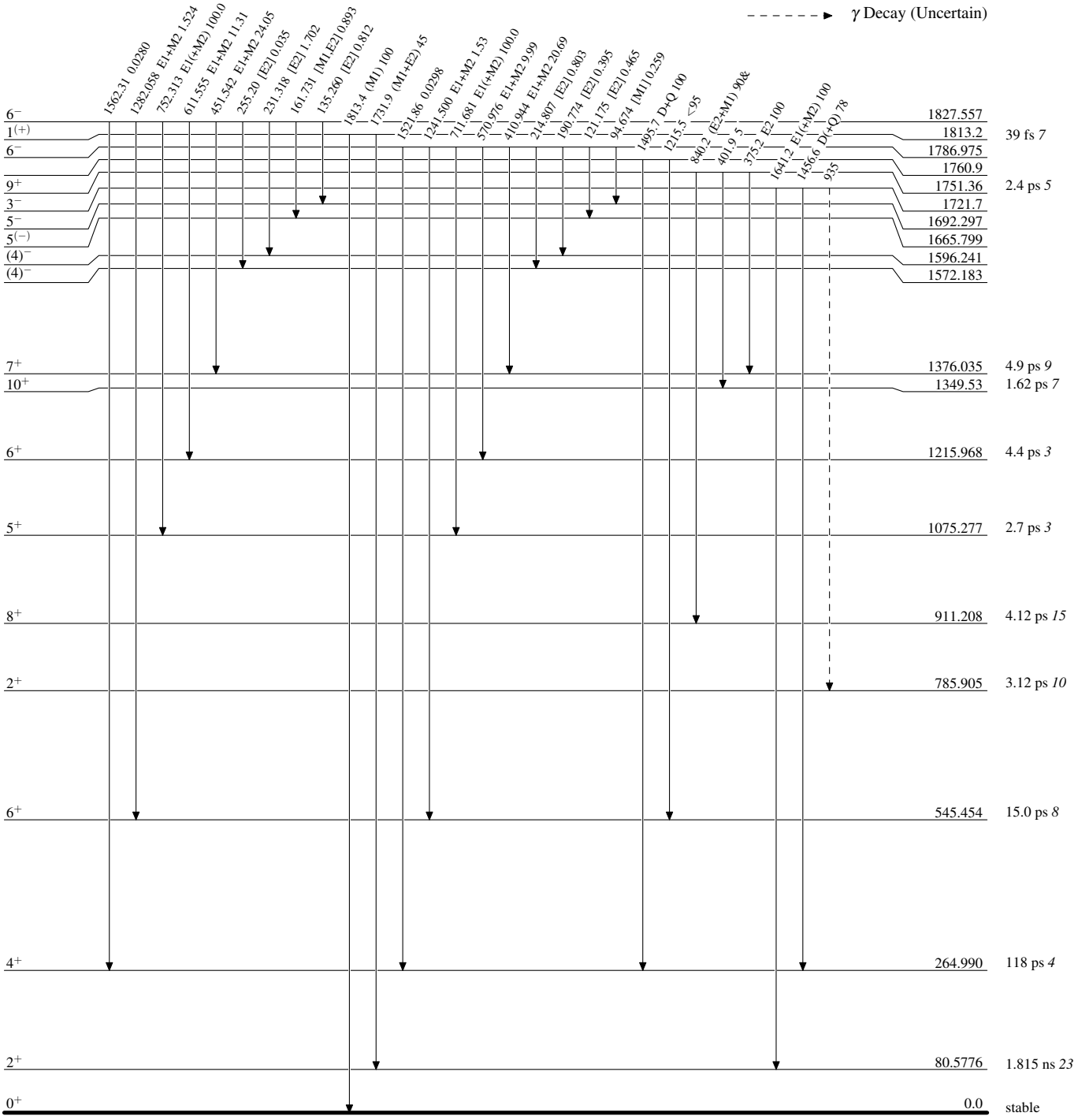


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

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

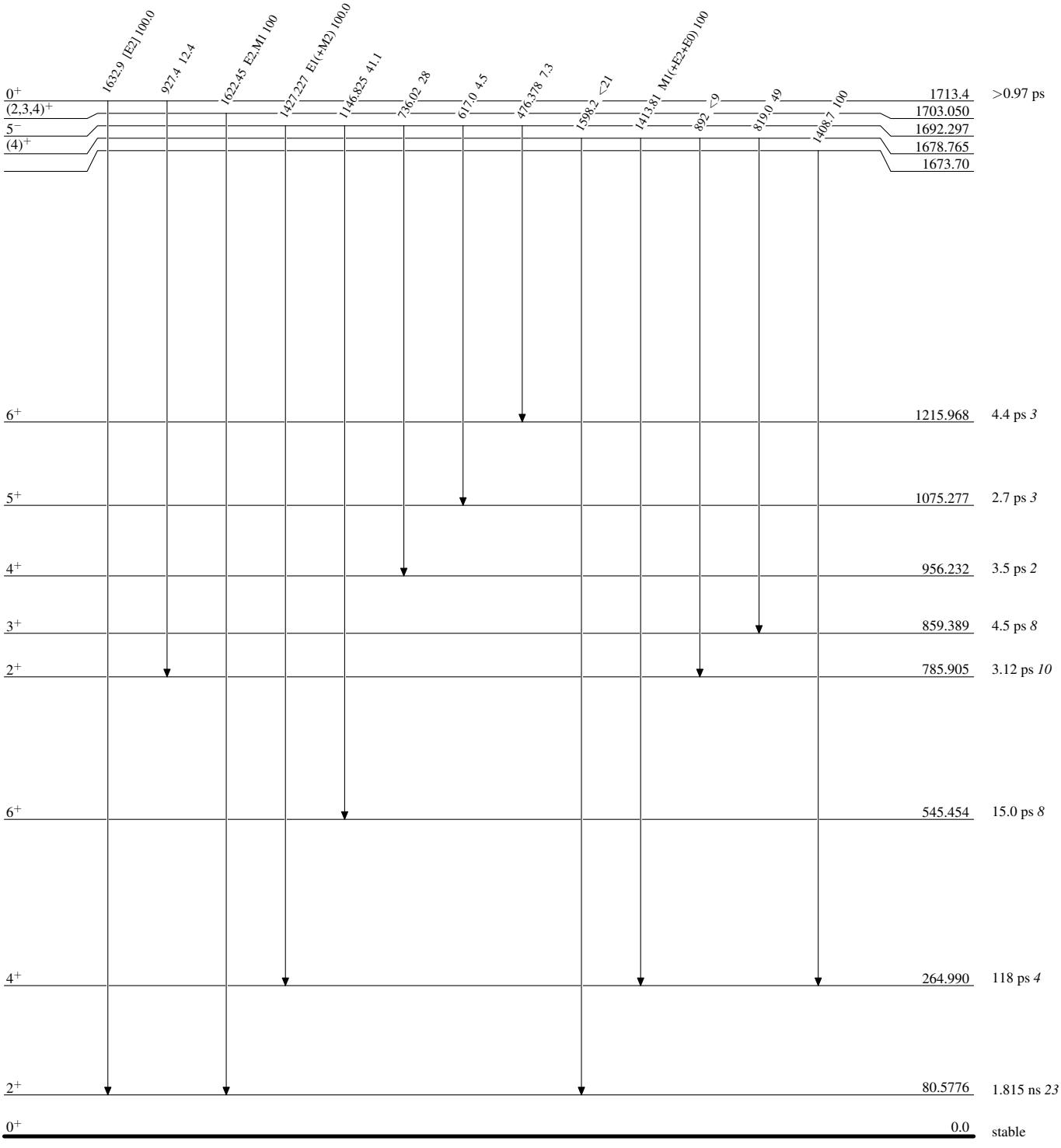


$^{166}_{68}Er_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

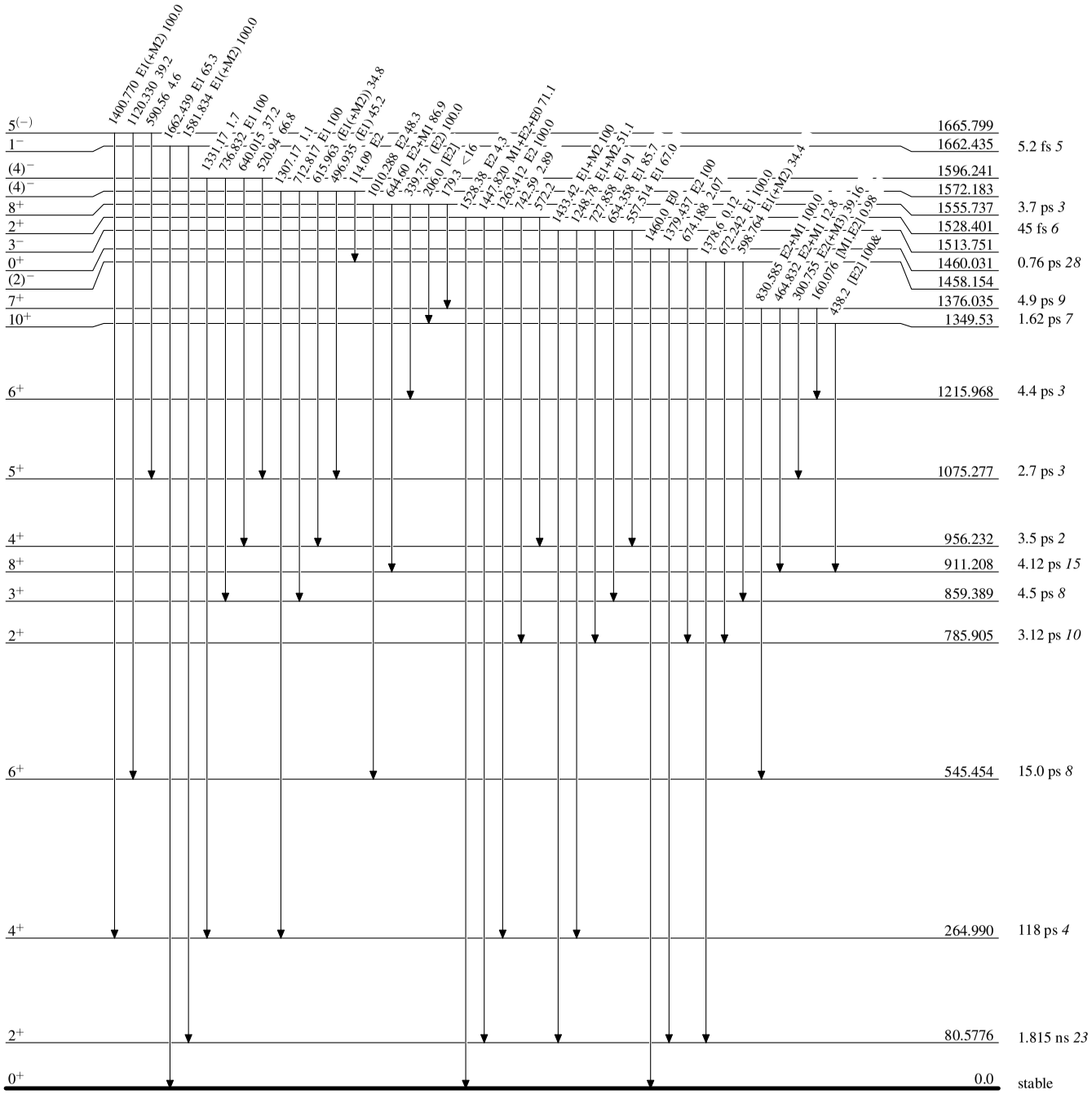
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

Level Scheme (continued)

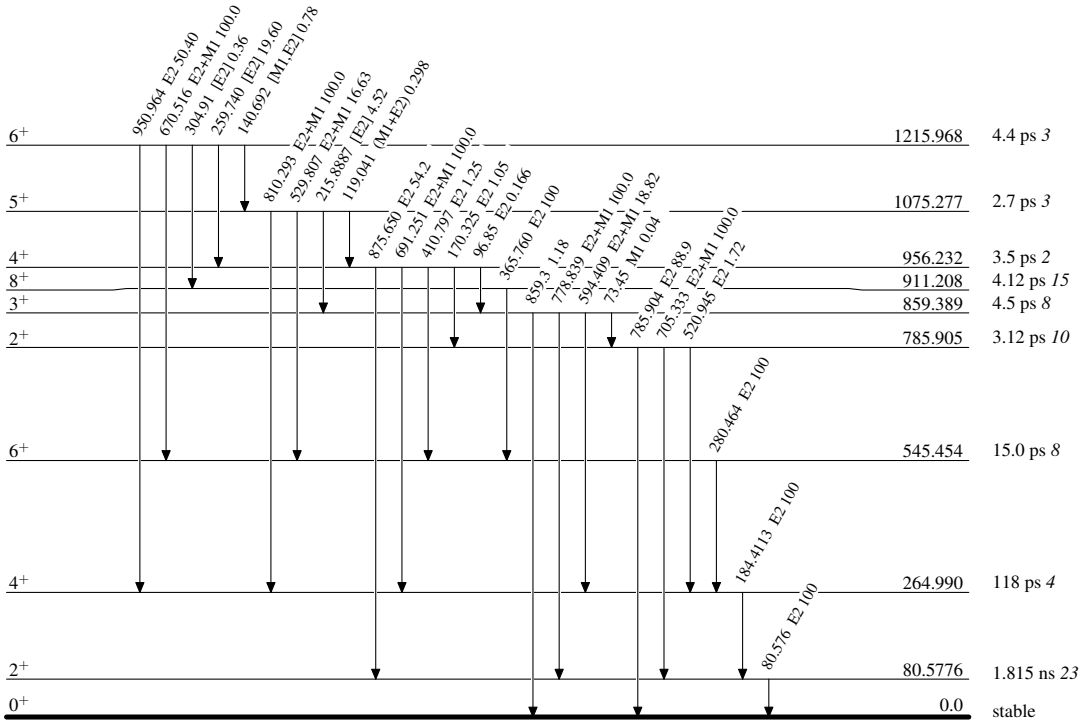
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

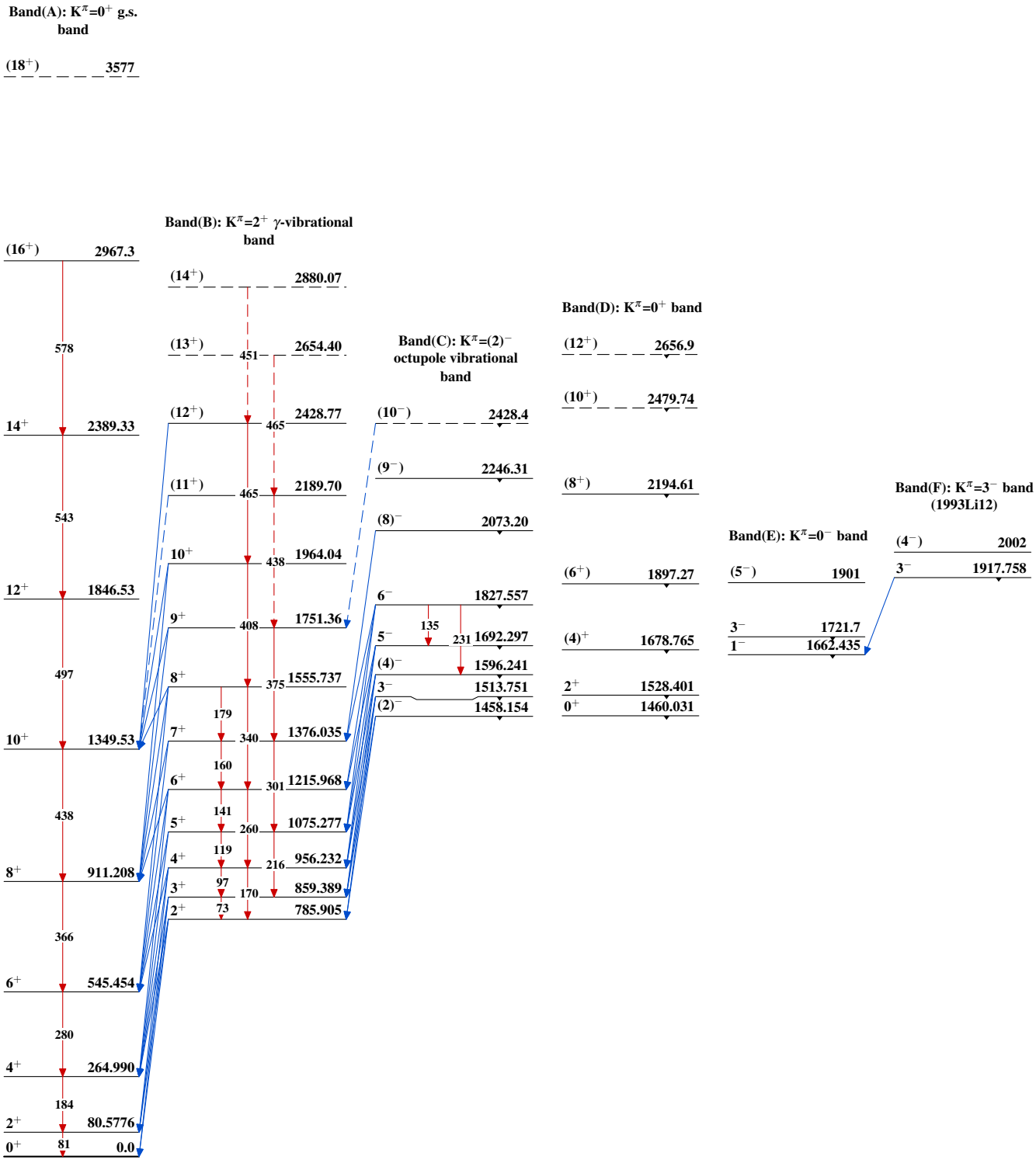
Level Scheme (continued)

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



$^{166}_{68}Er_{98}$

Adopted Levels, Gammas



$^{166}_{68}Er_{98}$

Adopted Levels, Gammas (continued)

Band(L): $K^{\pi}=3^{+}$ band

7^{+} 2713

6^{+} 2563

Band(I): $K^{\pi}=(5^{-})$ band (1975Pa15)

(6^{-}) 2368

5^{+} 2359

Band(G): $K^{\pi}=4^{+}$ band (1993Li12)

7^{+} 2266

Band(K): $K^{\pi}=2^{-}$ band

(5^{-}) 2240.1

(4^{-}) 2226

4^{+} 2239

6^{+} 2132

(3^{-}) 2132

3^{+} 2132.941

(2^{-}) 2057

5^{+} 2045

Band(H): $K^{\pi}=7^{-}$ band (1993Li12)

$(7)^{-}$ 1992.70

4^{+} 1978.422

Band(J): $K^{\pi}=1^{+}$ band

$1^{(+)}$ 1813.2

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Adopted Levels, Gammas (continued)

Band(N): $K^{\pi}=1+?$ band (1993Li12)

4087

4002

Band(M): $K^{\pi}=8^{+}$ band

(9^{+}) 3273

(8^{+}) 3077

Band(O): $K^{\pi}=1^{-}$ band

(3^{-}) 2226

(2^{-}) 2152

(1^{-}) 2055

Band(P): $K^{\pi}=(6^{-})$ band (1975Pa15)

(7^{-}) 2050

(6^{-}) 1908.2

Band(Q): $K^{\pi}=(4^{-})$ band (1975Pa15)

(5^{-}) 2124.7

(4^{-}) 2022

Band(R): $K^{\pi}=(3^{-})$ band (1975Pa15)

(4^{-}) 2148.6

(3^{-}) 2076.294

$^{166}_{68}Er_{98}$

Adopted Levels, Gammas (continued)

Band(S): Possible $K^{\pi}=4^{+}$, $\gamma\gamma$ vibration band (1998Fa15)

(8^{+}) **2574.0**

(6^{+}) **2260.3**

(4^{+}) **2027.9**

$^{166}_{68}Er_{98}$