Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 113, 2537 (2012)	1-Mar-2012

Q(β^-)=−5.05×10^3 *6*; S(n)=9445 *10*; S(p)=6568 *10*; Q(α)=1753.0 *3* 2017Wa10
S(2n)=16278 *10*; S(2p)=11400.95 *10* 2017Wa10
Additional information 1.
Additional information 2.
Data are from the following studies: ^{156}Ho ε+β^+ decay; ^{159}Tb(p,4nγ) and ^{156}Gd(α,4nγ) studies; (HI,xnγ) studies; ^{158}Dy(p,t) reaction; ^{156}Dy(d,d′) reaction; ^{165}Ho(π^-,9nγ) study; and Coul. ex.
Model discussions and calculations of level energies, configurations, B(E2), or degree of deformation: 1975Bi13, 1978Pe01, 1980De34, 1980Di15, 1983He20, 1986BeZG, 1989Gu07, 1990Ha22, and 1991Bo05.

^{156}Dy Levels

Average g-factors given in the evaluation 1989Ra17 are: +0.11 *4* and +0.12 *3* for an average J of 19; +0.14 *6* for an average J of 21; and +0.20 *3*, +0.21 *7*, and +0.21 *3* for an average J of 23. These values are based on the data of 1984Ha39 and 1985Ta02. See also the compilation by 2005St24.

The customary expression for the energies of the low-spin members of the rotational bands does not provide a good description of these energy spacings. Thus, at most only an A value is given here (in order to provide insight into how the effective moment of inertia differs for the various bands). It is computed from the energies of the first two band members, unless noted otherwise.

For the definition of the quasiparticle band-labeling convention for the various high-spin bands, see the (HI,xnγ) Data Set.

Cross Reference (XREF) Flags

A	(HI,xnγ)	E	^{158}Dy(p,t)
B	^{156}Ho ε decay (56 min)	F	^{156}Dy(d,d′)
C	^{156}Ho ε decay (7.6 min)	G	^{165}Ho(π^-,9nγ)
D	^{159}Tb(p,4nγ),^{156}Gd(α,4nγ),	H	Coulomb excitation

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0[@]	0$^+$	stable	ABCDEFGH	T$_{1/2}$: 2011Be18 report an experimental lower limit for the half-life of the α transition to the first 2$^+$ state in ^{152}Gd of 3.8×10^{16} y. The model calculation of 1988Al13 gives T$_{1/2}$(α)=4.3×10^{24} y. Authors quote a measured limit of >1.0×10^{15} y. From systematics of α decay using a radius parameter extrapolated from ^{150,152,154}Dy, one deduces T$_{1/2}$(α)=2.2×10^{24} y. 2011Be18 report measured lower limits for the half-lives of $\varepsilon\varepsilon$ and $\varepsilon\beta^+$ transitions, both 0ν and 2ν, to a number of levels in ^{156}Gd. These range from ≈1.8×10^{14} y to ≈7.1×10^{16} y. 2002Hi09 calculate 2ν double ε decay for several deformed nuclei. For ^{156}Dy, they compute T$_{1/2}$=2.74×10^{22} y, 8.31×10^{24} y, and 1.08×10^{25} y, respectively, for 2ν ε decay to the g.s., the first excited 0$^+$ state, and the second excited 0$^+$ state of ^{156}Gd. These values are also given in 1999Ce12, which involves some of the same authors. More recent calculations of various aspects of the "double-beta-decay" process are given by 2009Ra26, 2010Ra06, 2011Kr07 and 2011El05. These are discussed in the ^{156}Gd data set. 2002Hi09 calculate 2ν ε decay for several deformed nuclei. For ^{156}Dy, they report calculated upper limits for T$_{1/2}$ values for the 2ν ε decay to the g.s., the first and second excited 0$^+$ levels in ^{156}Gd. The change in the mean square charge radius has been determined from optical isotope shift data. From 1987NeZW Δ<r^2>(156-154)≈0.38 fm^2 and Δ<r^2>(158-156)≈0.20 fm^2 (values read from plot by evaluator). From 1990Wa25, Δ<r^2>(158-156)=0.199 fm^2 *10*. For the nuclear parameter, λ (which ≈ Δ<r^2>), 1982Cl04 report λ(158-156)=0.215 fm^2 *12*. The compilation of 1987Au06 quotes values of λ(156-154)=0.37 fm^2 *3* and λ(158-156)=0.194 fm^2 *17*.

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Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				From an evaluation of data on nuclear rms charge radii, 2004An14 report $<r^2>^{1/2}$=5.16 fm *25*.
137.77[@] *8*	2^+	0.823 ns *7*	ABCDEFGH	μ=+0.78 *8* J^{π}: E2 γ to 0^+ gs; L=2 in (p,t). $T_{1/2}$: Computed from B(E2)↑=3.72 *3* (1977Ro27) in Coul. ex. Others: 0.82 ns *5* (1966Ab02) and 0.90 ns *8* (1970Mo39), from ^{156}Ho ε decay; and 0.74 ns *4* (2006Mo22), from (HI,xnγ). μ: From the evaluation by 1989Ra17. See also the compilation by 2005St24.
404.19[@] *10*	4^+	31.6 ps *3*	ABCDEFG	J^{π}: E2 γ to 2^+ and expected band structure.
675.60[&] *14*	0^+		AB DEF	J^{π}: E0 transition to 0^+ gs; L=0 in (p,t).
770.44[@] *11*	6^+	6.3 ps *3*	ABCDEFG	J^{π}: E2 γ to 4^+, L=6 in (p,t) and expected band structure.
828.64[&] *11*	2^+		AB DEF H	B(E2)↑=0.008 *5* B(E2)↑: From Coul. ex. (1982Ro07). J^{π}: E0 component in γ to 2^+, L=2 in (p,t).
890.50[a] *9*	2^+	1.56 ps *12*	AB DEF H	The γ decay of this level is quite different from what is expected (and observed) for γ vibrations in other nuclides. This, together with an apparent E0 component in the transition to the 2^+ member of the g.s. band, suggests that this state may be more than simply a γ vibration. J^{π}: E2 γ to 0^+, L=2 in (p,t). $T_{1/2}$: Computed from B(E2)↑=0.180 *11* (1982Ro07) in Coul. ex. and the adopted γ branching.
1022.08[a] *10*	3^+		AB D	J^{π}: E2 γ's to 2^+ and 4^+ levels and expected band structure.
1088.28[&] *11*	4^+	4.5 ps *12*	AB DEF	J^{π}: From E0 component in γ to 4^+ level and L=4 in (p,t).
1168.47[a] *11*	4^+		AB DEF	J^{π}: E2 γ's to 2^+ levels, E0 or M1 γ to 4^+, L=(4) in (p,t), and expected band structure.
1215.61[@] *20*	8^+	2.26 ps *6*	ABCDE G	J^{π}: E2 γ to 6^+ and expected band structure.
1293.2[b] *3*	1^-		D	J^{π}: Assumed E1 γ to 2^+ level. Bandhead of odd-spin octupole band.
1335.56[a] *13*	5^+		AB D	J^{π}: E2 γ's to 3^+ and 6^+ levels and expected band structure.
1368.36[b] *12*	3^-		B DEF H	B(E3)↑=0.22 *7* J^{π}: E1 γ's to 2^+ and 4^+ levels. B(E3)↑: From Coul. ex. (1982Ro07).
1377.80?	(0^+)		B	2003KaZP report this level but give no other information about it. 2008VaZU, with many of the same authors, also list it but also provide no information other than what is given here.
1382.31 *16*	2^+		B E	XREF: E(1385). J^{π}: γ's to 0^+, 2^+, and 3^+ levels. Presumed M1 γ to 2^+ gives $J^{\pi}=2^+$. Evaluator associates this level with the 1385 level in (p,t), which was assigned $J^{\pi}=(3^-)$ based on L=(3).
1407 *5*	(3^-)		EF	B(E3)↑=0.009 J^{π}: From L=(3) in (p,t); and (d,d′) reaction data. B(E3)↑: From Coul. ex. (1982Ro07).
1437.28[&] *17*	6^+	3.56 ps *24*	AB D	J^{π}: E0 component in γ to 6^+ member of the gs band and expected band structure.
1447.38 *20*	(2^+)		D	J^{π}: γ to 2^+. Proposed in (p,4nγ) as a member of the "Super" band.
1476.10 *15*	$(3)^-$		B E	XREF: E(1483). J^{π}: E1 γ to 2^+ indicates π=−. L=(3) in (p,t) suggests $J^{\pi}=(3^-)$.
1514.94 *20*	2^+		B E	XREF: E(1520). J^{π}: γ's to 0^+ and 4^+ levels; L=2 in (p,t). Assigned as a "β-γ" vibrational bandhead by 1977Ko04 from (p,t).
1525.17[a] *19*	6^+		AB D f	XREF: f(1523). J^{π}: Possible E0 component in γ to 6^+ level; expected band structure.
1526.28[b] *15*	5^-		B D f	XREF: f(1523).

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Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	XREF	Comments
				J$^\pi$: E1 γ's to 4$^+$ and 6$^+$ levels, but both γ's are multiply placed. Expected band structure.
1609.33 *16*	(3)$^-$		B EF	J$^\pi$: E1 γ to 4$^+$ indicates J=3,4,5 and π=−. Population in (d,d′) indicates natural parity. Assignment requires γ to g.s. to be E3. In (p,t), L=(0) which implies J$^\pi$=(0$^+$).
1624.64 *18*			B	
1627.42 *16*	(4)$^+$		B DE	XREF: E(1635). J$^\pi$: E2 γ's to 3$^+$ and 4$^+$ levels indicates π=+. L=(4) in (p,t). Proposed in (p,4nγ) as a member of the "Super" band. However, 1977Ko04, (p,t), suggest that it is the bandhead of a K$^\pi$=4$^+$ band.
1677.15 *15*	4$^+$		B	J$^\pi$: γ's to 2$^+$ and 6$^+$ levels.
1679.9 *8*			B	
1725.02[@] *8*	10$^+$	1.06 ps *10*	A CD G	J$^\pi$: E2 γ to 8$^+$ level and expected band structure.
1728.79[a] *12*	7$^+$		AB D	J$^\pi$: E2 γ's to 5$^+$ and 6$^+$ levels and expected band structure.
1772.4 *10*	(3$^-$)		B E	XREF: E(1778). J$^\pi$: From L=(3) in (p,t).
1794.55 *19*	4$^+$		B EF	XREF: E(1798)F(1794). J$^\pi$: From L=4 in (p,t).
1809.97[b] *10*	7$^-$		AB D	J$^\pi$: E1 γ to 6$^+$ level and expected band structure.
1840.07 *13*	(4)$^+$		B E	XREF: E(1844). J$^\pi$: M1 γ to 3$^+$ level indicates J$^\pi$=2$^+$,3$^+$,4$^+$. M1+E2 γ to 4$^+$ rules out 2$^+$. Probable excitation in (p,t) indicates natural parity. Note that L=(5) in (p,t).
1857.84 *14*			B	
1858.64[&] *11*	8$^+$	2.09 ps *10*	A D	J$^\pi$: E0 component in γ to 8$^+$ member of the gs band, and expected band structure.
1878.6 *4*	(2)$^+$		B E	XREF: E(1874). J$^\pi$: E2 to 2$^+$, possible M1 to 2$^+$ and γ's to 4$^+$ indicate π=+ and J=2,3,4. L=(2) in (p,t) suggests J=2.
1884 *5*	(5$^-$)		E	J$^\pi$: From L=(5) in (p,t).
1898.64[c] *10*	6$^-$		AB D	J$^\pi$: Feeding by stretched quadrupole (i.e. E2) transition from negative-parity level indicates π=−. J=6 from proposed band assignment. Assigned as (6,7)$^+$ in (p,4nγ).
1930.1 *5*	(3$^-$)		B EF	XREF: E(1934)F(1927). J$^\pi$: L=(3) in (p,t).
1933.60 *18*	+		B	J$^\pi$: E2 to 3$^+$ indicates π=+. Thus, this is not likely to be the (3$^-$) level at 1927 in (d,d′) and at 1934 in (p,t).
1942.9 *4*	+		B	J$^\pi$: E2 γ to 4$^+$ indicates π=+.
1949.99 *22*	(3$^-$)		B EF	XREF: E(1956)F(1948). J$^\pi$: From L=(3) in (p,t).
1958.64[a] *11*	8$^+$		A D	J$^\pi$: E0 component in γ to 8$^+$ level, and expected band structure.
2002.9 *3*	4$^+$		B E	XREF: E(2009?). J$^\pi$: L=4 in (p,t).
2032 *5*	2$^+$		E	J$^\pi$: From L=2 in (p,t).
2052 *5*	(3$^-$)		E	J$^\pi$: L=(3) in (p,t). If J$^\pi$ is indeed 3$^-$, then this level is not the same as the 2058 level in ^{156}Ho ε decay, since this latter level has a decay γ to a 5$^+$ level.
2058.49 *20*			B	
2071			F	
2085.14 *23*			B	
2089.81 *22*	2$^+$		B F	XREF: F(2086). J$^\pi$: γ's to 0$^+$ and 4$^+$ levels.
2094 *5*	(5$^-$)		E	J$^\pi$: From L=(5) in (p,t).
2103.38 *25*	(4$^+$)		B E	J$^\pi$: γ's to 3$^+$ and 5$^+$ levels indicate J$^\pi$=3$^+$,4,5$^+$. If the 2103 level in (p,t) is the same as the 2103 level in ε decay, then the implied natural parity gives 4$^+$.
2135			F	
2146 *5*	(5$^-$)		E	J$^\pi$: From L=(5) in (p,t).

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Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
2164.3 *5*			B	
2176	(3$^-$)		EF	XREF: E(2174)F(2179). J^{π}: L=(3) in (p,t).
2183.7 *5*			B	
2186.58[b] *14*	9$^-$		A D F	J^{π}: From E1 γ to 8$^+$ level and expected band structure.
2191.62[a] *26*	9$^+$		A D	J^{π}: E2 γ's to 7$^+$ and 10$^+$ levels and expected band structure.
2193.6 *3*	4$^+$		B E	J^{π}: From L=4 in (p,t).
2199.68 *19*			B	
2207.4 *4*			B	
2220.4 *4*			B E	
2228.9 *5*			B	
2230.9 *4*			B	
2244.64 *14*	(3$^-$)		B	J^{π}: Assumes that mult=E1 for the 1076 γ. Then, γ's to 2$^+$ and 4$^+$ levels require J^{π}=3$^-$ uniquely.
2250 *5*	2$^+$		E	J^{π}: L=2 in (p,t). Level assumed to be distinct from the 2244 level.
2261.62[c] *11*	8$^-$		A D	J^{π}: Feeding by stretched quadrupole (i.e., E2) transition from negative-parity level indicates π=−. J=8 from proposed band assignment. Assigned as 8$^+$ in (p,4nγ).
2264.3 *5*			B	
2270.0 *4*			B	
2285.88[@] *10*	12$^+$	0.62 ps *7*	A D G	J^{π}: E2 γ to 10$^+$ and expected band structure.
2293.4 *4*			B	
2300.1 *4*			B	
2307.44 *12*	4$^+$		B	J^{π}: γ's to 2$^+$ and 6$^+$ levels.
2315.59[&] *12*	10$^+$	1.55 ps *10*	A D	J^{π}: E0 component in γ to 10$^+$ level.
2323.58 *13*			B	
2331.7 *3*			B	
2342.68 *23*			B	
2345.1[f] *2*	8$^-$		A	J^{π}: γ's to 7$^+$ and 8$^+$, and proposed band structure.
2372.1 *3*			B	
2385.7 *3*			B	
2408.45 *14*	2$^+$,3,4$^+$		B	J^{π}: γ's to 2$^+$ and 4$^+$ levels.
2408.5[e] *3*	9$^-$		A	J^{π}: E1 γ to 8$^+$ and proposed band structure.
2419.1 *6*			B	
2433.84 *16*			B	
2439.16 *17*			B	
2445.17 *21*	3$^+$,4$^+$		B	J^{π}: γ's to 2$^+$ and 5$^+$ levels.
2448.03[a] *16*	10$^+$		A D	J^{π}: E2 γ to 8$^+$ and expected band structure.
2489.5 *5*			B	
2491.90 *18*			B	
2517.0 *4*			B	
2571.7 *5*			B	
2580.1[f]	10$^-$		A	J^{π}: (E1) γ to 10$^+$, E2 γ to 8$^-$, and expected band structure.
2592.7[g]	9$^-$		A	J^{π}: (E1) γ to 8$^+$ and expected band structure.
2594.3 *3*			B	
2636.55[b] *18*	11$^-$		A D	J^{π}: E1 γ to 10$^+$ and expected band structure.
2642.50 *22*			B	
2653.3 *6*			B	
2701.5[h] *2*	10$^-$		A D	J^{π}: From E2 γ to 8$^-$ level and expected band structure. Negative parity for this level and its associated band members is proposed by 1988Ri09, in (HI,xnγ), based on cranked shell-model and signature-splitting considerations. (Level assigned as 10$^+$ in (p,xnγ) (1977De28).).
2706.87[i] *13*	12$^+$	4.53 ps *10*	A D	J^{π}: E2 γ's to 10$^+$ levels and expected band structure.
2707.8[c]	10$^-$		A	J^{π}: From proposed band structure in (HI,xnγ).

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Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
2709.4[e]	11⁻		A	Jπ: E2 γ to 9⁻, E1 γ to 10⁺, and expected band structure.
2712.37[a] 14	11⁺		A D	Jπ: E2 γ to 9⁺, γ to 12⁺, and expected band structure.
2757.8 5			B	
2787.4[o]	8⁺		C	From log ft≈4.5 in ^{156}Ho ε decay (7.6 min), conf = ν5/2[523]+ν11/2[505]. Jπ: γ's to 6⁺ and 10⁺ levels.
2788.1 9			B	
2810.4 7			B	
2818.35 12	4⁺,5⁻		B	Jπ: γ's to 3⁻ and 6⁺ levels.
2823.38 15			B	
2833.7 4			B	
2847.5[g]	11⁻		A	Jπ: E2,M1 γ to 10⁻, E2 γ to 9⁻, and expected band structure.
2887.82[@] 13	14⁺	0.56 ps 6	A D	Jπ: E2 γ to 12⁺, and expected band structure.
2895.0 4			B	
2941.9[f]	12⁻		A	Jπ: γ to 10⁻, and expected band structure.
2981.5 13			B	
2997.23?[a] 18	12⁺		D	Jπ: E2 γ to 10⁺, and expected band structure.
3021.2[h]	12⁻		A	Jπ: E2 γ's to 10⁻ and 11⁻ levels and expected band structure.
3065.88[i] 23	14⁺	7.49 ps 21	A D	Jπ: E2 γ to 12⁺, γ to 14⁺, and expected band structure.
3103.6[e]	13⁻		A	Jπ: E2 γ's to 11⁻ levels, E1 γ to 12⁺, and expected band structure.
3154.2[b]	13⁻		A D	Jπ: E1 γ to 12⁺, and expected band structure.
3186.8[c]	12⁻		A	Jπ: From proposed band structure in (HI,xnγ).
3221.2[g]	13⁻		A	Jπ: E2 γ to 11⁻, and expected band structure.
3273.5[a]	(13⁺)		A	Jπ: γ to 11⁺, and expected band structure.
3411.6[f]	14⁻		A	Jπ: E2 γ to 12⁻, and expected band structure.
3444.9[h]	14⁻		A	Jπ: E2 γ to 12⁻, and expected band structure.
3498.8[i] 3	16⁺	1.39 ps 8	A D	Jπ: E2 γ's to 14⁺ levels, and expected band structure.
3523.3[@] 2	16⁺	0.32 ps 6	A D	Jπ: E2 γ to 14⁺, and expected band structure.
3596.4[e]	15⁻		A	Jπ: E2 γ to 13⁻, and expected band structure.
3678.0[c]	14⁻		A	Jπ: From proposed band structure in (HI,xnγ).
3689.9[g]	15⁻		A	Jπ: E2 γ to 13⁻, and expected band structure.
3719.6[b]	15⁽⁻⁾		A	
3861.2?[a]	(15⁺)		A	
3954.0[h]	16⁻		A	
3961.5[f]	16⁻		A	
4025.8[i]	18⁺	0.92 ps 5	A D	
4157.8[e]	17⁻		A	
4178.1[@]	18⁺	0.24 ps 6	A D	
4210.4[c]	16⁻		A	
4236.2[g]	17⁻		A	
4331.1[b]	(17⁻)		A	
4533.9[h]	18⁻		A	
4562.4[f]	18⁻		A	
4635.6[i] 6	20⁺	0.49 ps 4	A D	
4771.2[e]	19⁻		A	
4779.2[c]	18⁻		A	
4845.9[g]	19⁻		A	
4859.0[@]	20⁺	0.24 ps 6	A D	
4978.8[b]	(19⁻)		A	
5170.8[h]	20⁻		A	

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Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF
5199.9[f]	20^-		A	10141[c]	32^-		A
5320.2[i]	22^+	0.31 ps *3*	A D	10340.6[e]	33^-		A
5381.9[c]	20^-		A	10449.3[g]	33^-		A
5428.2[e]	21^-		A	10592[d]	33^-		A
5507.3[g]	21^-		A	10618.0[i]	34^+	0.06 ps *1*	A
5573.0[@]	22^+	0.21 ps *3*	A	10629[k]	(33^+)		A
5855.3[h]	22^-		A	10713[l]	(34^+)		A
5873.4[f]	22^-		A	10828.1[@]	34^+		A
6036.3[c]	22^-		A	10925.0[f]	34^-		A
6070.1[i]	24^+	0.177 ps *18*	A	10944.6[h]	34^-		A
6129.3[e]	23^-		A	10975[j]	34^+		A
6213.8[g]	23^-		A	11092[c]	34^-		A
6328.7[@]	24^+	0.155 ps *30*	A	11313.4[e]	35^-		A
6582.5[h]	24^-		A	11443.5[g]	35^-		A
6589.7[f]	24^-		A	11585[d]	35^-		A
6753.7[c]	24^-		A	11614[k]	(35^+)		A
6876.8[e]	25^-		A	11670.6[i]	36^+	0.04 ps *1*	A
6877.9[i]	26^+	0.123 ps *19*	A	11735[l]	(36^+)		A
6963.9[g]	25^-		A	11886.7[@]	36^+		A
7130.3[@]	26^+		A	11946.2[f]	36^-		A
7349.6[f]	26^-		A	11957.3[h]	36^-		A
7358.7[h]	26^-		A	11986[j]	36^+		A
7533.4[c]	26^-		A	12089[c]	36^-		A
7672.6[e]	27^-		A	12326.8[e]	37^-		A
7738.8[i]	28^+	0.091 ps *14*	A	12462[g]	37^-		A
7760.3[g]	27^-		A	12626[d]	37^-		A
7920.5[d]	27^-		A	12628[k]	(37^+)		A
7978.5[@]	28^+		A	12769.3[i]	38^+	0.14 ps *4*	A
8164.5[f]	28^-		A	12818[l]	(38^+)		A
8179.7[h]	28^-		A	12959[h]	38^-		A
8364[c]	28^-		A	12976[@]	38^+		A
8517.0[e]	29^-		A	13014.0[f]	38^-		A
8605.8[g]	29^-		A	13051[j]	38^+		A
8650.8[i]	30^+	0.074 ps *8*	A	13140[c]	38^-		A
8762[d]	29^-		A	13386.8[e]	39^-		A
8875.9[@]	30^+		A	13470[g]	39^-		A
9031.9[f]	30^-		A	13686[k]	(39^+)		A
9051.5[h]	30^-		A	13711[d]	39^-		A
9234[c]	30^-		A	13885.1[i]	40^+	0.05 ps *+8−3*	A
9407.4[e]	31^-		A	13941[l]	(40^+)		A
9502.2[g]	31^-		A	13973[h]	40^-		A
9611.3[i]	32^+	0.06 ps *1*	A	14021.9[@]	40^+		A
9653[d]	31^-		A	14113.9[f]	40^-		A
9692[k]	(31^+)		A	14210[j]	40^+		A
9825.2[@]	32^+		A	14254[c]	(40^-)		A
9952.3[f]	32^-		A	14496.1[e]	41^-		A
9973.5[h]	32^-		A	14532[g]	41^-		A
10063[j]	32^+		A	14797[d]	(41^-)		A

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF
14800[k]	(41^+)	A	17012[n]	(45^-)	A	19963[@]	50^+	A
14994.8[i]	42^+	A	17236[k]	(45^+)	A	20002[k]	(49^+)	A
15061[h]	42^-	A	17348[i]	46^+	A	20009[f]	52^-	A
15152[l]	(42^+)	A	17388[f]	46^-	A	20241?[h]	(50^-)	A
15190[@]	42^+	A	17434[@]	46^+	A	20332.2[e]	51^-	A
15229[m]	42^+	A	17482[h]	46^-	A	20858[j]	(50^+)	A
15232[f]	42^-	A	17832[l]	(46^+)	A	20874[l]	(50^+)	A
15411[c]	(42^-)	A	17908?[c]	(46^-)	A	21332[@]	52^+	A
15447[j]	(42^+)	A	18015.7[e]	47^-	A	21422[i]	(52^+)	A
15635.6[e]	43^-	A	18036[j]	(46^+)	A	21512[k]	(51^+)	A
15679[g]	43^-	A	18152[g]	47^-	A	21763[e]	53^-	A
15841[n]	43^-	A	18303[n]	(47^-)	A	22369?[j]	(52^+)	A
15950[d]	(43^-)	A	18472[f]	48^-	A	22576?[l]	(52^+)	A
15975[k]	(43^+)	A	18600[k]	(47^+)	A	22799[@]	54^+	A
16171.2[i]	44^+	A	18615[i]	48^+	A	22998[i]	(54^+)	A
16210[h]	44^-	A	18616[f]	50^-	A	23244?[k]	(53^+)	A
16289[@]	44^+	A	18651[@]	48^+	A	24382?[l]	(54^+)	A
16350[f]	44^-	A	18813[h]	48^-	A	24430[@]	(56^+)	A
16448[l]	(44^+)	A	19090.2[e]	49^-	A	24716?[i]	(56^+)	A
16474[m]	(44^+)	A	19298[l]	(48^+)	A	26224[@]	(58^+)	A
16625[c]	(44^-)	A	19408[j]	(48^+)	A	26640?[i]	(58^+)	A
16717[j]	(44^+)	A	19488[g]	49^-	A	28122?[@]	(60^+)	A
16833.3[e]	45^-	A	19652?[n]	(49^-)	A	30241?[@]	(62^+)	A
16869[g]	45^-	A	19953[i]	50^+	A			

[†] From values given in individual reactions or decays, primarily from ^{156}Ho ε decay and (HI,xnγ) and ^{159}Tb(p,4nγ) studies.

[‡] Arguments are given explicitly for each level below 3.7 MeV. Above this energy, all values are from (HI,xnγ) alone and are based on the considerations mentioned in that data set. These values are generally those proposed by the authors of those studies. The light-ion-induced in-beam studies are for convenience frequently referred to simply as (p,4nγ), although they may include (α,4nγ) data as well.

[#] Unless noted otherwise, the $T_{1/2}$ values are from the (HI,xnγ) data set.

[@] Band(A): $K^{\pi}=0^+$ g.s. band. α=23.0.

[&] Band(B): First excited $K^{\pi}=0^+$ band. α=25.5. Because of the small value of B(E2)↑, this band is not, at least predominantly, a β vibration. For a discussion of this and related points regarding excited 0^+ bands in strongly deformed nuclei, see 2001Ga02. Microscopic calculations of the 0^+ excitations in the even-mass Dy isotopes from α=156 to 166 are described and discussed by 2002Ge10.

[a] Band(C): $K^{\pi}=2^+$ γ-vibrational band. α=19.8. α-value computed from the energies of the 2^+ and 4^+ states. For a discussion of the odd-even staggering in the γ-vibrational bands of a number of heavy deformed nuclei, see 2000Mi18. The decay of the bandhead is quite different from that observed for γ vibrations in most other nuclides, and the ΔJ=0 transitions from some of the excited band members to members of the g.s. band seem to have E0 components, suggesting that a γ-vibrational assignment may not be entirely appropriate. Mixing with the near-lying 828 level may be significant.

[b] Band(D): Aligned odd-spin octupole band. α=7.55. α-value computed from the energies of the 1^- and 3^- states.

[c] Band(E): Unfavored, even-spin octupole band. α=12.1. α-value computed from the energies of the 6^- and 8^- states.

[d] Band(e): Negative-parity band, α=1. Band proposed by 1998Ko49 in (HI,xnγ).

[e] Band(F): Odd-spin, negative-parity band. Configuration assigned as AE, changing to AEBC at the higher spins (1988Ri09). (For the definition of the quasiparticle band-labeling convention for this and the other high-spin bands, see the (HI,xnγ) data set).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{156}Dy Levels (continued)

[f] Band(f): Even-spin, negative-parity band. Configuration assigned as AF, changing to AFBC at the higher spins (1988Ri09).

[g] Band(g): Odd-spin, negative-parity band. Configuration assigned as AX, changing to AXBC at the higher spins (1988Ri09).

[h] Band(G): Even-spin, negative-parity band. Configuration assigned as AY, changing to AYBC at the higher spins (1988Ri09).

[i] Band(H): Positive-parity band, α=0. Configuration assigned as AB at the lower spins (J<22) (1988Ri09). This band crosses the g.s. band around $J^{\pi}=16^{+}$ and the first excited 0^{+} band between J=10 and 12. A crossing with the two-proton- quasiparticle band with configuration A_pB_p also occurs within this band at higher spins.

[j] Band(I): Positive-parity band, α=0. Band proposed by 1998Ko49 in (HI,xnγ).

[k] Band(J): Positive-parity band, α=1 branch. Band proposed by 1998Ko49 in (HI,xnγ).

[l] Band(j): Positive-parity band, α=0 branch. Band proposed by 1998Ko49 in (HI,xnγ).

[m] Band(K): Positive-parity band, α=0. Band proposed by 1998Ko49 in (HI,xnγ).

[n] Band(L): Negative-parity band, α=0. Band proposed by 1998Ko49 in (HI,xnγ).

[o] Band(M): Bandhead of a $K^{\pi}=8^{+}$ band. configuration=ν5/2[523]+ν11/2[505].

Adopted Levels, Gammas (continued)

$\gamma(^{156}$Dy)

Measurements of continuum γ's: 1982Lu03, 1988HoZQ.

The unplaced γ's are not given here, see ^{156}Ho ε decay and ^{159}Tb(p,4nγ).

Calculations of the reduced γ transition probabilities, e.g., B(E2)(W.u.), assume that essentially all of the decays from the level are given. This assumption may be unrealistic for the high-energy levels observed in the (HI,xnγ) studies. The presence of other decay modes would reduce the calculated transition probabilities.

In this data set, unless noted otherwise, mention of the ^{156}Ho ε decay refers to the 56-min g.s. decay. Reference to the isomeric (7.6 min) decay is specifically indicated.

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	$I_{(\gamma+ce)}$[a]	Comments
137.77	2^+	137.80 *10*	100	0	0^+	E2	0.849		B(E2)(W.u.)=150.0 *17* Mult.: Based on α(K)exp=0.46 (1966La11) and 0.45 (1976Gr20); K/L=1.8 *5* (1960Gr24), 1.42 (1961Ba32), and 1.69 (1966La11); L1/L2=0.41 (1966GrZX) and 0.37 *2* (1987BaYQ); L1/L3=0.41 (1966GrZX) and 0.40 *2* (1987BaYQ), all from ^{156}Ho ε decay. Also from $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
404.19	4^+	266.38 *10*	100	137.77	2^+	E2	0.0933		B(E2)(W.u.)=244.8 *24* Additional information 3. Mult.: Based on α(K)exp=0.064 (1966La11), 0.075 (1976Gr20), and 0.069 *3* (1977De28); K/L=3.0 *4* (1960Gr24), 2.0 (1961Ba32), 3.6 (1966GrZX), and 3.21 (1966La11), together with L subshell ratios (1960Gr24,1966GrZX,1987BaYQ), all from ^{156}Ho ε decay. Also from $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
675.60	0^+	537.8 *2*	100	137.77	2^+	E2	0.01257		Mult.: Based on α(K)exp=0.013 in ^{156}Ho ε decay (1976Gr20) and 0.014 *4* in (p,4nγ) (1977De28).
		675.8 *3*		0	0^+	E0		4	I_γ: Measured Iγ<9 (1976Gr20, ε decay), but γ is an E0. Mult.: Based on observation of ce and lack of observation of γ in ^{156}Ho ε decay (1976Gr20).
770.44	6^+	366.22 *12*	100	404.19	4^+	E2	0.0356		B(E2)(W.u.)=264 *13* Mult.: From ^{156}Ho ε decay: α(K)exp=0.023 (1966La11) and 0.030 (1976Gr20); K/L=5.1 *8* (1960Gr24), 2.8 (1961Ba32), 4.4 (1966GrZX) and 4.0 (1966La11); L subshell ratios (1960Gr24,1966GrZX); α(K)exp= 0.0287 16 (1977De28), (p,4nγ). Also $\gamma(\theta)$ from (HI,xnγ) (1988Ri09).
828.64	2^+	152.8	<0.7	675.60	0^+	[E2]	0.591		I_γ: From ^{156}Ho ε decay. Value from (α,4nγ) is 36 *7*.
		424.5 *2*	10.8 *5*	404.19	4^+	E2	0.0235		I_γ: From ^{156}Ho ε decay. Value from (α,4nγ) is 89, but includes a ^{157}Dy impurity. Mult.: Based on α(K)exp=0.019 (1976Gr20), ^{156}Ho ε decay, and 0.029 *3* (1977De28), (p,4nγ).
		690.86 *13*	100 *5*	137.77	2^+	E0+E2	0.031		Mult.: From α(K)exp=0.036 (1976Gr20), ^{156}Ho ε decay, and 0.024 *4* (1977De28), (p,4nγ). α: Computed from α(K)exp=0.026 and α/α(K).
		828.7	<4	0	0^+	[E2]	0.00454		I_γ: From ^{156}Ho ε decay. From (α,4nγ), Iγ=16 *18*.

From ENSDF

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	$I_{(\gamma+ce)}$[a]	Comments
890.50	2$^+$	61.7	<1.0	828.64	2$^+$	[M1,E2]	14 *5*	14	
		486.4 *3*	8.5 *10*	404.19	4$^+$	[E2]	0.01629		B(E2)(W.u.)=12.6 *19*
		752.67 *15*	56 *5*	137.77	2$^+$	E2+E0(+M1)	0.0085		B(E2)(W.u.)=9.4 *12* ρ^2(E0)×10^3=8 *5*. Value computed by the evaluator assuming no M1 component in the 752 transition. E0 components in the ΔJ=0 transitions between γ-vibrational states and members of the g.s. band are not expected, suggesting that the make-up of this band is more than simply a γ vibration. B(E2)(W.u.): Calculated assuming a pure E2 mult. Mult.: From α(K)exp=0.0065 (1976Gr20), ^{156}Ho ε decay and 0.0075 *13* (1977De28), from (p,4nγ). If α(K)exp is assumed to result from a M1,E2 admixture only, one computes δ^2=0.82, which seems unreasonably large for a transition between a γ band and a gs band. α: Computed from α(K)exp=0.0072 and α/α(K), assuming no M1 component. Additional information 4.
		890.44 *12*	100 *15*	0	0$^+$	E2	0.00389		B(E2)(W.u.)=7.2 *8* Mult.: From α(K)exp=0.0029 (1976Gr20), ^{156}Ho ε decay.
1022.08	3$^+$	131.7	<0.5	890.50	2$^+$	[M1,E2]	1.04 *5*	6.	I_γ: From ^{156}Ho ε decay. From I(ce) and α for [M1,E2], Iγ=7.2; in (α,4nγ) value is 57% of Iγ(618), but also 65% of Iγ(884).
		617.88 *12*	22 *2*	404.19	4$^+$	E2	0.00891		I_γ: From ^{156}Ho ε decay; value from (α,4nγ) is 115. Mult.: From α(K)exp=0.0075 (1976Gr20), ^{156}Ho ε decay.
		884.30 *10*	100 *7*	137.77	2$^+$	E2	0.00394		Mult.: From α(K)exp=0.0031 (1976Gr20), ^{156}Ho ε decay, and 0.0033 *4* (1977De28), (p,4nγ).
1088.28	4$^+$	259.59 *15*	11.0 *10*	828.64	2$^+$				I_γ: Value from (α,4nγ) is 57, but this value includes ^{157}Dy impurity. From (p,4nγ) Iγ=11.3.
		317.9 *2*	2.0 *3*	770.44	6$^+$	E2	0.0541		B(E2)(W.u.)=12 *4* I_γ: From ^{156}Ho ε decay. Mult.: Based on α(K)exp=0.045 (1976Gr20), from ^{156}Ho ε decay.
		684.10 *10*	100 *7*	404.19	4$^+$	E2+E0	0.035		B(E2)(W.u.)=13 *4* B(E2)(W.u.): Calculated assuming a pure E2 mult. Mult.: From α(K)exp=0.043 (1976Gr20), ^{156}Ho ε decay and 0.0324 *19* (1977De28), (p,4nγ). α: Computed from α(K)exp=0.030 and α/α(K). Additional information 5.
		950.5 *2*	9.0 *15*	137.77	2$^+$	E2	0.00338		B(E2)(W.u.)=0.23 *8* I_γ: From ^{156}Ho ε decay. Mult.: From α(K)exp=0.0028 (1976Gr20), ^{156}Ho ε decay.
1168.47	4$^+$	80.2	<3	1088.28	4$^+$			7	E_γ: From ce data (1976Gr20), ^{156}Ho ε decay. I_γ: From 2002Ca49, ^{156}Ho ε decay.
		146.4	<3	1022.08	3$^+$	[M1,E2]	0.75 *7*	2	E_γ: From ce data in ^{156}Ho ε decay (1976Gr20). I_γ: From 2002Ca49, ^{156}Ho ε decay. Value from (α,4nγ) is 515.

Adopted Levels, Gammas (continued)

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	$I_{(\gamma+ce)}$[a]	Comments
1168.47	4^+	277.96 *18*	7.9 *8*	890.50	2^+	E2	0.0816		E_γ: From ^{156}Ho ε decay. Value from (p,4nγ) is 279.22 *21*. I_γ: From ^{156}Ho ε decay. Value from (p,4nγ) is ≤415. Mult.: From α(K)exp=0.062 (1976Gr20), ^{156}Ho ε decay.
		397.9 *2*	2.3 *6*	770.44	6^+	[E2]	0.0281		I_γ: Value from (α,4nγ) is 370.
		764.12 *13*	100 *6*	404.19	4^+	E0+E2,M1	0.0095		Mult.: Based on α(K)exp=0.0072 (1976Gr20), ^{156}Ho ε decay. Value from (p,4nγ) is 0.0082 *12* (1977De28). α: Computed from α(K)exp=0.0080 and α/α(K).
		1030.7 *2*	86 *4*	137.77	2^+	E2	0.00286		Mult.: Based on α(K)exp=0.0024 (1976Gr20), ^{156}Ho ε decay. and 0.0023 *4* (1977De28), (p,4nγ).
1215.61	8^+	445.23 *17*	100	770.44	6^+	E2	0.0206		B(E2)(W.u.)=281 *8* Mult.: From α(K)exp=0.0165 *17* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
1293.2	1^-	1154.4 *3*	100	137.77	2^+	E1			Mult.: From $\gamma(\theta)$ in (p,4nγ) (1976El13), mult=D. From assigned configuration, mult=E1 is expected.
1335.56	5^+	167.0	<4	1168.47	4^+	[M1,E2]	0.50 *7*	14	E_γ: From ce data (1976Gr20), ^{156}Ho ε decay. I_γ: From 2002Ca49, ^{156}Ho ε decay.
		313.4 *2*	9.2 *7*	1022.08	3^+	E2	0.0565		I_γ: From ^{156}Ho ε decay; value from (α,4nγ) is ≤73. Mult.: From α(K)exp=0.044 (1976Gr20), ^{156}Ho ε decay, and $\gamma(\theta)$ (1988Ri09), (HI,xnγ).
		565.07 *17*	16.0 *8*	770.44	6^+	E2(+M1)	0.016 *6*		I_γ: From ^{156}Ho ε decay. Mult.: From α(K)exp=0.012 (1976Gr20), ^{156}Ho ε decay, and 0.0090 *22* (1977De28), (p,4nγ).
		931.35 *16*	100 *6*	404.19	4^+	E2	0.00353		Mult.: From: α(K)exp=0.0029 (1976Gr20), ^{156}Ho ε decay; 0.0034 *5* (1977De28), (p,4nγ); and $\gamma(\theta)$ (1988Ri09), (HI,xnγ).
1368.36	3^-	964.36 *18*	29 *2*	404.19	4^+	E1	0.00134		Mult.: From α(K)exp=0.0012 (1976Gr20), ^{156}Ho ε decay.
		1230.72 *14*	100 *10*	137.77	2^+	E1	8.92×10^{-4}		Mult.: From α(K)exp=0.00071 (1976Gr20), ^{156}Ho ε decay, and 0.00072 *14* (1977De28), (p,4nγ).
1382.31	2^+	360.7[e] *12*	39 *14*	1022.08	3^+				
		491.6 *3*	82 *21*	890.50	2^+				
		553.7 *2*	100 *11*	828.64	2^+	M1	0.0229		α(K)=0.020; α(L)=0.003 Mult.: Assigned to a 554.03 γ by 1976Gr20, previously placed from a 3071.7 level. If this association is correct, then $J^\pi=2^+$ uniquely for the 1382.3 level.
		706.74 *16*	50 *7*	675.60	0^+				
1437.28	6^+	348.96 *14*	73 *4*	1088.28	4^+	E2	0.0410		B(E2)(W.u.)=209 *21* Mult.: From α(K)exp=0.041 (1976Gr20), ^{156}Ho ε decay, and $\gamma(\theta)$ (1988Ri09), (HI,xnγ).
		666.88 *15*	100 *5*	770.44	6^+	E0+E2	0.048		B(E2)(W.u.)=11.2 *11* B(E2)(W.u.): Calculated assuming a pure E2 mult. Mult.: From α(K)exp=0.058 (1976Gr20), ^{156}Ho ε decay, and 0.0344 *21* (1977De28), (p,4nγ). α: Computed from α(K)exp=0.040 and α/α(K).

$^{156}_{66}Dy_{90}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{156}\mathrm{Dy})$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
1437.28	6^+	1033.2 *3*	34 *7*	404.19	4^+	E2[&]	0.00284	B(E2)(W.u.)=0.43 *10* I_γ: From ^{156}Ho ε decay. 2006Mo22 report Iγ=14 *4*.
1447.38	(2^+)	1310.9 *8*	100	137.77	2^+			
1476.10	$(3)^-$	585.6 *2*	32 *6*	890.50	2^+	E1		Mult.: From ce data in ^{156}Ho ε decay. (See the comment there.).
		1338.31 *17*	100 *10*	137.77	2^+			
1514.94	2^+	624.4 *3*	21 *9*	890.50	2^+			
		839.3 *2*	37 *4*	675.60	0^+			
		1111.2 *6*	100 *25*	404.19	4^+			
1525.17	6^+	190	<13	1335.56	5^+			
		356.5[c] *3*	30 *3*	1168.47	4^+			
		437[c]	<7	1088.28	4^+			
		754.9[c] *2*	100 *6*	770.44	6^+			Mult.: Suggested to be E0+E2 from α(K)exp=0.0120 *22* (1977De28), (p,4nγ). However, uncertainty in split of the intensity between the two placements casts doubt on this. Note also that an E0 component in a ΔJ=0 transition between a member of a γ-vibrational band and a member of a g.s. band is not expected. However, such a component is apparently observed in the deexcitation of the 2^+ bandhead, suggesting that this band may be more than simply a γ band.
		1121[c]	<149	404.19	4^+	E2[&]		
1526.28	5^-	357[c]	<3	1168.47	4^+			
		437.6[ce] *6*	1.0 *7*	1088.28	4^+			
		755[c]	<7	770.44	6^+			I_γ: From ^{156}Ho ε decay; value from (α,4nγ) is 75, but it is doubly placed. Mult.: Assigned E1 in ^{156}Ho ε decay and in (p,4nγ), but γ may be a doublet.
		1121.8[c] *2*	100 *10*	404.19	4^+			I_γ: From ^{156}Ho ε decay. Mult.: Assigned E1 in ^{156}Ho ε decay and in (p,4nγ), but γ may be a doublet.
1609.33	$(3)^-$	1205.2 *2*	51 *4*	404.19	4^+	E1		Mult.: From α(K)exp=0.00062 in ^{156}Ho ε decay (1976Gr20).
		1471.5 *2*	100 *12*	137.77	2^+			
		1609.1 *6*	5.6 *12*	0	0^+	[E3]		
1624.64		456.2 *8*	9 *3*	1168.47	4^+			
		796.03 *15*	100 *6*	828.64	2^+			
		1486.4 *7*	55 *16*	137.77	2^+			
1627.42	$(4)^+$	458.9 *4*	3.6 *11*	1168.47	4^+			
		605.3 *3*	6.4 *13*	1022.08	3^+	E2	0.00937	Mult.: From α(K)exp=0.0085 (1976Gr20), ^{156}Ho ε decay.
		1223.36 *18*	100 *7*	404.19	4^+	E2,M1	0.0027 *7*	Mult.: From α(K)exp=0.0022 *18* in (p,4nγ) (1977De28).
1677.15	4^+	588.88 *14*	100 *3*	1088.28	4^+			
		654.9 *4*	63 *17*	1022.08	3^+			
		786.1[e] *5*	19 *6*	890.50	2^+			
		848.2 *5*	23 *10*	828.64	2^+			
		907.2 *4*	29 *4*	770.44	6^+	E2	0.00373	Mult.: From α(K)exp=0.0034 (1976Gr20), ^{156}Ho ε decay.
		1272.8 *3*	62 *15*	404.19	4^+			
1679.9		851.0[e] *12*	9 *5*	828.64	2^+			
		1542.1 *8*	100 *20*	137.77	2^+			
1725.02	10^+	509.35 *6*	100	1215.61	8^+	E2	0.01444	B(E2)(W.u.)=3.1×10^2 *3*

$^{156}_{66}\mathrm{Dy}_{90}$-12

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
								Mult.: From α(K)exp=0.0112 *11* in (p,4nγ) (1977De28), and γ(θ) in (HI,xnγ) (1988Ri09).
1728.79	7+	393.57 *19*	52 *8*	1335.56	5+	(E2)	0.0290	Iγ: In ^{148}Nd(^{12}C,4nγ), this γ is reported to be≈2.2 times as strong as the other γ (958.4 keV) deexciting this level (1988Ri09). Mult.: From α(K)exp=0.0028 *4* in (p,4nγ) (1977De28), but line is mixed, and γ(θ) in (HI,xnγ) (1988Ri09).
		958.40 *18*	100 *10*	770.44	6+	E2	0.00333	Mult.: From α(K)exp=0.0030 *8* in (p,4nγ) (1977De28) and γ(θ) in (HI,xnγ) (1988Ri09).
1772.4	(3−)	1634.6 *10*	100	137.77	2+			
1794.55	4+	1024.6 *6*	6 *2*	770.44	6+			
		1390.33 *17*	100 *6*	404.19	4+			
1809.97	7−	593.29 *26*	14 *4*	1215.61	8+			
		1039.88 *25*	100 *15*	770.44	6+	E1		Mult.: From α(K)exp=0.0006 *5* in (p,4nγ) (1977De28) and γ(θ) in (HI,xnγ) (1988Ri09).
1840.07	(4)+	671.2 *2*	25 *6*	1168.47	4+	M1+E2	0.011 *4*	α(K)=0.009 *3*; α(L)=0.001
		818.1 *2*	37 *8*	1022.08	3+	M1		
		949.60 *16*	100 *7*	890.50	2+			
		1011.7 *2*	14 *4*	828.64	2+			
		1435.7 *5*	66 *13*	404.19	4+			
1857.84		688.9[e] *5*	6 *4*	1168.47	4+			
		1087.40 *16*	24.8 *16*	770.44	6+			
		1453.65 *15*	100 *12*	404.19	4+			
1858.64	8+	421.25 *13*	100[#] *4*	1437.28	6+	E2	0.0240	B(E2)(W.u.)=310 *24* Mult.: From α(K)exp=0.020 *4* in (p,4nγ) (1977De28) and γ(θ) in (HI,xnγ) (1988Ri09).
		642.48 *40*	21[#] *3*	1215.61	8+	E2+E0	0.049	B(E2)(W.u.)=8.0 *10* B(E2)(W.u.): Calculated assuming a pure E2 mult. Iγ: From (α,4nγ), value is 65 *10*. Mult.: From α(K)exp=0.041 *6* in (α,4nγ) (1977De28) and γ(θ) in (HI,xnγ) (1988Ri09). α: Computed from α(K)exp=0.041 and α/α(K). Additional information 6.
		1089.3 *2*	7.6[#] *17*	770.44	6+	E2[&]	0.00255	B(E2)(W.u.)=0.20 *5* Iγ: From ^{148}Nd(^{12}C,4nγ), Iγ=8 *2*.
1878.6	(2)+	988.7[e] *5*	25 *5*	890.50	2+	E2	0.00312	Mult.: From α(K)exp=0.0031 in ^{156}Ho ε decay (1976Gr20).
		1049.6[e] *15*	21 *9*	828.64	2+	M1	0.00472	Mult.: From α(K)exp=0.0050 in ^{156}Ho ε decay (1976Gr20).
		1474.2 *4*	100 *25*	404.19	4+			
		1741.5 *7*	64 *16*	137.77	2+			
1898.64	6−	271.10 *21*	≤18	1627.42	(4)+			Eγ: From (p,4nγ). Iγ: From 2002Ca49, ^{156}Ho ε decay. From (p,4nγ), Iγ≤88.
		562.6 *5*	13 *6*	1335.56	5+			Eγ,Iγ: From ^{156}Ho ε decay.
		1128.2 *4*	100 *6*	770.44	6+			Eγ: From (p,4nγ).

$^{156}_{66}Dy_{90}$-13

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
								I_γ: From 2002Ca49, ^{156}Ho ε decay. From (p,4nγ), Iγ=100 *25*. Mult.: Assigned as M1 from α(K)exp=0.0040 *14* in (p,4nγ), E2 from α(K)exp=0.0024 in ^{156}Ho ε decay, and (E1) from $\gamma(\theta)$.
1930.1	(3$^-$)	1526.1 *6*	100 *25*	404.19	4$^+$			
		1791.9 *9*	78 *28*	137.77	2$^+$			
1933.60	+	845.3 *3*	7.2 *13*	1088.28	4$^+$			
		911.5 *6*	10 *3*	1022.08	3$^+$	E2	0.00370	Mult.: From α(K)exp=0.0025 for a 912.54 γ in ^{156}Ho ε decay (1976Gr20).
		1529.4 *2*	100 *9*	404.19	4$^+$			
1942.9	+	854.6 *3*	100 *15*	1088.28	4$^+$	E2	0.00425	Mult.: From α(K)exp=0.0048 for an 855.65 γ in ^{156}Ho ε decay (1976Gr20).
		1172.5[e] *16*	59 *19*	770.44	6$^+$			
		1538.0[e] *12*	121 *38*	404.19	4$^+$			
1949.99	(3$^-$)	1545.8 *2*	100 *6*	404.19	4$^+$			
1958.64	8$^+$	432.64[d] *18*	100[d] *9*	1525.17	6$^+$	E2	0.0223	Mult.: From α(K)exp=0.019 *3* (1977De28), in (p,4nγ). γ is doubly placed.
		520.1[d] *3*	14[d] *9*	1437.28	6$^+$			
		741.7 *4*	15 *7*	1215.61	8$^+$	E2+E0	0.011	Mult.: From α(K)exp=0.009 *4* (1977De28), (p,4nγ). α: Computed from α(K)exp=0.009 and α/α(K). Additional information 7.
		1186.7 *7*		770.44	6$^+$			
2002.9	4$^+$	914.6 *3*	56 *20*	1088.28	4$^+$			
		1174.5 *8*	88 *32*	828.64	2$^+$			
		1598.7 *5*	100 *28*	404.19	4$^+$			
2058.49		722.3 *7*	41 *13*	1335.56	5$^+$			
		890.2 *4*	84 *31*	1168.47	4$^+$			
		970.4[e] *18*	19 *13*	1088.28	4$^+$			
		1036.4 *2*	100 *19*	1022.08	3$^+$			
2085.14		1314.7 *2*	100	770.44	6$^+$			
2089.81	2$^+$	921.2 *3*	60 *14*	1168.47	4$^+$	[E2]	0.00361	Mult.: From α(K)exp=0.005 in ^{156}Ho ε decay (1976Gr20), mult=M1. J^π assignments require E2.
		1001.7 *3*	100 *14*	1088.28	4$^+$	[E2]	0.00303	Mult.: From α(K)exp=0.0007 in ^{156}Ho ε decay (1976Gr20), mult=E1, but placement requires E2.
		1952.3 *9*	56 *23*	137.77	2$^+$			
		2089.1 *10*	72 *30*	0	0$^+$	[E2]		
2103.38	(4$^+$)	767.8 *4*	25 *6*	1335.56	5$^+$			
		935.0 *4*	30 *9*	1168.47	4$^+$			
		1081.2 *4*	100 *8*	1022.08	3$^+$			
2164.3		1393.9[e] *7*	29 *12*	770.44	6$^+$			
		1760.1 *4*	100 *29*	404.19	4$^+$			
2183.7		1095.9[e] *5*	48 *29*	1088.28	4$^+$			
		1293.0[e] *5*	67 *38*	890.50	2$^+$			
		1355.1 *4*	100 *23*	828.64	2$^+$			
2186.58	9$^-$	970.69 *22*	100	1215.61	8$^+$	E1	0.00132	Mult.: From α(K)exp=0.0008 *8* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).

$^{156}_{66}$Dy$_{90}$-14

γ(^{156}Dy) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$	Mult.[@]	α[b]	Comments
2191.62	9$^+$	233.41 *18*	66 *16*	1958.64	8$^+$			
		332.6[e] *4*	91 *22*	1858.64	8$^+$			
		462.16 *21*	100 *19*	1728.79	7$^+$	E2	0.0187	Mult.: From α(K)exp=0.015 *4* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
		467.57 *25*	91 *19*	1725.02	10$^+$	E2	0.0181	Mult.: From α(K)exp=0.018 *5* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
		975.8[d] *3*	122[d] *25*	1215.61	8$^+$	(E2)	0.00320	I$_\gamma$: From ^{148}Nd(^{12}C,4nγ), Iγ(975.2γ)/Iγ(462.4γ)=0.76. Mult.: From α(K)exp=0.025 *11* in (p,4nγ) (1977De28), but γ is doubly placed. E2,M1 from $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
2193.6	4$^+$	858.0 *3*	100 *15*	1335.56	5$^+$	M1	0.00770	Mult.: From α(K)exp=0.0079 in ^{156}Ho ε decay (1976Gr20).
		1423.3 *6*	47 *18*	770.44	6$^+$			
2199.68		723.5 *4*	33 *10*	1476.10	(3)$^-$			
		863.3 *10*	24 *10*	1335.56	5$^+$			
		1031.8 *8*	26 *7*	1168.47	4$^+$			
		1177.6 *2*	69 *12*	1022.08	3$^+$	E2	0.00219	Mult.: From α(K)exp=0.0016 in ^{156}Ho ε decay (1976Gr20).
		1795.6 *5*	100 *36*	404.19	4$^+$			
2207.4		871.6 *5*	82 *23*	1335.56	5$^+$			
		1185.6 *5*	100 *18*	1022.08	3$^+$			
2220.4		1450.0 *3*	100 *27*	770.44	6$^+$			
2228.9		1824.7 *5*	100 *14*	404.19	4$^+$			
2230.9		1460.5 *3*	100 *18*	770.44	6$^+$			
2244.64	(3$^-$)	620.1 *8*	7 *2*	1624.64				
		1076.2 *5*	28 *5*	1168.47	4$^+$	E1	0.00109	Mult.: From α(K)exp=0.00094 in ^{156}Ho ε decay (1976Gr20).
		1156.4 *3*	21 *5*	1088.28	4$^+$			
		1222.8 *3*	25 *5*	1022.08	3$^+$			
		1354.1 *2*	27 *3*	890.50	2$^+$			
		1415.9 *2*	100 *6*	828.64	2$^+$			
		1840.5[e] *8*	15 *6*	404.19	4$^+$			
2261.62	8$^-$	362.83 *9*	80 *12*	1898.64	6$^-$	E2	0.0366	I$_\gamma$: From Iγ(362γ)/Iγ(1046γ) in ^{148}Nd(^{12}C,4nγ). From (p,4nγ), this ratio is 80 *13*. Mult.: From $\gamma(\theta)$ in (HI,xnγ) (1988Ri09). Assigned E1 or E2 from α(K)exp=0.006 *4* in (p,4nγ).
		451.7 *2*	<15	1809.97	7$^-$			E$_\gamma$: From (HI,xnγ). I$_\gamma$: From ^{148}Nd(^{12}C,4nγ).
		1046.3 *4*	100 *19*	1215.61	8$^+$	[E1]	0.00115	Mult.: From α(K)exp=0.0031 *12* (1977De28), (p,4nγ), mult=E2,M1. Other: assigned as (E1) from $\gamma(\theta)$ in (HI,xnγ) (1988Ri09). Placement requires E1.
2264.3		1094.8[e] *10*	19 *6*	1168.47	4$^+$			
		1241.2[e] *6*	19 *7*	1022.08	3$^+$			
		1860.1 *5*	100 *16*	404.19	4$^+$			
2270.0		1499.6 *3*	100 *15*	770.44	6$^+$			
2285.88	12$^+$	560.75 *10*	100	1725.02	10$^+$	E2	0.01131	B(E2)(W.u.)=3.3×10^2 *4* Mult.: From α(K)exp=0.0104 *16* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).

$^{156}_{66}Dy_{90}$-15

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
2293.4		1523.0 *3*	100 *16*	770.44	6^+			
		1888.8[e] *15*	71 *26*	404.19	4^+			
2300.1		1278.0 *3*	100 *27*	1022.08	3^+			
2307.44	4^+	680.6 *5*	<11	1627.42	$(4)^+$	E2+M1	0.010 *4*	Mult.: From α(K)exp=0.0084 (1976Gr20), ^{156}Ho ε decay.
		939.2 *1*	18 *7*	1368.36	3^-			
		1139.0 *6*	35 *10*	1168.47	4^+			
		1218.8 *9*	42 *10*	1088.28	4^+			
		1285.4 *4*	20 *8*	1022.08	3^+			
		1416.8 *2*	100 *11*	890.50	2^+	[E2]	0.00157	
		1478.7 *2*	30 *3*	828.64	2^+	[E2]	0.00147	
		1536.0 *4*	53 *9*	770.44	6^+	[E2]	0.00139	
		1902.5 *5*	46 *11*	404.19	4^+			
		2169.8 *6*	34 *4*	137.77	2^+	[E2]		
2315.59	10^+	456.86 *12*	100[#] *4*	1858.64	8^+	E2	0.0192	B(E2)(W.u.)=3.0×10^2 *3* Mult.: From α(K)exp=0.020 *4* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
		591.6 *5*	11[#] *2*	1725.02	10^+	E2+E0	0.060	B(E2)(W.u.)=8.9 *18* B(E2)(W.u.): Calculated assuming a pure E2 mult. I_γ: From ^{148}Nd(^{12}C,4nγ), Iγ=7 *1*. From (p,4nγ), Iγ=21 *4*. Mult.: From α(K)exp=0.051 *10* (1977De28), (p,4nγ), and E2,M1 from $\gamma(\theta)$ in (HI,xnγ) (1988Ri09). α: Computed from α(K)exp=0.051 and α/α(K). Additional information 8.
		1100.3	11[#] *2*	1215.61	8^+	E2[&]	0.00250	B(E2)(W.u.)=0.40 *8* I_γ: From ^{148}Nd(^{12}C,4nγ), Iγ=7 *1*. γ not reported in (p,4nγ).
2323.58		955.4 *4*	7.4 *16*	1368.36	3^-			
		1155.3 *2*	49 *3*	1168.47	4^+			
		1235.3 *2*	17 *3*	1088.28	4^+			
		1301.5 *4*	100 *5*	1022.08	3^+			
		1432.8 *2*	39 *4*	890.50	2^+			
		1494.5 *5*	11 *3*	828.64	2^+			
		1919.8 *4*	24 *5*	404.19	4^+			
		2185.6 *6*	12 *4*	137.77	2^+			
2331.7		996.1 *4*	37 *14*	1335.56	5^+			
		1163.1[e] *6*	27 *14*	1168.47	4^+			
		1309.7 *4*	100 *22*	1022.08	3^+			
2342.68		1174.2 *2*	100 *17*	1168.47	4^+			
2345.1	8^-	616.5 *1*		1728.79	7^+			
		1128.1 *2*		1215.61	8^+			
2372.1		1967.9 *3*	35 *9*	404.19	4^+			
		2234.2 *4*	100 *23*	137.77	2^+			
2385.7		1050.0 *5*	44 *12*	1335.56	5^+			

$^{156}_{66}Dy_{90}$-16

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]
2385.7		1217.2 *3*	100 *28*	1168.47	4^+		
		1363.4[e] *7*	32 *12*	1022.08	3^+		
2408.45	$2^+,3,4^+$	304.6[e] *7*	11 *3*	2103.38	(4^+)		
		1040.0 *7*	13 *5*	1368.36	3^-		
		1241.3[e] *12*	16 *7*	1168.47	4^+		
		1320.3 *15*	14 *6*	1088.28	4^+		
		1386.3 *2*	76 *7*	1022.08	3^+		
		1518.7 *3*	28 *8*	890.50	2^+		
		1580.3 *4*	13 *3*	828.64	2^+		
		2003.7[e] *7*	39 *11*	404.19	4^+		
		2271.0 *2*	100 *15*	137.77	2^+		
2408.5	9^-	1192.3 *3*	100	1215.61	8^+	E1[&]	
2419.1		1648.1[e] *7*	45 *14*	770.44	6^+		
		2014.9 *6*	100 *24*	404.19	4^+		
2433.84		908.0[e] *10*	9 *3*	1526.28	5^-		
		1345.6 *3*	9 *2*	1088.28	4^+		
		1663.3 *2*	24 *5*	770.44	6^+		
		2029.70 *18*	100 *7*	404.19	4^+		
2439.16		1351.3[e] *6*	6 *2*	1088.28	4^+		
		1668.7 *2*	19 *4*	770.44	6^+		
		2035.0 *2*	100 *12*	404.19	4^+		
2445.17	$3^+,4^+$	818.7[e] *4*	28 *7*	1627.42	$(4)^+$		
		820.9[e] *6*	12 *3*	1624.64			
		1110.7 *7*	43 *9*	1335.56	5^+		
		1423.0 *2*	100 *13*	1022.08	3^+		
		2307.4 *8*	40 *16*	137.77	2^+		
2448.03	10^+	490.63 *18*	100	1958.64	8^+	E2[&]	0.01502
2489.5		1154.4[e] *5*	29 *12*	1335.56	5^+		
		1467.1 *8*	20 *10*	1022.08	3^+		
		2085.4 *5*	100 *20*	404.19	4^+		
2491.90		1323.2 *4*	19 *6*	1168.47	4^+		
		1469.9 *5*	21 *7*	1022.08	3^+		
		2088.2 *6*	41 *17*	404.19	4^+		
		2354.1 *2*	100 *9*	137.77	2^+		
2517.0		907	<50	1609.33	$(3)^-$		
		1148	60 *25*	1368.36	3^-		
		1348.9 *5*	95 *25*	1168.47	4^+		
		1493.8 *10*	100 *25*	1022.08	3^+		
		1626.8[e] *6*	80 *30*	890.50	2^+		
		1688.2[e] *15*	32 *25*	828.64	2^+		
		1841.9 *9*	<17	675.60	0^+		
2571.7		944.3 *4*	65 *13*	1627.42	$(4)^+$		

$^{156}_{66}Dy_{90}$-17

Adopted Levels, Gammas (continued)

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
2571.7		2168.9[e] *7*	100 *35*	404.19	4^+			
2580.1	10^-	235.0 *2*	52 *14*	2345.1	8^-	E2[&]	0.1392	I_γ: From ^{148}Nd(^{12}C,4nγ).
		388.6 *2*		2191.62	9^+			
		855.4 *2*	100 *10*	1725.02	10^+	(E1)[&]	0.00168	I_γ: From ^{148}Nd(^{12}C,4nγ).
2592.7	9^-	1376.6 *3*	100	1215.61	8^+	(E1)[&]	8.18×10^{-4}	
2594.3		1259.1 *7*	95 *40*	1335.56	5^+			
		1425.9 *4*	100 *25*	1168.47	4^+			
		1572.0 *5*	62 *25*	1022.08	3^+			
2636.55	11^-	449.5 *2*		2186.58	9^-			
		911.8 *4*		1725.02	10^+	E1	0.00149	Mult.: From α(K)exp=0.016 *10* (1977De28), (p,4nγ), and γ(θ) in (HI,xnγ) (1988Ri09).
2642.50		2238.3 *2*	100 *17*	404.19	4^+			
2653.3		1824.7 *6*	63 *16*	828.64	2^+			
		2249[e] *2*	100 *47*	404.19	4^+			
2701.5	10^-	385.1[e] *7*	51 *15*	2315.59	10^+			
		439.96 *8*	≤256	2261.62	8^-	E2	0.0213	I_γ: From ^{148}Nd(^{12}C,4nγ), Iγ(439γ)/Iγ(975γ)=450. Mult.: From γ(θ) in (HI,xnγ) (1988Ri09); E2,M1 from α(K)exp=0.029 *16* in (p,4nγ) (1977De28).
		515.2 *2*		2186.58	9^-			
		977.1[d] *3*	100[d] *21*	1725.02	10^+	(E1)	0.00130	E_γ: From (HI,xnγ). In (p,4nγ), Eγ=975.8 *3*, but γ there is doubly placed. Mult.: From α(K)exp=0.0025 *11* in (p,4nγ), mult=(E2), but γ there is doubly placed (1977De28).
2706.87	12^+	390.9 *1*	100[#] *4*	2315.59	10^+	E2	0.0296	B(E2)(W.u.)=148 *9* E_γ: From 1988Ri09, (HI,xnγ). γ is doublet in (p,4nγ). Mult.: From γ(θ) in (HI,xnγ) (1988Ri09) and α(K)exp(391.14+393.39)=0.028 *4* in (p,4nγ) (1977De28).
		421.0 *4*	61[#] *4*	2285.88	12^+			
		982.2 *2*	21[#] *4*	1725.02	10^+	E2	0.00316	B(E2)(W.u.)=0.31 *6* I_γ: From (p,4nγ) (1977De28), Iγ=43 *8*. From ^{148}Nd(^{12}C,4nγ), Iγ=38 *4*. Mult.: From γ(θ) in (HI,xnγ) (1988Ri09). M1,E2 from α(K)exp=0.0046 *22* in (p,4nγ) (1977De28).
2707.8	10^-	446.1 *1*	100	2261.62	8^-			
2709.4	11^-	300.9 *1*		2408.5	9^-	E2[&]	0.0639	
		983.5 *5*		1725.02	10^+	E1[&]	0.00129	
2712.37	11^+	426.67 *20*	46 *11*	2285.88	12^+			
		520.1[d] *3*	58[d] *14*	2191.62	9^+	E2	0.01369	Mult.: From α(K)exp=0.010 *3* in (p,4nγ) (1977De28) and γ(θ) in (HI,xnγ) (1988Ri09).
		988.3 *4*	100 *4*	1725.02	10^+			
2757.8		1735.7 *5*	100 *28*	1022.08	3^+			
2787.4	8^+	1062.5	12 *3*	1725.02	10^+			
		1572.4	100 *6*	1215.61	8^+			

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
2787.4	8+	2016.7	33 *4*	770.44	6+			
2788.1		1572.5 *8*	100 *25*	1215.61	8+			
2810.4		2039.9[e] *10*	29 *11*	770.44	6+			
		2406.2 *7*	100 *29*	404.19	4+			
2818.35	4+,5−	884.3 *8*	7 *3*	1933.60	+			
		919.7 *15*	8 *3*	1898.64	6−			
		960.6 *3*	43 *4*	1857.84		E1		
		1191.1 *5*	27 *4*	1627.42	(4)+			
		1292.3 *3*	54 *7*	1526.28	5−			
		1293.4 *15*	17 *3*	1525.17	6+			
		1380.9 *2*	41 *4*	1437.28	6+			
		1450.0[e] *8*	9 *4*	1368.36	3−			
		1482.7 *2*	19 *3*	1335.56	5+			
		1649.7 *2*	86 *7*	1168.47	4+			
		1730.1 *2*	36 *4*	1088.28	4+			
		1796	<8	1022.08	3+			
		1990	<4	828.64	2+			
		2048.0 *2*	12 *4*	770.44	6+			
		2414.2 *2*	100 *11*	404.19	4+			
2823.38		965.3 *8*	3.0 *15*	1857.84				
		1297.3 *2*	10 *2*	1526.28	5−			
		1654.0[e] *11*	4.2 *18*	1168.47	4+			
		1932	<3	890.50	2+			
		1994	<2	828.64	2+			
		2052.8 *2*	21 *3*	770.44	6+			
		2419.2 *2*	100 *9*	404.19	4+			
2833.7		2063.2 *4*	37 *6*	770.44	6+			
		2429.5 *7*	100 *14*	404.19	4+			
2847.5	11−	146.1 *1*	84 *4*	2701.5	10−	E2,M1[&]	0.75 *7*	
		254.8 *1*	100 *8*	2592.7	9−	E2[&]	0.1074	
		1122.0 *5*	<35	1725.02	10+			
2887.82	14+	601.83 *13*	100	2285.88	12+	E2	0.00950	B(E2)(W.u.)=2.5×10^2 *3* Mult.: From α(K)exp=0.0085 *8* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
2895.0		1872.9 *4*	100 *24*	1022.08	3+			
		2004.2[e] *9*	48 *19*	890.50	2+			
		2490.7 *6*	100 *33*	404.19	4+			
2941.9	12−	361.7 *1*	100	2580.1	10−			
2981.5		2577.3 *13*	100 *21*	404.19	4+			
2997.23?	12+	549.32 *25*	100	2448.03	10+	E2	0.01191	Mult.: From α(K)exp=0.0087 *24* in (p,4nγ) (1977De28).
3021.2	12−	173.7 *1*	100 *5*	2847.5	11−	E2,M1[&]	0.44 *7*	
		319.6 *1*	89 *5*	2701.5	10−	E2[&]	0.0532	

$^{156}_{66}$Dy$_{90}$-19

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
3065.88	14^+	178.7 *5*		2887.82	14^+			
		359.09 *15*	100[#] *4*	2706.87	12^+	E2	0.0377	B(E2)(W.u.)=231 *15* Mult.: From α(K)exp=0.026 *5* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
		780.0 *2*	6[#] *2*	2285.88	12^+			
3103.6	13^-	393.9 *2*	82 *9*	2709.4	11^-	E2[&]	0.0289	I_γ: From ^{148}Nd(^{12}C,4nγ).
		467.5 *2*	100 *23*	2636.55	11^-	E2[&]	0.0181	I_γ: From ^{148}Nd(^{12}C,4nγ).
		818.0 *2*	96 *18*	2285.88	12^+	E1[&]	0.00183	I_γ: From ^{148}Nd(^{12}C,4nγ).
3154.2	13^-	518.0 *2*		2636.55	11^-			
		867.6 *4*		2285.88	12^+	E1	0.00163	Mult.: From α(K)exp=0.0012 *11* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
3186.8	12^-	479.0 *1*	100	2707.8	10^-			
3221.2	13^-	200.0 *1*	80 *3*	3021.2	12^-			
		373.8 *1*	100 *6*	2847.5	11^-	E2[&]	0.0336	
3273.5	(13^+)	562.3 *3*	100	2712.37	11^+			
3411.6	14^-	469.7 *1*	100	2941.9	12^-	E2[&]	0.0179	
3444.9	14^-	223.8 *1*	60 *3*	3221.2	13^-	E2,M1		
		423.6 *1*	100 *8*	3021.2	12^-	E2[&]	0.0236	
3498.8	16^+	432.64[d] *18*	55[d] *4*	3065.88	14^+	E2[&]	0.0224	B(E2)(W.u.)=188 *19* I_γ: From ^{148}Nd(^{12}C,4nγ). In (p,4nγ), Iγ=116, but γ is doubly placed. Mult.: From α(K)exp=0.019 *3* in (p,4nγ) (1977De28), mult=(E2), but γ is doubly placed.
		611.30 *25*	100 *4*	2887.82	14^+	E2[&]	0.00915	B(E2)(W.u.)=61 *5* I_γ: From ^{148}Nd(^{12}C,4nγ). Mult.: From α(K)exp=0.0082 *25* in (p,4nγ) (1977De28), mult=E2, but γ is doubly placed.
3523.3	16^+	635.5 *1*	100	2887.82	14^+	E2	0.00833	B(E2)(W.u.)=3.4×10^2 *7* E_γ: From 1988Ri09, (HI,xnγ). From (p,4nγ), 1977De28 report Eγ=638.50 *21*. Mult.: From $\gamma(\theta)$ in (HI,xnγ) (1988Ri09) and α(K)exp=0.0066 *11* for the 635γ in (p,4nγ) (1977De28).
3596.4	15^-	492.8 *1*	100	3103.6	13^-	E2[&]	0.01574	
3678.0	14^-	491.2 *2*	100	3186.8	12^-			
3689.9	15^-	244.9 *1*	100 *12*	3444.9	14^-	E2,M1[&]		I_γ: From ^{148}Nd(^{12}C,4nγ).
		468.7 *1*	36 *5*	3221.2	13^-	E2[&]	0.0180	I_γ: From ^{148}Nd(^{12}C,4nγ).
3719.6	$15^{(-)}$	565.4 *2*		3154.2	13^-			
		832.4 *4*		2887.82	14^+	(D)[&]	0.00178	
3861.2?	(15^+)	587.4[e] *2*		3273.5	(13^+)			
3954.0	16^-	264.2 *1*		3689.9	15^-			
		509.1 *1*		3444.9	14^-			
3961.5	16^-	549.9 *1*	100	3411.6	14^-	E2[&]	0.01188	

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
4025.8	18+	527.1 *1*	100	3498.8	16+	E2	0.01322	B(E2)(W.u.)=299 *17* Mult.: From α(K)exp=0.014 *4* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
4157.8	17−	561.4 *1*	100	3596.4	15−	E2[&]	0.01128	
4178.1	18+	654.89 *26*	100	3523.3	16+	E2	0.00776	B(E2)(W.u.)=3.9×10^2 *10* Mult.: From α(K)exp=0.055 *13* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
4210.4	16−	532.4 *2*	100	3678.0	14−	E2[&]		
4236.2	17−	281.8 *2*	44 *3*	3954.0	16−	E2,M1		
		546.4 *1*	100 *5*	3689.9	15−	E2[&]	0.01207	
4331.1	(17−)	611.3 *2*		3719.6	15(−)			
4533.9	18−	297.7 *1*	42 *12*	4236.2	17−	E2,M1		
		579.9 *1*	100 *4*	3954.0	16−	E2[&]	0.01041	
4562.4	18−	600.9 *1*	100	3961.5	16−			
4635.6	20+	609.8 *1*	100	4025.8	18+	E2[&]	0.00920	B(E2)(W.u.)=272 *23*
4771.2	19−	613.3 *2*	100	4157.8	17−	E2[&]	0.00907	
4779.2	18−	568.8 *2*	100	4210.4	16−	E2[&]	0.01092	
4845.9	19−	312.2 *2*		4533.9	18−			
		609.6 *1*		4236.2	17−	E2[&]	0.00921	
4859.0	20+	680.8 *1*	100	4178.1	18+	E2	0.00708	B(E2)(W.u.)=3.2×10^2 *8* Mult.: From α(K)exp=0.0050 *26* (1977De28), (p,4nγ), and $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).
4978.8	(19−)	647.7 *6*		4331.1	(17−)			
5170.8	20−	324.7 *1*		4845.9	19−	E2,M1		
		637.0 *1*		4533.9	18−	E2[&]	0.00828	
5199.9	20−	637.4 *1*	100	4562.4	18−	E2[&]	0.00827	
5320.2	22+	684.6 *1*	100	4635.6	20+	E2[&]	0.00699	B(E2)(W.u.)=242 *24*
5381.9	20−	602.7 *2*	100	4779.2	18−			
5428.2	21−	657.0 *1*	100	4771.2	19−	E2[&]	0.00770	
5507.3	21−	336.4 *1*	30 *4*	5170.8	20−			
		661.5 *1*	100 *4*	4845.9	19−	E2[&]	0.00757	
5573.0	22+	714.0 *1*	100	4859.0	20+	E2[&]	0.00634	B(E2)(W.u.)=2.9×10^2 *5*
5855.3	22−	347.9 *1*		5507.3	21−			
		684.6 *1*		5170.8	20−			
5873.4	22−	673.5 *1*	100	5199.9	20−	E2[&]	0.00726	
6036.3	22−	654.4 *1*	100	5381.9	20−			
6070.1	24+	749.9 *1*	100	5320.2	22+	E2[&]	0.00567	B(E2)(W.u.)=2.7×10^2 *3*
6129.3	23−	701.1 *1*	100	5428.2	21−	E2[&]	0.00661	
6213.8	23−	358.6 *3*		5855.3	22−			

$^{156}_{66}Dy_{90}$-21

Adopted Levels, Gammas (continued)

γ(^{156}Dy) (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[‡]	E_f	J^{π}_f	Mult.[@]	α[b]	Comments
6213.8	23⁻	706.5 *1*		5507.3	21⁻	E2[&]	0.00650	
6328.7	24⁺	755.7 *1*	100	5573.0	22⁺	E2[&]	0.00557	B(E2)(W.u.)=3.0×10^2 *6*
6582.5	24⁻	727.2 *1*	100	5855.3	22⁻			
6589.7	24⁻	716.3 *1*	100	5873.4	22⁻			
6753.7	24⁻	717.4 *2*	100	6036.3	22⁻			
6876.8	25⁻	747.5 *1*	100	6129.3	23⁻	E2[&]	0.00571	
6877.9	26⁺	807.8 *1*	100	6070.1	24⁺	E2[&]	0.00480	B(E2)(W.u.)=2.7×10^2 *5*
6963.9	25⁻	750.1 *1*	100	6213.8	23⁻	E2[&]	0.00567	
7130.3	26⁺	801.6	100	6328.7	24⁺	E2[&]	0.00488	
7349.6	26⁻	760.0 *2*	78 *7*	6589.7	24⁻			
		766.9 *2*	100 *11*	6582.5	24⁻			
7358.7	26⁻	394 *1*		6963.9	25⁻			
		768.7 *2*		6589.7	24⁻			
		776.7 *3*		6582.5	24⁻	E2[&]	0.00524	
7533.4	26⁻	779.7 *3*	100	6753.7	24⁻			
7672.6	27⁻	795.8 *1*	100	6876.8	25⁻	E2[&]	0.00496	
7738.8	28⁺	860.9 *1*	100	6877.9	26⁺	E2[&]	0.00418	B(E2)(W.u.)=2.6×10^2 *4*
7760.3	27⁻	402		7358.7	26⁻			
		796.4 *1*		6963.9	25⁻	E2[&]	0.00496	
7978.5	28⁺	848.2 *1*	100	7130.3	26⁺	E2[&]	0.00432	
8164.5	28⁻	814.9 *1*	100	7349.6	26⁻	E2[&]	0.00471	
8179.7	28⁻	420		7760.3	27⁻			
		821.0 *1*		7358.7	26⁻	E2[&]	0.00463	
8364	28⁻	831	100	7533.4	26⁻			
8517.0	29⁻	844.4 *1*	100	7672.6	27⁻	E2[&]	0.00436	
8605.8	29⁻	426		8179.7	28⁻			
		845.6 *2*		7760.3	27⁻	E2[&]	0.00434	
8650.8	30⁺	912.0 *1*	100	7738.8	28⁺	E2[&]	0.00369	B(E2)(W.u.)=2.4×10^2 *3*
8762	29⁻	842	100	7920.5	27⁻			
8875.9	30⁺	897.4 *1*	100	7978.5	28⁺	E2[&]	0.00382	
9031.9	30⁻	867.5 *1*	100	8164.5	28⁻	E2[&]	0.00411	
9051.5	30⁻	446[e]		8605.8	29⁻			
		871.7 *2*		8179.7	28⁻	E2[&]	0.00407	
9234	30⁻	870	100	8364	28⁻			
9407.4	31⁻	890.4 *1*	100	8517.0	29⁻	E2[&]	0.00389	
9502.2	31⁻	451		9051.5	30⁻			
		896.5 *2*		8605.8	29⁻	E2[&]	0.00383	
9611.3	32⁺	960.5 *1*	100	8650.8	30⁺	E2[&]	0.00331	B(E2)(W.u.)=2.3×10^2 *4*

From ENSDF

$^{156}_{66}Dy_{90}$-22

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
9653	31^-	891	100	8762	29^-			
9692	(31^+)	1041[e]	100	8650.8	30^+			
9825.2	32^+	949.3 *2*	100	8875.9	30^+	E2[&]	0.00339	
9952.3	32^-	920.3 *2*	100	9031.9	30^-	E2[&]	0.00362	
9973.5	32^-	472[e]		9502.2	31^-			
		921.9 *2*		9051.5	30^-	E2[&]	0.00361	
10063	32^+	1187		8875.9	30^+			
10141	32^-	907	100	9234	30^-			
10340.6	33^-	933.2 *1*	100	9407.4	31^-	E2[&]	0.00352	
10449.3	33^-	475		9973.5	32^-			
		947.2 *2*		9502.2	31^-	E2[&]	0.00341	
10592	33^-	939		9653	31^-			
		1185		9407.4	31^-			
10618.0	34^+	1006.7 *1*	100	9611.3	32^+	E2[&]	0.00300	B(E2)(W.u.)=1.8×10^2 *3*
10629	(33^+)	937	100	9692	(31^+)			
10828.1	34^+	1003.1 *5*	100	9825.2	32^+	E2[&]	0.00302	
10925.0	34^-	972.7 *3*	100	9952.3	32^-	E2[&]	0.00322	
10944.6	34^-	496[e]		10449.3	33^-			
		970.9 *4*		9973.5	32^-	E2[&]	0.00324	
10975	34^+	912		10063	32^+			
		1150		9825.2	32^+			
11092	34^-	951	100	10141	32^-			
11313.4	35^-	972.8 *1*	100	10340.6	33^-	E2[&]	0.00322	
11443.5	35^-	499		10944.6	34^-			
		994.3 *2*		10449.3	33^-	E2[&]	0.00308	
11585	35^-	992		10592	33^-			
		1244		10340.6	33^-			
11614	(35^+)	985	100	10629	(33^+)			
11670.6	36^+	1052.6 *2*	100	10618.0	34^+	E2[&]	0.00274	B(E2)(W.u.)=2.2×10^2 *6*
11735	(36^+)	1022[e]	100	10713	(34^+)			
11886.7	36^+	1058.6 *4*	100	10828.1	34^+	E2[&]	0.00271	
11946.2	36^-	1021.2 *4*	100	10925.0	34^-	E2[&]	0.00291	
11957.3	36^-	514[e]		11443.5	35^-			
		1012.6		10944.6	34^-	E2[&]	0.00297	
11986	36^+	1010		10975	34^+			
		1158		10828.1	34^+			
12089	36^-	997	100	11092	34^-			
12326.8	37^-	1013.3 *2*	100	11313.4	35^-	E2[&]	0.00296	
12462	37^-	504[e]		11957.3	36^-			

Adopted Levels, Gammas (continued)

γ(^{156}Dy) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[b]	Comments
12462	37⁻	1019		11443.5	35⁻			
12626	37⁻	1042		11585	35⁻			
		1313		11313.4	35⁻			
12628	(37⁺)	1014	100	11614	(35⁺)			
12769.3	38⁺	1098.7 *2*	100	11670.6	36⁺	E2[&]	0.00251	B(E2)(W.u.)=50 *15*
12818	(38⁺)	1083[e]		11735	(36⁺)			
		1147[e]		11670.6	36⁺			
12959	38⁻	497[e]		12462	37⁻			
		1002		11957.3	36⁻			
		1013		11946.2	36⁻			
12976	38⁺	1089	100	11886.7	36⁺			
13014.0	38⁻	1057		11957.3	36⁻			
		1067.8 *4*		11946.2	36⁻			
13051	38⁺	1065		11986	36⁺			
		1165		11886.7	36⁺			
13140	38⁻	1051	100	12089	36⁻			
13386.8	39⁻	1060.0 *3*	100	12326.8	37⁻	E2[&]	0.00270	
13470	39⁻	511[e]		12959	38⁻			
		1008		12462	37⁻			
13686	(39⁺)	1058	100	12628	(37⁺)			
13711	39⁻	1084		12626	37⁻			
		1384		12326.8	37⁻			
13885.1	40⁺	1115.8 *2*	100	12769.3	38⁺	E2[&]	0.00243	B(E2)(W.u.)=1.3×10^2 *+20−8*
13941	(40⁺)	1123	100	12818	(38⁺)			
		1172[e]		12769.3	38⁺			
13973	40⁻	503[e]		13470	39⁻			
		1014		12959	38⁻			
14021.9	40⁺	1046		12976	38⁺			
		1252.6 *3*		12769.3	38⁺			
14113.9	40⁻	1100.2	100	13014.0	38⁻			
14210	40⁺	1159		13051	38⁺			
		1234		12976	38⁺			
14254	(40⁻)	1114	100	13140	38⁻			
14496.1	41⁻	1109.2 *3*	100	13386.8	39⁻	E2[&]		
14532	41⁻	559[e]		13973	40⁻			
		1062[e]		13470	39⁻			
		1145		13386.8	39⁻			
14797	(41⁻)	1086		13711	39⁻			
		1410		13386.8	39⁻			
14800	(41⁺)	1114	100	13686	(39⁺)			
14994.8	42⁺	973		14021.9	40⁺			
		1109.6		13885.1	40⁺			

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[‡]	E_f	J^{π}_f	Mult.[@]	Comments
15061	42⁻	529		14532	41⁻		
		1088		13973	40⁻		
15152	(42⁺)	1211	100	13941	(40⁺)		
15190	42⁺	1168		14021.9	40⁺		
		1304		13885.1	40⁺		
15229	42⁺	1207		14021.9	40⁺		
		1344		13885.1	40⁺		
15232	42⁻	1118	100	14113.9	40⁻		
15411	(42⁻)	1157	100	14254	(40⁻)		
15447	(42⁺)	1237	100	14210	40⁺		
15635.6	43⁻	1138.8	100	14496.1	41⁻		Additional information 9.
15679	43⁻	1148		14532	41⁻		
		1183		14496.1	41⁻		
15841	43⁻	1345	100	14496.1	41⁻		
15950	(43⁻)	1154[e]		14797	(41⁻)		
		1454		14496.1	41⁻		
15975	(43⁺)	1175	100	14800	(41⁺)		
16171.2	44⁺	983[e]		15190	42⁺		
		1176.4 *3*		14994.8	42⁺	E2[&]	
16210	44⁻	1149	100	15061	42⁻		
16289	44⁺	1060		15229	42⁺		
		1099		15190	42⁺		
16350	44⁻	1119	100	15232	42⁻		
16448	(44⁺)	1296	100	15152	(42⁺)		
16474	(44⁺)	1245	100	15229	42⁺		
16625	(44⁻)	1214	100	15411	(42⁻)		
16717	(44⁺)	1270	100	15447	(42⁺)		
16833.3	45⁻	1196.8	100	15635.6	43⁻		
16869	45⁻	1190		15679	43⁻		
		1233		15635.6	43⁻		
17012	(45⁻)	1171	100	15841	43⁻		
17236	(45⁺)	1261	100	15975	(43⁺)		
17348	46⁺	1177	100	16171.2	44⁺		
17388	46⁻	1038		16350	44⁻		
		1177		16210	44⁻		
17434	46⁺	1145	100	16289	44⁺		
17482	46⁻	1132		16350	44⁻		
		1272		16210	44⁻		
17832	(46⁺)	1384	100	16448	(44⁺)		
17908?	(46⁻)	1283[e]	100	16625	(44⁻)		
18015.7	47⁻	1148		16869	45⁻		
		1181.7		16833.3	45⁻		
18036	(46⁺)	1319	100	16717	(44⁺)		

$^{156}_{66}Dy_{90}$-25

Adopted Levels, Gammas (continued)

$\gamma(^{156}Dy)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f
18152	47^-	1284		16869	45^-	20332.2	51^-	1242.0	100	19090.2	49^-
		1319		16833.3	45^-	20858	(50^+)	1450	100	19408	(48^+)
18303	(47^-)	1291	100	17012	(45^-)	20874	(50^+)	1576	100	19298	(48^+)
18472	48^-	1084	100	17388	46^-	21332	52^+	1369	100	19963	50^+
18600	(47^+)	1364	100	17236	(45^+)	21422	(52^+)	1469	100	19953	50^+
18615	48^+	1267	100	17348	46^+	21512	(51^+)	1510	100	20002	(49^+)
18616	50^-	1228	100	17388	46^-	21763	53^-	1431	100	20332.2	51^-
18651	48^+	1217	100	17434	46^+	22369?	(52^+)	1511[e]	100	20858	(50^+)
18813	48^-	1331	100	17482	46^-	22576?	(52^+)	1702[e]	100	20874	(50^+)
19090.2	49^-	1074.5	100	18015.7	47^-	22799	54^+	1467	100	21332	52^+
19298	(48^+)	1466	100	17832	(46^+)	22998	(54^+)	1576	100	21422	(52^+)
19408	(48^+)	1372	100	18036	(46^+)	23244?	(53^+)	1732[e]	100	21512	(51^+)
19488	49^-	1336	100	18152	47^-	24382?	(54^+)	1806[e]	100	22576?	(52^+)
19652?	(49^-)	1349[e]	100	18303	(47^-)	24430	(56^+)	1631	100	22799	54^+
19953	50^+	1338	100	18615	48^+	24716?	(56^+)	1718[e]	100	22998	(54^+)
19963	50^+	1312	100	18651	48^+	26224	(58^+)	1794	100	24430	(56^+)
20002	(49^+)	1402	100	18600	(47^+)	26640?	(58^+)	1924[e]	100	24716?	(56^+)
20009	52^-	1393	100	18616	50^-	28122?	(60^+)	1898[e]	100	26224	(58^+)
20241?	(50^-)	1428[e]	100	18813	48^-	30241?	(62^+)	2119[e]	100	28122?	(60^+)

† Generally from ^{156}Ho ε decay where such data exist. The values from ^{156}Ho ε decay and the (p,4nγ),(α,4nγ) reactions often differ well outside their uncertainties.

‡ From the ^{156}Ho ε decays where such data exist. Otherwise, the values are from the (α,4nγ) and (HI,xnγ) reactions. 2006Mo22, in (HI,xnγ), report Iγ values for the γ transitions from the 4^+ through 18^+ members of the first excited positive-parity band, including the 4^+ through 10^+ members of the first excited $K^\pi=0^+$ band and the 12^+ through 18^+ members of the aligned two-neutron-quasiparticle band (AB) above the band crossing. Where adopted, these are pointed out. The significant differences between the experiments, of which there are many between the ^{156}Ho ε decay (56 min) and the other studies, are noted.

From 2006Mo22, (HI,xnγ).

@ From ce data from the ^{156}Ho ε decay (56 min) (1976Gr20), the (p,4nγ) (α,4nγ) studies (1977De28), and the $\gamma(\theta)$ measurements in the (HI,xnγ) study (1988Ri09). In the ^{156}Ho ε decay data, where a reasonable association of a γ from 2002Ca49 (where ce data are not measured) can be made with one from 1976Gr20, the evaluator has assigned the multipolarity from 1976Gr20 to that γ. In the (HI,xnγ) data, stretched quadrupole transitions are taken to be E2 rather than M2. For levels seen only in (HI,xnγ) for which no comments are shown regarding the multipolarities, it is to be noted that they are from $\gamma(\theta)$ data and that M1/E2 is chosen over E1/M2 primarily on the basis of parity considerations. In the (p,4nγ) and (α,4nγ) studies, the normalization of the electron and γ intensities was done using α(K)exp=0.0165±0.0017 for the 445.36-keV E2 transition (1977De28). In the ^{156}Ho ε decay, this normalization was presumably done using the established (1976Gr20) E2 multipolarities of the 137.8-, 266.5-, and 366.4-keV transitions.

& From $\gamma(\theta)$ in (HI,xnγ) (1988Ri09).

^{a} From ce data from ^{156}Ho ε decay (56-min) (1976Gr20).

^{b} 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.

$^{156}_{66}Dy_{90}$-26

$\gamma(^{156}Dy)$ (continued)

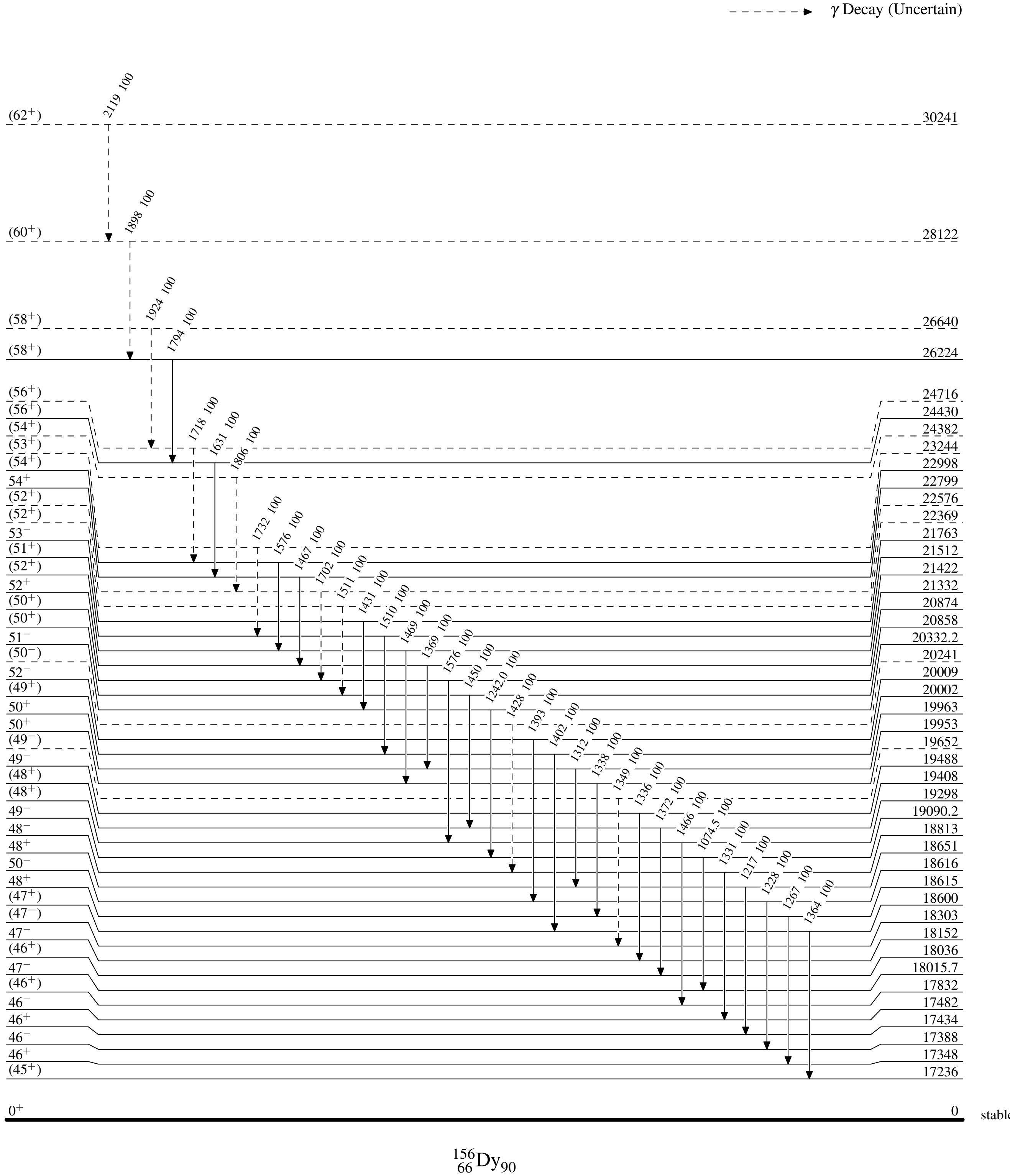
[c] Multiply placed.
[d] Multiply placed with undivided intensity.
[e] Placement of transition in the level scheme is uncertain.

$^{156}_{66}Dy_{90}$-27

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



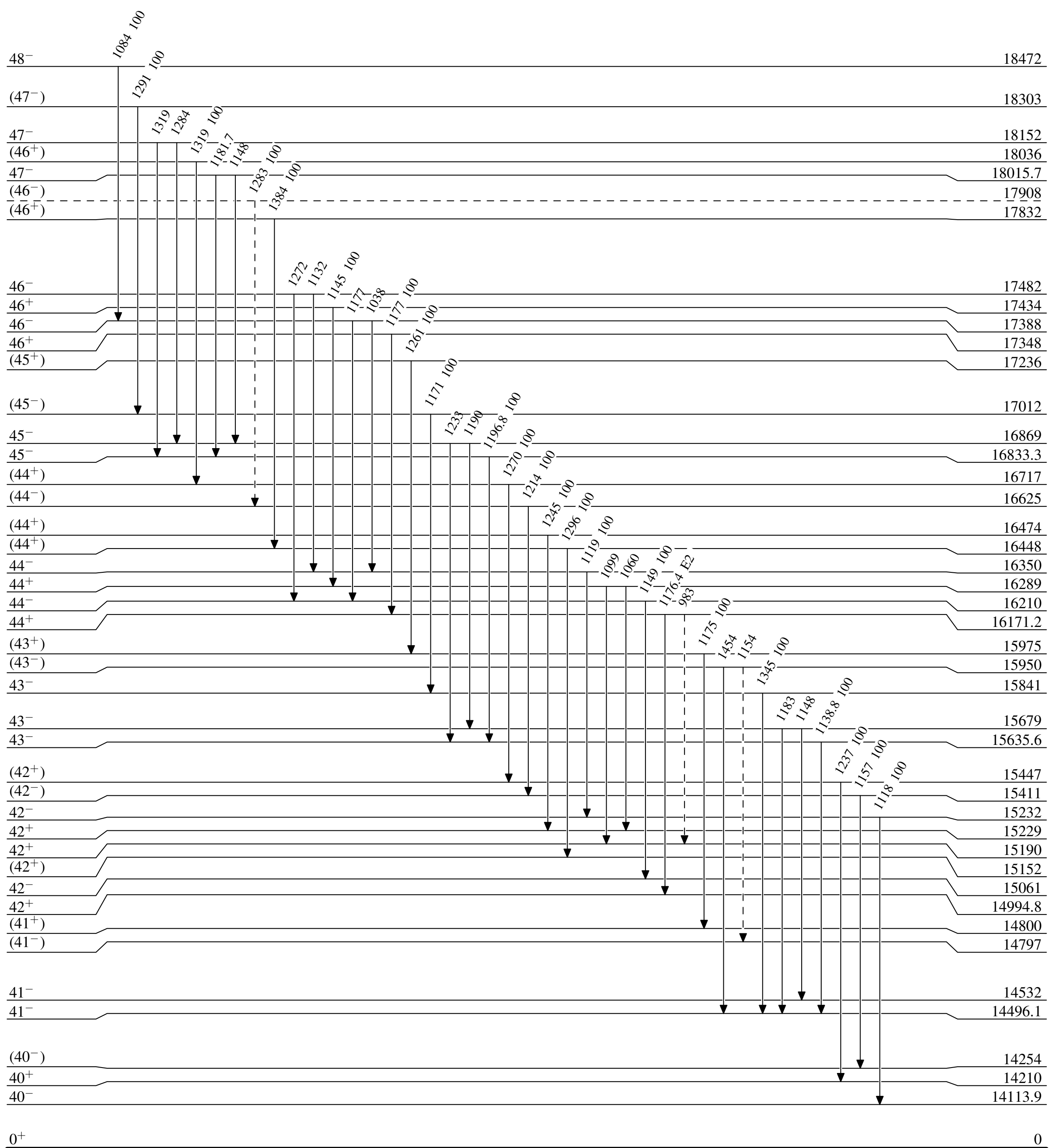
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{156}_{66}Dy_{90}$

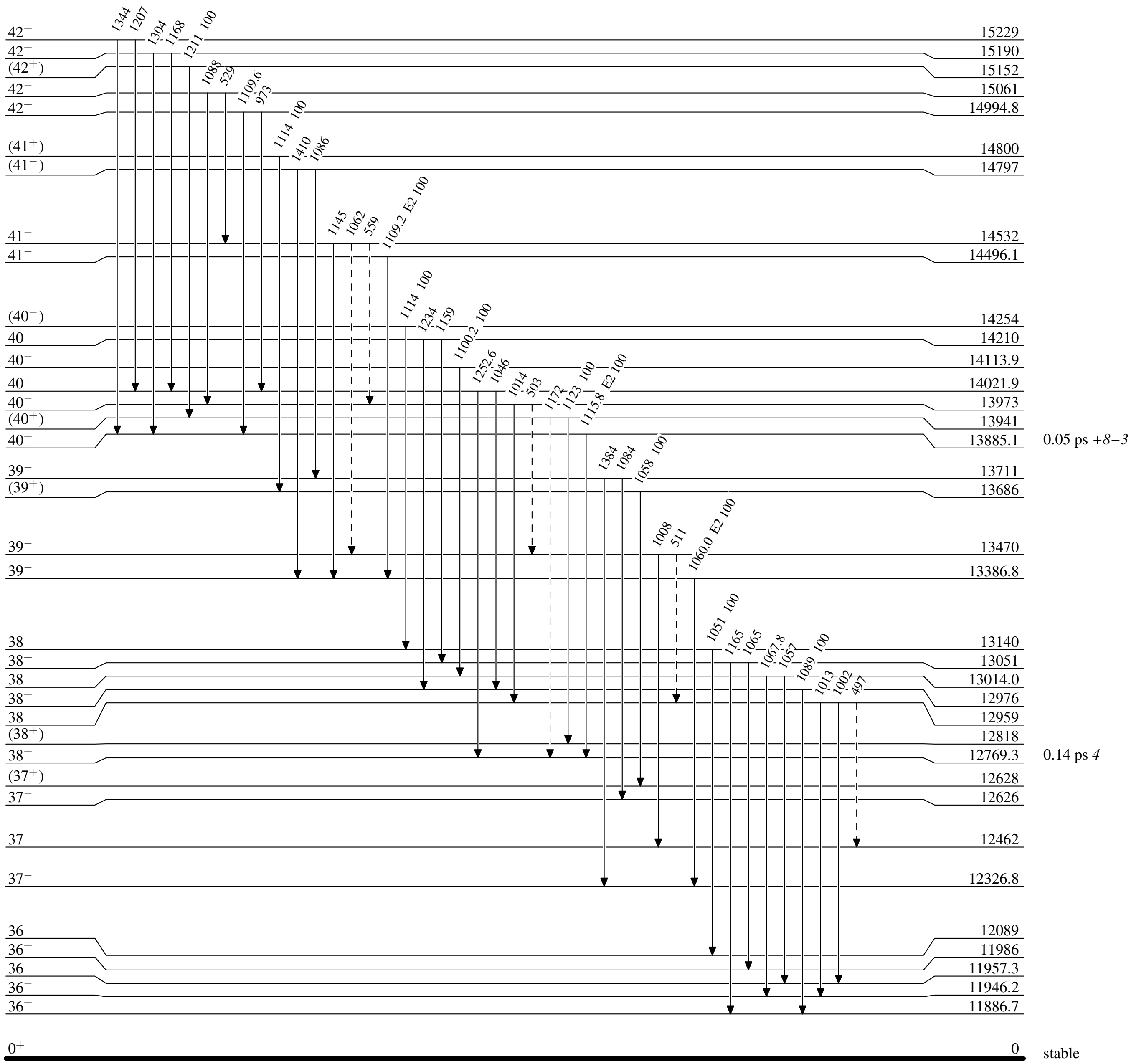
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - -► γ Decay (Uncertain)



$^{156}_{66}Dy_{90}$

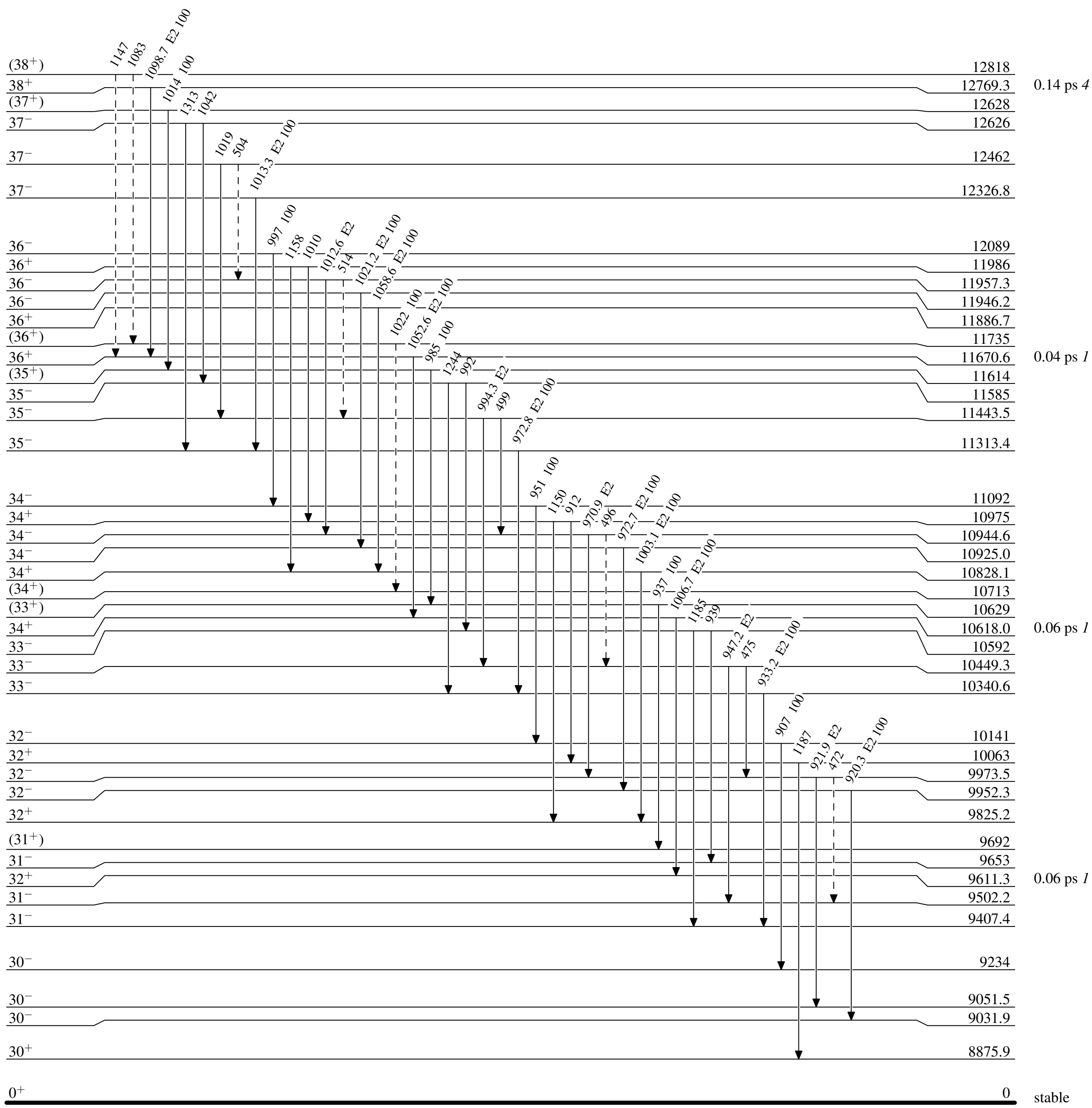
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



$^{156}_{66}Dy_{90}$

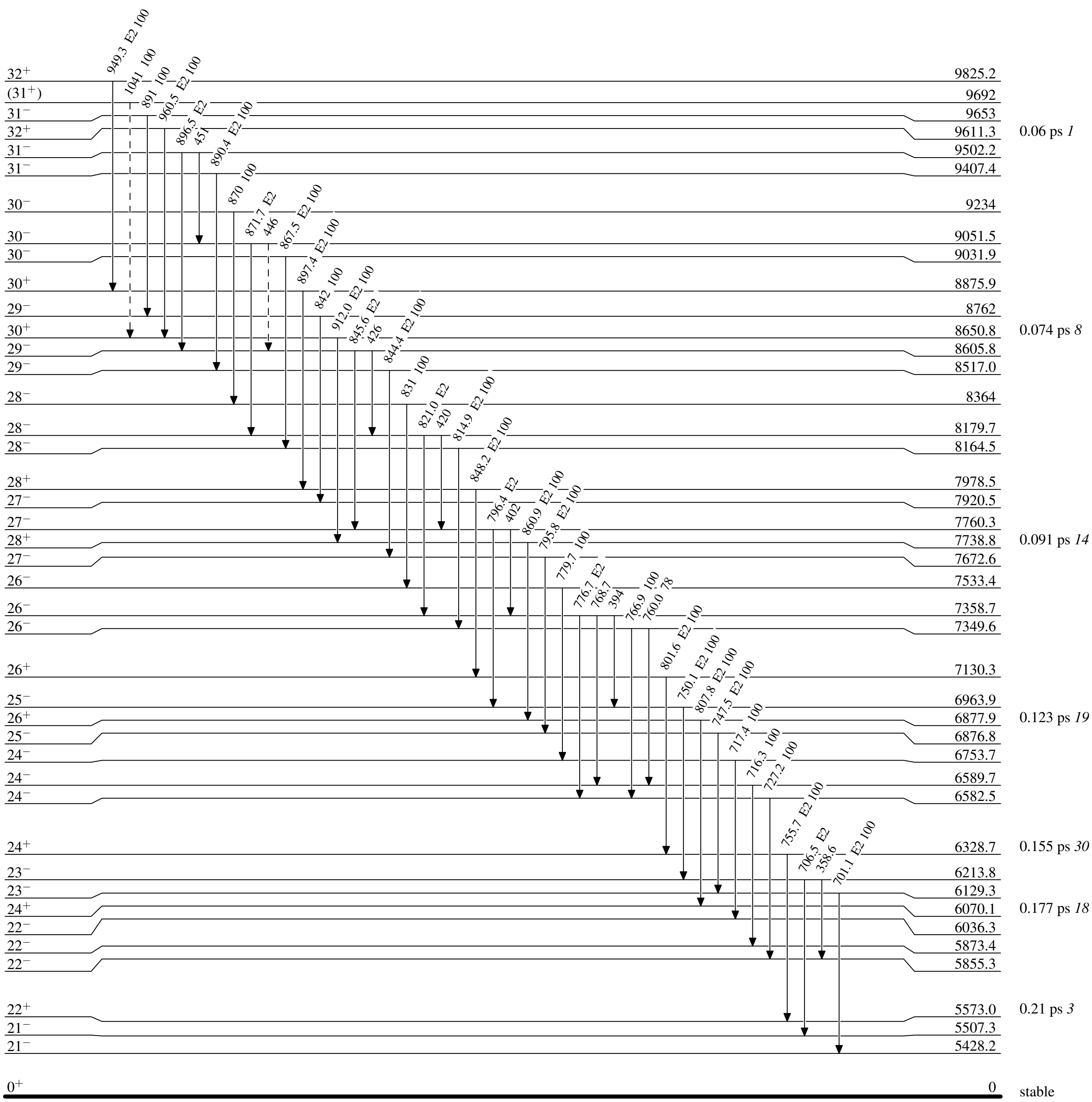
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



$^{156}_{66}Dy_{90}$

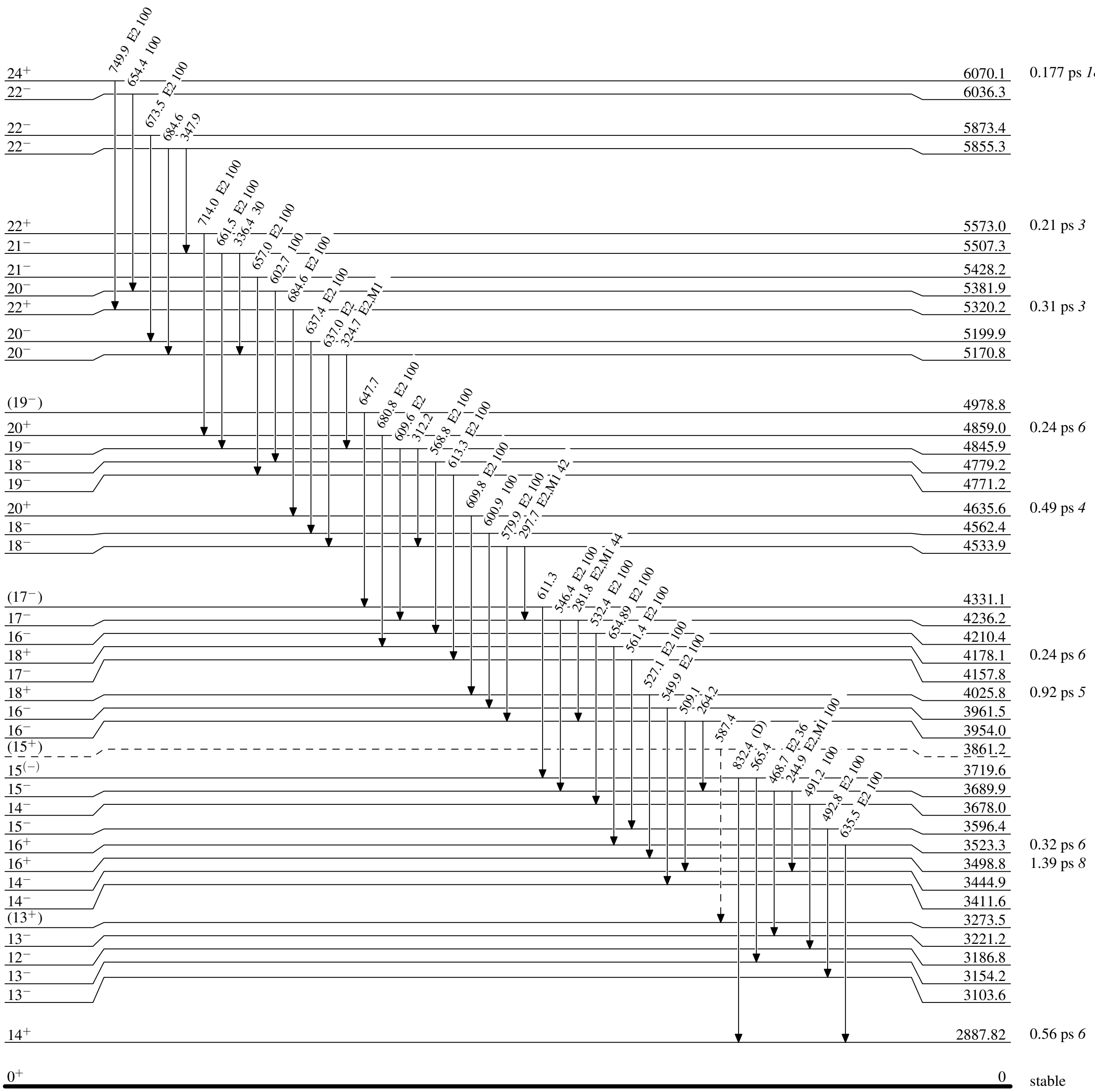
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



$^{156}_{66}Dy_{90}$

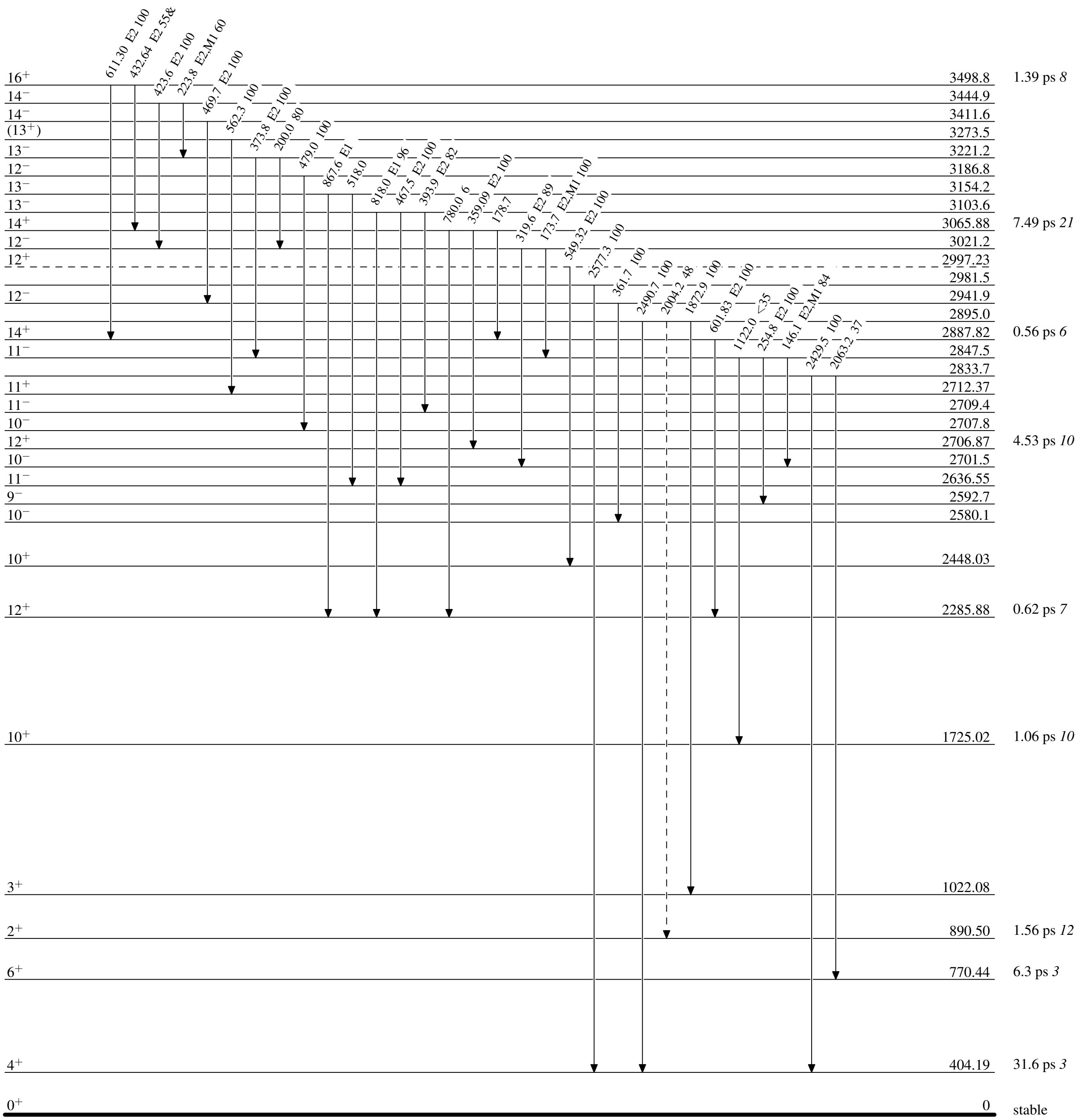
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)

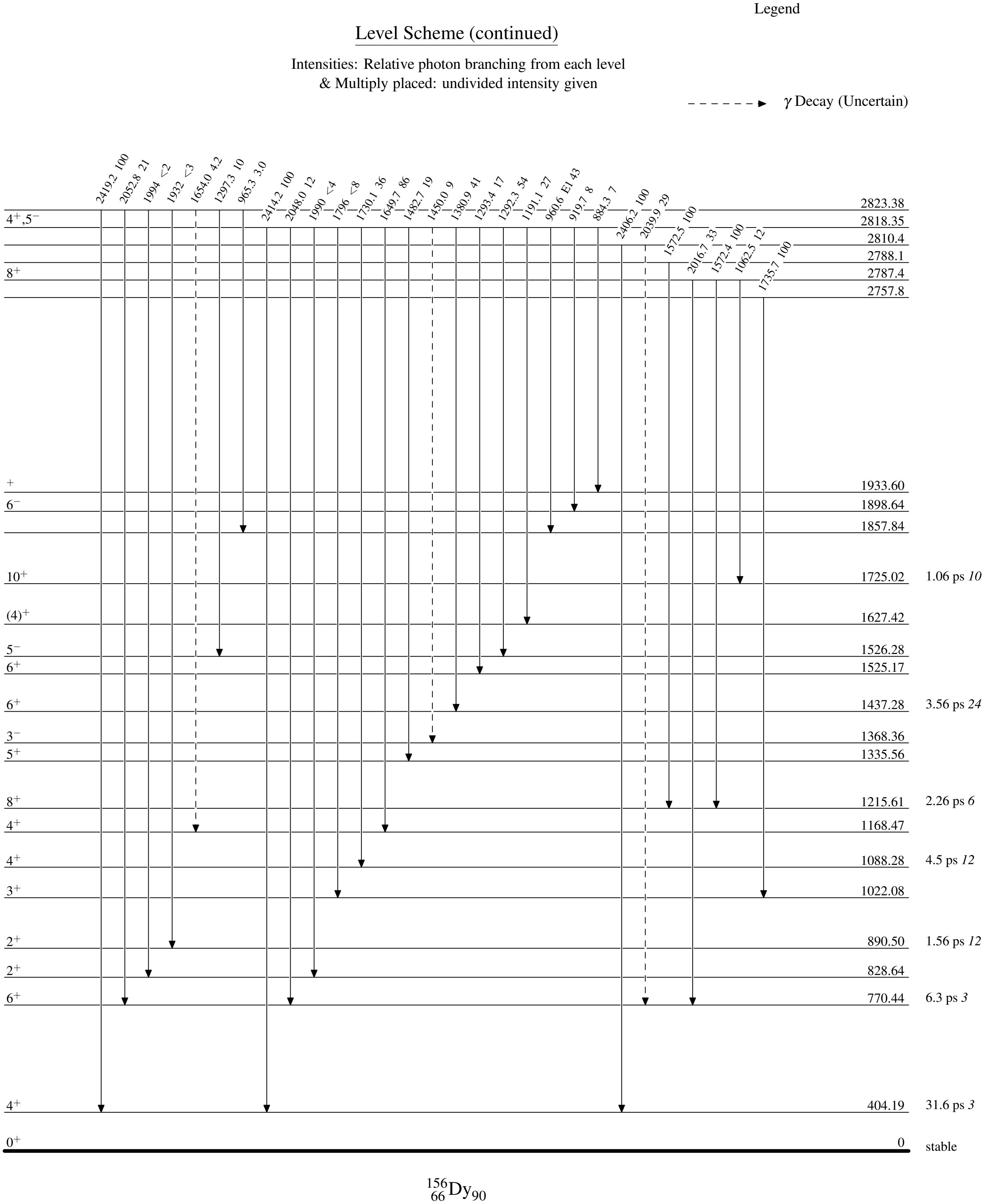


$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

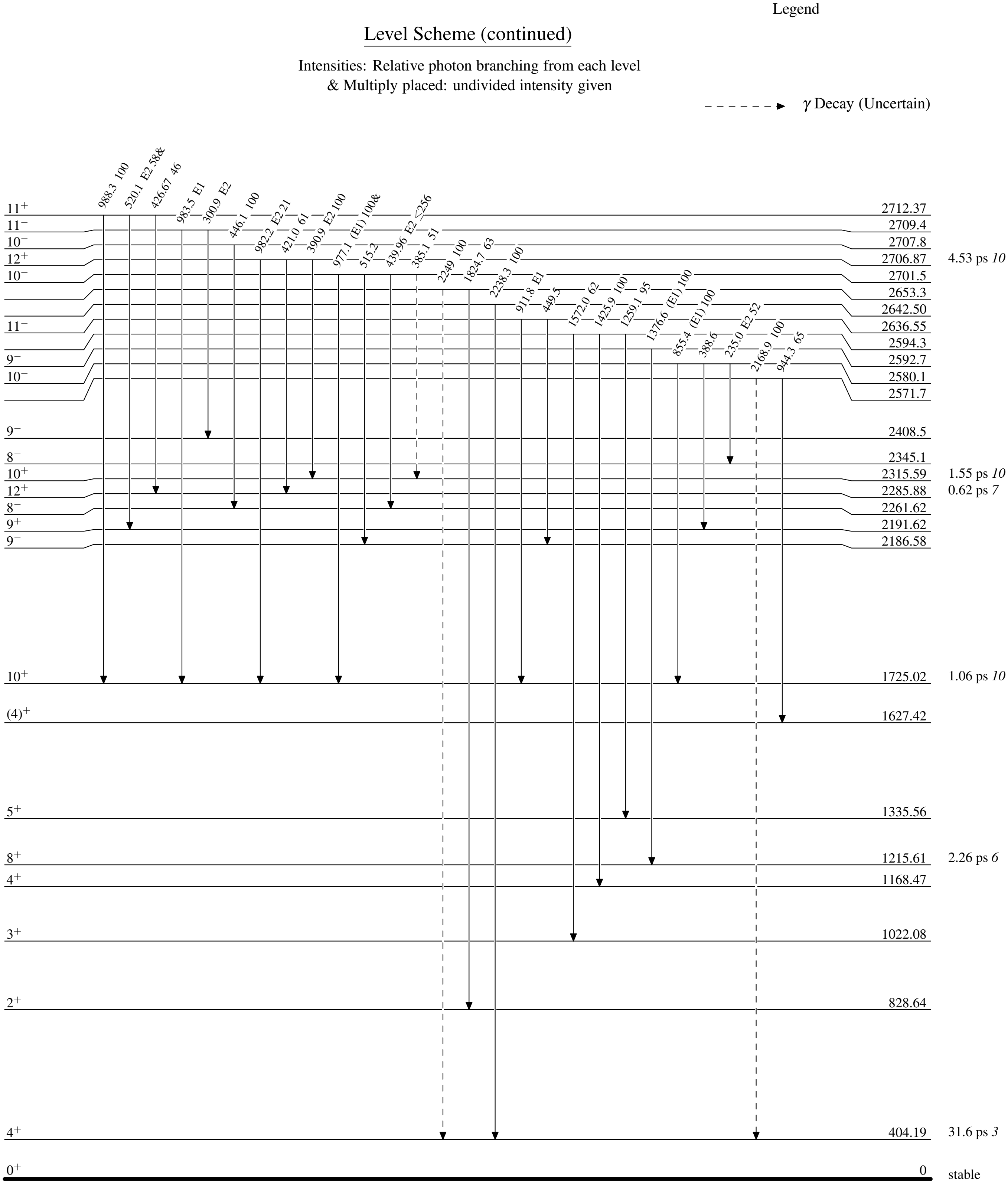
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

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

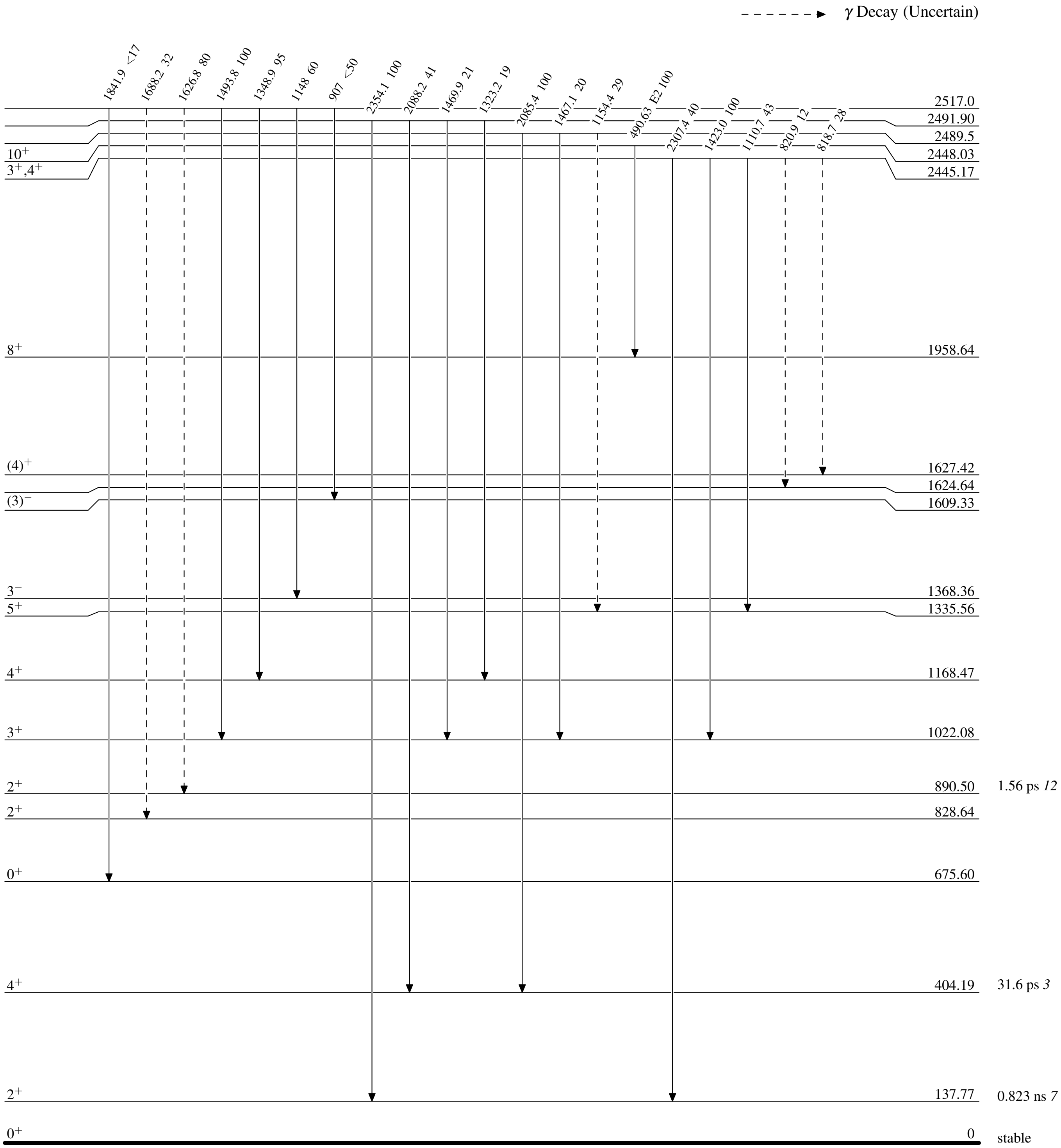


$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{156}_{66}Dy_{90}$

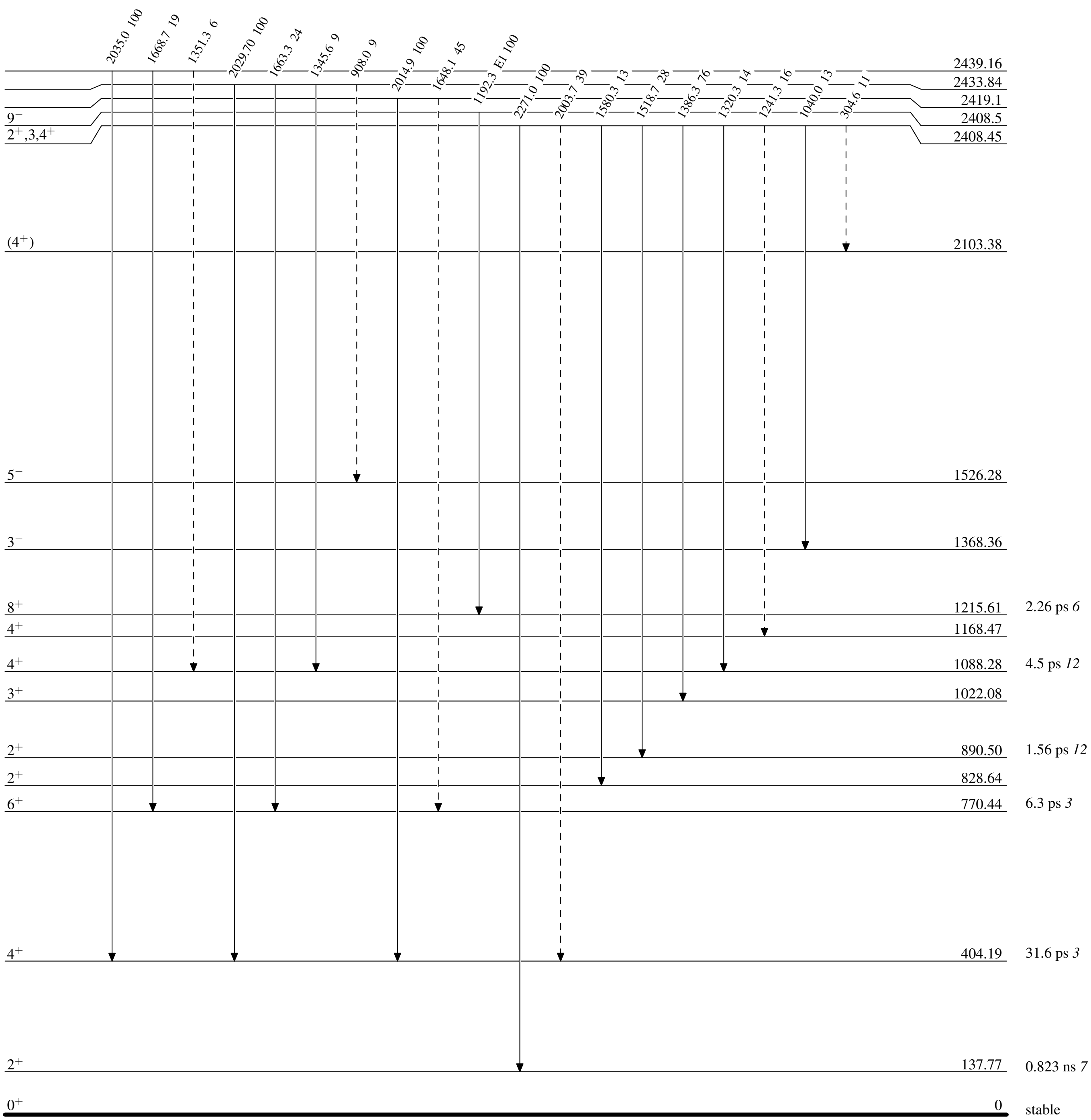
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

γ Decay (Uncertain)

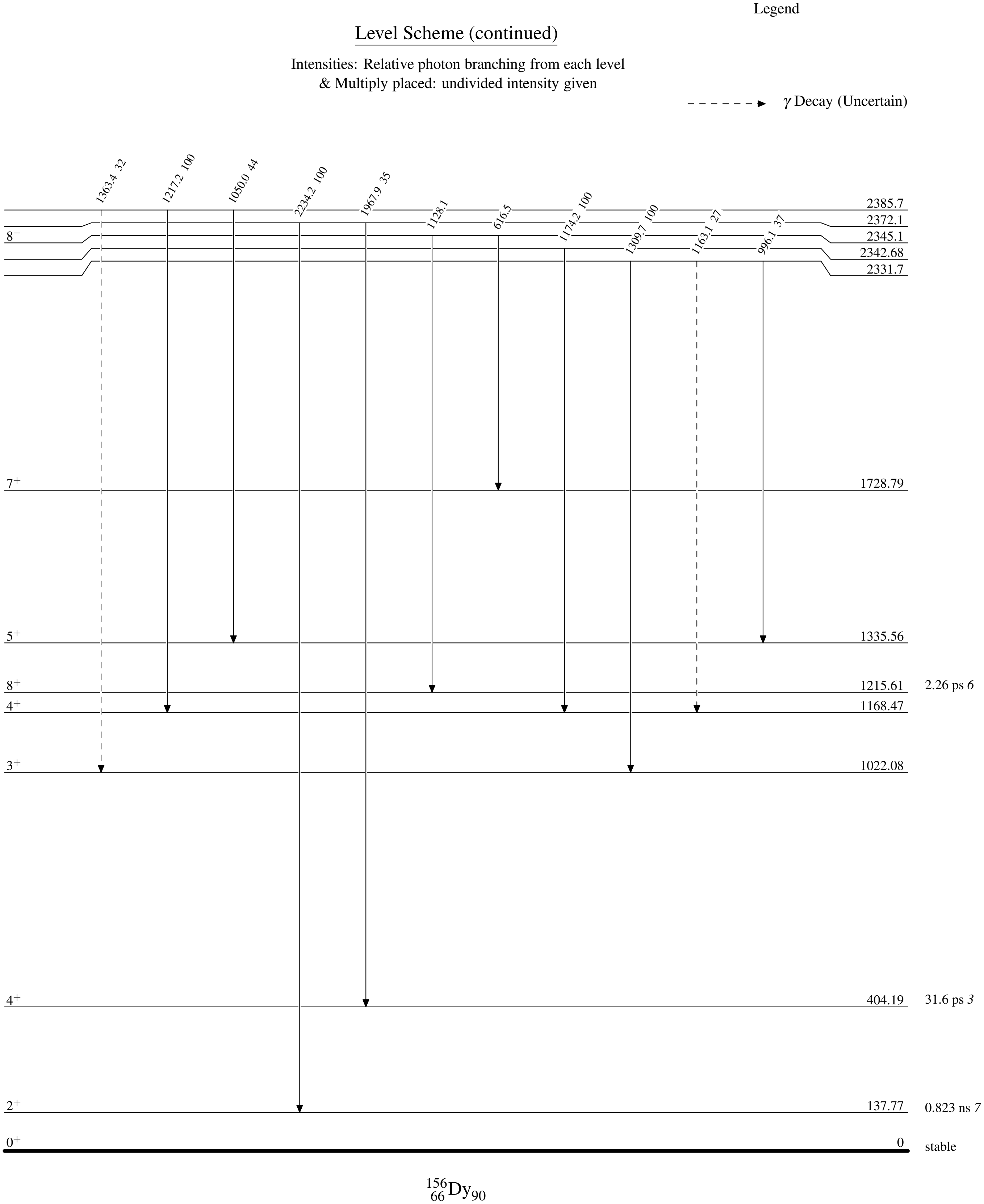


$^{156}_{66}Dy_{90}$

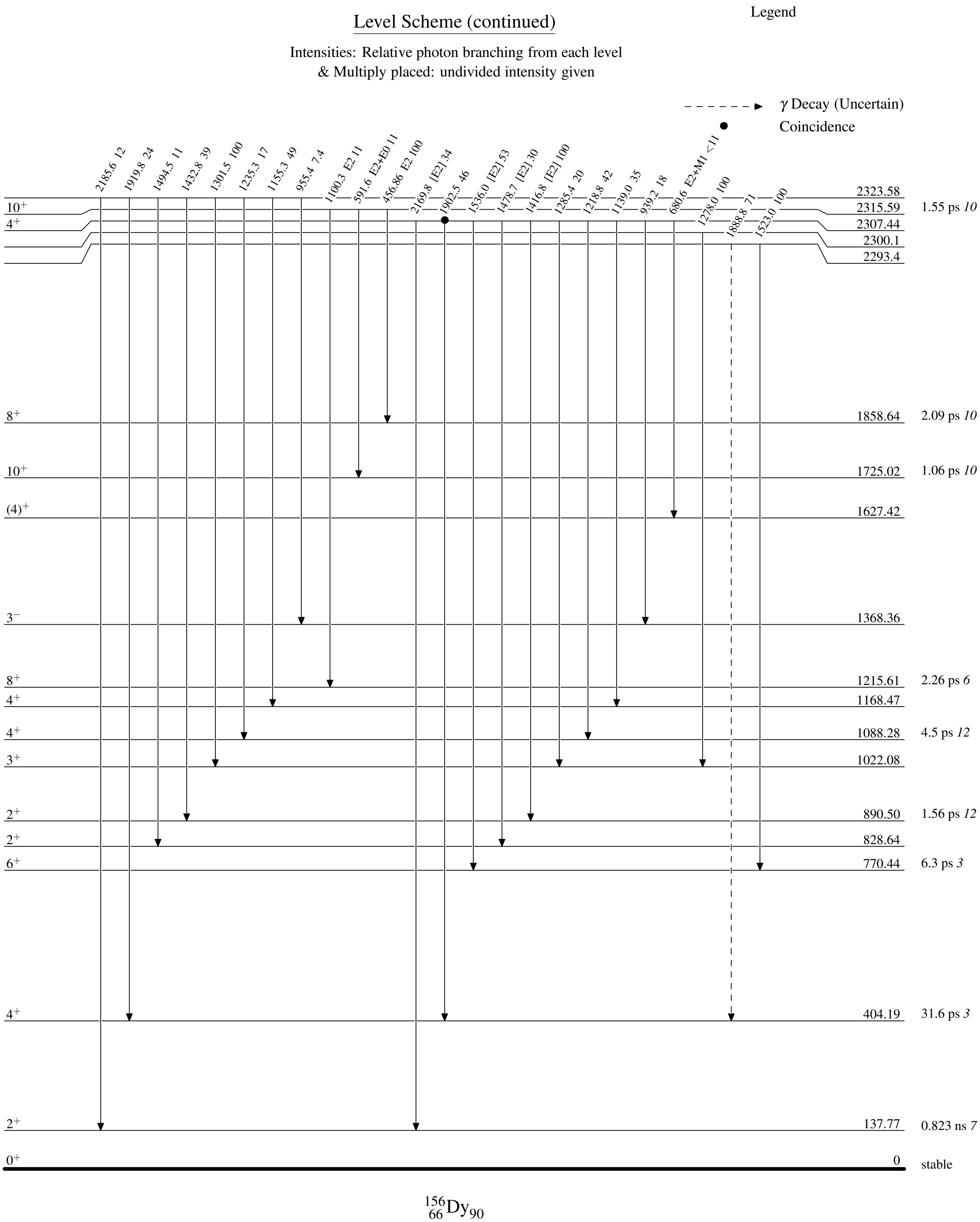
Adopted Levels, Gammas

Level Scheme (continued)

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



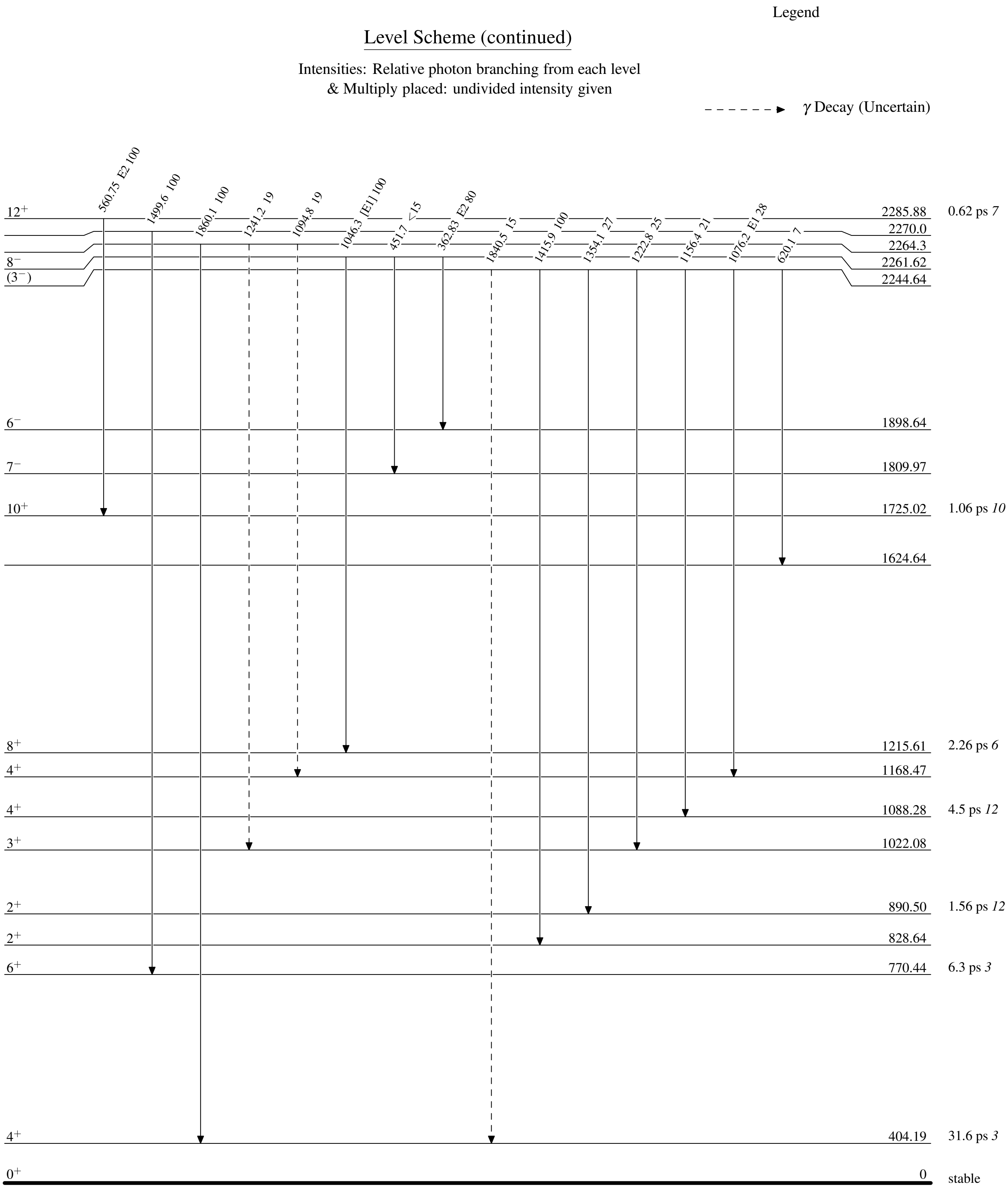
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

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

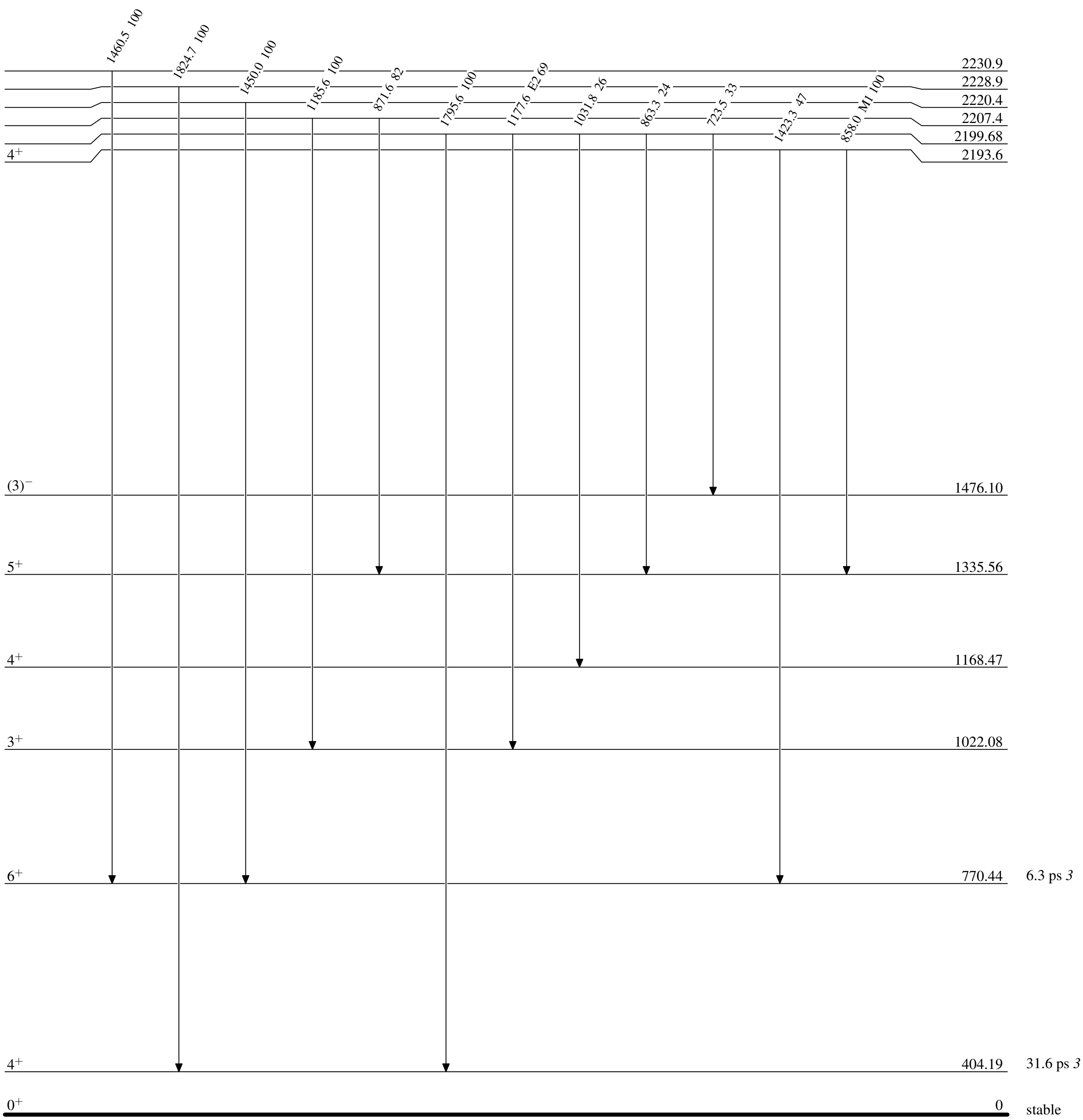


$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

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



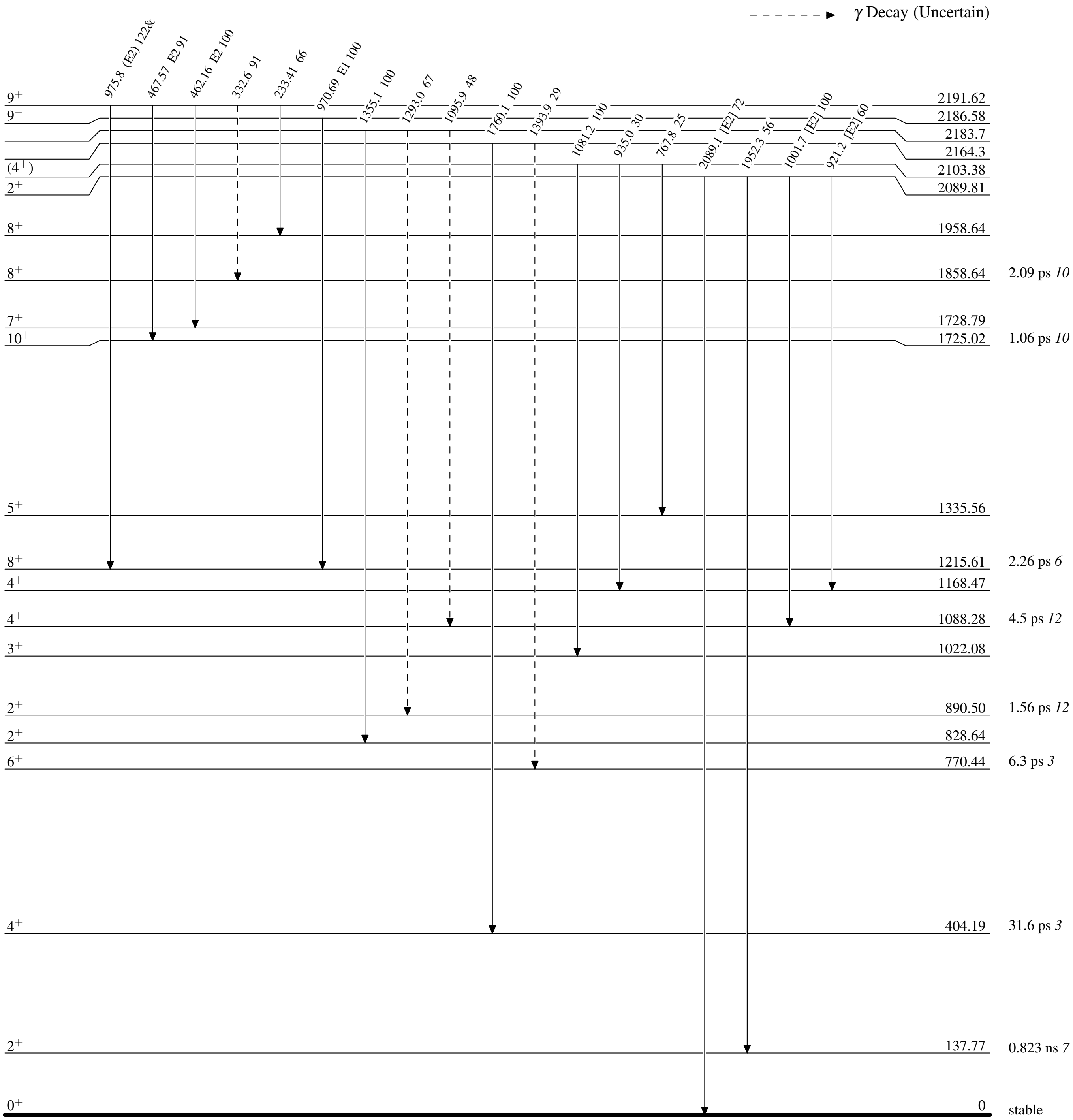
$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

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

Legend



$^{156}_{66}Dy_{90}$

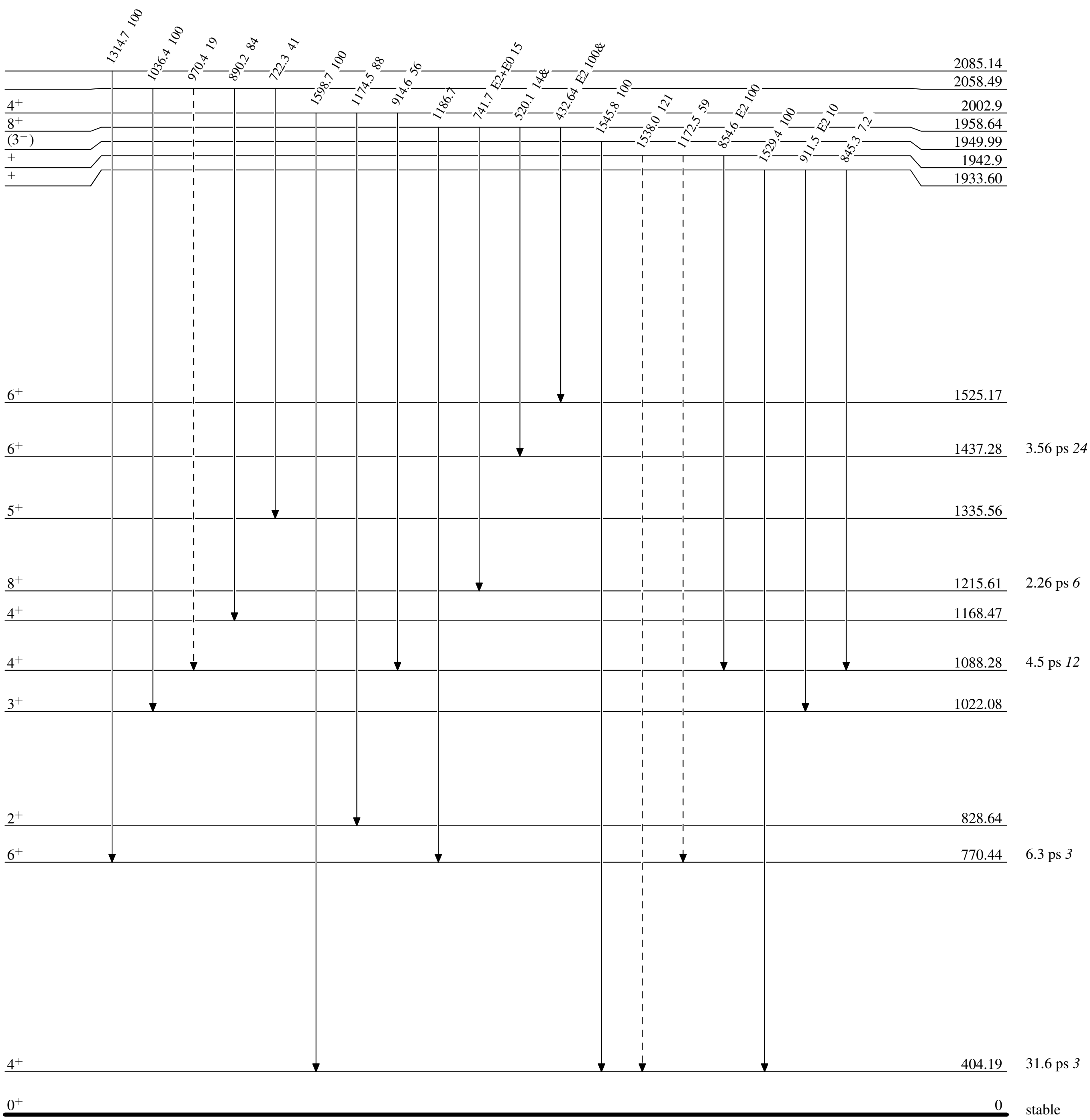
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)

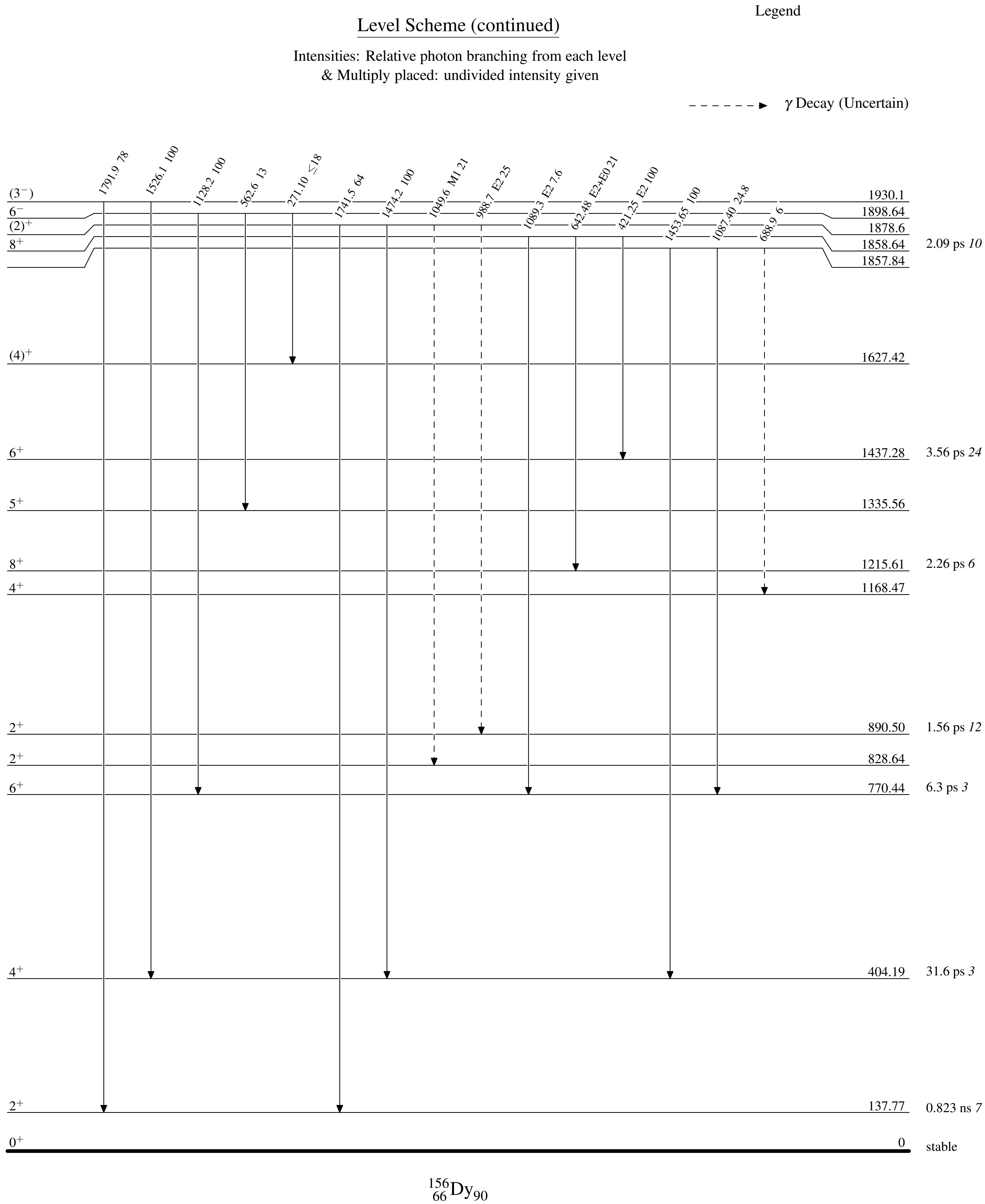


$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

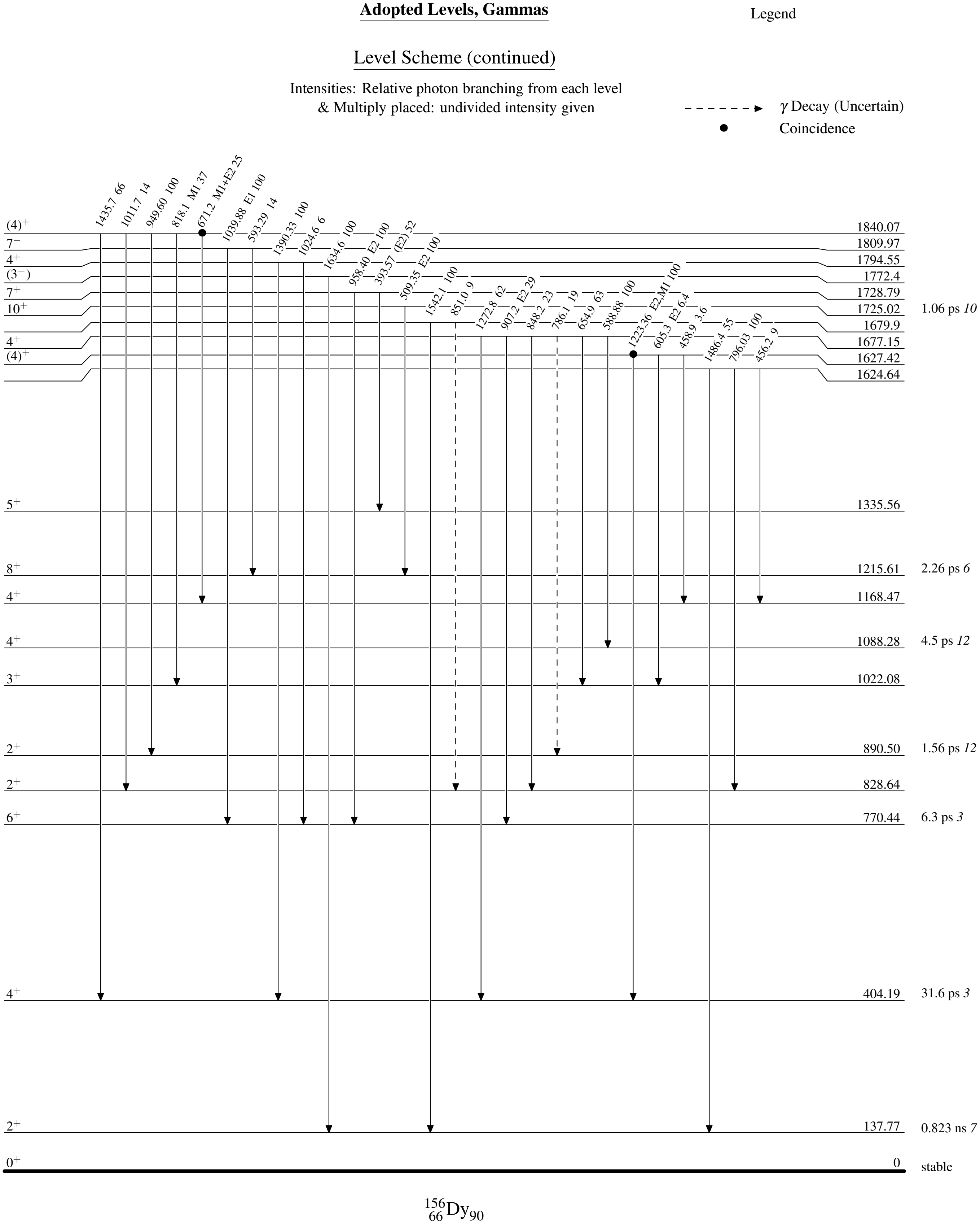
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

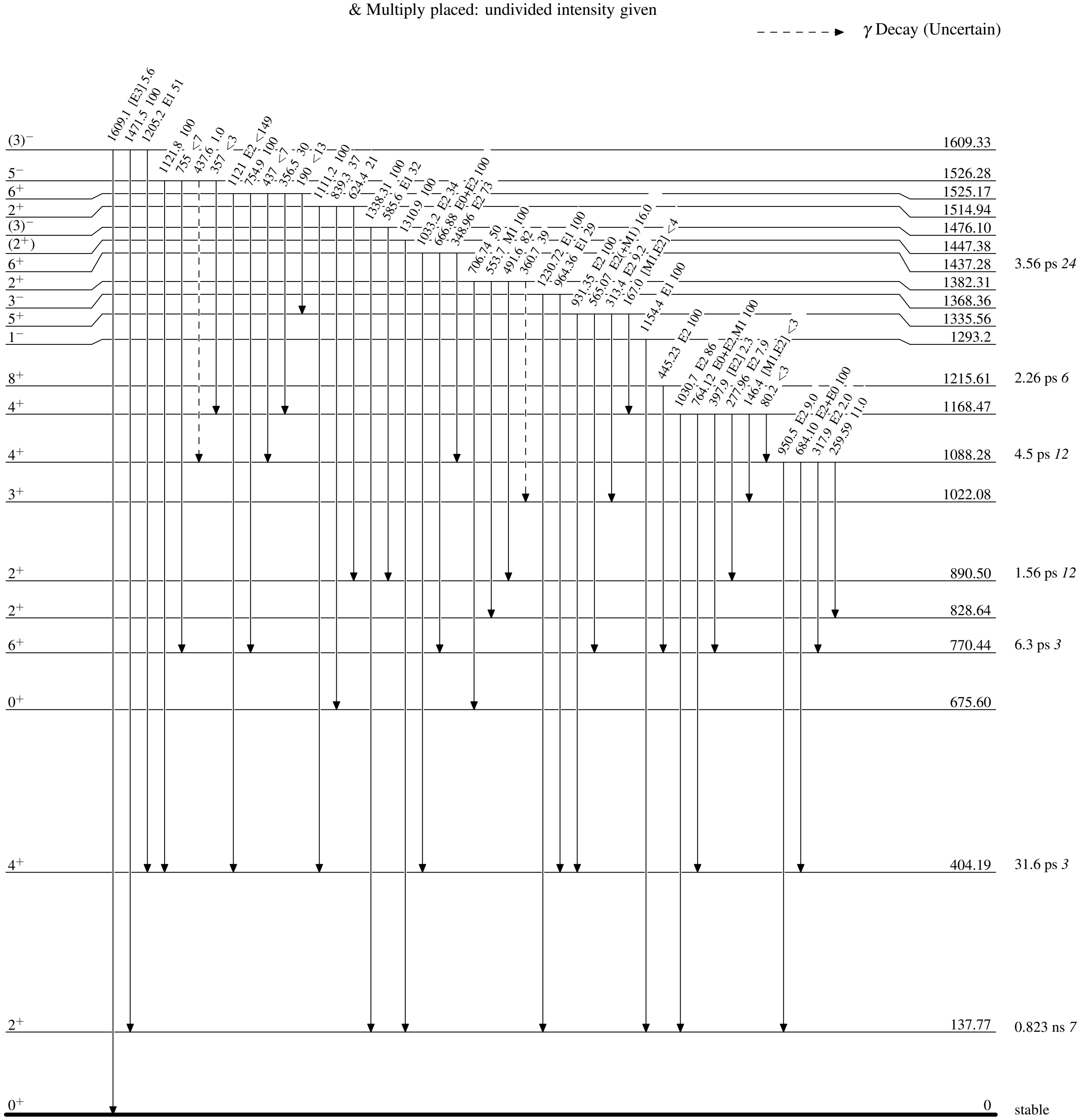
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

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

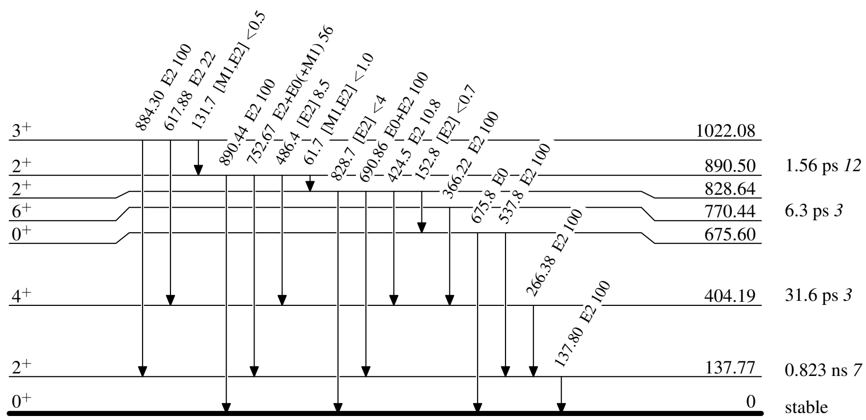


$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas

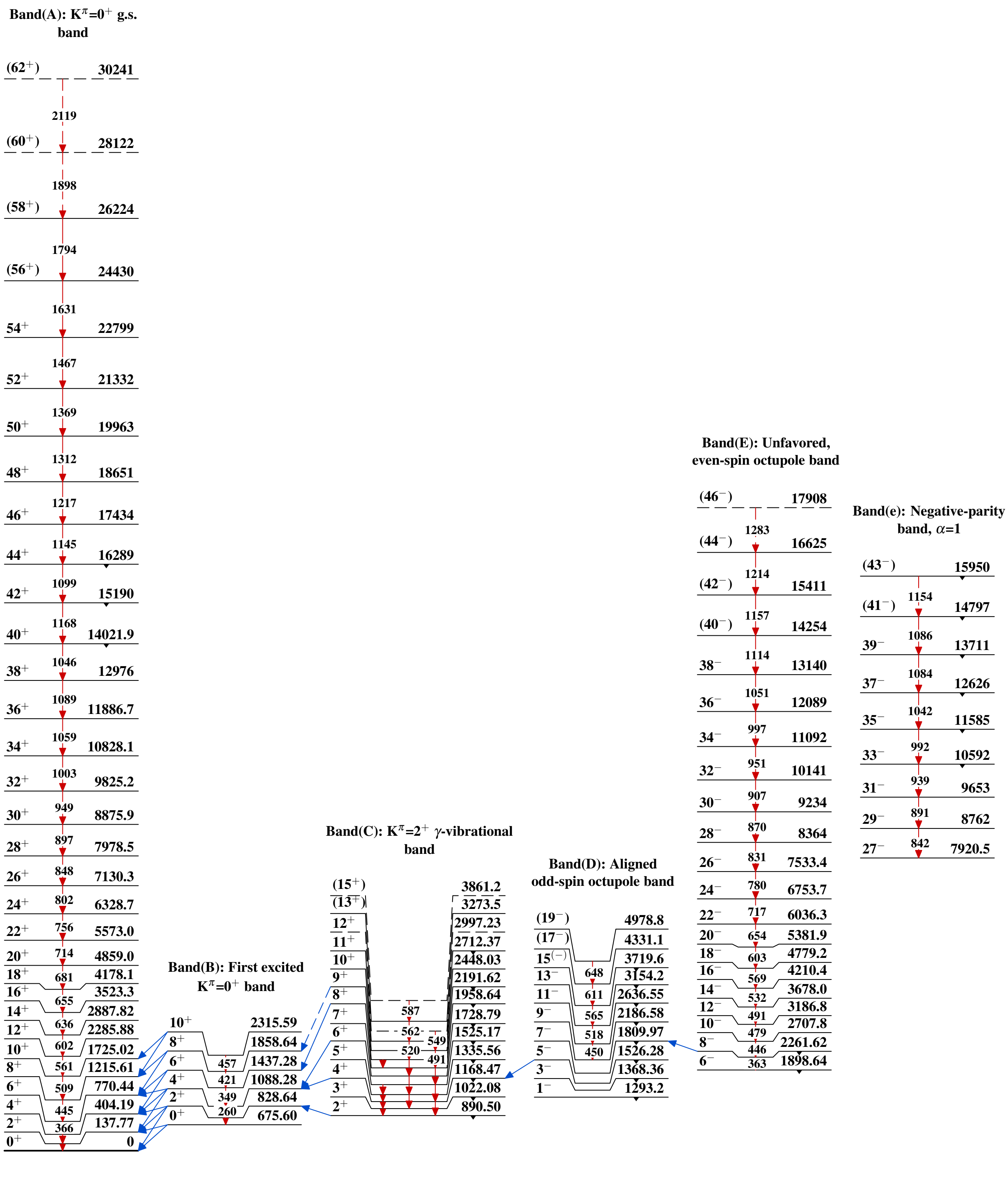
Level Scheme (continued)

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



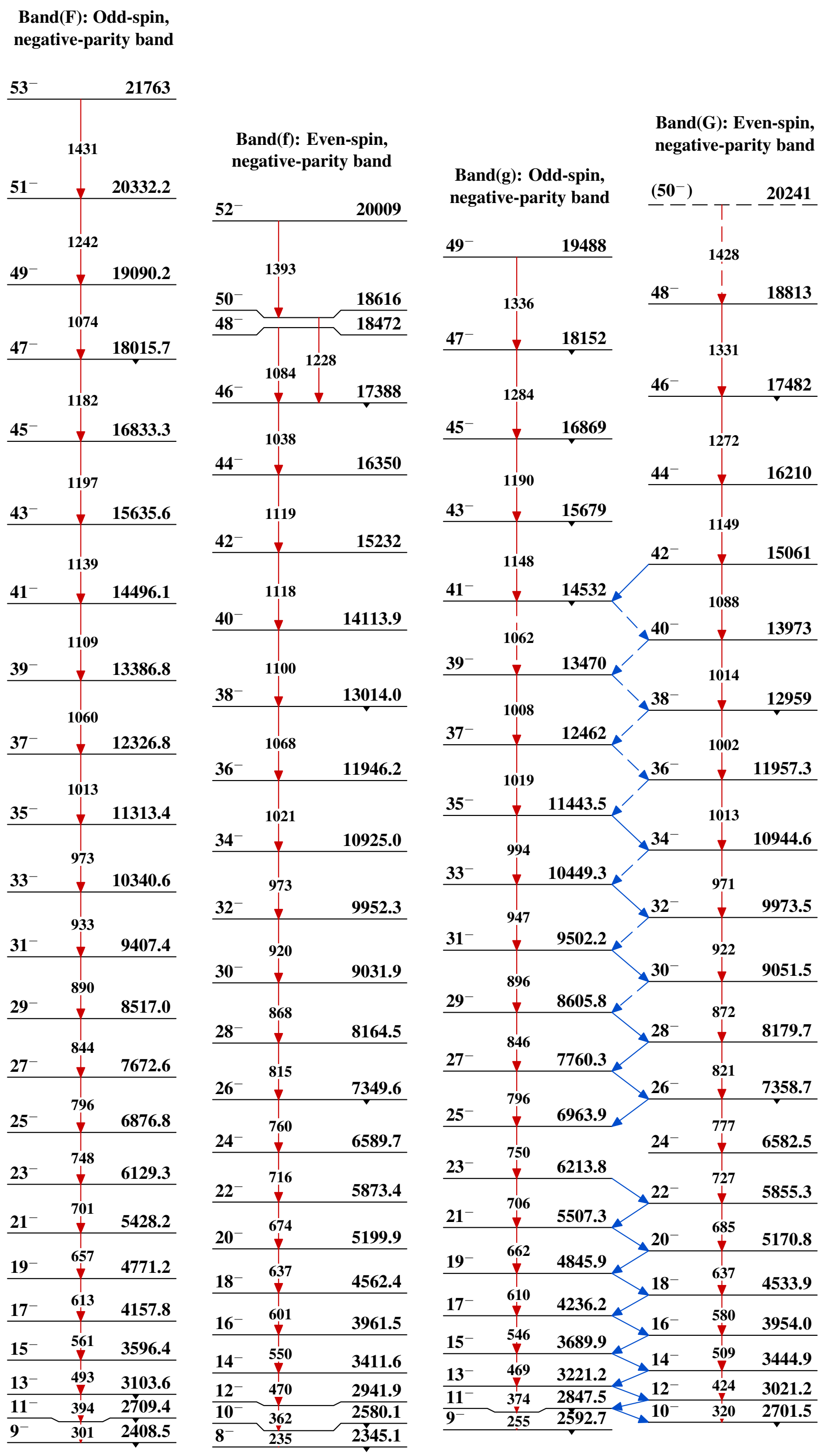
$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas



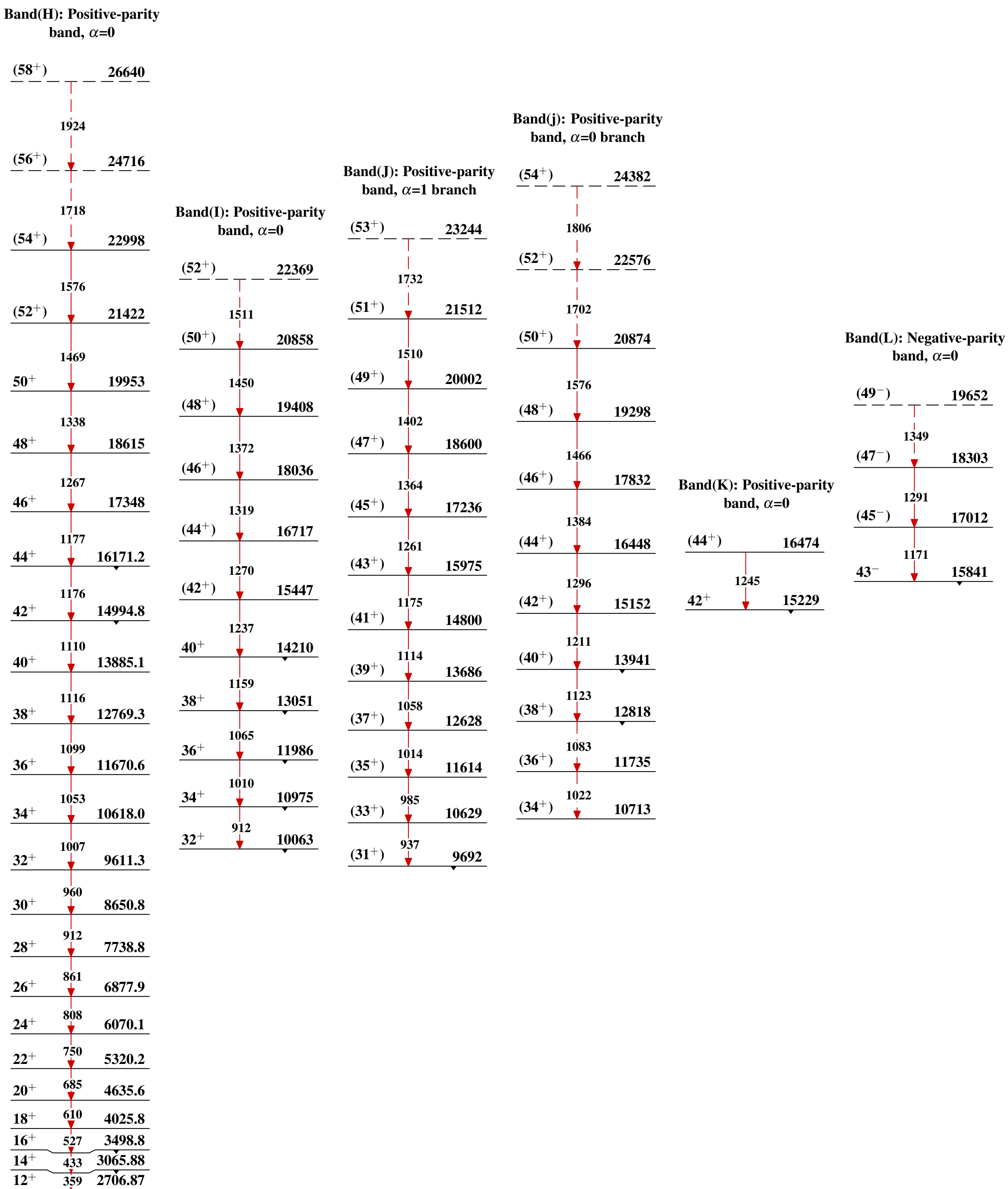
$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas (continued)



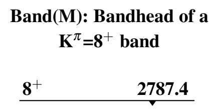
$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas (continued)



$^{156}_{66}Dy_{90}$

Adopted Levels, Gammas (continued)



$^{156}_{66}Dy_{90}$