^{153}Ho ε decay (2.01 min) 1982Ba75

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Parent: ^{153}Ho: E=0.0; J^π=11/2$^-$; $T_{1/2}$=2.01 min *3*; Q(ε)=4131 *6*; %ε+%β^+ decay=99.949 *25*

^{153}Ho-Q(ε): Measured values: 4153 *50* determined by 1983Al06 from 3857 *50* β+ endpoint to the 296 level; 4160 *60* by 1993Al03 from total absorption γ spectrometer.

1982Ba75 produced sources in 1-GeV proton spallation of target followed by mass separation with nuclide identification from E(K-x ray), $T_{1/2}$ of I(K-x ray) along with $T_{1/2}$ associated with each γ. 1981PaZP produced sources from Tb(^{3}He,xn) reaction and measured γ and ce spectra.

Others: 1974Sc19, 1977ZuZV.

^{153}Dy Levels

E(level)	J^π†	Comments
0.0	7/2$^{(-)}$	
108.75 *12*	(3/2$^-$)	
270.46 *14*	(3/2$^-$,5/2$^-$)	
295.83 *9*	(9/2$^-$)	
365.85 *17*	(5/2$^-$,7/2$^-$,9/2$^-$)	
565.57 *15*	(3/2$^-$,5/2$^-$)	
576.74 *14*	(3/2$^-$,5/2,7/2$^-$)	
637.12 *13*	11/2$^{(-)}$	
688.34 *14*	(5/2$^-$,7/2$^-$)	
712.44 *17*	(13/2$^+$)	
830.12 *15*		E(level): In the Adopted Levels, levels are placed at 829.93, with depopulating γ's of 117 and 192 keV, and 830.4, with depopulating γ's of 141, 253, and 721 keV. J^π: The Adopted Levels are at 829.93 with J^π=(13/2$^+$) and 830.47 with J^π=(7/2$^-$).
837.33 *18*	(13/2$^-$)	
1041.13 *21*	(11/2$^+$)	
1068.13 *22*	(11/2$^-$)	
1092.3 *3*	(9/2,11/2$^-$)	
1189.5 *4*	(7/2$^-$,9/2,11/2$^-$)	
1276.4 *3*	(9/2$^-$)	
1321.97 *22*	(13/2$^-$)	
1381.3 *3*	(5/2$^-$,7/2,9/2$^-$)	
1500.8 *3*	(9/2$^-$)	
1581.16 *23*	(9/2$^+$,11/2$^-$)	

† From ^{153}Dy Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)†‡	Comments
(2550 *6*)	1581.16	0.21 *3*	1.53 *19*	5.71 *6*	1.74 *22*	av Eβ=692.1 *27*; εK=0.7355 *12*; εL=0.11142 *18*; εM+=0.03278 *6*
(2630 *6*)	1500.8	0.25 *4*	1.5 *3*	5.73 *8*	1.8 *3*	av Eβ=727.8 *27*; εK=0.7201 *12*; εL=0.10896 *19*; εM+=0.03205 *6*
(2750 *6*)	1381.3	0.74 *7*	3.7 *3*	5.40 *4*	4.4 *4*	av Eβ=781.2 *27*; εK=0.6953 *13*; εL=0.10505 *21*; εM+=0.03090 *6*
(2809 *6*)	1321.97	0.15 *3*	0.65 *13*	6.17 *9*	0.80 *16*	av Eβ=807.7 *27*; εK=0.6823 *14*; εL=0.10302 *21*; εM+=0.03029 *7*
(2855 *6*)	1276.4	1.1 *1*	4.3 *3*	5.36 *4*	5.4 *4*	av Eβ=828.1 *27*; εK=0.6721 *14*; εL=0.10142 *22*; εM+=0.02982 *7*

Continued on next page (footnotes at end of table)

^{153}Ho ε decay (2.01 min) 1982Ba75 (continued)

ε,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I(ε+β^+)†‡	Comments
(2942 *6*)	1189.5	0.16 *4*	0.58 *12*	6.26 *10*	0.74 *16*	av Eβ=867.1 *27*; εK=0.6521 *15*; εL=0.09830 *22*; εM+=0.02890 *7*
(3039 *6*)	1092.3	0.20 *5*	0.60 *15*	6.27 *11*	0.80 *20*	av Eβ=910.8 *27*; εK=0.6289 *15*; εL=0.09473 *23*; εM+=0.02785 *7*
(3063 *6*)	1068.13	0.03 *4*	0.10 *11*	7.1 *5*	0.13 *15*	av Eβ=921.7 *27*; εK=0.6231 *15*; εL=0.09383 *23*; εM+=0.02758 *7*
(3090 *6*)	1041.13	0.18 *5*	0.49 *14*	6.37 *13*	0.67 *19*	av Eβ=933.8 *27*; εK=0.6166 *15*; εL=0.09282 *23*; εM+=0.02728 *7*
(3294 *6*)	837.33	0.31 *5*	0.64 *11*	6.32 *8*	0.95 *16*	av Eβ=1025.9 *28*; εK=0.5665 *15*; εL=0.08512 *23*; εM+=0.02501 *7*
(3301 *6*)	830.12	0.59 *10*	1.2 *2*	6.04 *8*	1.8 *3*	av Eβ=1029.1 *28*; εK=0.5647 *15*; εL=0.08485 *23*; εM+=0.02493 *7*
(3419 *6*)	712.44	0.36 *14*	0.6 *3*	6.35 *18*	1.0 *4*	av Eβ=1082.5 *28*; εK=0.5357 *15*; εL=0.08041 *23*; εM+=0.02363 *7*
(3443 *6*)	688.34	1.2 *2*	2.1 *4*	5.84 *8*	3.3 *6*	av Eβ=1093.4 *28*; εK=0.5298 *15*; εL=0.07951 *23*; εM+=0.02336 *7*
(3494 *6*)	637.12	0.92 *11*	1.5 *2*	6.00 *6*	2.4 *3*	av Eβ=1116.7 *28*; εK=0.5173 *15*; εL=0.07761 *23*; εM+=0.02280 *7*
(3765 *6*)	365.85	0.6 *3*	0.7 *3*	6.39 *20*	1.3 *6*	av Eβ=1240.3 *28*; εK=0.4533 *14*; εL=0.06788 *21*; εM+=0.01993 *7*
(3835 *6*)	295.83	33.4 *11*	36.6 *12*	4.70 *2*	70.0 *23*	av Eβ=1272.4 *28*; εK=0.4375 *14*; εL=0.06549 *21*; εM+=0.01923 *6*
(3861 *6*)	270.46	0.84 *3*	0.90 *3*	6.31 *2*	1.74 *6*	av Eβ=1284.0 *28*; εK=0.4319 *14*; εL=0.06463 *20*; εM+=0.01898 *6*

† From intensity balances at each level and the assumption of no ε+β+ feeding of the ground state. This neglects the influence of the unplaced γ′s which would shift the ε+β+ feeding to higher energy levels.
‡ Absolute intensity per 100 decays.

γ(^{153}Dy)

Iγ normalization: Calculated to give 100% feeding of the ground state with the assumption of no ε+β+ branching to the ground state which neglects the influence of the unplaced γ′s.

E_γ[†]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[a]	Comments
[x]66.2[@]	7.2[@]							%Iγ=4.83 *16*
75.3 *2*	1.3 *3*	712.44	(13/2$^+$)	637.12	11/2$^{(-)}$	(E1)	0.655 *11*	%Iγ=0.87 *20* α(K)=0.542 *9*; α(L)=0.0884 *14*; α(M)=0.0194 *3* α(N)=0.00439 *7*; α(O)=0.000587 *10*; α(P)=2.40×10^{-5} *4*
[x]84.8[@]	2.4[@]							%Iγ=1.61 *5*
95.2 *3*	≈0.1	365.85	(5/2$^-$,7/2$^-$,9/2$^-$)	270.46	(3/2$^-$,5/2$^-$)			%Iγ=0.07 *4* I_γ: Other: 0.09 (1981PaZP).
108.7 *2*	≈3	108.75	(3/2$^-$)	0.0	7/2$^{(-)}$	E2	1.99	%Iγ=2.0 *10* α(K)=0.907 *14*; α(L)=0.835 *14*; α(M)=0.200 *4* α(N)=0.0448 *8*; α(O)=0.00541 *9*; α(P)=3.79×10^{-5} *6* I_γ: Other: 5.1 (1981PaZP).
117.3 *3*	0.4 *2*	830.12		712.44	(13/2$^+$)			%Iγ=0.27 *14*
125.1 *3*	0.2 *1*	837.33	(13/2$^-$)	712.44	(13/2$^+$)			%Iγ=0.13 *7*
141.8 *3*	1.0 *3*	830.12		688.34	(5/2$^-$,7/2$^-$)			%Iγ=0.67 *20*
161.5 *2*	≈1	270.46	(3/2$^-$,5/2$^-$)	108.75	(3/2$^-$)	M1	0.615	%Iγ=0.7 *4* α(K)=0.518 *8*; α(L)=0.0757 *11*; α(M)=0.01662 *24* α(N)=0.00385 *6*; α(O)=0.000563 *9*; α(P)=3.22×10^{-5} *5* I_γ: Other: 2.7 (1981PaZP).
[x]186.9[&] *2*	0.43[&]							%Iγ=0.288 *9*
192.8 *2*	0.6 *2*	830.12		637.12	11/2$^{(-)}$			%Iγ=0.40 *14*
203.8 *4*	≈0.2	1041.13	(11/2$^+$)	837.33	(13/2$^-$)			%Iγ=0.13 *7*
[x]230.0 *6*	≈1							%Iγ=0.7 *4* I_γ: Other: 1.5 (1981PaZP).
253.8[c] *2*	0.5[c] *1*	830.12		576.74	(3/2$^-$,5/2,7/2$^-$)			%Iγ=0.34 *7*
253.8[c] *2*	0.5[c] *1*	1321.97	(13/2$^-$)	1068.13	(11/2$^-$)			%Iγ=0.34 *7*
270.6 *2*	≈1	270.46	(3/2$^-$,5/2$^-$)	0.0	7/2$^{(-)}$	E2	0.0888	%Iγ=0.7 *4* α(K)=0.0651 *10*; α(L)=0.0184 *3*; α(M)=0.00425 *6* α(N)=0.000964 *14*; α(O)=0.0001255 *18*; α(P)=3.32×10^{-6} *5* I_γ: Other: 2.2 (1981PaZP).
295.8 *1*	100	295.83	(9/2$^-$)	0.0	7/2$^{(-)}$	M1	0.1172	%Iγ=67.0 *21* α(K)=0.0990 *14*; α(L)=0.01427 *20*; α(M)=0.00313 *5* α(N)=0.000724 *11*; α(O)=0.0001061 *15*; α(P)=6.11×10^{-6} *9*
[x]341.0[&] *3*	0.37[&]							%Iγ=0.248 *8*
365.9 *2*	3.0 *8*	365.85	(5/2$^-$,7/2$^-$,9/2$^-$)	0.0	7/2$^{(-)}$	M1	0.0667	%Iγ=2.0 *6* α(K)=0.0564 *8*; α(L)=0.00807 *12*; α(M)=0.001769 *25* α(N)=0.000409 *6*; α(O)=6.00×10^{-5} *9*; α(P)=3.47×10^{-6} *5* I_γ: Other: 6.1 (1981PaZP).

$^{153}_{66}Dy_{87}$-3

γ(^{153}Dy) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[a]	Comments
392.5 *4*	0.5 *2*	688.34	(5/2⁻,7/2⁻)	295.83	(9/2⁻)			%Iγ=0.34 *14*
404.1[c] *3*	0.4[c] *2*	1041.13	(11/2⁺)	637.12	11/2⁽⁻⁾			%Iγ=0.27 *14*
404.1[c] *3*	0.4[c] *2*	1092.3	(9/2,11/2⁻)	688.34	(5/2⁻,7/2⁻)			%Iγ=0.27 *14*
[x]420.4 *2*	0.7 *2*							%Iγ=0.47 *14*
431.0 *5*	≈0.1	1068.13	(11/2⁻)	637.12	11/2⁽⁻⁾			%Iγ=0.07 *4*
[x]445.7 *5*	0.2 *1*							%Iγ=0.13 *7*
[x]449.7 *4*	0.3 *1*							%Iγ=0.20 *7*
456.8 *2*	≈1	565.57	(3/2⁻,5/2⁻)	108.75	(3/2⁻)	M1+E2	0.0284 *92*	%Iγ=0.7 *4* α(K)=0.0235 *82*; α(L)=0.0038 *8*; α(M)=0.00084 *16* α(N)=0.00019 *4*; α(O)=2.7×10⁻⁵ *6*; α(P)=1.40×10⁻⁶ *55* I_γ: Other: 1.6 (1981PaZP).
468.2 *2*	1.4 *2*	576.74	(3/2⁻,5/2,7/2⁻)	108.75	(3/2⁻)			%Iγ=0.94 *14*
[x]529.6 *4*	0.3 *1*							%Iγ=0.20 *7*
541.4 *2*	1.4 *2*	837.33	(13/2⁻)	295.83	(9/2⁻)	(E2)	0.01235	%Iγ=0.94 *14* α(K)=0.01002 *14*; α(L)=0.00182 *3*; α(M)=0.000408 *6* α(N)=9.35×10⁻⁵ *14*; α(O)=1.298×10⁻⁵ *19*; α(P)=5.65×10⁻⁷ *8*
552.0 *5*	0.4 *2*	1189.5	(7/2⁻,9/2,11/2⁻)	637.12	11/2⁽⁻⁾			%Iγ=0.27 *14*
565.5 *2*	0.6 *2*	565.57	(3/2⁻,5/2⁻)	0.0	7/2⁽⁻⁾	E2	0.01107	%Iγ=0.40 *14* α(K)=0.00901 *13*; α(L)=0.001606 *23*; α(M)=0.000360 *5* α(N)=8.24×10⁻⁵ *12*; α(O)=1.148×10⁻⁵ *17*; α(P)=5.10×10⁻⁷ *8*
577.0 *3*	1.6 *3*	576.74	(3/2⁻,5/2,7/2⁻)	0.0	7/2⁽⁻⁾			%Iγ=1.07 *21*
579.7 *3*	1.2 *5*	688.34	(5/2⁻,7/2⁻)	108.75	(3/2⁻)			%Iγ=0.8 *4*
[x]617.5 *3*	0.5 *2*							%Iγ=0.34 *14*
637.0 *2*	8.0 *3*	637.12	11/2⁽⁻⁾	0.0	7/2⁽⁻⁾	E2	0.00828	%Iγ=5.4 *3* α(K)=0.00680 *10*; α(L)=0.001155 *17*; α(M)=0.000257 *4* α(N)=5.91×10⁻⁵ *9*; α(O)=8.30×10⁻⁶ *12*; α(P)=3.87×10⁻⁷ *6*
685.2 *5*	≈0.3	1321.97	(13/2⁻)	637.12	11/2⁽⁻⁾			%Iγ=0.20 *10*
688.5 *2*	5.5 *4*	688.34	(5/2⁻,7/2⁻)	0.0	7/2⁽⁻⁾			%Iγ=3.7 *3*
693.0 *5*	0.3 *1*	1381.3	(5/2⁻,7/2,9/2⁻)	688.34	(5/2⁻,7/2⁻)			%Iγ=0.20 *7*
712.0 *5*	0.3 *1*	712.44	(13/2⁺)	0.0	7/2⁽⁻⁾			%Iγ=0.20 *7*
721.0 *5*	0.2 *1*	830.12		108.75	(3/2⁻)			%Iγ=0.13 *7*
[x]726.8 *3*	1.8 *3*							%Iγ=1.21 *21*
[x]742.8 *5*	0.5 *2*							%Iγ=0.34 *14*
745.2[c] *3*	0.4[c] *2*	1041.13	(11/2⁺)	295.83	(9/2⁻)			%Iγ=0.27 *14*
745.2[c] *3*	0.4[c] *2*	1321.97	(13/2⁻)	576.74	(3/2⁻,5/2,7/2⁻)			%Iγ=0.27 *14*
772.2 *3*	0.6 *2*	1068.13	(11/2⁻)	295.83	(9/2⁻)			%Iγ=0.40 *14*
[x]775.4 *5*	0.5 *2*							%Iγ=0.34 *14*
[x]784.8 *4*	1.0 *2*							%Iγ=0.67 *14*
[x]806.0 *4*	1.2 *2*							%Iγ=0.80 *14*
812.1 *5*	0.3 *1*	1500.8	(9/2⁻)	688.34	(5/2⁻,7/2⁻)			%Iγ=0.20 *7*
815.5 *5*	0.6 *2*	1381.3	(5/2⁻,7/2,9/2⁻)	565.57	(3/2⁻,5/2⁻)			%Iγ=0.40 *14*
[x]836.1 *4*	0.8 *2*							%Iγ=0.54 *14*
[x]843.8 *5*	0.6 *2*							%Iγ=0.40 *14*

γ(^{153}Dy) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]847.5 *3*	1.1 *2*					%Iγ=0.74 *14*
[x]862.9 *5*	1.1 *2*					%Iγ=0.74 *14*
864.0 *5*	0.6 *2*	1500.8	(9/2⁻)	637.12	11/2$^{(-)}$	%Iγ=0.40 *14*
868.6 *5*	0.4 *1*	1581.16	(9/2⁺,11/2⁻)	712.44	(13/2⁺)	%Iγ=0.27 *7*
[x]885.1 *5*	0.5 *1*					%Iγ=0.34 *7*
893.9[c] *5*	0.3[c] *1*	1189.5	(7/2⁻,9/2,11/2⁻)	295.83	(9/2⁻)	%Iγ=0.20 *7*
893.9[c] *5*	0.3[c] *1*	1581.16	(9/2⁺,11/2⁻)	688.34	(5/2⁻,7/2⁻)	%Iγ=0.20 *7*
910.4 *4*	1.4 *2*	1276.4	(9/2⁻)	365.85	(5/2⁻,7/2⁻,9/2⁻)	%Iγ=0.94 *14*
924.0 *4*	1.8 *3*	1500.8	(9/2⁻)	576.74	(3/2⁻,5/2,7/2⁻)	%Iγ=1.21 *21*
1004.1 *4*	0.4 *2*	1581.16	(9/2⁺,11/2⁻)	576.74	(3/2⁻,5/2,7/2⁻)	%Iγ=0.27 *14*
1015.4 *4*	1.4 *2*	1581.16	(9/2⁺,11/2⁻)	565.57	(3/2⁻,5/2⁻)	%Iγ=0.94 *14*
1085.8 *4*	3.8 *3*	1381.3	(5/2⁻,7/2,9/2⁻)	295.83	(9/2⁻)	%Iγ=2.55 *22*
1091.8 *5*	0.8 *2*	1092.3	(9/2,11/2⁻)	0.0	7/2$^{(-)}$	%Iγ=0.54 *14*
[x]1151.2 *5*	1.3 *2*					%Iγ=0.87 *14*
1167.6 *5*	1.6 *2*	1276.4	(9/2⁻)	108.75	(3/2⁻)	%Iγ=1.07 *14*
[x]1183.1 *5*	0.8 *2*					%Iγ=0.54 *14*
1189.9 *8*	≈0.4	1189.5	(7/2⁻,9/2,11/2⁻)	0.0	7/2$^{(-)}$	%Iγ=0.27 *14*
[x]1202.4 *6*	0.5 *2*					%Iγ=0.34 *14*
[x]1208.4 *5*	0.9 *2*					%Iγ=0.60 *14*
1276.5 *4*	5.0 *4*	1276.4	(9/2⁻)	0.0	7/2$^{(-)}$	%Iγ=3.4 *3*
1284.8 *8*	≈0.1	1581.16	(9/2⁺,11/2⁻)	295.83	(9/2⁻)	%Iγ=0.07 *4*
[x]1300.8 *8*	0.4 *2*					%Iγ=0.27 *14*
[x]1347.8 *6*	1.0 *2*					%Iγ=0.67 *14*
1381.0 *6*	1.9 *3*	1381.3	(5/2⁻,7/2,9/2⁻)	0.0	7/2$^{(-)}$	%Iγ=1.27 *21*
[x]1389.0 *8*	0.2 *1*					%Iγ=0.13 *7*

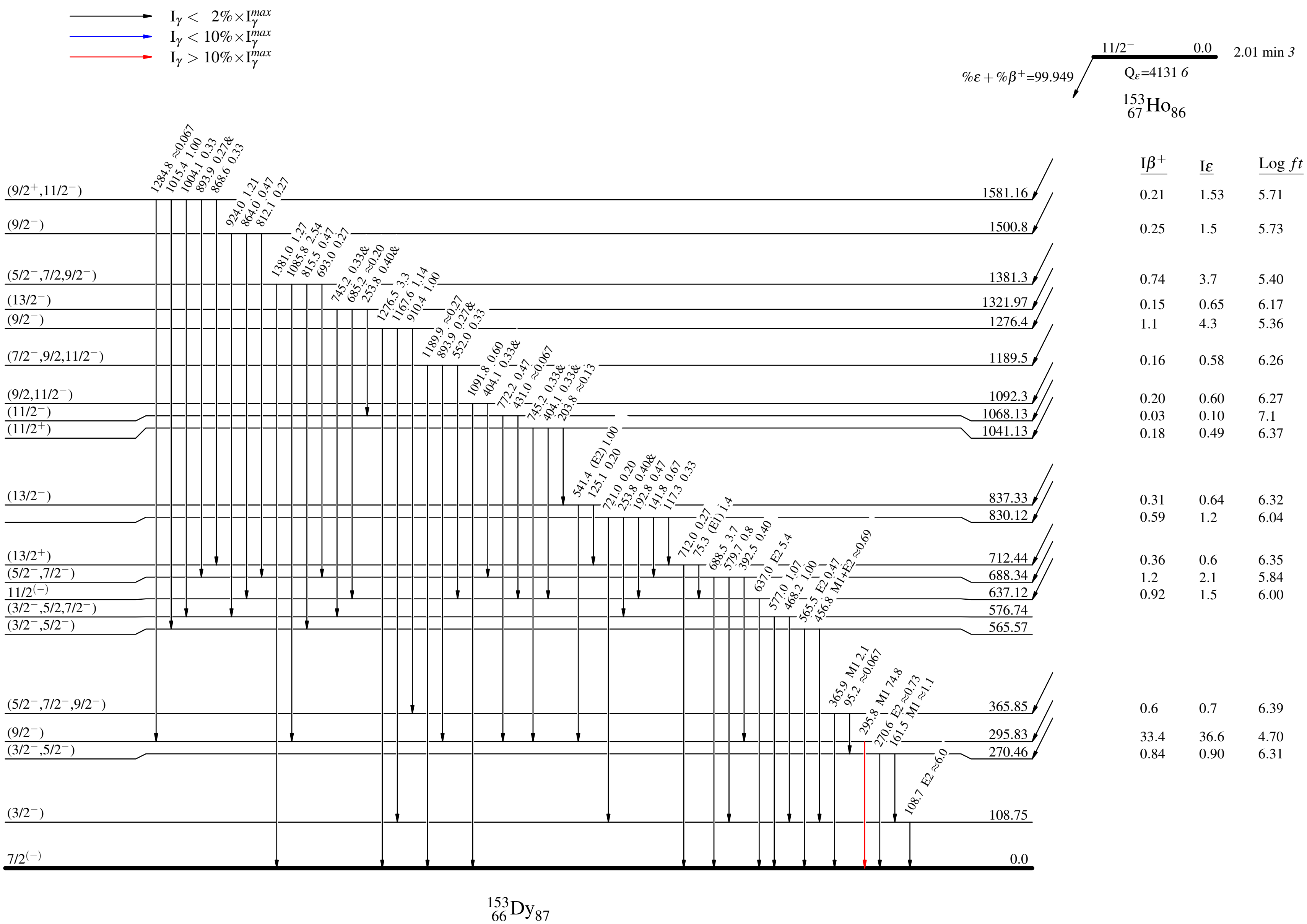
[†] From 1982Ba75; others: 1981PaZP (especially below 700 keV) and short lists in 1977ZuZV and 1974Sc19.
[‡] From 1982Ba75; where these values are given as approximate, the values of 1981PaZP are given in comments.
[#] From ^{153}Dy Adopted γ′s, but primarily from 1977ZuZV and 1981PaZP.
[@] Only reported by 1977ZuZV.
[&] Only reported by 1981PaZP.
[a] Additional information 1.
[b] For absolute intensity per 100 decays, multiply by 0.670 *21*.
[c] Multiply placed with undivided intensity.
[x] γ ray not placed in level scheme.

$^{153}_{66}Dy_{87}$-5

^{153}Ho ε decay (2.01 min)   1982Ba75

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



$^{153}_{66}Dy_{87}$-6