^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06

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

Parent: ^{154}Ho: E=0.0; $J^\pi=2^-$; $T_{1/2}$=11.76 min *19*; Q(ε)=5755 *10*; %ε+%β^+ decay=99.981 *4*

^{154}Ho-Q($\varepsilon+\beta^+$): From 2021Wa16.

^{154}Ho-%ε+%β^+ decay: From %α=0.019 *4*, weighted average of 0.017 *4* and 0.028 *9* (1974Sc19).

Additional information 1.

Experimental methods:

1968Wa12: Produced by ^{148}Sm(^{11}B,5n) and (^{10}B,4n) with E(^{11}B)=75 MeV and E(^{10}B)=60 MeV. γ singles and $\gamma\gamma$ coincidences measured with Ge and NaI(Tl) detectors. Report 19 γ's.

1974Sc19: Produced by ^{147}Sm(^{10}B,3n) with E(^{10}B)=41 and 45 MeV. γ measured with Ge detector; report 19 γ's.

1980Zo02: From the ^{154}Er ε decay, with the source material produced in the ^{148}Sm(^{12}C,6n) reaction with E(^{12}C)=83 MeV. Measured γ singles and $\gamma\gamma$ coincidences with Ge detectors and ce with Si(Li) detectors. Reported 32 γ's, 16 with multipolarities. Preliminary reports: 1975ZoZT and 1977ZoZY.

1981ZuZU: Abstract which reports Eγ and Iγ for 28 γ's and 511 annihilation line; 3 γ's and 511 are not reported by 1980Zo02.

1983Al06, 1983AlZP: Measured β^+ end-point with Ge detector.

1983GaZR: Measured ce with Si(Li) detector and reported α_K and α_L values.

1991AlZY: Measured β^+ end-points with Ge detector to determine isomer excitation energy.

^{154}Dy Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0.0[@]	0^+	3.0×10^6 y *15*	
334.62[@] *6*	2^+	27.5 ps *20*	
660.76[&] *8*	0^+		
747.02[@] *10*	4^+	6.9 ps *5*	
905.26[&] *7*	2^+		
1027.20[a] *7*	2^+		
1058.07[b] *17*	0^+		
1207.98[c] *11*	3^-		
1251.95[&] *12*	4^+		
1334.45[a] *10*	3^+		
1390.48[b] *10*	2^+		
1420.46[c] *16*	1^-		
1442.53[a] *15*	4^+		
1507.74[e] *10*	2^+		
1545.92[c] *23*	5^-		
1635.22[d] *21*	2^-		
1782.0[e] *3*	(3^+)		
1819.14[d] *21*	(4^-)		
1832.9 *3*	1,2,3		
1844.9 *3*	1,2,3		
1877.2 *4*	1,2,3		
1903.80[d] *22*	(3^-)		
1958.3 *5*	1,2,3		
1991.1 *3*	1,2,3		
2148.4 *5*	1,2,3		
2168.7 *4*	1,2,3		
2178.1 *3*	1,2,3		
2183.9 *4*	1,2,3		E(level): As reported by 1980Zo02. These authors report a 2318.43, 7^+, level in the decay of the 3.10-m isomer. The γ-decay modes of these two states are quite

Continued on next page (footnotes at end of table)

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

^{154}Dy Levels (continued)

E(level)†	Jπ‡	Comments
		different. Also, a 7^+ level at this energy cannot be appreciably populated in the decay of the 11.76-m state in ^{154}Ho. The evaluator concludes that this 2183.9 level is not the same as the 7^+ level seen in the decay of the 3.01-m isomer and questions its existence, but has chosen to include it here anyway.
2249.5 *4*	1,2,3	
2271.97 *24*	1,2,3	
2344.9 *6*	1,2,3	

† From least-squares fit to γ energies.
‡ From the adopted values. These are the same as proposed by 1980Zo02, which are based on γ multipolarities and expected band structure.
# From the adopted values.
@ Band(A): Ground-state band.
& Band(B): First excited 0^+ band. Denoted as a quasi-β band by 1980Zo02.
a Band(C): Quasi-gamma band.
b Band(D): Second excited 0^+ band. Several possibilities for configuration assignments for this band are discussed by 1980Zo02.
c Band(E): Octupole-based band, odd-spin band.
d Band(F): Octupole-related level sequence.
e Band(G): $K^\pi=2^+$ band.

ε,β^+ radiations

Additional information 2.
av Eβ: Additional information 6.

E(decay)†	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)‡	Comments
(3410 *10*)	2344.9	0.172 *34*	0.33 *9*	7.5 *1*	0.5 *1*	av Eβ=1072.9 *45*; εK=0.5498 *29*; εL=0.08163 *44*; εM+=0.02548 *13*
(3483 *10*)	2271.97	0.47 *7*	0.83 *19*	7.1 *1*	1.3 *2*	av Eβ=1105.8 *45*; εK=0.5324 *29*; εL=0.07901 *44*; εM+=0.02466 *13*
(3506 *10*)	2249.5	0.259 *37*	0.44 *9*	7.4 *1*	0.7 *1*	av Eβ=1116.2 *45*; εK=0.5271 *29*; εL=0.07821 *44*; εM+=0.02441 *13*
(3571 *10*)	2183.9	0.350 *39*	0.55 *9*	7.3 *1*	0.9 *1*	av Eβ=1145.5 *45*; εK=0.5117 *29*; εL=0.07588 *44*; εM+=0.02368 *13*
(3577 *10*)	2178.1	0.43 *8*	0.67 *18*	7.2 *1*	1.1 *2*	av Eβ=1148.2 *45*; εK=0.5103 *29*; εL=0.07568 *43*; εM+=0.02361 *13*
(3586 *10*)	2168.7	0.393 *39*	0.61 *9*	7.2 *1*	1.0 *1*	av Eβ=1152.3 *45*; εK=0.5081 *29*; εL=0.07535 *43*; εM+=0.02351 *13*
(3607 *10*)	2148.4	0.199 *40*	0.30 *9*	7.6 *1*	0.5 *1*	av Eβ=1161.7 *45*; εK=0.5034 *29*; εL=0.07464 *43*; εM+=0.02329 *13*
(3764 *10*)	1991.1	0.62 *9*	0.78 *18*	7.2 *1*	1.4 *2*	av Eβ=1232.8 *45*; εK=0.4674 *28*; εL=0.06923 *42*; εM+=0.02160 *12*
(3797 *10*)	1958.3	0.315 *45*	0.38 *9*	7.5 *1*	0.7 *1*	av Eβ=1247.7 *45*; εK=0.4601 *28*; εL=0.06814 *42*; εM+=0.02126 *12*
(3851 *10*)	1903.80	3 *6*	3.7457	6.5 *4*	7 *6*	av Eβ=1272.2 *45*; εK=0.4481 *28*; εL=0.06634 *41*; εM+=0.02070 *12*
(3878 *10*)	1877.2	0.66 *9*	0.74 *18*	7.2 *1*	1.4 *2*	av Eβ=1284.5 *45*; εK=0.4423 *28*; εL=0.06547 *41*; εM+=0.02043 *12*
(3910 *10*)	1844.9	0.91 *10*	0.99 *18*	7.1 *1*	1.9 *2*	av Eβ=1299.0 *45*; εK=0.4353 *27*; εL=0.06443 *41*; εM+=0.02010 *12*
(3922 *10*)	1832.9	0.68 *10*	0.72 *18*	7.3 *1*	1.4 *2*	av Eβ=1304.5 *45*; εK=0.4327 *27*; εL=0.06405 *41*; εM+=0.01998 *12*

Continued on next page (footnotes at end of table)

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

ϵ,β^+ radiations (continued)

E(decay)†	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)‡	Comments
(3936 *10*)	1819.14	0.28 *5*	0.82 *19*	9.0 *1*	1.1 *2*	av Eβ=1299.0 *44*; εK=0.6204 *23*; εL=0.09403 *35*; εM+=0.02944 *12*
(3973 *10*)	1782.0	0.55 *10*	0.55 *17*	7.4 *1*	1.1 *2*	av Eβ=1327.6 *45*; εK=0.4220 *27*; εL=0.06243 *40*; εM+=0.01947 *12*
(4120 *10*)	1635.22	2.02 *18*	1.78 *9*	6.9 *1*	3.8 *2*	av Eβ=1394.6 *46*; εK=0.3921 *26*; εL=0.05796 *38*; εM+=0.01808 *11*
(4247 *10*)	1507.74	2.08 *27*	1.62 *13*	7.0 *1*	3.7 *3*	av Eβ=1452.5 *46*; εK=0.3675 *24*; εL=0.05430 *36*; εM+=0.01694 *10*
(4313 *10*)	1442.53	0.75 *7*	1.45 *19*	8.9^{1u} *1*	2.2 *2*	av Eβ=1464.0 *44*; εK=0.5518 *24*; εL=0.08330 *36*; εM+=0.02607 *12*
(4335 *10*)	1420.46	2.32 *27*	1.68 *13*	7.0 *1*	4.0 *3*	av Eβ=1492.7 *46*; εK=0.3515 *24*; εL=0.05191 *35*; εM+=0.01619 *10*
(4365 *10*)	1390.48	2.93 *36*	2.07 *17*	6.9 *1*	5.0 *4*	av Eβ=1506.4 *46*; εK=0.3461 *23*; εL=0.05111 *35*; εM+=0.01595 *10*
(4421 *10*)	1334.45	1.8	<1.2	>7.1	<3	av Eβ=1532.1 *46*; εK=0.3363 *23*; εL=0.04965 *34*; εM+=0.01549 *9* I($\varepsilon+\beta^+$): Value depends on Iγ for multiply placed 570 γ which feeds this level.
(4503 *10*)	1251.95	1.03 *8*	1.67 *18*	8.9^{1u} *1*	2.7 *2*	av Eβ=1548.1 *44*; εK=0.5171 *24*; εL=0.07792 *36*; εM+=0.02437 *11*
(4547 *10*)	1207.98	7.5 *6*	4.51 *27*	6.59 *3*	12.0 *7*	av Eβ=1589.8 *46*; εK=0.3151 *22*; εL=0.04651 *32*; εM+=0.01450 *8*
(4697 *10*)	1058.07	0.93 *8*	1.27 *18*	9.1^{1u} *1*	2.2 *2*	av Eβ=1633.9 *44*; εK=0.4824 *23*; εL=0.07258 *36*; εM+=0.02270 *11*
(4728 *10*)	1027.20	5.98 *47*	3.12 *17*	6.79 *3*	9.1 *5*	av Eβ=1672.9 *46*; εK=0.2872 *20*; εL=0.04235 *30*; εM+=0.01320 *8*
(4850 *10*)	905.26	7.4583	3.5417	>6.8	<11	av Eβ=1729.1 *46*; εK=0.2698 *19*; εL=0.03977 *28*; εM+=0.01240 *7* Additional information 3.
(5008 *10*)	747.02	3.55 *49*	3.8 *9*	8.73^{1u} *6*	7.3 *10*	av Eβ=1771.9 *44*; εK=0.4294 *22*; εL=0.06444 *34*; εM+=0.02015 *10* Additional information 4.
5360 *80*	334.62	16 *6*	5.1 *15*	6.70 *12*	21 *6*	av Eβ=1992.4 *46*; εK=0.2025 *14*; εL=0.02981 *21*; εM+=0.00929 *5* Additional information 5.

† From 1983Al06.
‡ Absolute intensity per 100 decays.

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

$\gamma(^{154}Dy)$

Iγ normalization: Value computed to give 100% feeding of g.s.
The indicated $\gamma\gamma$ coincidence results are from a general statement (1980Zo02), rather than explicit results.

E_γ †	I_γ †‡ *a*	E_i(level)	J_i^π	E_f	J_f^π	Mult. #	α *c*	$I_{(\gamma+ce)}$ *b*	Comments
152.7 *3*	0.59 *10*	1058.07	0^+	905.26	2^+	[E2]	0.592 *10*		α(K)=0.352 *6*; α(L)=0.186 *3*; α(M)=0.0440 *8*; α(N+..)=0.01114 *19* α(N)=0.00990 *17*; α(O)=0.001223 *20*; α(P)=1.572×10^{-5} *24* %Iγ=0.50 *9*
182.0 *4*	0.76 *15*	1390.48	2^+	1207.98	3^-	[E1]	0.0623 *10*		α(K)=0.0525 *8*; α(L)=0.00767 *12*; α(M)=0.00168 *3*; α(N+..)=0.000440 *7* α(N)=0.000383 *6*; α(O)=5.38×10^{-5} *9*; α(P)=2.63×10^{-6} *4* %Iγ=0.64 *13*
244.3 *3*	0.50 *15*	905.26	2^+	660.76	0^+	[E2]	0.1228		α(K)=0.0878 *13*; α(L)=0.0271 *4*; α(M)=0.00630 *10*; α(N+..)=0.001616 *24* α(N)=0.001427 *22*; α(O)=0.000184 *3*; α(P)=4.38×10^{-6} *7* %Iγ=0.42 *13*
326.1 *1*	6.2 *3*	660.76	0^+	334.62	2^+	[E2]	0.0501		α(K)=0.0381 *6*; α(L)=0.00930 *13*; α(M)=0.00213 *3*; α(N+..)=0.000552 *8* α(N)=0.000485 *7*; α(O)=6.43×10^{-5} *9*; α(P)=2.02×10^{-6} *3* %Iγ=5.2 *3*
334.6 *1*	100	334.62	2^+	0.0	0^+	E2	0.0464		α(K)=0.0355 *5*; α(L)=0.00850 *12*; α(M)=0.00195 *3*; α(N+..)=0.000504 *7* α(N)=0.000443 *7*; α(O)=5.89×10^{-5} *9*; α(P)=1.88×10^{-6} *3* %Iγ=84.3 *4* α(K)exp: 0.036 (1980Zo02).
346.7 *1*	1.19 *12*	1251.95	4^+	905.26	2^+	E2	0.0418		α(K)=0.0321 *5*; α(L)=0.00751 *11*; α(M)=0.001717 *25*; α(N+..)=0.000445 *7* α(N)=0.000391 *6*; α(O)=5.21×10^{-5} *8*; α(P)=1.717×10^{-6} *24* %Iγ=1.00 *10*
363.4 *4*	0.42 *20*	1390.48	2^+	1027.20	2^+				%Iγ=0.35 *17*
366.2 *3*	1.27 *16*	1027.20	2^+	660.76	0^+	[E2]	0.0357		α(K)=0.0276 *4*; α(L)=0.00622 *9*; α(M)=0.001420 *21*; α(N+..)=0.000368 *6* α(N)=0.000323 *5*; α(O)=4.34×10^{-5} *7*; α(P)=1.489×10^{-6} *21* %Iγ=1.07 *14*
397.3 *2*		1058.07	0^+	660.76	0^+	E0		1.44 *9*	
412.4 *2*	18.0 *10*	747.02	4^+	334.62	2^+	E2	0.0255		α(K)=0.0201 *3*; α(L)=0.00419 *6*; α(M)=0.000952 *14*; α(N+..)=0.000248 *4* α(N)=0.000217 *3*; α(O)=2.95×10^{-5} *5*; α(P)=1.099×10^{-6} *16* %Iγ=15.2 *9* α(K)exp: 0.0218 *20* (1980Zo02).
415.8 *4*	0.47 *11*	1442.53	4^+	1027.20	2^+	[E2]	0.0249		α(K)=0.0196 *3*; α(L)=0.00408 *6*; α(M)=0.000927 *14*; α(N+..)=0.000241 *4* α(N)=0.000211 *3*; α(O)=2.87×10^{-5} *5*; α(P)=1.076×10^{-6} *16* %Iγ=0.40 *9*

$^{154}_{66}Dy_{88}$-4

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

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

E_γ[†]	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[c]	$I_{(\gamma+ce)}$[b]	Comments
429.0 *2*	0.53 *13*	1334.45	3^+	905.26	2^+	[M1,E2]	0.033 *11*		α(K)=0.028 *10*; α(L)=0.0045 *8*; α(M)=0.00100 *17*; α(N+..)=0.00026 *5* α(N)=0.00023 *4*; α(O)=3.3×10^{-5} *7*; α(P)=1.6×10^{-6} *7* %Iγ=0.45 *11*
461.0 *2*	1.0 *2*	1207.98	3^-	747.02	4^+	[E1]	0.00617		α(K)=0.00524 *8*; α(L)=0.000724 *11*; α(M)=0.0001576 *23*; α(N+..)=4.18×10^{-5} *6* α(N)=3.63×10^{-5} *5*; α(O)=5.23×10^{-6} *8*; α(P)=2.85×10^{-7} *4* %Iγ=0.84 *17*
480.0 *4*	0.26 *10*	1507.74	2^+	1027.20	2^+				%Iγ=0.22 *9*
485.3 *2*	0.66 *10*	1390.48	2^+	905.26	2^+	E0+E2,M1	0.20[@] *5*		%Iγ=0.56 *9* α(K)exp: 0.176 *37* (1980Zo02).
504.9 *3*	1.78 *17*	1251.95	4^+	747.02	4^+	E0+E2,M1	0.094[@] *15*		%Iγ=1.50 *14* α(K)exp: 0.079 *12* (1980Zo02).
515.2 *4*	0.48 *20*	1420.46	1^-	905.26	2^+	[E1]	0.00481		α(K)=0.00409 *6*; α(L)=0.000561 *8*; α(M)=0.0001221 *18*; α(N+..)=3.24×10^{-5} *5* α(N)=2.81×10^{-5} *4*; α(O)=4.06×10^{-6} *6*; α(P)=2.23×10^{-7} *4* %Iγ=0.41 *17*
569[d] *1*	13.2[d] *7*	1903.80	(3^-)	1334.45	3^+	[E1]	0.00387		α(K)=0.00329 *5*; α(L)=0.000449 *7*; α(M)=9.78×10^{-5} *15*; α(N+..)=2.60×10^{-5} *4* α(N)=2.25×10^{-5} *4*; α(O)=3.26×10^{-6} *5*; α(P)=1.81×10^{-7} *3* %Iγ=11.1 *6*
570.6[d] *1*	13.2[d] *7*	905.26	2^+	334.62	2^+	E0+E2,M1	0.025[&] *3*		%Iγ=11.1 *6* α(K)exp: 0.0191 *15* (1980Zo02).
587.5 *1*	0.94 *10*	1334.45	3^+	747.02	4^+	[M1,E2]	0.015 *5*		α(K)=0.012 *5*; α(L)=0.0019 *5*; α(M)=0.00042 *10*; α(N+..)=0.00011 *3* α(N)=9.7×10^{-5} *23*; α(O)=1.4×10^{-5} *4*; α(P)=7 %Iγ=0.79 *9*
602.9 *4*	0.36 *10*	1507.74	2^+	905.26	2^+				%Iγ=0.30 *9*
610.6 *5*	0.35 *16*	1819.14	(4^-)	1207.98	3^-	[M1,E2]	0.014 *5*		α(K)=0.011 *4*; α(L)=0.0017 *5*; α(M)=0.00038 *9*; α(N+..)=0.000100 *25* α(N)=8.7×10^{-5} *21*; α(O)=1.3×10^{-5} *4*; α(P)=6.8×10^{-7} *25* %Iγ=0.30 *14*
642.8 *4*	0.54 *25*	1390.48	2^+	747.02	4^+	[E2]	0.00811		α(K)=0.00666 *10*; α(L)=0.001127 *16*; α(M)=0.000251 *4*; α(N+..)=6.61×10^{-5} *10* α(N)=5.76×10^{-5} *9*; α(O)=8.11×10^{-6} *12*; α(P)=3.80×10^{-7} *6* %Iγ=0.46 *21*
660.8 *2*		660.76	0^+	0.0	0^+	E0		0.53 *3*	%Iγ=0.44692 *21*
692.6 *1*	6.0 *3*	1027.20	2^+	334.62	2^+	M1	0.01306		α(K)=0.01107 *16*; α(L)=0.001551 *22*; α(M)=0.000339 *5*; α(N+..)=9.06×10^{-5} *13*

$^{154}_{66}Dy_{88}$-5

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

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

E_γ †	I_γ †‡ *a*	E_i(level)	J_i^π	E_f	J_f^π	Mult. #	α *c*	Comments
								α(N)=7.84×10^{-5} *11*; α(O)=1.153×10^{-5} *17*; α(P)=6.73×10^{-7} *10* %Iγ=5.1 *3* α(K)exp: 0.0134 *31* (1980Zo02).
695.3 *2*	1.4 *2*	1442.53	4$^+$	747.02	4$^+$	M1(+E2)	0.010 *3*	α(K)=0.008 *3*; α(L)=0.0012 *4*; α(M)=0.00027 *7*; α(N+..)=7.2×10^{-5} *18* α(N)=6.2×10^{-5} *16*; α(O)=9.0×10^{-6} *24*; α(P)=4.9×10^{-7} *18* %Iγ=1.18 *17* α(K)exp: 0.0115 *58* (1980Zo02).
723.6 *5*	0.2 *1*	1058.07	0$^+$	334.62	2$^+$	[E2]	0.00615	α(K)=0.00509 *8*; α(L)=0.000826 *12*; α(M)=0.000183 *3*; α(N+..)=4.84×10^{-5} *7* α(N)=4.21×10^{-5} *6*; α(O)=5.97×10^{-6} *9*; α(P)=2.92×10^{-7} *5* %Iγ=0.17 *9*
729.8 *1*	1.6 *2*	1390.48	2$^+$	660.76	0$^+$	[E2]	0.00603	α(K)=0.00500 *7*; α(L)=0.000808 *12*; α(M)=0.000179 *3*; α(N+..)=4.74×10^{-5} *7* α(N)=4.12×10^{-5} *6*; α(O)=5.84×10^{-6} *9*; α(P)=2.86×10^{-7} *4* %Iγ=1.35 *17*
755.1 *5*	0.65 *13*	1782.0	(3$^+$)	1027.20	2$^+$	[M1,E2]	0.0081 *25*	α(K)=0.0068 *22*; α(L)=0.0010 *3*; α(M)=0.00022 *6*; α(N+..)=5.8×10^{-5} *15* α(N)=5.0×10^{-5} *13*; α(O)=7.3×10^{-6} *20*; α(P)=4.0×10^{-7} *14* %Iγ=0.55 *11*
798.9 *2*	0.66 *10*	1545.92	5$^-$	747.02	4$^+$	[E1]	0.00192	α(K)=0.001639 *23*; α(L)=0.000220 *3*; α(M)=4.77×10^{-5} *7*; α(N+..)=1.270×10^{-5} *18* α(N)=1.100×10^{-5} *16*; α(O)=1.603×10^{-6} *23*; α(P)=9.10×10^{-8} *13* %Iγ=0.56 *9*
846.7 *2*	1.0 *1*	1507.74	2$^+$	660.76	0$^+$	[E2]	0.00433	α(K)=0.00362 *5*; α(L)=0.000560 *8*; α(M)=0.0001237 *18*; α(N+..)=3.27×10^{-5} *5* α(N)=2.85×10^{-5} *4*; α(O)=4.07×10^{-6} *6*; α(P)=2.08×10^{-7} *3* %Iγ=0.84 *9*
873.3 *1*	14.4 *7*	1207.98	3$^-$	334.62	2$^+$	E1	1.61×10^{-3}	α(K)=0.001379 *20*; α(L)=0.000184 *3*; α(M)=4.00×10^{-5} *6*; α(N+..)=1.063×10^{-5} *15* α(N)=9.21×10^{-6} *13*; α(O)=1.344×10^{-6} *19*; α(P)=7.67×10^{-8} *11* %Iγ=12.1 *6* α(K)exp: 0.0014 *7* (1980Zo02).
876.6 *3*	0.72 *10*	1903.80	(3$^-$)	1027.20	2$^+$	[E1]	1.60×10^{-3}	α(K)=0.001369 *20*; α(L)=0.000183 *3*; α(M)=3.97×10^{-5} *6*; α(N+..)=1.056×10^{-5} *15* α(N)=9.15×10^{-6} *13*; α(O)=1.334×10^{-6} *19*; α(P)=7.62×10^{-8} *11* %Iγ=0.61 *9*
905.3 *1*	2.60 *24*	905.26	2$^+$	0.0	0$^+$	[E2]	0.00375	α(K)=0.00314 *5*; α(L)=0.000478 *7*; α(M)=0.0001054 *15*; α(N+..)=2.79×10^{-5} *4* α(N)=2.43×10^{-5} *4*; α(O)=3.48×10^{-6} *5*; α(P)=1.81×10^{-7} *3* %Iγ=2.19 *20*
999.8 *1*	3.9 *2*	1334.45	3$^+$	334.62	2$^+$	[M1,E2]	0.0042 *12*	α(K)=0.0035 *10*; α(L)=0.00050 *13*; α(M)=0.00011 *3*; α(N+..)=2.9×10^{-5} *8*

$^{154}_{66}Dy_{88}$-6

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

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

E_γ[†]	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[c]	$I_{(\gamma+ce)}$[b]	Comments
									α(N)=2.5×10^{-5} *7*; α(O)=3.7×10^{-6} *10*; α(P)=2.1×10^{-7} *7* %Iγ=3.29 *17*
1027.2 *1*	6.3 *3*	1027.20	2$^+$	0.0	0$^+$	[E2]	0.00288		α(K)=0.00242 *4*; α(L)=0.000358 *5*; α(M)=7.87×10^{-5} *11*; α(N+..)=2.09×10^{-5} *3* α(N)=1.81×10^{-5} *3*; α(O)=2.61×10^{-6} *4*; α(P)=1.397×10^{-7} *20* %Iγ=5.31 *24*
1055.8 *2*	1.1 *2*	1390.48	2$^+$	334.62	2$^+$	E0+E2,M1	0.018[@] *8*		%Iγ=0.93 *17* α(K)exp: 0.0155 *65* (1980Zo02).
1058.4 *6*		1058.07	0$^+$	0.0	0$^+$	E0		0.034 *10*	%Iγ=2.867×10^{-2} *7*
1072.2 *2*	1.0 *2*	1819.14	(4$^-$)	747.02	4$^+$	[E1]	1.10×10^{-3}		α(K)=0.000938 *14*; α(L)=0.0001242 *18*; α(M)=2.69×10^{-5} *4*; α(N+..)=7.17×10^{-6} *10* α(N)=6.21×10^{-6} *9*; α(O)=9.09×10^{-7} *13*; α(P)=5.24×10^{-8} *8* %Iγ=0.84 *17*
1085.9 *2*	1.8 *2*	1420.46	1$^-$	334.62	2$^+$	[E1]	1.07×10^{-3}		α(K)=0.000917 *13*; α(L)=0.0001213 *17*; α(M)=2.63×10^{-5} *4*; α(N+..)=7.01×10^{-6} *10* α(N)=6.07×10^{-6} *9*; α(O)=8.87×10^{-7} *13*; α(P)=5.12×10^{-8} *8* %Iγ=1.52 *17*
1108.0 *2*	0.75 *10*	1442.53	4$^+$	334.62	2$^+$	[E2]	0.00247		α(K)=0.00208 *3*; α(L)=0.000303 *5*; α(M)=6.65×10^{-5} *10*; α(N+..)=1.80×10^{-5} *3* α(N)=1.532×10^{-5} *22*; α(O)=2.22×10^{-6} *4*; α(P)=1.201×10^{-7} *17*; α(IPF)=3.75×10^{-7} *6* %Iγ=0.63 *9*
1156.8 *3*	0.8 *2*	1903.80	(3$^-$)	747.02	4$^+$	[E1]	9.65×10^{-4}		α(K)=0.000818 *12*; α(L)=0.0001079 *16*; α(M)=2.34×10^{-5} *4*; α(N+..)=1.586×10^{-5} *24* α(N)=5.40×10^{-6} *8*; α(O)=7.90×10^{-7} *11*; α(P)=4.57×10^{-8} *7*; α(IPF)=9.62×10^{-6} *16* %Iγ=0.68 *17*
1173.2 *1*	1.9 *2*	1507.74	2$^+$	334.62	2$^+$				%Iγ=1.60 *17*
1244.6 *3*	0.40 *10*	2271.97	1,2,3	1027.20	2$^+$				%Iγ=0.34 *9*
1300.6 *2*	4.48 *28*	1635.22	2$^-$	334.62	2$^+$	[E1]	8.46×10^{-4}		α(K)=0.000665 *10*; α(L)=8.73×10^{-5} *13*; α(M)=1.89×10^{-5} *3*; α(N+..)=7.51×10^{-5} *11* α(N)=4.37×10^{-6} *7*; α(O)=6.40×10^{-7} *9*; α(P)=3.72×10^{-8} *6*; α(IPF)=7.01×10^{-5} *10* %Iγ=3.78 *24*
1390.0 *4*	0.58 *13*	1390.48	2$^+$	0.0	0$^+$	[E2]	1.62×10^{-3}		α(K)=0.001337 *19*; α(L)=0.000188 *3*; α(M)=4.10×10^{-5} *6*; α(N+..)=5.08×10^{-5} *8* α(N)=9.47×10^{-6} *14*; α(O)=1.378×10^{-6} *20*; α(P)=7.72×10^{-8} *11*; α(IPF)=3.99×10^{-5} *6* %Iγ=0.49 *11*

$^{154}_{66}Dy_{88}$-7

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

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

E_γ[†]	I_γ[†‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[c]	Comments
1420.3 *3*	2.41 *23*	1420.46	1^-	0.0	0^+	[E1]	8.11×10^{-4}	α(K)=0.000571 *8*; α(L)=7.47×10^{-5} *11*; α(M)=1.619×10^{-5} *23*; α(N+..)=0.0001492 *21* α(N)=3.74×10^{-6} *6*; α(O)=5.48×10^{-7} *8*; α(P)=3.20×10^{-8} *5*; α(IPF)=0.0001449 *21* %Iγ=2.03 *19*
1431.0 *3*	0.67 *13*	2178.1	1,2,3	747.02	4^+			%Iγ=0.57 *11*
1447.1 *4*	0.59 *13*	1782.0	(3^+)	334.62	2^+	[M1,E2]	0.0019 *4*	α(K)=0.0016 *4*; α(L)=0.00021 *5*; α(M)=4.7×10^{-5} *9*; α(N+..)=7.3×10^{-5} *8* α(N)=1.08×10^{-5} *22*; α(O)=1.6×10^{-6} *4*; α(P)=9.2×10^{-8} *21*; α(IPF)=6.1×10^{-5} *5* %Iγ=0.50 *11*
1498.3 *3*	1.68 *16*	1832.9	1,2,3	334.62	2^+			%Iγ=1.42 *14*
1502.5 *4*	0.77 *13*	2249.5	1,2,3	747.02	4^+			%Iγ=0.65 *11*
1507.6 *4*	0.89 *18*	1507.74	2^+	0.0	0^+	[E2]	1.43×10^{-3}	α(K)=0.001146 *16*; α(L)=0.0001594 *23*; α(M)=3.48×10^{-5} *5*; α(N+..)=8.49×10^{-5} *12* α(N)=8.03×10^{-6} *12*; α(O)=1.170×10^{-6} *17*; α(P)=6.62×10^{-8} *10*; α(IPF)=7.57×10^{-5} *11* %Iγ=0.75 *15*
1510.3 *3*	2.21 *19*	1844.9	1,2,3	334.62	2^+			%Iγ=1.86 *16*
1542.7 *5*	1.05 *14*	1877.2	1,2,3	334.62	2^+			%Iγ=0.89 *12*
1611.2 *5*	0.37 *15*	2271.97	1,2,3	660.76	0^+			%Iγ=0.31 *13*
1623.7 *5*	0.80 *15*	1958.3	1,2,3	334.62	2^+			%Iγ=0.68 *13*
1656.5 *3*	1.65 *16*	1991.1	1,2,3	334.62	2^+			%Iγ=1.39 *14*
1813.8 *5*	0.64 *12*	2148.4	1,2,3	334.62	2^+			%Iγ=0.54 *10*
1834.1 *4*	1.19 *14*	2168.7	1,2,3	334.62	2^+			%Iγ=1.00 *12*
1843.8 *5*	0.60 *13*	2178.1	1,2,3	334.62	2^+			%Iγ=0.51 *11*
1849.3 *4*	1.09 *14*	2183.9	1,2,3	334.62	2^+			%Iγ=0.92 *12*
1877.1 *6*	0.55 *14*	1877.2	1,2,3	0.0	0^+			%Iγ=0.46 *12*
1937.8 *5*	0.73 *15*	2271.97	1,2,3	334.62	2^+			%Iγ=0.62 *13*
2010.3 *6*	0.62 *12*	2344.9	1,2,3	334.62	2^+			%Iγ=0.52 *10*

[†] From evaluator's average of the data of 1980Zo02, 1974Sc19, and 1981ZuZU, but primarily from 1980Zo02.
[‡] Iγ(511)=25.5 *5* (1981ZuZU). However, from the calculated capture/positron ratios, we expect I(β^+) > 50 and thus Iγ(511) > 100.
[#] Assignments are from Adopted Gammas. However, they are primarily from α_K(exp) from this decay mode (1980Zo02). Other: 1983GaZR.
[@] Based on α_K(exp) (1980Zo02).
[&] Based on α_K(exp) (1980Zo02) from 3.10-m ^{154}Ho ε decay, where γ is not multiply placed.
[a] For absolute intensity per 100 decays, multiply by 0.843 *4*.
[b] For absolute intensity per 100 decays, multiply by 0.844 *6*.
[c] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[d] Multiply placed with undivided intensity.

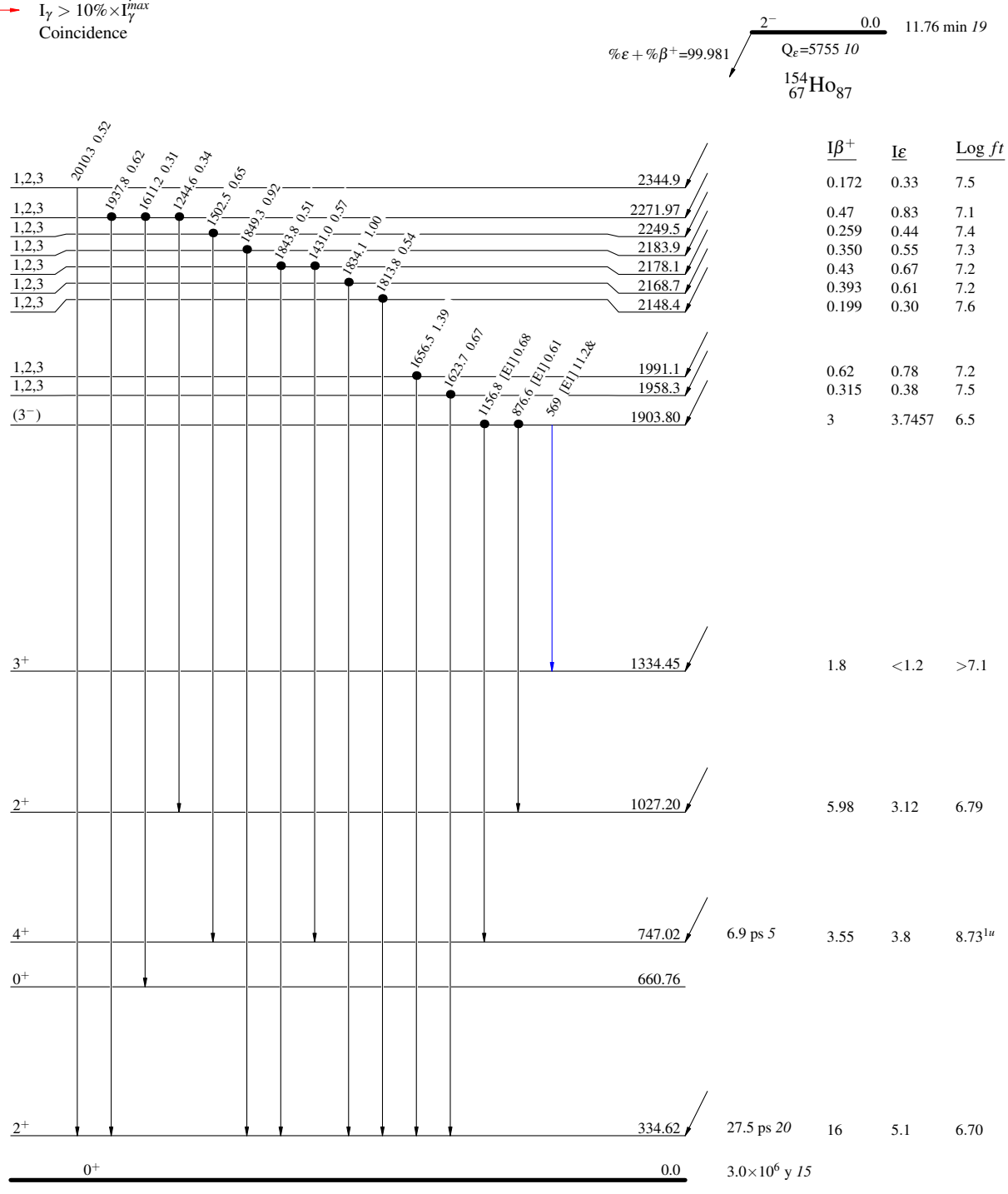
$^{154}_{66}Dy_{88}$-8

^{154}Ho ε+β$^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06

Decay Scheme

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

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- Coincidence

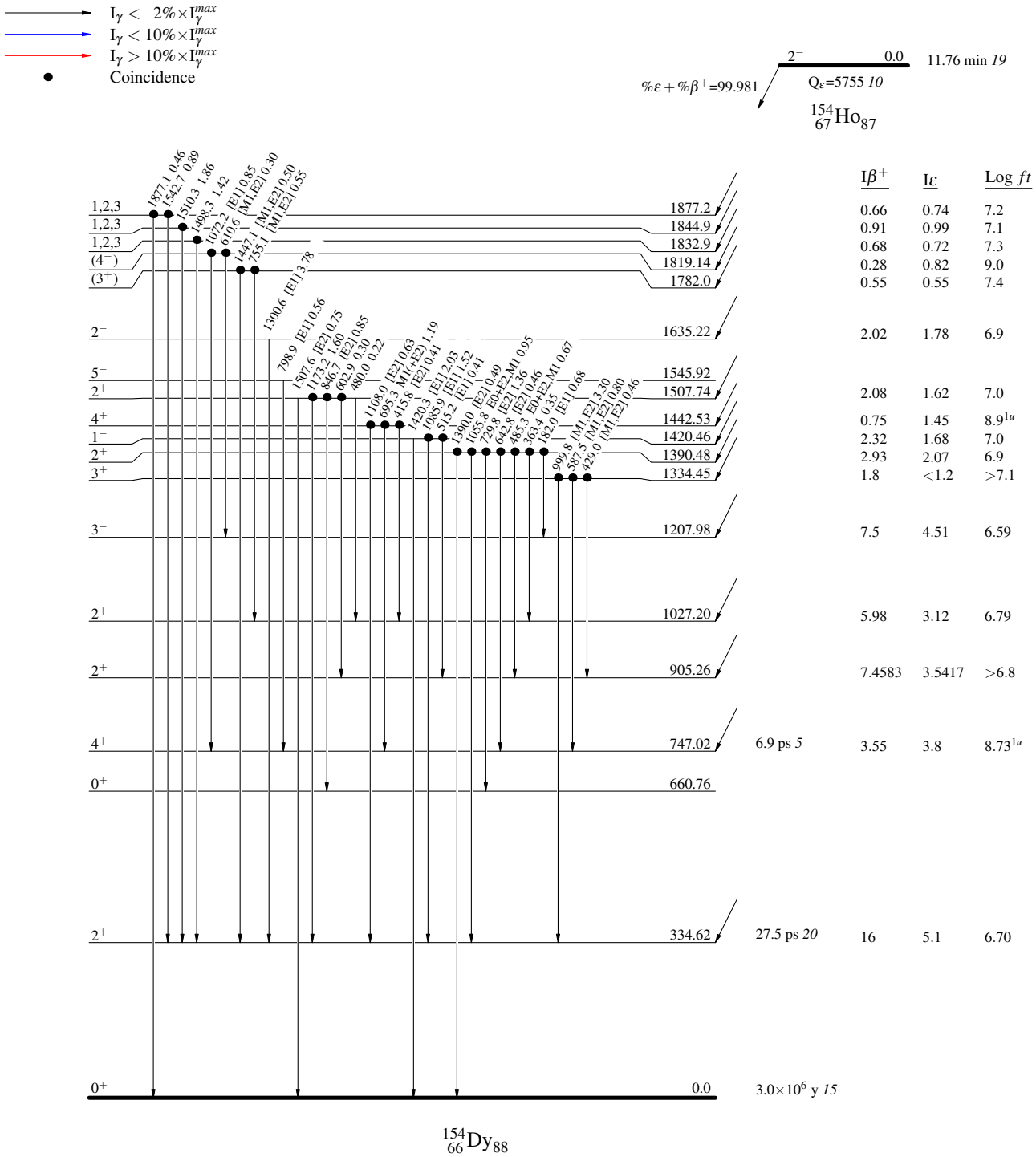


$^{154}_{66}Dy_{88}$

^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06

Decay Scheme (continued)

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

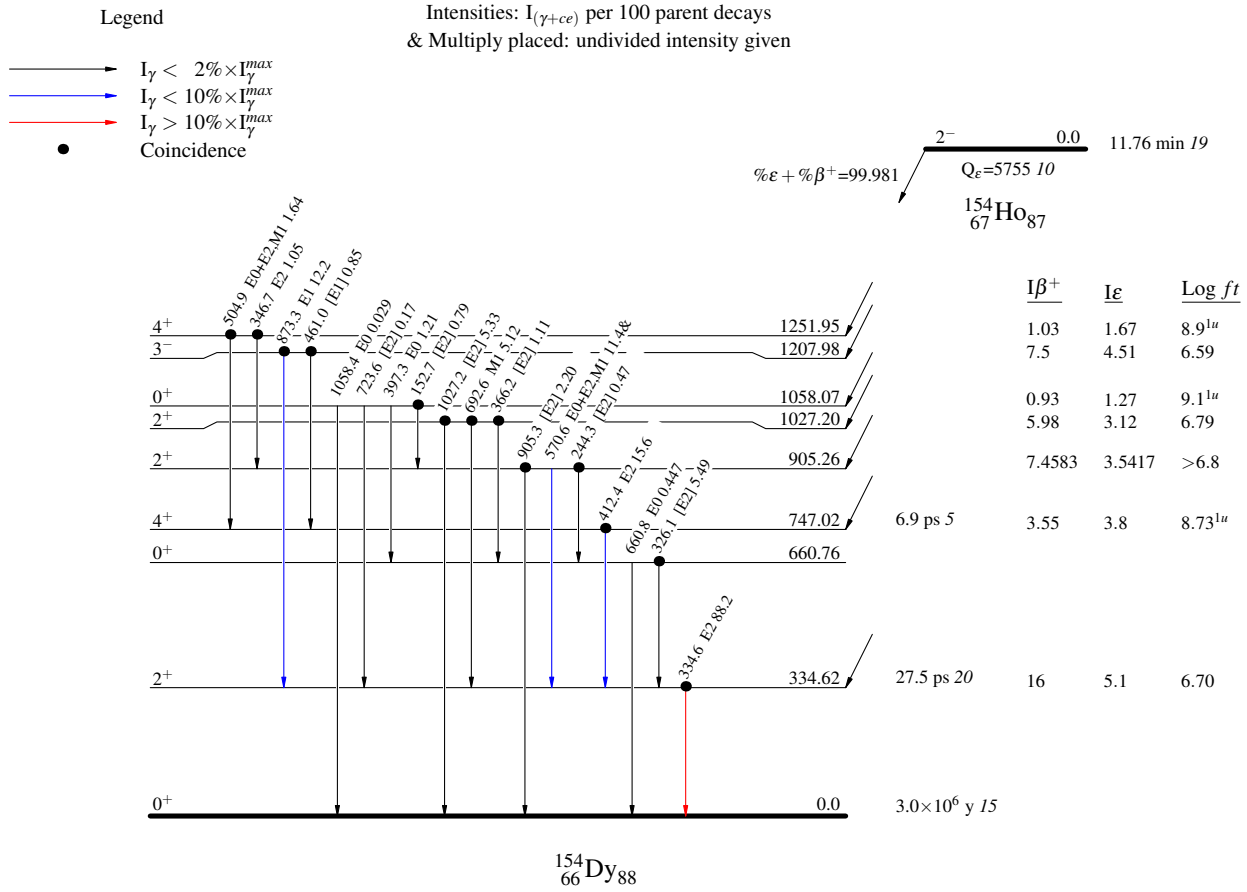


	Iβ+	Iε	Log *ft*
1877.2	0.66	0.74	7.2
1844.9	0.91	0.99	7.1
1832.9	0.68	0.72	7.3
1819.14	0.28	0.82	9.0
1782.0	0.55	0.55	7.4
1635.22	2.02	1.78	6.9
1545.92			
1507.74	2.08	1.62	7.0
1442.53	0.75	1.45	8.9[1u]
1420.46	2.32	1.68	7.0
1390.48	2.93	2.07	6.9
1334.45	1.8	<1.2	>7.1
1207.98	7.5	4.51	6.59
1027.20	5.98	3.12	6.79
905.26	7.4583	3.5417	>6.8
747.02	3.55	3.8	8.73[1u]
660.76			
334.62	16	5.1	6.70
0.0			

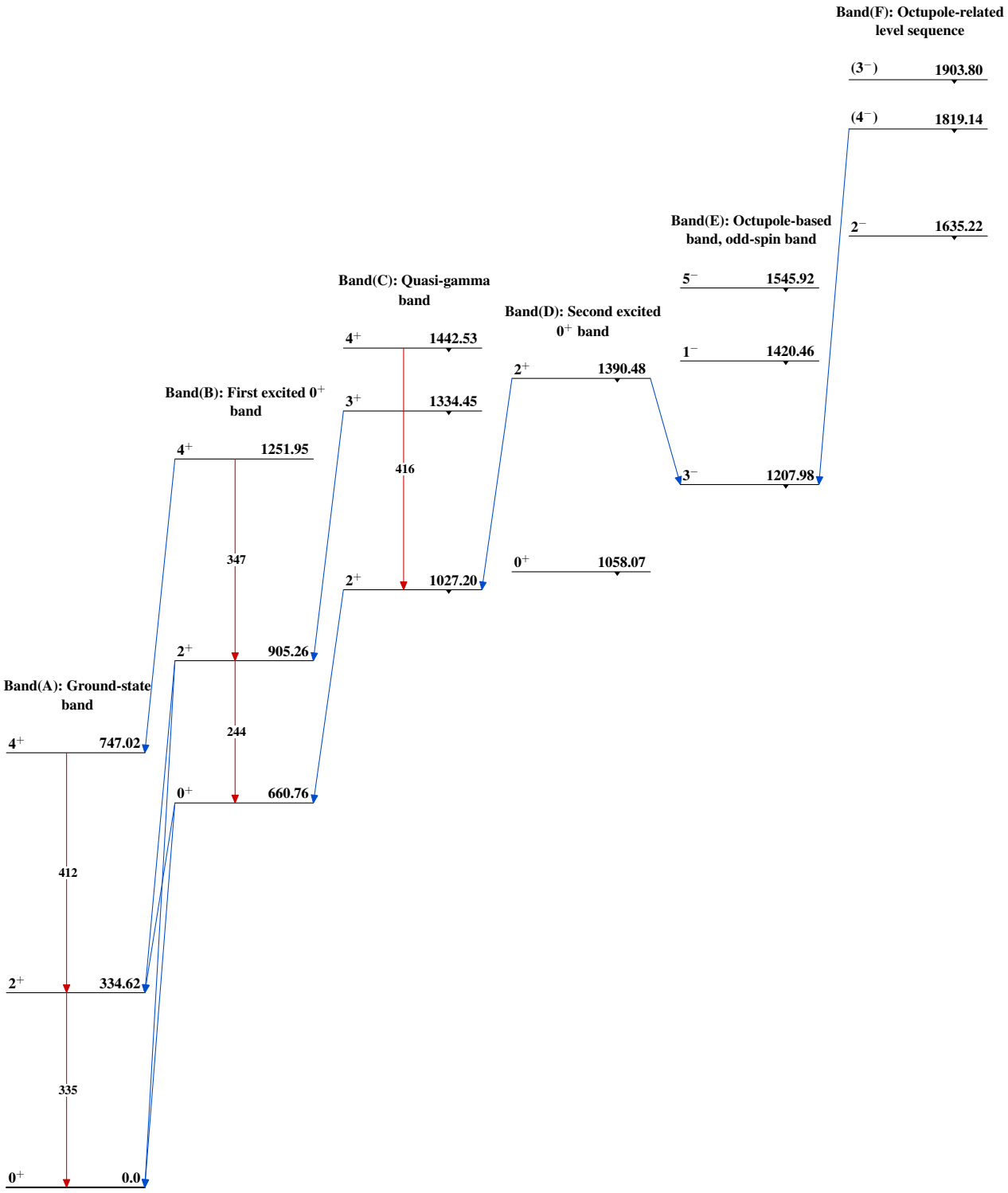
^{154}Ho $\varepsilon+\beta^+$ decay (11.76 min) 1980Zo02,1968Wa12,1983Al06

Decay Scheme (continued)

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



^{154}Ho ε decay (11.76 min) 1980Zo02,1968Wa12,1983Al06



$^{154}_{66}Dy_{88}$

^{154}Ho ε decay (11.76 min) 1980Zo02,1968Wa12,1983Al06 (continued)

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

(3^{+}) **1782.0**

2^{+} **1507.74**

$^{154}_{66}Dy_{88}$