^{176}Ta ε decay 1971Be10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 107, 791 (2006)	15-Sep-2005

Parent: ^{176}Ta: E=0.0; J^π=(1)$^-$; $T_{1/2}$=8.09 h *5*; Q(ε)=3210 *30*; %ε+%β^+ decay=100.0
Others: 1971Br32, 1969Bo23, 1966St01, 1960Ha18.
Q(ε)=3050+380-40 (1969Bo23); Q(ε)=3050+125-45 (1971Be10).

^{176}Hf Levels

E(level)‡	J^π†	$T_{1/2}$	Comments
0.0	0$^+$		
88.35 *3*	2$^+$	1.43 ns *4*	$T_{1/2}$: from Adopted Levels.
290.23 *4*	4$^+$		
1149.91 *8*	0$^+$		
1226.63 *5*	2$^+$	0.8 ps *1*	$T_{1/2}$: from Adopted Levels.
1247.69 *4*	2$^-$	4.66 ns *17*	$T_{1/2}$: weighted average of 4.75 ns *25* (1969Ho17) and 4.58 ns *23* (1972Lo03). Other: 1971Br32.
1293.14 *8*	0$^+$		
1313.38 *4*	3$^-$		
1341.31 *4*	2$^+$	0.29 ps *3*	$T_{1/2}$: from Adopted Levels.
1379.40 *5*	2$^+$		
1404.63 *4*	4$^-$		
1412.96? *7*			
1445.82 *5*	3$^+$		
1577.63 *5*	(3$^+$)		
1591.31? *5*	(4$^+$)		
1643.41 *4*	1$^-$		
1672.36 *4*	(1)$^+$		
1704.62 *6*	(2$^+$)		
1710.24 *5*	(3$^-$)		
1722.05 *5*	1$^-$		
1767.52 *7*	2$^-$,3$^-$		
1786.13 *8*			
1793.60 *6*			
1818.91 *6*	(0)$^-$		
1854.03 *7*			
1856.91 *5*	(2)$^-$		
1862.82 *5*	1$^+$		
1912.02 *5*	(2)$^+$		
1924.57 *6*	(2,3)$^-$		
1949.70 *5*			
1958.19 *4*	2$^-$		
2044.82 *6*	(1$^+$)		
2066.28 *9*	($^+$)		
2265.28 *5*	(2)$^-$		
2280.83 *9*			
2307.78 *6*			
2308.34 *5*	1$^-$,2$^-$,3$^-$		
2405.37 *7*			
2432.32 *7*	$^-$		
2452.32? *10*			
2470.84 *5*	2$^-$		
2482.87? *6*			
2602.18 *9*			
2762.50 *8*			
2791.67 *7*			

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^{176}Ta ε decay 1971Be10 (continued)

^{176}Hf Levels (continued)

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
2817.55 *5*	(2)$^+$	2905.71? *7*		2921.01 *8*	1$^+$,2$^+$
2878.32 *7*		2912.27 *6*	(0)$^-$	2944.19 *5*	2$^-$
2885.52? *7*		2920.27 *7*	1$^-$	2969.02 *6*	(2$^-$)

† From Adopted Levels.
‡ Deduced by evaluator from a least-squares fit to γ-ray energies.

ε,β^+ radiations

%Iβ+=0.69 *9* (1971Be10), based on I$\gamma(\gamma^{\pm})$=26 *4*, measured with a Ge detector (spectrum not shown by authors) and with the source placed between 6-mm thick aluminum absorbers to annihilate all the β^+ radiation. Other value: 0.38 *4* (1969Bo23).

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(2.4×10^2 *3*)	2969.02		1.3 *2*	6.11 *17*	1.3 *2*	εK=0.739 *20*; εL=0.196 *14*; εM+=0.064 *6*
(2.7×10^2 *3*)	2944.19		7.3 *9*	5.47 *15*	7.3 *9*	εK=0.751 *15*; εL=0.188 *11*; εM+=0.061 *4*
(2.9×10^2 *3*)	2921.01		0.8 *1*	6.52 *13*	0.8 *1*	εK=0.759 *12*; εL=0.182 *9*; εM+=0.059 *4*
(2.9×10^2 *3*)	2920.27		7.5 *9*	5.55 *13*	7.5 *9*	εK=0.760 *12*; εL=0.182 *9*; εM+=0.059 *3*
(3.0×10^2 *3*)	2912.27		6.1 *9*	5.67 *13*	6.1 *9*	εK=0.762 *11*; εL=0.180 *8*; εM+=0.058 *3*
(3.3×10^2 *3*)	2878.32		1.0 *2*	6.57 *14*	1.0 *2*	εK=0.771 *8*; εL=0.173 *6*; εM+=0.0555 *22*
(3.9×10^2 *3*)	2817.55		2.0 *3*	6.44 *11*	2.0 *3*	εK=0.782 *5*; εL=0.165 *4*; εM+=0.0524 *14*
(4.2×10^2 *3*)	2791.67		0.8 *1*	6.90 *10*	0.8 *1*	εK=0.786 *5*; εL=0.162 *4*; εM+=0.0514 *12*
(4.5×10^2 *3*)	2762.50		0.43 *6*	7.24 *10*	0.43 *6*	εK=0.790 *4*; εL=0.160 *3*; εM+=0.0505 *10*
(6.1×10^2 *3*)	2602.18		1.0 *2*	7.17 *10*	1.0 *2*	εK=0.8022 *18*; εL=0.1507 *13*; εM+=0.0471 *5*
(7.4×10^2 *3*)	2470.84		7 *1*	6.51 *8*	7 *1*	εK=0.8080 *12*; εL=0.1465 *9*; εM+=0.0455 *3*
(7.8×10^2 *3*)	2432.32		2.0 *3*	7.10 *8*	2.0 *3*	εK=0.8093 *10*; εL=0.1455 *8*; εM+=0.0452 *3*
(8.0×10^2 *3*)	2405.37		0.7 *1*	7.59 *8*	0.7 *1*	εK=0.8101 *10*; εL=0.1449 *7*; εM+=0.04496 *25*
(9.0×10^2 *3*)	2308.34		0.36 *6*	7.98 *8*	0.36 *6*	εK=0.8126 *8*; εL=0.1431 *6*; εM+=0.04428 *20*
(9.0×10^2 *3*)	2307.78		0.54 *8*	7.81 *8*	0.54 *8*	εK=0.8126 *8*; εL=0.1431 *6*; εM+=0.04428 *19*
(9.3×10^2 *3*)	2280.83		0.39 *6*	7.98 *8*	0.39 *6*	εK=0.8132 *7*; εL=0.1426 *5*; εM+=0.04412 *18*
(9.4×10^2 *3*)	2265.28		1.1 *2*	7.54 *9*	1.1 *2*	εK=0.8136 *7*; εL=0.1424 *5*; εM+=0.04403 *18*
(1.14×10^3 *3*)	2066.28		0.9 *2*	7.80 *10*	0.9 *2*	εK=0.8169 *5*; εL=0.1400 *4*; εM+=0.04313 *12*
(1.17×10^3 *3*)	2044.82		2.0 *3*	7.47 *7*	2.0 *3*	εK=0.8172 *4*; εL=0.1397 *3*; εM+=0.04306 *11*
(1.25×10^3 *3*)	1958.19		8 *1*	6.94 *6*	8 *1*	εK=0.8182 *4*; εL=0.1390 *3*; εM+=0.04277 *10*
(1.29×10^3 *3*)	1924.57		0.12 *2*	8.79 *8*	0.12 *2*	εK=0.8186 *3*; εL=0.13868 *25*; εM+=0.04267 *9*
(1.30×10^3 *3*)	1912.02		8 *1*	6.97 *6*	8 *1*	εK=0.8187 *3*; εL=0.13858 *25*; εM+=0.04263 *9*
(1.35×10^3 *3*)	1862.82	0.002 *1*	9 *1*	6.95 *6*	9 *1*	av Eβ=164 *14*; εK=0.8191 *3*; εL=0.13820 *23*; εM+=0.04250 *9*
(1.35×10^3 *3*)	1856.91		0.8 *1*	8.01 *6*	0.8 *1*	εK=0.8191 *3*; εL=0.13816 *23*; εM+=0.04248 *9*
(1.36×10^3 *3*)	1854.03		0.24 *4*	8.53 *8*	0.24 *4*	εK=0.8191 *3*; εL=0.13813 *23*; εM+=0.04247 *9*
(1.39×10^3 *3*)	1818.91		0.8 *1*	8.03 *6*	0.8 *1*	εK=0.8193 *2*; εL=0.13787 *23*; εM+=0.04238 *8*
(1.42×10^3 *3*)	1786.13		0.3 *1*	8.48 *15*	0.3 *1*	εK=0.8195 *2*; εL=0.13764 *22*; εM+=0.04229 *8*
(1.44×10^3 *3*)	1767.52		0.7 *1*	8.12 *7*	0.7 *1*	εK=0.8195 *1*; εL=0.13750 *22*; εM+=0.04225 *8*
(1.49×10^3 *3*)	1722.05	0.0014 *5*	1.3 *2*	7.88 *7*	1.3 *2*	av Eβ=227 *14*; εK=0.8196; εL=0.13718 *22*; εM+=0.04213 *8*
(1.50×10^3 *3*)	1710.24	0.00047 *16*	0.39 *7*	8.41 *8*	0.39 *7*	av Eβ=232 *14*; εK=0.8196; εL=0.13710 *22*; εM+=0.04210 *8*
(1.51×10^3 *3*)	1704.62	0.0025 *8*	2.0 *3*	7.71 *7*	2.0 *3*	av Eβ=235 *14*; εK=0.8196; εL=0.13706 *22*; εM+=0.04209 *8*
(1.54×10^3 *3*)	1672.36	0.0081 *25*	4.9 *8*	7.34 *8*	4.9 *8*	av Eβ=249 *14*; εK=0.8195 *2*; εL=0.13683 *22*; εM+=0.04201 *8*

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^{176}Ta ε decay 1971Be10 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(1.57×10^3 *3*)	1643.41	0.0066 *19*	3.2 *5*	7.54 *7*	3.2 *5*	av Eβ=262 *14*; εK=0.8194 *2*; εL=0.13662 *22*; εM+=0.04193 *8*
(1.63×10^3 *3*)	1577.63		0.17 *2*	9.83^{1u} *7*	0.17 *2*	εK=0.8092 *4*; εL=0.1452 *4*; εM+=0.04509 *14*
(1.76×10^3 *3*)	1445.82	0.0006 *2*	0.5 *1*	9.50^{1u} *10*	0.5 *1*	av Eβ=364 *14*; εK=0.8105 *3*; εL=0.1437 *4*; εM+=0.04456 *12*
(1.83×10^3 *3*)	1379.40	0.005 *1*	0.5 *1*	8.49 *9*	0.5 *1*	av Eβ=379 *14*; εK=0.8150 *10*; εL=0.1345 *3*; εM+=0.04121 *10*
(1.87×10^3 *3*)	1341.31	0.0018 *4*	0.16 *3*	9.00 *9*	0.16 *3*	av Eβ=395 *14*; εK=0.8138 *11*; εL=0.1341 *3*; εM+=0.04109 *10*
(1.92×10^3 *3*)	1293.14	0.0040 *7*	0.30 *4*	8.75 *6*	0.30 *4*	av Eβ=416 *14*; εK=0.8121 *13*; εL=0.1336 *4*; εM+=0.04093 *11*
(1.96×10^3 *3*)	1247.69	0.18 *4*	11 *2*	7.21 *8*	11 *2*	av Eβ=436 *14*; εK=0.8101 *14*; εL=0.1331 *4*; εM+=0.04077 *11* Iβ^+: from $\gamma^\pm\gamma$ coin (1971Be10).
(1.98×10^3 *3*)	1226.63	0.010 *2*	0.69 *10*	8.42 *7*	0.7 *1*	av Eβ=446 *14*; εK=0.8092 *15*; εL=0.1329 *4*; εM+=0.04069 *12*
(2.06×10^3 *3*)	1149.91	0.0081 *14*	0.35 *5*	8.74 *7*	0.36 *5*	av Eβ=479 *14*; εK=0.8052 *18*; εL=0.1320 *4*; εM+=0.04039 *13*
(3.12×10^3 *3*)	88.35	≈0.16	≈0.71	≈8.8	≈0.87	av Eβ=949 *14*; εK=0.671 *6*; εL=0.1079 *10*; εM+=0.0329 *3* Iβ^+: from $\gamma^\pm\gamma$ coin (1971Be10). I($\varepsilon+\beta^+$): from Iβ^+ and ε/β^+ (theory)=5.0.
(3.21×10^3 *3*)	0.0	≈0.50	≈1.9	≈8.4	≈2.4	av Eβ=989 *14*; εK=0.654 *6*; εL=0.1052 *10*; εM+=0.0321 *3* Iβ^+: from total %Iβ+=0.69 *9*, %Iβ+(88 level)=0.14 *12*, and %Iβ+(1247 level)=0.10 *4* (1971Be10). I($\varepsilon+\beta^+$): from Iβ^+ and ε/β^+ (theory)=5.0.

† Absolute intensity per 100 decays.

γ(^{176}Hf)

Iγ normalization: From decay scheme and ΣI(γ+ce)(g.s.)=98 *2*%. A possible 8% fractional systematic uncertainty, due to unplaced γ rays, may affect the normalization factor.

γγ(θ): 1971Bo26, 1972Lo03.

E_γ	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	δ[a]	α[‡]	Comments
(65.6)		1313.38	3⁻	1247.69	2⁻				
(76.7)		1226.63	2⁺	1149.91	0⁺				
88.35 *4*	220	88.35	2⁺	0.0	0⁺	E2		5.86	α(K)=1.21 *4*; α(L)=3.53 *11*; α(M)=0.88 *3*; α(N+..)=0.250 *8* %Iγ=11.8 *4*.
91.23 *4*	1.1	1404.63	4⁻	1313.38	3⁻	E2(+M1)		5.26 *11*	α(K)=2.8 *17*; α(L)=1.9 *12*; α(M)=0.5 *3*; α(N+..)=0.13 *9* Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=>4:weak:5.5:5.5 (1960Ha18).
[x]110.1 *2*	0.36 *5*								
[x]111.3 *2*	0.31 *5*								
[x]117.5 *2*	0.23 *5*								
118.93 *2*	0.22 *4*	1710.24	(3⁻)	1591.31?	(4⁺)				
125.4	≤4.	1912.02	(2)⁺	1786.13					Obscured by ^{175}Ta 125.9- and 126.6-keV γ rays. Assignment to ^{176}Ta based on coincidence results.
131.0[c] *15*	0.40[c]	1924.57	(2,3)⁻	1793.60					
131.0[c] *15*	0.40[c]	1949.70		1818.91	(0)⁻				
[x]140.9 *10*	0.97 *10*								
146.74 *5*	3.9	1856.91	(2)⁻	1710.24	(3⁻)	M1 (+E2)	0.74	1.19	α(K)=0.88 *3*; α(L)=0.239 *8*; α(M)=0.0564 *17*; α(N+..)=0.0164 *5* Mult.: from α(K)exp=0.88, deduced in 1971Be10 with ce data from 1960Ha18.
156.84 *7*	6.6	1404.63	4⁻	1247.69	2⁻	E2		0.671	α(K)=0.328 *10*; α(L)=0.261 *8*; α(M)=0.0641 *20*; α(N+..)=0.0183 *6* Mult.: from α(K)exp=0.37, deduced in 1971Be10 with ce data from 1960Ha18.
158.19 *7*	4.2	1862.82	1⁺	1704.62	(2⁺)	M1		1.12	α(K)=0.93 *3*; α(L)=0.144 *5*; α(M)=0.0325 *10*; α(N+..)=0.0096 *3* Mult.: from α(K)exp=0.86, deduced in 1971Be10 with ce data from 1960Ha18.
173.00 *7*	0.28 *4*	1577.63	(3⁺)	1404.63	4⁻				
175.50 *7*	7.8	1818.91	(0)⁻	1643.41	1⁻	M1		0.833	α(K)=0.694 *21*; α(L)=0.108 *4*; α(M)=0.0242 *8*; α(N+..)=0.00715 *22* Mult.: M1(+E2) from α(K)exp=0.51, deduced in 1971Be10 with ce data from 1960Ha18. Level scheme requires M1.
[x]179.10 *6*	0.72 *7*								
[x]185.72 *6*	0.50 *6*								
190.36 *7*	7.6	1862.82	1⁺	1672.36	(1)⁺	M1+E2	0.72	0.554	α(K)=0.430 *13*; α(L)=0.095 *3*; α(M)=0.0222 *7*; α(N+..)=0.00644 *20* Mult.: from α(K)exp=0.43 and ce(K)/ce(L) exp=7.2.
[x]192.80 *8*	0.24 *4*								
196.82 *14*	0.46 *12*	2602.18		2405.37					
198.07 *12*	0.70 *15*	1445.82	3⁺	1247.69	2⁻				
201.84 *6*	105	290.23	4⁺	88.35	2⁺	E2		0.282	α(K)=0.164 *5*; α(L)=0.089 *3*; α(M)=0.0218 *7*; α(N+..)=0.00618 *19* Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=48:6:13:10 (1960Ha18).

$^{176}_{72}$Hf$_{104}$-4

γ(^{176}Hf) (continued)

E_γ	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	δ[a]	α[‡]	Comments
207.5	≤1.5	1912.02	(2)$^+$	1704.62	(2$^+$)				Obscured by ^{175}Ta 207.4-keV γ ray, and ^{177}Ta 208.4-keV γ ray. Assignment to ^{176}Hf based on coincidence results.
213.50 *6*	7.8[†] *15*	1856.91	(2)$^-$	1643.41	1$^-$	M1 (+E2)	0.87	0.376	α(K)=0.290 *9*; α(L)=0.0659 *20*; α(M)=0.0154 *5*; α(N+..)=0.00445 *14* Mult.: from α(K)exp=0.29.
216.00 *7*	2.2	1793.60		1577.63	(3$^+$)				
^{x}230.88 *8*	0.49 *4*								
236.19 *7*	1.5	1958.19	2$^-$	1722.05	1$^-$	M1 (+E2)	0.87	0.281	α(K)=0.219 *7*; α(L)=0.0471 *15*; α(M)=0.0110 *4*; α(N+..)=0.00316 *10* Mult.: from α(K)exp=0.22.
239.62 *6*	10.0	1912.02	(2)$^+$	1672.36	(1)$^+$	M1		0.352	α(K)=0.293 *9*; α(L)=0.0452 *14*; α(M)=0.0102 *3*; α(N+..)=0.00298 *9* Mult.: from α(K)exp=0.25 and ce(K)/ce(L) exp≥5.7.
^{x}248.29 *8*	0.52 *5*								
264.13[e] *6*	1.4	1577.63	(3$^+$)	1313.38	3$^-$				
^{x}271.58 *9*	0.24 *4*								
^{x}277.74 *8*	0.20 *4*								
^{x}280.77 *7*	0.22 *4*								
292.88 *10*	0.73 *7*	1672.36	(1)$^+$	1379.40	2$^+$				
303.55 *15*	0.42 *4*	2905.71?		2602.18					
^{x}306.79 *20*	0.50 *5*								
^{x}314.53 *20*	0.57 *7*								
315.50 *15*	1.5 *2*	2265.28	(2)$^-$	1949.70					
318.83 *30*	0.21 *4*	2921.01	1$^+$,2$^+$	2602.18					
^{x}327.05 *30*	0.26 *4*								
^{x}337.51 *20*	0.23 *3*								
^{x}343.38 *20*	0.69 *7*								
346.90 *20*	2.1	1924.57	(2,3)$^-$	1577.63	(3$^+$)				
350.18 *20*	1.5	2308.34	1$^-$,2$^-$,3$^-$	1958.19	2$^-$	M1 (+E2)	0.56	0.108	α(K)=0.089 *3*; α(L)=0.0148 *5*; α(M)=0.00336 *10*; α(N+..)=0.00098 *3* Mult.: from α(K)exp=0.089.
358.72 *20*	1.8	2308.34	1$^-$,2$^-$,3$^-$	1949.70					
361.76 *20*	0.62 *9*	2066.28	($^+$)	1704.62	(2$^+$)				
362.71 *30*	0.38 *9*	1767.52	2$^-$,3$^-$	1404.63	4$^-$				
^{x}366.20 *25*	0.24 *3*								
380.48 *20*	2.4	1958.19	2$^-$	1577.63	(3$^+$)	E1(+M2)		0.18 *18*	α(K)=0.15 *14*; α(L)=0.03 *3*; α(M)=0.007 *7*; α(N+..)=0.0019 *19* Mult.: from α(K)exp=0.018.
^{x}382.71 *25*	0.44 *8*								
383.60 *20*	0.97 *10*	2308.34	1$^-$,2$^-$,3$^-$	1924.57	(2,3)$^-$				
386.10 *20*	0.45 *5*	2791.67		2405.37					
388.06 *20*	0.56 *5*	1767.52	2$^-$,3$^-$	1379.40	2$^+$				
401.44 *20*	0.36 *4*	2044.82	(1$^+$)	1643.41	1$^-$				
^{x}411.67 *20*	0.34 *5*								
414.34 *15*	1.4	1793.60		1379.40	2$^+$				I_γ: 1971Be10 also placed this transition from an additional 1819 level based only on energy differences.

γ(^{176}Hf) (continued)

E_γ	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[‡]	Comments
[x]421.08 *30*	0.33 *7*							
[x]423.15 *30*	0.32 *8*							
424.48 *15*	0.92 *10*	1672.36	$(1)^+$	1247.69	2^-			
428.85 *20*	0.27 *4*	1722.05	1^-	1293.14	0^+			
[x]433.51 *9*	0.80 *9*							
434.85 *10*	0.89 *9*	2905.71?		2470.84	2^-			
[x]440.01 *8*	0.41 *5*							
445.52[c] *8*	1.0[c]	1672.36	$(1)^+$	1226.63	2^+			
445.52[c] *8*	1.0[c]	2308.34	$1^-,2^-,3^-$	1862.82	1^+			
450.94 *13*	0.31 *5*	2307.78		1856.91	$(2)^-$			
452.18[c] *10*	0.45[c]	1793.60		1341.31	2^+			
452.18[c] *10*	0.45[c]	1856.91	$(2)^-$	1404.63	4^-			
454.63 *9*	0.32 *5*	2762.50		2307.78				
[x]459.10 *9*	0.60 *7*							
461.41 *8*	1.1 *2*	2944.19	2^-	2482.87?				
466.16 *7*	20.6	1912.02	$(2)^+$	1445.82	3^+	M1	0.0593	α(K)=0.0497 *15*; α(L)=0.00749 *23*; α(M)=0.00168 *5*; α(N+..)=0.00049 *2* Mult.: from α(K)exp=0.047.
473.21 *7*	5.1	2944.19	2^-	2470.84	2^-			
474.64[c] *8*	1.6[c]	1854.03		1379.40	2^+			
474.64[c] *8*	1.6[c]	2066.28	$(^+)$	1591.31?	(4^+)			
479.14 *10*	0.55 *7*	2265.28	$(2)^-$	1786.13				
480.83 *9*	0.54 *7*	2405.37		1924.57	$(2,3)^-$			
483.28 *9*	0.50 *6*	1862.82	1^+	1379.40	2^+			
[x]494.98 *13*	0.26 *4*							
507.79 *15*	26.7	2432.32	$^-$	1924.57	$(2,3)^-$	M1	0.0477	α(K)=0.0398 *12*; α(L)=0.00599 *18* Mult.: from α(K)exp=0.038 and ce(K)/ce(L) exp=6.4.
512.3 *2*	7.4 *7*	1958.19	2^-	1445.82	3^+			
[x]517.4 *4*	0.60 *30*							
519.7 *2*	≈6.[†]	1924.57	$(2,3)^-$	1404.63	4^-			
521.3 *1*	≈5.[†]	2470.84	2^-	1949.70				
521.6 *1*	≈45.	1862.82	1^+	1341.31	2^+			
[x]524.90 *11*	1.10 *25*							
[x]529.08 *17*	0.26 *10*							
532.54 *11*	4.5 *7*	1912.02	$(2)^+$	1379.40	2^+			
533.23 *16*	1.2 *4*	2482.87?		1949.70				
540.27 *13*	1.1 *2*	2307.78		1767.52	$2^-,3^-$			
[x]541.24 *12*	1.7 *2*							
543.18 *11*	1.5	2265.28	$(2)^-$	1722.05	1^-			
[x]545.74 *11*	4.1 *7*							
546.53 *10*	9.8	2470.84	2^-	1924.57	$(2,3)^-$	(M1)	0.0395	α(K)=0.0329 *10*; α(L)=0.00495 *15* Mult.: from α(K)exp≈0.045.
[x]550.4 *5*	0.81 *20*							
551.4 *2*	0.35 *6*	2405.37		1854.03				

$^{176}_{72}$Hf$_{104}$-6

γ(^{176}Hf) (continued)

E_γ	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[‡]	Comments
553.5 *2*	0.40 *6*	1958.19	2⁻	1404.63	4⁻			
555.2 *2*	0.27 *5*	2265.28	(2)⁻	1710.24	(3⁻)			
[x]560.0 *2*	0.51 *7*							
[x]561.6 *3*	0.25 *6*							
[x]566.6 *2*	0.23 *4*							
569.77 *11*	2.1 *3*	1862.82	1⁺	1293.14	0⁺			
570.76[c] *10*	8.5[c]	1912.02	(2)⁺	1341.31	2⁺			
570.76[c] *10*	8.5[c]	2482.87?		1912.02	(2)⁺			
571.30[e] *9*	4.9	1818.91	(0)⁻	1247.69	2⁻			
577.3 *1*	0.83 *9*	2885.52?		2308.34	1⁻,2⁻,3⁻			
579.08 *15*	1.1	1958.19	2⁻	1379.40	2⁺			
583.5 *2*	0.24 *4*	1924.57	(2,3)⁻	1341.31	2⁺			
[x]584.9 *2*	0.36 *5*							
[x]586.72 *9*	1.6							
[x]589.9 *1*	0.30 *4*							
[x]594.9 *2*	0.23 *4*							
598.6 *2*	0.46 *8*	1912.02	(2)⁺	1313.38	3⁻			
604.6[c] *1*	0.48[c]	2885.52?		2280.83				
604.6[c] *1*	0.48[c]	2912.27	(0)⁻	2307.78				
609.25 *9*	1.4 *2*	1856.91	(2)⁻	1247.69	2⁻			
611.16 *8*	23.4	1924.57	(2,3)⁻	1313.38	3⁻	M1	0.0296	α(K)=0.0247 *8*; α(L)=0.00370 *12* Mult.: from α(K)exp=0.026 and ce(K)/ce(L) exp=6.8.
615.22 *9*	1.9 *3*	1862.82	1⁺	1247.69	2⁻			
616.79 *8*	18.6	1958.19	2⁻	1341.31	2⁺	E1	0.00423	α=0.00423; α(K)=0.00355 *11*; α(L)=0.00051 *2* Mult.: from α(K)exp=0.0044.
626.1 *2*	0.31 *5*	2482.87?		1856.91	(2)⁻			
[x]632.12 *9*	1.3							
636.6[c] *1*	0.95[c]	1949.70		1313.38	3⁻			
636.6[c] *1*	0.95[c]	2944.19	2⁻	2307.78				
638.83 *8*	3.7	2432.32	⁻	1793.60				
[x]642.85 *8*	1.8							
644.86 *8*	18.4	1958.19	2⁻	1313.38	3⁻	M1	0.0258	α(K)=0.0215 *7*; α(L)=0.00322 *10* Mult.: from α(K)exp=0.021.
[x]656.8 *1*	0.64 *7*							
660.67 *8*	2.2	2969.02	(2⁻)	2308.34	1⁻,2⁻,3⁻			
664.07 *10*	1.6 *2*	2482.87?		1818.91	(0)⁻			
665.01 *12*	1.1 *3*	2308.34	1⁻,2⁻,3⁻	1643.41	1⁻			
[x]670.2 *2*	0.22 *5*							
677.09[c] *8*	5.9[c]	1924.57	(2,3)⁻	1247.69	2⁻			
677.09[c] *8*	5.9[c]	2470.84	2⁻	1793.60				
678.85 *8*	3.8	2944.19	2⁻	2265.28	(2)⁻	M1	0.0226	α(K)=0.0189 *6*; α(L)=0.00282 *9* Mult.: from α(K)exp=0.019.

$^{176}_{72}$Hf$_{104}$-7

γ(^{176}Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	α [‡]	Comments
685.55 *8*	2.2	1912.02	(2)$^+$	1226.63	2$^+$	M1	0.0221	α(K)=0.0184 *6*; α(L)=0.00275 *9* Mult.: from α(K)exp=0.015.
[x]693.2 *1*	0.38 *5*							
701.96 *9*	1.3	1949.70		1247.69	2$^-$			
710.50 *8*	100.	1958.19	2$^-$	1247.69	2$^-$	M1	0.0202	α(K)=0.0168 *5*; α(L)=0.00251 *8* Mult.: from α(K)exp=0.018 and ce(K)/ce(L) exp=6.0.
[x]717.45 *8*	1.2							
723.10 *8*	2.4	1949.70		1226.63	2$^+$			
730.7 *1*	0.60 *7*	2308.34	1$^-$,2$^-$,3$^-$	1577.63	(3$^+$)			
[x]735.9 *2*	0.30 *6*							
[x]740.97 *9*	2.5							
760.4 *2*	0.31 *5*	2470.84	2$^-$	1710.24	(3$^-$)			
[x]766.5 *1*	0.56 *7*							
[x]774.0 *3*	0.24 *6*							
[x]779.3 *1*	0.54 *6*							
[x]782.7 *1*	0.62 *7*							
[x]784.2 *2*	0.34 *7*							
[x]787.1 *1*	0.53 *6*							
[x]789.4 *2*	0.26 *4*							
798.5 *2*	0.87 *15*	2470.84	2$^-$	1672.36	(1)$^+$			
[x]799.5 *3*	0.39 *20*							
[x]801.7 *2*	0.26 *5*							
[x]803.8 *1*	0.65 *7*							
[x]808.6 *1*	0.68 *8*							
819.49 *10*	4.8	2265.28	(2)$^-$	1445.82	3$^+$			
833.50[c] *10*	1.4[c]	2791.67		1958.19	2$^-$			
833.50[c] *10*	1.4[c]	2878.32		2044.82	(1$^+$)			
[x]837.7 *3*	0.35 *10*							
839.25 *11*	1.3 *2*	2905.71?		2066.28	($^+$)			
841.5 *2*	0.78 *18*	2791.67		1949.70				
[x]842.6 *5*	0.38 *20*							
[x]857.66 *10*	2.6							
861.0[c]	0.75[c]	2265.28	(2)$^-$	1404.63	4$^-$			
861.0[c] *1*	0.75[c]	2452.32?		1591.31?	(4$^+$)			
861.0[c] *1*	0.75[c]	2905.71?		2044.82	(1$^+$)			
[x]863.19 *10*	2.2							
867.4 *1*	0.63 *8*	2912.27	(0)$^-$	2044.82	(1$^+$)			
[x]872.3 *2*	0.31 *5*							
[x]876.6 *2*	0.46 *6*							
[x]878.4 *2*	0.45 *6*							
[x]884.7 *3*	0.26 *10*							
[x]886.3 *2*	0.72 *9*							
893.3 *2*	0.48 *12*	2470.84	2$^-$	1577.63	(3$^+$)			

γ(^{176}Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	α [‡]	Comments
[x]900.3 *1*	0.69 *8*							
[x]907.3 *1*	0.89 *10*							
923.94 *8*	13.5	2265.28	(2)$^-$	1341.31	2$^+$	E1	0.00190	α=0.00190; α(K)=0.00161 *5*; α(L)=0.00022 *1* Mult.: from α(K)exp≈0.0013.
936.42 *8*	10.4	1226.63	2$^+$	290.23	4$^+$	E2	0.00472	α=0.00472; α(K)=0.00386 *12*; α(L)=0.00064 *2* Mult.: from α(K)exp=0.005.
951.86 *10*	1.3 *2*	2265.28	(2)$^-$	1313.38	3$^-$			
957.40 *8*	10.6	1247.69	2$^-$	290.23	4$^+$	M2+E3	0.017 *7*	α(K)=0.014 *6*; α(L)=0.0024 *8* δ: from α(K)exp=0.0092. Additional information 1.
960.77 *12*	1.4 *2*	2817.55	(2)$^+$	1856.91	(2)$^-$			
962.74 [c] *14*	1.0 [c]	2912.27	(0)$^-$	1949.70				
962.74 [c] *14*	1.0 [c]	2921.01	1$^+$,2$^+$	1958.19	2$^-$			
967.06 *9*	2.4 *3*	2308.34	1$^-$,2$^-$,3$^-$	1341.31	2$^+$			
[x]971.8 *1*	0.89 *10*							
[x]975.1 *2*	0.81 *10*							
[x]977.0 *2*	0.91 *11*							
[x]979.94 *22*	1.1							
981.0 *3*	0.92 *35*	2905.71?		1924.57	(2,3)$^-$			
[x]986.7 *2*	0.60 *12*							
994.46 [c] *12*	1.0 [c]	2307.78		1313.38	3$^-$			
994.46 [c] *12*	1.0 [c]	2944.19	2$^-$	1949.70				
[x]998.30 *10*	1.8 *3*							
[x]1002.62 *11*	1.3 *2*							
1011.1 *3*	0.57 *20*	2969.02	(2$^-$)	1958.19	2$^-$			
1017.58 *11*	2.2 *3*	2265.28	(2)$^-$	1247.69	2$^-$			
1021.0 *5*	0.66 *30*	2878.32		1856.91	(2)$^-$			
1023.10 *10*	49.4	1313.38	3$^-$	290.23	4$^+$	E1	0.00158	α=0.00158; α(K)=0.00133 *4*; α(L)=0.00019 *1* Mult.: from α(K)exp=0.0016.
[x]1035.0 *2*	0.46 *9*							
[x]1043.29 *11*	1.1 *2*							
1051.03 *11*	2.0 *3*	1341.31	2$^+$	290.23	4$^+$			
1052.7 *2*	0.80 *12*	2432.32	$^-$	1379.40	2$^+$			
1061.61 *9*	10.0	1149.91	0$^+$	88.35	2$^+$	E2	0.00366	α=0.00366; α(K)=0.00301 *9*; α(L)=0.00048 *2* Mult.: from α(K)exp=0.0054.
1064.03 *12*	1.6 *2*	2921.01	1$^+$,2$^+$	1856.91	(2)$^-$			
1066.20 *9*	11.9	2470.84	2$^-$	1404.63	4$^-$			
1089.06 *10*	3.7	1379.40	2$^+$	290.23	4$^+$			
1090.94 *13*	1.4 *2*	2432.32	$^-$	1341.31	2$^+$			
[x]1097.24 *10*	1.2 *2*							
[x]1107.81 *9*	4.7							
1112.9 *2*	0.94 *10*	2817.55	(2)$^+$	1704.62	(2$^+$)			
1115.0 [c] *9*	9.2 [c]	1404.63	4$^-$	290.23	4$^+$			

From ENSDF

$^{176}_{72}$Hf$_{104}$-9

γ(^{176}Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	α [‡]	$I_{(\gamma+ce)}$ [b]	Comments
1115.0[c] 9	9.2[c]	2969.02	(2$^-$)	1854.03					
1122.80 9	1.9 3	1412.96?		290.23	4$^+$				
[x]1125.45 9	2.6								
1138.26 8	12.6	1226.63	2$^+$	88.35	2$^+$	E0+E2	≈0.037		From α(K)exp=0.028 and ce(K)/ce(L) exp≈4. α: experimental value.
1148.3 2	0.85 15	2791.67		1643.41	1$^-$				
1149.8		1149.91	0$^+$	0.0	0$^+$	E0		0.09 2	$I_{(\gamma+ce)}$: ce(K), from ce data of 1971Be10.
1155.5 2	12.0 15	1445.82	3$^+$	290.23	4$^+$	(E2 + M1)	0.0046 15		α=0.0046 15; α(K)=0.0038 13; α(L)=0.00057 17 Mult.: from α(K)exp≈0.003.
1157.41 10	62.9	2470.84	2$^-$	1313.38	3$^-$	M1	0.00602		α=0.00602; α(K)=0.00504 16; α(L)=0.00074 2
1159.30 10	458.	1247.69	2$^-$	88.35	2$^+$	E1+M2+E3	0.008 7		α(K)=0.006 6; α(L)=0.0010 9 Mult.: from α(K)exp=0.0029 and ce(K)/ce(L) exp=6.2. Matrix element ratios <M2>/<E1> =0.359 49; <E3>/<E1> =0.529 66 were deduced by 1972Lo03 from α(K)exp and ce(K)/ce(L) of 1971Be10. See also 1972Lo03 for a reanalysis of γγ(θ) data from 1971Bo16.
1174.17 10	3.8	2817.55	(2)$^+$	1643.41	1$^-$				
1178.5 2	0.70 12	2405.37		1226.63	2$^+$				
1184.55 13	2.0 3	2432.32	$^-$	1247.69	2$^-$				
1190.22 10	84.1	2912.27	(0)$^-$	1722.05	1$^-$	M1	0.00562		α=0.00562; α(K)=0.00471 15; α(L)=0.00069 2 Mult.: from α(K)exp=0.0054 and ce(K)/ce(L) exp=6.6.
1198.15 11	1.2 2	2920.27	1$^-$	1722.05	1$^-$				
1201.48 10	6.7	2969.02	(2$^-$)	1767.52	2$^-$,3$^-$				
1204.85 10	6.1	1293.14	0$^+$	88.35	2$^+$				
[x]1211.30 13	1.5 2								
1213.20 11	2.7	2885.52?		1672.36	(1)$^+$				
1222.95 10	37.0	2470.84	2$^-$	1247.69	2$^-$	E2+M1+E0	≈0.042		Mult.: from α(K)exp≈0.036 and ce(K)/ce(L) exp≥6. α: experimental value.
1224.96 10	105	1313.38	3$^-$	88.35	2$^+$	E1	0.00114		α=0.00114; α(K)=0.00096 3; α(L)=0.00013 Mult.: from α(K)exp≈9×10^{-4}.
1226.85 25	6.8 9	1226.63	2$^+$	0.0	0$^+$				
[x]1234.26 15	1.2 2								
1239.86[c] 12	2.1[c]	2817.55	(2)$^+$	1577.63	(3$^+$)				
1239.86[c] 12	2.1[c]	2912.27	(0)$^-$	1672.36	(1)$^+$				
1247.68 15	8.5 9	1247.69	2$^-$	0.0	0$^+$	M2	0.0119		α(K)=0.0098 3; α(L)=0.00154 5 Mult.: M2(+E3) from α(K)exp=0.011 and ce(K)/ce(L) exp≈5. Level scheme requires M2.
[x]1250.01 18	2.3 3								
1252.90 10	57.1	1341.31	2$^+$	88.35	2$^+$	M1 + E2	0.0038 12		α=0.0038 12; α(K)=0.0032 10; α(L)=0.00047 14 Mult.: from α(K)exp=0.0034 and ce(K)/ce(L) exp=7.6.
1258.75 11	3.5 5	2969.02	(2$^-$)	1710.24	(3$^-$)				
1268.78 10	24.6	2912.27	(0)$^-$	1643.41	1$^-$	M1	0.00481		α=0.00481; α(K)=0.00403 12; α(L)=0.00059 2 Mult.: E2+M1 from α(K)exp=0.0025. Level scheme requires M1.

$^{176}_{72}$Hf$_{104}$-10

γ(^{176}Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	α [‡]	$I_{(\gamma+ce)}$ [b]	Comments
[x]1277.90 *11*	2.9								
[x]1281.2[e] *2*	0.87 *13*								
1287.40 *12*	1.7	1577.63	(3^+)	290.23	4^+				
1291.01 *10*	24.6	1379.40	2^+	88.35	2^+	(E2 + E0)	0.022		From α(K)exp=0.019 and ce(K)/ce(L) exp≈6. α: experimental value.
1293.2		1293.14	0^+	0.0	0^+	E0		1.8 *3*	$I_{(\gamma+ce)}$: ce(K)+ce(L), from ce data of 1971Be10.
1301.10 *11*	1.4	1591.31?	(4^+)	290.23	4^+				
[x]1308.30 *12*	1.2								
1325.67 *13*	1.5 *2*	2969.02	(2^-)	1643.41	1^-				
1333.1 *2*	0.69 *18*	2482.87?		1149.91	0^+				
1341.33 *10*	61.9	1341.31	2^+	0.0	0^+	E2	0.00231		α=0.00231; α(K)=0.00192 *6*; α(L)=0.00029 *1* Mult.: E2(+M1) from α(K)exp=0.0026 and ce(K)/ce(L) exp=6.3. Level scheme requires E2.
1346.08 *25*	1.3 *3*	2791.67		1445.82	3^+				
1357.52 *10*	37.0	1445.82	3^+	88.35	2^+	(M1)	0.00409		α=0.00409; α(K)=0.00342 *11*; α(L)=0.00050 *2* Mult.: from α(K)exp≈0.003.
1366.49 *11*	4.0	2944.19	2^-	1577.63	(3^+)				
1371.75 *12*	2.8	2817.55	$(2)^+$	1445.82	3^+				
1379.29[e] *15*	1.0 *3*	1379.40	2^+	0.0	0^+				
1412.84[c] *11*	2.1[c]	1412.96?		0.0	0^+				
1412.84[c] *11*	2.1[c]	2817.55	$(2)^+$	1404.63	4^-				
1420.04 *10*	8.4	1710.24	(3^-)	290.23	4^+				
[x]1427.64 *11*	2.2								
1432.56 *11*	1.6	2878.32		1445.82	3^+				
1438.1 *3*	0.55 *12*	2817.55	$(2)^+$	1379.40	2^+				
1450.40 *10*	6.7	2791.67		1341.31	2^+				
[x]1462.6 *2*	0.49 *10*								
[x]1467.5 *2*	0.80 *9*								
[x]1470.0 *2*	0.93 *20*								
1476.18 *10*	8.8	2817.55	$(2)^+$	1341.31	2^+	E2	0.00193		α=0.00193; α(K)=0.00161 *5*; α(L)=0.00024 *1* Mult.: from α(K)exp=0.0016.
[x]1482.8 *3*	0.54 *14*								
1489.33 *10*	13.5	1577.63	(3^+)	88.35	2^+	(E2)	0.00190		α=0.00190; α(K)=0.00158 *5*; α(L)=0.00024 *1* Mult.: from α(K)exp=0.0017.
1495.85 *15*	3.5	1786.13		290.23	4^+				
1503.7	≤2.[†]	1793.60		290.23	4^+				
1504.24 *10*	14. *2*	2817.55	$(2)^+$	1313.38	3^-				
1536.62 *11*	7.1	2878.32		1341.31	2^+				
1540.82 *11*	6.5	2920.27	1^-	1379.40	2^+				
1543.73 *15*	4.7	2791.67		1247.69	2^-				
1555.05 *10*	74.1	1643.41	1^-	88.35	2^+	E1			Mult.: from α(K)exp=7.8×10^{-4} and ce(K)/ce(L) exp≥3.6.
1563.53 *13*	3.6 *6*	1854.03		290.23	4^+				
1564.95 *11*	7.6	2878.32		1313.38	3^-				

$\gamma(^{176}$Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	Comments
^{x}1573.3 2	0.66 16						
1579.9 2	5.2 5	2921.01	$1^+,2^+$	1341.31	2^+	M1+E2	Mult.: from α(K)exp=0.0018.
1584.02 10	97.6	1672.36	$(1)^+$	88.35	2^+	M1 + E2	Mult.: from α(K)exp=0.0017.
^{x}1603.46 18	1.0 3						
^{x}1608.68 11	2.7						
1612.63 12	3.2	2762.50		1149.91	0^+		
1616.18 10	23.8	1704.62	(2^+)	88.35	2^+	(M1)	Mult.: from α(K)exp=0.0024.
1621.87 [d] 10	6.7 [d&] 18	1710.24	(3^-)	88.35	2^+		
1621.87 [d] 10	4.0 [d] 20	1912.02	$(2)^+$	290.23	4^+		
^{x}1628.53 30	2.5 6						
1630.83 10	32.8	2944.19	2^-	1313.38	3^-	M1	Mult.: from α(K)exp=0.0022.
1633.74 10	54.3	1722.05	1^-	88.35	2^+	E1	Mult.: from α(K)exp=6.0×10^{-4}.
1637.60 18	1.5 3	2885.52?		1247.69	2^-		
1643.45 10	44.4	1643.41	1^-	0.0	0^+	E1	Mult.: from α(K)exp=6.5×10^{-4}.
^{x}1659.21 11	2.0						
^{x}1665.0 2	0.91 14						
1672.32 12	22.0	1672.36	$(1)^+$	0.0	0^+		
1673.40 16	8.3 20	2921.01	$1^+,2^+$	1247.69	2^-		
1679.18 11	22.3	1767.52	$2^-,3^-$	88.35	2^+	E1	Mult.: from α(K)exp=5.7×10^{-4}.
1693.7 2	9.6	2920.27	1^-	1226.63	2^+		
1696.55 13	85.8	2944.19	2^-	1247.69	2^-	M1	Mult.: from α(K)exp=0.0022.
1697.8 2	6.0 2	1786.13		88.35	2^+		I_γ: Presented as 6. (2).
1704.70 12	25.9	1704.62	(2^+)	0.0	0^+	(E2)	Mult.: from α(K)exp=0.0014 and ce(K)/ce(K) exp$\geq$3.4.
$\approx$1705.4 [e]	$\leq$3 [†]	1793.60		88.35	2^+		
^{x}1712.0 3	0.82 20						
^{x}1718.1 4	1.8 6						
1721.3	[†]	2969.02	(2^-)	1247.69	2^-		I_γ: weak.
1722.04 13	60.6	1722.05	1^-	0.0	0^+	E1	Mult.: from α(K)exp=6.0×10^{-4}.
^{x}1725.9 4	1.2 4						
^{x}1736.7 2	0.71 8						
^{x}1745.29 14	2.1						
^{x}1751.1 3	0.51 9						
^{x}1754.94 16	1.3						
1765.75 15	8.8	1854.03		88.35	2^+		
^{x}1768.22 16	3.4						
1774.56 15	28.9	1862.82	1^+	88.35	2^+	M1 (+E2)	Mult.: from α(K)exp=0.0019 and ce(K)/ce(L) exp=10.
^{x}1793.17 15	3.7						
^{x}1820.0 3	1.6 3						
1823.70 15	83.4	1912.02	$(2)^+$	88.35	2^+	M1	Mult.: from α(K)exp=0.016.
1836.34 16	4.0	1924.57	$(2,3)^-$	88.35	2^+	(E1)	Mult.: from α(K)exp$\leq$0.001.
^{x}1855.69 16	2.2						
1861.15 25	4.8 12	1949.70		88.35	2^+		

$^{176}_{72}$Hf$_{104}$-12

^{176}Ta ε decay 1971Be10 (continued)

γ(^{176}Hf) (continued)

E_γ	I_γ #b	E_i(level)	J_i^π	E_f	J_f^π	Mult.@	Comments
1862.74 *15*	74.0	1862.82	1$^+$	0.0	0$^+$	M1	Mult.: M1(+E2) from α(K)exp=0.0016 and ce(K)/ce(L) exp=7.6. Level scheme requires M1.
1869.78 *16*	1.5	1958.19	2$^-$	88.35	2$^+$		
^{x}1875.1 *3*	0.47 *9*						
1911.6 *3*	0.24 *5*	1912.02	(2)$^+$	0.0	0$^+$		
^{x}1937.9 *2*	0.45 *7*						
^{x}1948.40 *18*	2.2 *5*						
1949.80 *17*	2.4 *5*	1949.70		0.0	0$^+$		
1956.48 *15*	15.9	2044.82	(1$^+$)	88.35	2$^+$	(M1,E2)	Mult.: from α(K)exp=0.0011.
^{x}1960.60 *16*	1.1						
^{x}1970.6 *2*	0.57 *7*						
1977.85 *15*	16.2	2066.28	($^+$)	88.35	2$^+$	(M1,E2)	Mult.: from α(K)exp=9.8×10^{-4}.
^{x}2042.7 *5*	0.65 *22*						
2044.87 *15*	25.0	2044.82	(1$^+$)	0.0	0$^+$	(M1,E2)	Mult.: from α(K)exp=9.4×10^{-4}.
^{x}2049.2 *4*	0.52 *11*						
^{x}2057.4 *3*	0.32 *5*						
2066.28 *16*	1.3	2066.28	($^+$)	0.0	0$^+$		
^{x}2071.0 *2*	0.31 *5*						
^{x}2077.0 *2*	0.76 *9*						
^{x}2090.6 *3*	0.26 *5*						
^{x}2140.1 *2*	0.72 *8*						
2162.1 *2*	0.72 *8*	2452.32?		290.23	4$^+$		
2192.33 *20*	4.2	2280.83		88.35	2$^+$		
2219.49 *20*	5.4	2307.78		88.35	2$^+$		
^{x}2246.92 *20*	2.4						
^{x}2257.9 *4*	0.44 *12*						
^{x}2260.4 *3*	0.57 *10*						
^{x}2272.1 *3*	0.32 *5*						
^{x}2278.6 *3*	0.49 *7*						
2280.6 *2*	3.3	2280.83		0.0	0$^+$		
^{x}2304.5 *4*	0.50 *22*						
2307.7 *2*	3.7	2307.78		0.0	0$^+$		
^{x}2314.8 *5*	0.50 *25*						
2317.0 *2*	4.6	2405.37		88.35	2$^+$		
^{x}2361.5 *2*	3.8						
^{x}2374.2 *3*	0.35 *7*						
2394.6 *2*	2.3	2482.87?		88.35	2$^+$		
2405.2 *2*	9.1	2405.37		0.0	0$^+$		
^{x}2421.7 *3*	0.37 *6*						
^{x}2460.3 *3*	0.54 *7*						
^{x}2480.5 *4*	0.80 *10*						
2482.8 *2*	1.6	2482.87?		0.0	0$^+$		
^{x}2506.2 *3*	0.51 *9*						
2513.82 *20*	12.4	2602.18		88.35	2$^+$		
^{x}2531.6 *5*	0.40 *12*						

$^{176}_{72}Hf_{104}$-13

γ(^{176}Hf) (continued)

E_γ	I_γ [#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	Comments
[x]2534.2 *3*	0.65 *12*						
[x]2548.4 *3*	0.63 *10*						
[x]2571.6 *2*	0.85 *9*						
[x]2586.1 *3*	0.63 *10*						
2602.15 *20*	6.5 *7*	2602.18		0.0	0^+		
2674.2 *2*	3.4	2762.50		88.35	2^+		
[x]2681.6 *3*	0.60 *15*						
[x]2689.7 *3*	0.85 *20*						
[x]2703.4 *3*	1.3 *3*						
[x]2705.6 *3*	0.45 *17*						
[x]2729.3 *2*	0.65 *10*						
[x]2744.5 *3*	0.48 *7*						
[x]2755.3 *3*	0.25 *7*						
2762.8 *2*	0.90 *12*	2762.50		0.0	0^+		
[x]2769.1 *3*	0.85 *9*						
[x]2773.8 *2*	2.1 *3*						
[x]2789.98 *20*	1.5						
2797.14 *20*	1.2	2885.52?		88.35	2^+		
2817.0 *4*	0.85 *12*	2905.71?		88.35	2^+		
2823.60 *40*	1.0 *2*	2912.27	$(0)^-$	88.35	2^+		
2832.00 *20*	80.5	2920.27	1^-	88.35	2^+	E1	Mult.: from α(K)exp=8.8×10^{-5} and ce(K)/ce(L) exp≥6.
[x]2845.1 *3*	0.12 *3*						
[x]2854.1 *9*	0.10 *7*						
2856.1 *5*	0.22 *9*	2944.19	2^-	88.35	2^+		
[x]2863.88 *20*	2.0						
[x]2882.5 *4*	0.57 *11*						
2885.55 *22*	2.0	2885.52?		0.0	0^+		
[x]2890.3 *4*	0.15 *5*						
2905.7 *4*	0.40 *6*	2905.71?		0.0	0^+		
[x]2912.3 *6*	0.39 *6*						E_γ: Placement is from 2912.3 ($J^\pi=0^-$) to 0 ($J^\pi=0^+$) in 1971Be10. It is a forbidden transition and evaluator has removed the placement.
2920.41 *20*	40.6	2920.27	1^-	0.0	0^+	E1	Mult.: from α(K)exp=7.1×10^{-5}.
[x]2940.7 *3*	0.34 *4*						
[x]2952.4 *2*	0.69 *8*						
[x]2971.6 *3*	0.21 *3*						
[x]2978.7 *3*	0.34 *3*						
[x]2995.4 *3*	0.092 *14*						

† Complex line.

‡ Conversion coefficients for γ-rays with mixed multipolarities and no δ given are average values for the individual multipolarities, unless otherwise specified.

\# ΔIγ≈8%, unless otherwise specified.

$\gamma(^{176}$Hf) (continued)

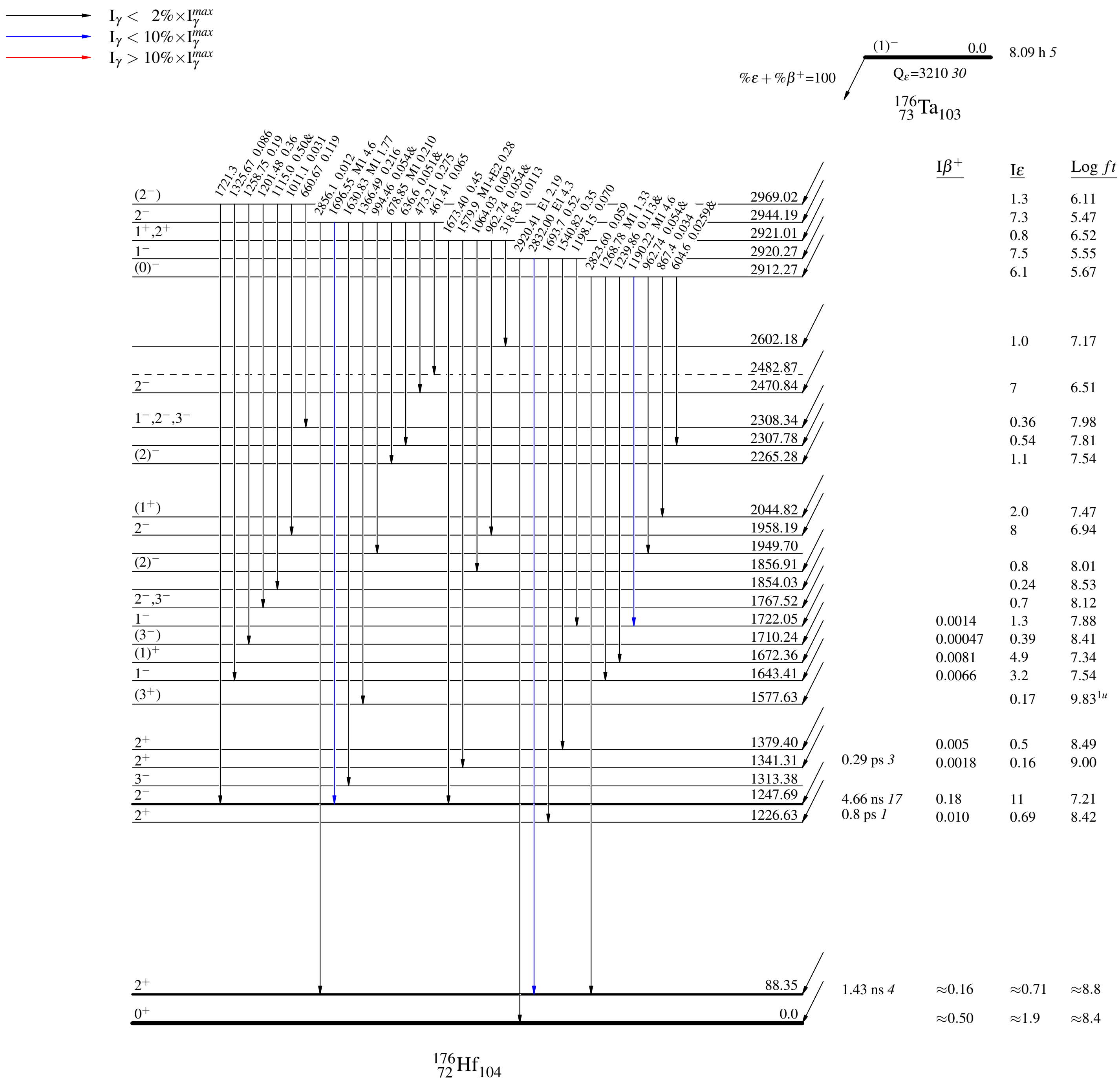
[@] From α(K)exp and ce(K)/ce(L), normalized to α(K)exp(201.8γ)=0.165 (E2, theory).
[&] From I(1621γ)/I(1420γ)=0.8 *2* in (α,2nγ).
[a] Estimated by evaluator from the deduced α(K)exp.
[b] For absolute intensity per 100 decays, multiply by 0.054 *4*.
[c] Multiply placed with undivided intensity.
[d] Multiply placed with intensity suitably divided.
[e] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{176}_{72}$Hf$_{104}$-15

^{176}Ta ε decay 1971Be10

Decay Scheme

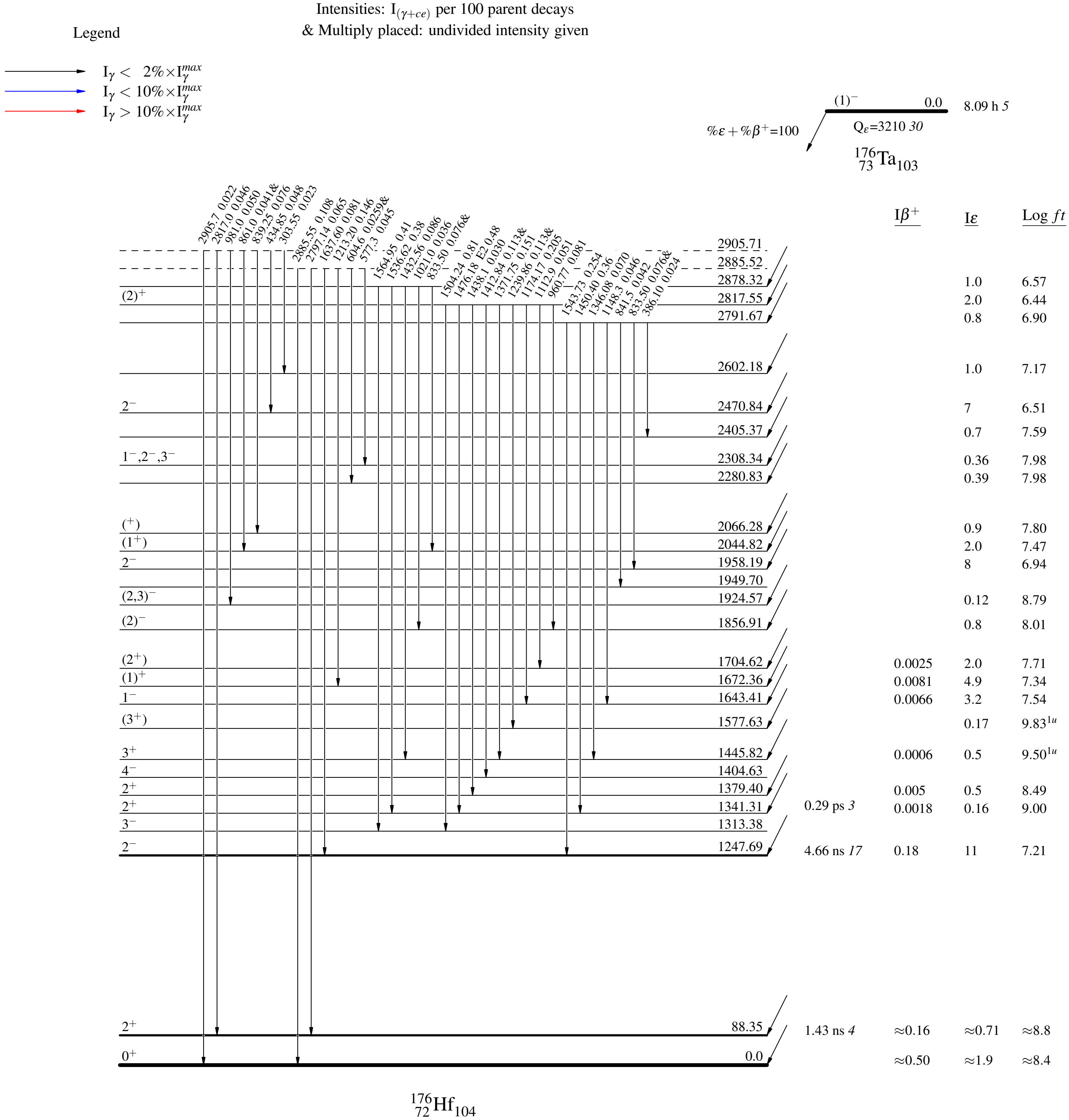
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

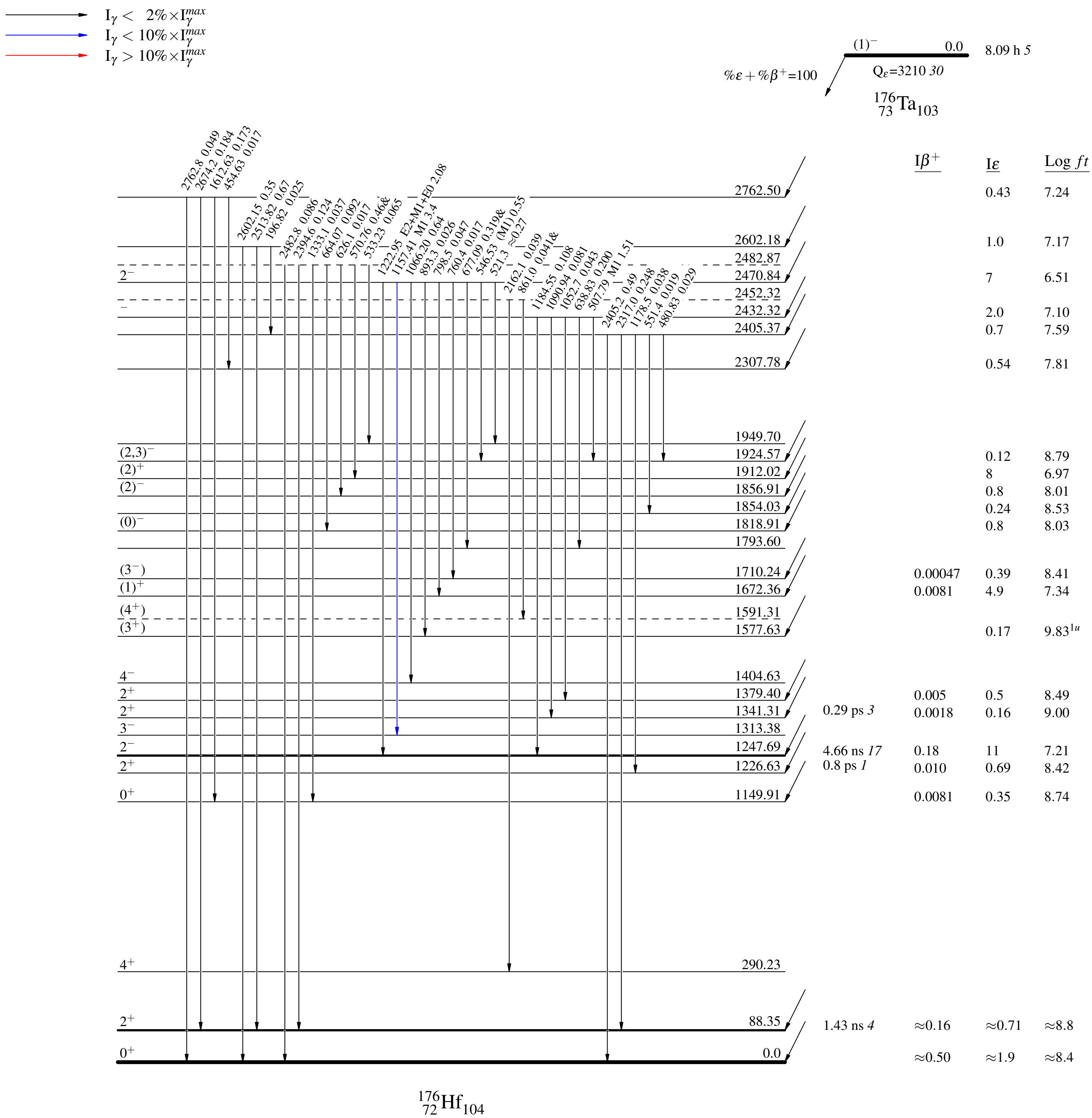
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

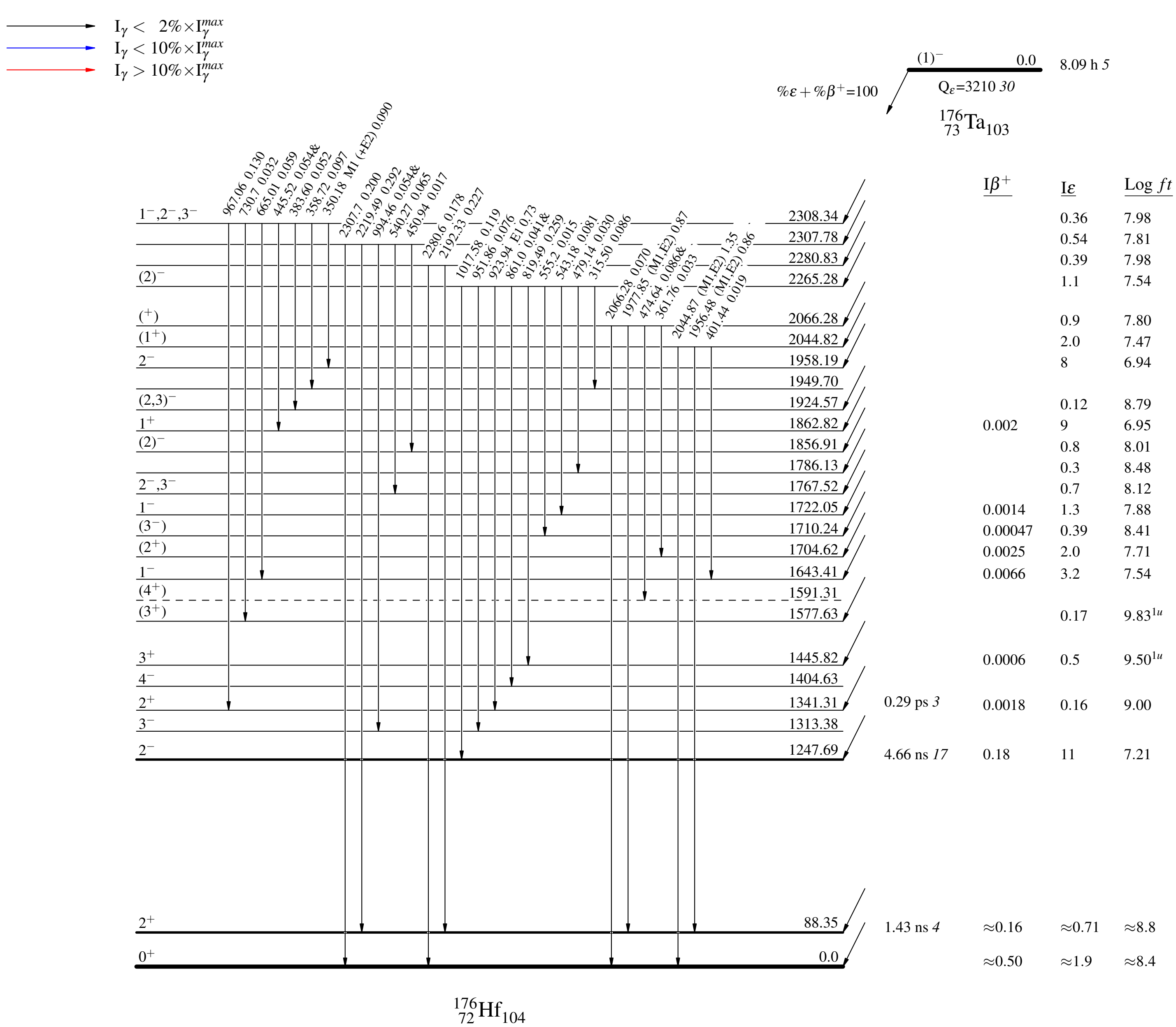
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

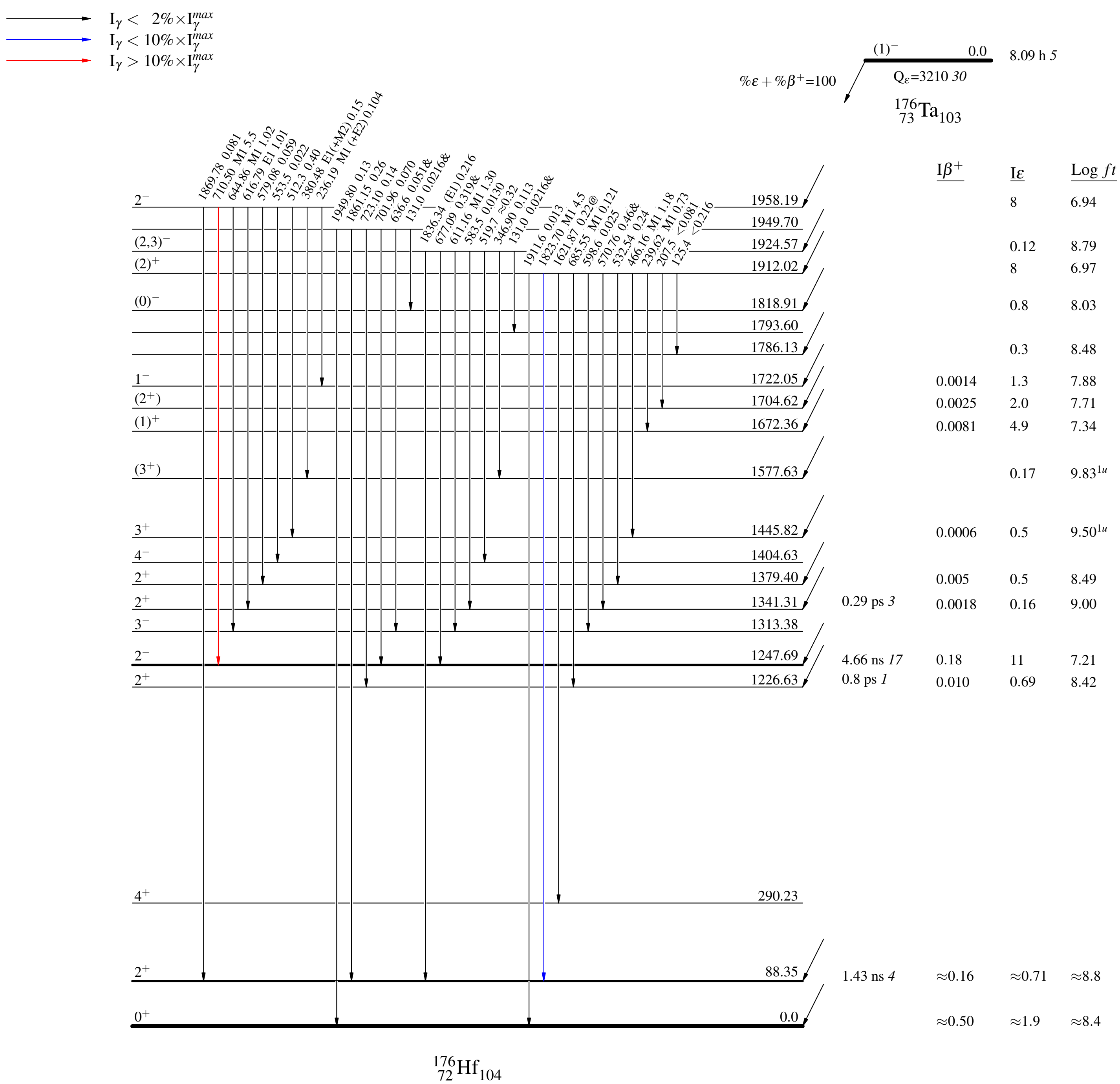
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

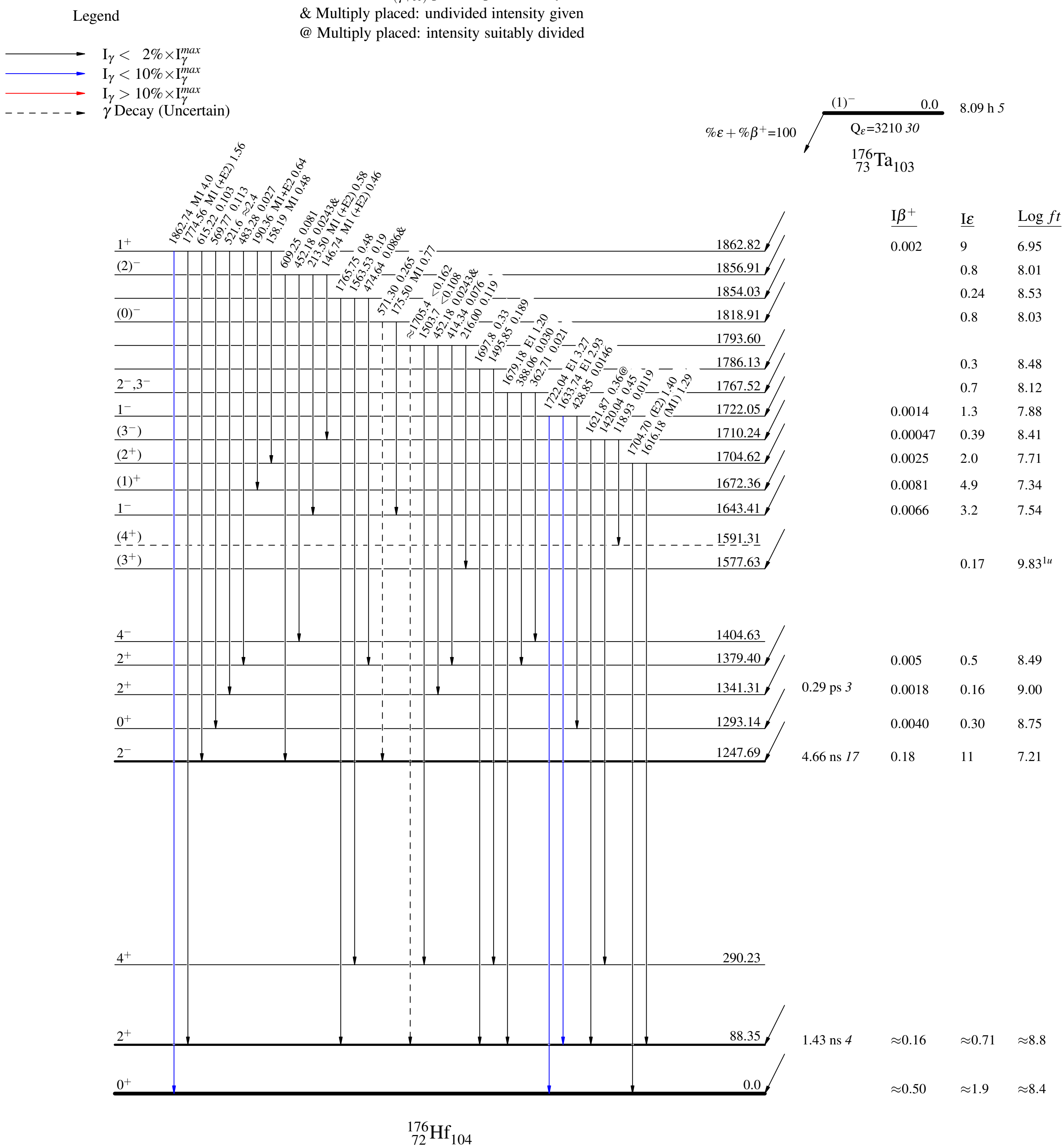
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

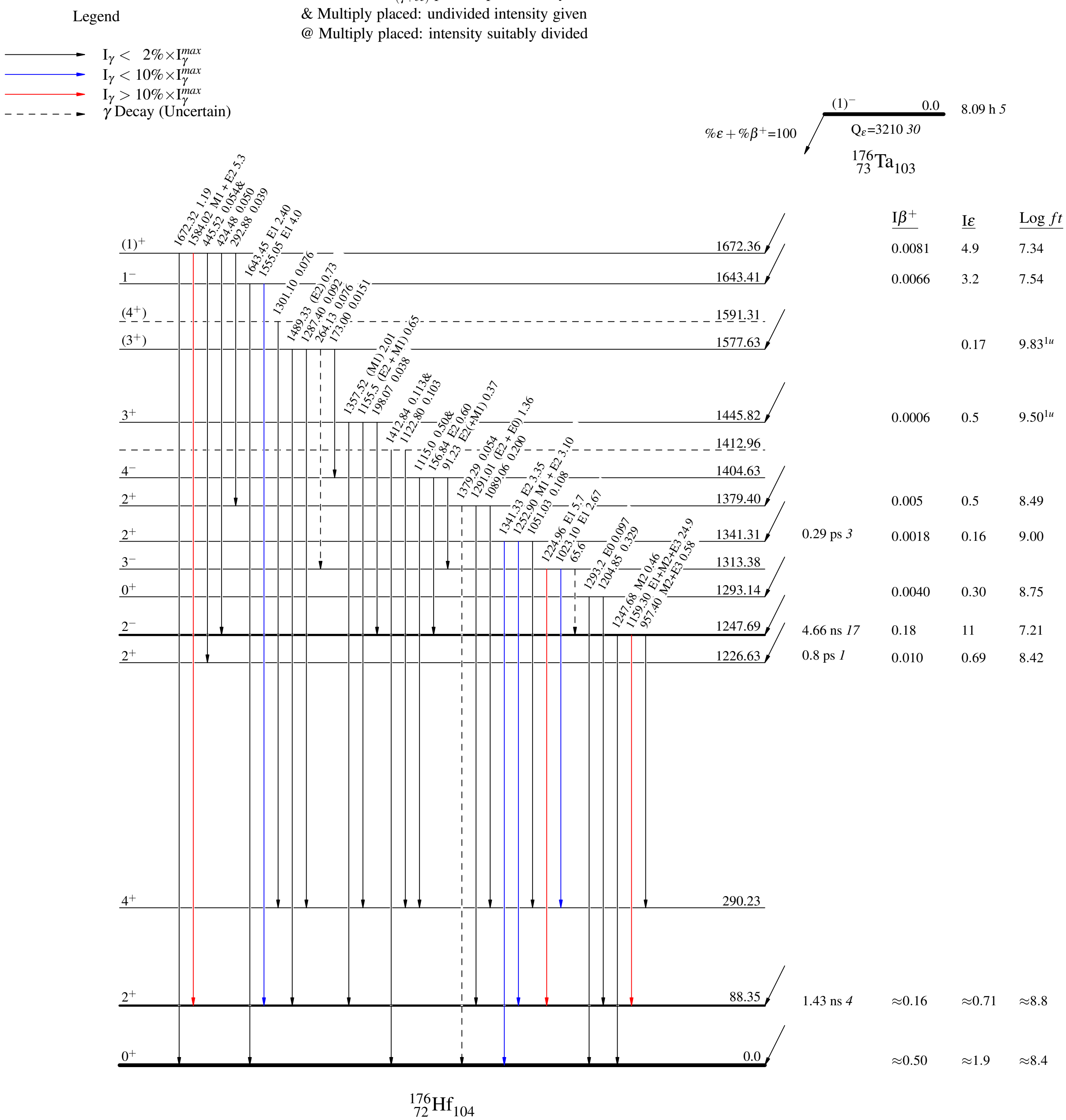
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

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



^{176}Ta ε decay 1971Be10

Decay Scheme (continued)

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