^{175}Ta ε decay 1971Ga38,1960Ha18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 102, 719 (2004)	1-Jun-2004

Parent: ^{175}Ta: E=0; J$^{\pi}$=7/2^{+}; T$_{1/2}$=10.5 h *2*; Q(ε)=2080 *30*; %ε+%β^{+} decay=100.0

1971Ga38: source, produced by 600-MeV p on Au and 20-MeV ^{20}Ne on Tb. Measured Ice, Eγ, Iγ, $\gamma\gamma$ coin. Deduced α(K).

1960Ha18: source produced by ^{174}Hf(p,2n). Measured ce.

Decay scheme is from 1971Ga38. Assignment of single-particle configurations is largely based on the energy systematics of Nilsson orbitals in Yb and Hf nuclei.

^{175}Hf Levels

E(level)[†]	J$^{\pi}$	T$_{1/2}$	Comments
0.0[‡]	5/2$^-$	70 d *2*	
81.50[‡] *8*	7/2$^-$		
125.93[#] *12*	1/2$^-$		
185.92[‡] *13*	9/2$^-$		
196.43[#] *14*	3/2$^-$		
207.48[@] *12*	7/2$^+$	1.55 ns *9*	T$_{1/2}$: from 1964Un01.
213.42[#] *12*	5/2$^-$		
258.00[@] *14*	9/2$^+$		
312.53[‡] *13*	11/2$^-$		
335.30[@] *16*	(11/2$^+$)		
348.35[&] *12*	7/2$^-$		
375.52[#] *16*	7/2$^-$		
406.1[#] *3*	9/2$^-$		
436.10[@] *24*	(13/2$^+$)		
474.97[&] *15*	9/2$^-$		
629.0? *3*	(11/2$^-$)		
644.12[a] *21*	9/2$^+$		
732.6[b] *4*	(5/2$^+$)		
797.59[a] *23*	11/2$^+$		
807.3 *4*	(7/2$^+$)		
1060.1 *5*	(5/2,7/2,9/2)		
1124.3 *3*	(7/2,9/2)		
1205.94 *17*	(9/2$^-$)		
1224.88 *23*	(7/2$^-$)		
1248.58 *21*	(9/2$^-$)		
1466.3 *3*	(7/2$^+$)		
1468.7 *5*	(5/2$^-$)		
1606.24 *23*	(9/2$^+$)		
1658.91 *25*	(5/2$^+$,7/2$^+$)		
1746.8 *5*	(5/2$^+$,7/2$^+$,9/2$^+$)		
1793.29 *21*	(5/2$^+$)		
1802.9 *3*	(9/2$^-$)		
1818.37 *23*	(9/2$^+$)		
1825.79 *23*	(7/2$^+$)		
1887.8 *3*			
1893.87 *24*	(9/2$^+$)		

[†] Deduced by evaluator from a least-squares fit to γ-ray energies.
[‡] 5/2(512) band.

Continued on next page (footnotes at end of table)

^{175}Ta ε decay 1971Ga38,1960Ha18 (continued)

^{175}Hf Levels (continued)

[#] 1/2(521) band.
[@] 7/2(633) band.
[&] 7/2(514) band.
[a] 9/2(624) band.
[b] 5/2(642)? band.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I(ε+β^+)†‡	Comments
(1.9×10^2 *3*)	1893.87		6.0 *7*	5.26 *23*	6.0 *7*	εK=0.70 *5*; εL=0.23 *4*; εM+=0.076 *13*
(1.9×10^2 *3*)	1887.8		0.61 *9*	6.29 *22*	0.61 *9*	εK=0.70 *4*; εL=0.22 *3*; εM+=0.074 *11*
(2.5×10^2 *3*)	1825.79		4.6 *3*	5.74 *15*	4.6 *3*	εK=0.746 *17*; εL=0.192 *12*; εM+=0.062 *5*
(2.6×10^2 *3*)	1818.37		3.11 *22*	5.94 *14*	3.11 *22*	εK=0.749 *15*; εL=0.189 *11*; εM+=0.062 *5*
(2.8×10^2 *3*)	1802.9		2.32 *20*	6.13 *14*	2.32 *20*	εK=0.755 *13*; εL=0.185 *10*; εM+=0.060 *4*
(2.9×10^2 *3*)	1793.29		7.6 *6*	5.65 *13*	7.6 *6*	εK=0.759 *12*; εL=0.182 *9*; εM+=0.059 *4*
(3.3×10^2 *3*)	1746.8		0.65 *6*	6.87 *11*	0.65 *6*	εK=0.771 *8*; εL=0.173 *6*; εM+=0.0554 *21*
(4.2×10^2 *3*)	1658.91		2.46 *19*	6.53 *9*	2.46 *19*	εK=0.787 *5*; εL=0.162 *3*; εM+=0.0513 *12*
(4.7×10^2 *3*)	1606.24		4.1 *3*	6.43 *8*	4.1 *3*	εK=0.792 *4*; εL=0.1579 *23*; εM+=0.0497 *9*
(6.1×10^2 *3*)	1468.7		1.5 *3*	7.11 *10*	1.5 *3*	εK=0.8024 *18*; εL=0.1506 *13*; εM+=0.0470 *5*
(6.1×10^2 *3*)	1466.3		2.8 *3*	6.85 *7*	2.8 *3*	εK=0.8025 *17*; εL=0.1505 *13*; εM+=0.0470 *5*
(8.3×10^2 *3*)	1248.58		3.8 *4*	7.00 *6*	3.8 *4*	εK=0.8109 *9*; εL=0.1444 *7*; εM+=0.04476 *23*
(8.6×10^2 *3*)	1224.88		5.4 *5*	6.87 *6*	5.4 *5*	εK=0.8115; εL=0.1439 *6*; εM+=0.04459 *22*
(8.7×10^2 *3*)	1205.94		7.0 *5*	6.78 *5*	7.0 *5*	εK=0.8120; εL=0.1436 *6*; εM+=0.04446 *21*
(9.6×10^2 *3*)	1124.3		0.53 *15*	7.98 *13*	0.53 *15*	εK=0.8138; εL=0.1422 *5*; εM+=0.04397 *17*
(1.02×10^3[#] *3*)	1060.1		<0.17	>8.5	<0.17	εK=0.8150; εL=0.1414 *4*; εM+=0.04365 *15*
(1.27×10^3 *3*)	807.3		0.31 *6*	8.48 *9*	0.31 *6*	εK=0.8184; εL=0.1388 *3*; εM+=0.04271 *10*
(1.28×10^3[#] *3*)	797.59		0.75 *18*	8.10 *11*	0.75 *18*	εK=0.8185; εL=0.13870 *25*; εM+=0.04268 *9*
(1.35×10^3 *3*)	732.6		<0.22	>8.7	<0.22	εK=0.8191; εL=0.13820 *23*; εM+=0.04250 *9*
(1.44×10^3 *3*)	644.12		1.1 *8*	8.0 *4*	1.1 *8*	εK=0.8195; εL=0.13755 *22*; εM+=0.04226 *8*
(1.61×10^3 *3*)	474.97	0.016 *4*	5.9 *4*	7.41 *4*	5.9 *4*	av Eβ=279 *14*; εK=0.8191; εL=0.13634 *23*; εM+=0.04184 *8*
(1.67×10^3 *3*)	406.1	0.0013 *5*	0.31 *10*	8.73 *15*	0.31 *10*	av Eβ=309 *14*; εK=0.8184; εL=0.13582 *24*; εM+=0.04166 *8*
(1.70×10^3 *3*)	375.52	0.010 *4*	2.1 *8*	7.91 *17*	2.1 *8*	av Eβ=323 *14*; εK=0.8179; εL=0.13558 *25*; εM+=0.04158 *9*
(1.73×10^3 *3*)	348.35	0.15 *3*	26.3 *18*	6.83 *4*	26.5 *18*	av Eβ=335 *14*; εK=0.8174; εL=0.1354 *3*; εM+=0.04150 *9*
(1.88×10^3 *3*)	196.43	0.0089 *15*	3.7 *3*	8.86[1u] *5*	3.7 *3*	av Eβ=417 *13*; εK=0.8110; εL=0.1425 *3*; εM+=0.04413 *11*
(1.89×10^3 *3*)	185.92	0.10 *3*	8.1 *20*	7.42 *11*	8.2 *20*	av Eβ=406 *14*; εK=0.8129 *12*; εL=0.1339 *4*; εM+=0.04101 *11*
(2.00×10^3 *3*)	81.50	<0.22	<12	>7.3	<12	av Eβ=452 *14*; εK=0.8084 *16*; εL=0.1327 *4*; εM+=0.04064 *12*

† From intensity balance at each level.
‡ Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

γ(^{175}Hf)

Iγ normalization: assuming no ε+β feeding to g.s. and using Σ Ti(g.s.)=100%. This is consistent with experimental I(K x ray)=3000 *500* (1971Ga38). The ε transition 7/2[404] → 5/2[512] has λ=2, and it is expected to be hindered by selection rules.

E_γ[‡]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ	α[c]	Comments
35.8[#] *1*		348.35	7/2⁻	312.53	11/2⁻				
50.5[#] *1*	≈9.2	258.00	9/2⁺	207.48	7/2⁺	M1+E2	0.36	12.3	α(L)= 9.41; α(M)= 2.25; α(N+..)= 0.650 I_γ: deduced by evaluator from Ice(L23)=57 and α(L2) + α(L3)(theory)=6.22. Mult.,δ: from L1:L2:L3:M:N≈30:29:28:≈20:6 (1960Ha18).
70.5[#] *1*	≈8	196.43	3/2⁻	125.93	1/2⁻	M1+E2	0.92	13.0	α(K)= 5.73; α(L)= 5.51; α(M)= 1.35; α(N+..)= 0.383 I_γ: deduced by evaluator from Ice(L)≈44 (1960Ha18) and α(L)(theory)=5.51. Mult.,δ: from L1:L2:L3:M=7:20:≈19:≈9 (1960Ha18).
77.3[#] *1*		335.30	(11/2⁺)	258.00	9/2⁺				
81.5[#] *1*	150 *25*	81.50	7/2⁻	0.0	5/2⁻	M1+E2	0.26	7.48	α(K)= 5.88; α(L)= 1.23; α(M)= 0.285; α(N+..)= 0.0836 %Iγ=6.0 *5*. Mult.,δ: from K:L1:L2:L3:N=>250:100:29:19:10 (1960Ha18).
87.5[#] *1*	≈3	213.42	5/2⁻	125.93	1/2⁻	(E2)		6.09	α(K)= 1.22; α(L)= 3.69; α(M)= 0.918; α(N+..)= 0.262 I_γ: deduced by evaluator from Ice(K)=2.5 (1960Ha18) and α(K)(theory)=1.22. Iγ<22 reported by 1971Ga38. Mult.: from K:L1:L2:L3=2.5:≈1:≈7:6.5 (1960Ha18).
90.0 *9*	10 *3*	348.35	7/2⁻	258.00	9/2⁺				
100.8[#] *2*		436.10	(13/2⁺)	335.30	(11/2⁺)				
104.3[#] *2*	78 *10*	185.92	9/2⁻	81.50	7/2⁻	M1+E2	0.23	3.62	α(K)= 2.93; α(L)= 0.532; α(M)= 0.122; α(N+..)= 0.0361 Mult.,δ: from K:L1:L2:L3:M:N=>109:21:4:2:6.5:1.5 (1960Ha18).
125.9[e#] *2*	65[e] *20*	125.93	1/2⁻	0.0	5/2⁻				
125.9[e#] *2*	145[e@] *30*	207.48	7/2⁺	81.50	7/2⁻				
126.6[e#] *2*	9[e@] *3*	312.53	11/2⁻	185.92	9/2⁻				
126.6[e#] *2*	7[e@] *3*	474.97	9/2⁻	348.35	7/2⁻				
132.0[#] *2*	[&]	213.42	5/2⁻	81.50	7/2⁻				
140.9[#] *2*	58 *7*	348.35	7/2⁻	207.48	7/2⁺	(E1)		0.147	α(K)= 0.122; α(L)= 0.0196; α(M)= 0.00442; α(N+..)= 0.00127 Mult.: from α(K)exp=0.077 (1971Ga38).
162.0[#] *2*	21 *11*	375.52	7/2⁻	213.42	5/2⁻				
162.5[#] *2*	37[@] *7*	348.35	7/2⁻	185.92	9/2⁻	M1+E2	0.4	0.973	α(K)= 0.783; α(L)= 0.146; α(M)= 0.0335; α(N+..)= 0.00984 Mult.,δ: from K:L1:L3:M:N=24:<7:0.45:1.7:0.5 (1960Ha18).

γ(^{175}Hf) (continued)

E_γ[‡]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	α[c]	Comments
162.5[#] *2*	4.3[@] *8*	474.97	9/2⁻	312.53	11/2⁻			
178[f] *1*	7[a] *1*	258.00	9/2⁺	81.50	7/2⁻			
178 *1*	7[a] *1*	436.10	(13/2⁺)	258.00	9/2⁺			
179.1[#] *3*	32 *5*	375.52	7/2⁻	196.43	3/2⁻	(E2)	0.422	α(K)= 0.229; α(L)= 0.147; α(M)= 0.0361; α(N+..)= 0.0103 Mult.: from K:L2:L3:M=5:≈2.4:1.7:1.3 (1960Ha18).
185.8[#] *3*	16 *2*	185.92	9/2⁻	0.0	5/2⁻	(E2)	0.372	α(K)= 0.207; α(L)= 0.126; α(M)= 0.0308; α(N+..)= 0.00877 Mult.: from K:L2:L3=4.5:2:1.5 (1960Ha18).
192.7[#] *3*	9.1 *13*	406.1	9/2⁻	213.42	5/2⁻	(E2)	0.329	α(K)= 0.187; α(L)= 0.108; α(M)= 0.0264; α(N+..)= 0.00751 Mult.: from α(K)exp=0.22 and K:L2=2:≈0.8 (1960Ha18).
196.4[#] *3*	4.0 *10*	196.43	3/2⁻	0.0	5/2⁻			
207.4[#] *3*	350 *20*	207.48	7/2⁺	0.0	5/2⁻	(E1)	0.0540	α(K)= 0.0450; α(L)= 0.00698; α(M)= 0.00157; α(N+..)= 0.000448 Mult.: from K:L1:N=16.5:3.2:0.8 (1960Ha18).
213.4[#] *3*	<2	213.42	5/2⁻	0.0	5/2⁻			
216.4 *3*	4.7 *6*	474.97	9/2⁻	258.00	9/2⁺			
230.8[#] *3*	17.6 *10*	312.53	11/2⁻	81.50	7/2⁻	(E2)	0.181	α(K)= 0.113; α(L)= 0.0517; α(M)= 0.0126; α(N+..)= 0.00355 Mult.: from K:L2:L3=2:≈0.7:0.5 (1960Ha18).
[x]256[f]	2 *1*							
259.8 *4*	13 *4*	1466.3	(7/2⁺)	1205.94	(9/2⁻)			
266.9[e#] *4*	270[e] *32*	348.35	7/2⁻	81.50	7/2⁻	(M1)	0.262	α(K)= 0.219; α(L)= 0.0336; α(M)= 0.00755; α(N+..)= 0.00221 Mult.: from K:L1:L3:M=54:9:0.5:2.3(1960Ha18).
266.9[e#] *4*	11[e] *4*	474.97	9/2⁻	207.48	7/2⁺			
[x]275[f]	≈1.2							
280.5[e#f] *4*	[e]	629.0?	(11/2⁻)	348.35	7/2⁻			
280.5[e#] *4*	14.1[e] *10*	1746.8	(5/2⁺,7/2⁺,9/2⁺)	1466.3	(7/2⁺)	(M1+E2)	0.16 *7*	α(K)= 0.13 *6*; α(L)= 0.027 *11*; α(M)= 0.0062 *24*; α(N+..)= 0.00179 *14* Mult.: from α(K)exp=0.16 (1971Ga38).
288.9[#] *4*	37 *4*	474.97	9/2⁻	185.92	9/2⁻	(M1)	0.211	α(K)= 0.176; α(L)= 0.0270; α(M)= 0.00608; α(N+..)= 0.00178 Mult.: from α(K)exp=0.18 (1971Ga38).
294.0[#] *4*	4 *1*	375.52	7/2⁻	81.50	7/2⁻			
308.9[#] *4*	3.6 *12*	644.12	9/2⁺	335.30	(11/2⁺)	(M1)	0.176	α(K)= 0.147; α(L)= 0.0225; α(M)= 0.00506; α(N+..)= 0.00148 Mult.: from α(K)exp=0.18 (1971Ga38).

$^{175}_{72}Hf_{103}$-4

γ(^{175}Hf) (continued)

E_γ[‡]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ	α[c]	Comments
331.1 *6*	1.4 *6*	644.12	9/2$^+$	312.53	11/2$^-$				
348.5[#] *5*	300 *15*	348.35	7/2$^-$	0.0	5/2$^-$	(M1+E2)	1.08	0.0866	α(K)= 0.0692; α(L)= 0.0134; α(M)= 0.00309; α(N+..)= 0.000890 Mult.,δ: from α(K)exp=0.070 (1971Ga38).
^{x}357 *1*	≈0.8								
361.4[#] *5*	7.6 *10*	797.59	11/2$^+$	436.10	(13/2$^+$)	(M1)		0.116	α(K)= 0.0968; α(L)= 0.0147; α(M)= 0.00331; α(N+..)= 0.000968 Mult.: from α(K)exp=0.11 (1971Ga38).
^{x}365.7	5.3 *15*								α(K)exp≈0.028.
^{x}375 *1*	≈0.3								
^{x}380 *1*	0.9 *7*								
386.0[#] *6*	14.9 *15*	644.12	9/2$^+$	258.00	9/2$^+$	(M1)		0.0973	α(K)= 0.0813; α(L)= 0.0123; α(M)= 0.00278; α(N+..)= 0.000812 Mult.: from α(K)exp=0.081 (1971Ga38).
393.2[#] *6*	53 *4*	474.97	9/2$^-$	81.50	7/2$^-$	(M1)		0.0926	α(K)= 0.0775; α(L)= 0.0117; α(M)= 0.00264; α(N+..)= 0.000773 Mult.: from α(K)exp=0.083 (1971Ga38).
400.8 *13*	0.6 *6*	1606.24	(9/2$^+$)	1205.94	(9/2$^-$)				
^{x}404 *1*	0.5								α(K)exp=1.8.
^{x}432.8	1.3 *5*								α(K)exp=0.34.
436.4[#] *7*	95 *5*	644.12	9/2$^+$	207.48	7/2$^+$	(M1)		0.0705	α(K)= 0.0590; α(L)= 0.00891; α(M)= 0.00200; α(N+..)= 0.000586 Mult.: from α(K)exp=0.058 (1971Ga38).
443.3[#] *7*	3.6 *9*	629.0?	(11/2$^-$)	185.92	9/2$^-$	(M1)		0.0676	α(K)= 0.0566; α(L)= 0.00855; α(M)= 0.00192; α(N+..)= 0.000563 Mult.: from α(K)exp≈0.08 (1971Ga38).
^{x}448.4	0.4 *3*								
^{x}450.5	1.5 *9*								
461.9[#] *7*	5.8 *11*	797.59	11/2$^+$	335.30	(11/2$^+$)	(M1+E2)		0.042 *18*	α(K)= 0.035 *16*; α(L)= 0.0060 *24*; α(M)= 0.0014 *5*; α(N+..)= 0.00040 *11* Mult.: from α(K)exp=0.034 (1971Ga38).
^{x}467.4 *7*	1.2 *5*								
^{x}470.6 *5*	4.2 *5*								
475.0[#] *7*	51 *5*	474.97	9/2$^-$	0.0	5/2$^-$	(E2)		0.0222	α(K)= 0.0170; α(L)= 0.00395; α(M)= 0.000923; α(N+..)= 0.000264 Mult.: from α(K)exp=0.019 (1971Ga38).
^{x}481.8 *7*	1.5 *5*								
485.6 *6*	3.5 *9*	797.59	11/2$^+$	312.53	11/2$^-$				
^{x}502.0 *8*	3.2 *10*								
525.0 *4*	8.4 *14*	732.6	(5/2$^+$)	207.48	7/2$^+$	(M1+E2)		0.031 *13*	α(K)= 0.025 *12*; α(L)= 0.0042 *17* Mult.: from α(K)exp≈0.028 (1971Ga38).
^{x}533.0 *4*	5.2 *9*								α(K)exp=0.027.

$^{175}_{72}$Hf$_{103}$-5

$\gamma(^{175}$Hf) (continued)

E_γ[‡]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[c]	Comments
539.6 3	24 3	797.59	11/2+	258.00	9/2+	(M1)	0.0408	α(K)= 0.0340; α(L)= 0.00511 Mult.: from α(K)exp=0.032 (1971Ga38).
545.2 5	3.2 7	1606.24	(9/2+)	1060.1	(5/2,7/2,9/2)			
549.5 8	1.8 8	807.3	(7/2+)	258.00	9/2+			
561.6 4	3.7 9	1205.94	(9/2−)	644.12	9/2+			
[x]568.4 9	1.5 5							
[x]572.2 4	5.0 9							
[x]588.3 6	3.0 9							
[x]591.8 8	1.1 8							
599.8 4	5.7 11	807.3	(7/2+)	207.48	7/2+	(M1)	0.0311	α(K)= 0.0259; α(L)= 0.00389 Mult.: from α(K)exp≈0.024 (1971Ga38).
[x]609.3 9	4.1 20							
619.4[d] 4	11.2[d] 22	1248.58	(9/2−)	629.0?	(11/2−)			
619.4[d] 4	11.2[d] 22	1825.79	(7/2+)	1205.94	(9/2−)			
[x]661.4 4	2.8 14							
[x]676.2 5	2.2 11							
[x]694.5[f]								
[x]697.5 9	6.0 34							
701.0[f] 7	5 3	1825.79	(7/2+)	1124.3	(7/2,9/2)			
[x]720.1 5	0.6 6							
730.6 4	12.8 16	1205.94	(9/2−)	474.97	9/2−	(M1)	0.0188	α(K)= 0.0157; α(L)= 0.00234 Mult.: from α(K)exp=0.016 (1971Ga38).
[x]739.4 4	4.7 10							
749.5 4	6.0 11	1224.88	(7/2−)	474.97	9/2−	(M1)	0.0176	α(K)= 0.0147; α(L)= 0.00219 Mult.: from α(K)exp=0.02 (1971Ga38).
[x]759[f] 1	3 1							
[x]761.9[f]								Ice(K)≈0.07.
[x]774 1	≈1							
774[f] 1	≈1	1248.58	(9/2−)	474.97	9/2−			
[x]784.0 5	6.5 16							
789.1 9	3.1 11	1124.3	(7/2,9/2)	335.30	(11/2+)			
801.1 10	2.1 11	1060.1	(5/2,7/2,9/2)	258.00	9/2+			
808.6 4	16.4 22	1606.24	(9/2+)	797.59	11/2+	(M1)	0.0146	α(K)= 0.0122; α(L)= 0.00181 Mult.: from α(K)exp=0.011 (1971Ga38).
[x]812.0 9	2.0 8							α(K)exp=0.025.
819.2 11	1.2 9	1224.88	(7/2−)	406.1	9/2−			
842.7 6	3.1 16	1248.58	(9/2−)	406.1	9/2−	(M1)	0.0132	α(K)= 0.0110; α(L)= 0.00163 Mult.: from α(K)exp=0.016 (1971Ga38).
849.1 4	12.2 15	1224.88	(7/2−)	375.52	7/2−	(E2)	0.00578	α(K)= 0.00471; α(L)= 0.000808 Mult.: from α(K)exp=0.0041 (1971Ga38).
852.3 6	3.0 22	1060.1	(5/2,7/2,9/2)	207.48	7/2+			

$^{175}_{72}$Hf$_{103}$-6

γ(^{175}Hf) (continued)

Eγ[‡]	Iγ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	δ	α[c]	Comments
857.7 3	80 7	1205.94	(9/2$^-$)	348.35	7/2$^-$	(M1)		0.0126	α(K)= 0.0105; α(L)= 0.00156 Mult.: from α(K)exp=0.012 (1971Ga38).
866.3 4	13.5 14	1124.3	(7/2,9/2)	258.00	9/2$^+$				
872.9 5	7.9 11	1248.58	(9/2$^-$)	375.52	7/2$^-$	(M1+E2)	0.89 74	0.0091 19	α(K)= 0.0076 16; α(L)= 0.00117 23 Mult.,δ: from α(K)exp=0.0076 27 (1971Ga38).
876.4 4	18.9 21	1224.88	(7/2$^-$)	348.35	7/2$^-$	(M1)		0.0119	α(K)= 0.00997; α(L)= 0.00148 Mult.: from α(K)exp=0.001 (1971Ga38).
[x]887.2 7	3.3 17								
893.5 7	3.8 12	1205.94	(9/2$^-$)	312.53	11/2$^-$	(M1)		0.0114	α(K)= 0.00950; α(L)= 0.00141 Mult.: from α(K)exp=0.01 (1971Ga38).
900.2 4	16.9 24	1248.58	(9/2$^-$)	348.35	7/2$^-$	(M1)		0.0112	α(K)= 0.00933; α(L)= 0.00138 Mult.: from α(K)exp=0.012 (1971Ga38).
915.8 7	1.7 11	1124.3	(7/2,9/2)	207.48	7/2$^+$				
925.2 7	2.9 10	1658.91	(5/2$^+$,7/2$^+$)	732.6	(5/2$^+$)				
[x]933.8 11	1.6 18								
[x]937.9 6	3.8 18								
947.1 11	5 3	1205.94	(9/2$^-$)	258.00	9/2$^+$				
[x]949.0 12	4.7 30								α(K)exp(947γ + 949γ)=0.0032.
[x]959.4 9	6.3 35								
962.1 4	36 5	1606.24	(9/2$^+$)	644.12	9/2$^+$				
967.0 12	4.7 21	1224.88	(7/2$^-$)	258.00	9/2$^+$				
[x]985.8 7	5.9 19								
990.5[df] 5	11.7[d] 23	1248.58	(9/2$^-$)	258.00	9/2$^+$				
990.5[df] 5	11.7[d] 23	1466.3	(7/2$^+$)	474.97	9/2$^-$				
993.8[f] 9	5.8 19	1205.94	(9/2$^-$)	213.42	5/2$^-$				
998.3 4	64 7	1205.94	(9/2$^-$)	207.48	7/2$^+$	(E1)		0.00165	α(K)= 0.00139; α(L)= 0.000194 Mult.: from α(K)exp=0.0019 (1971Ga38).
[x]1010.6 4	21 3								α(K)exp=0.0048.
1019.5[f] 6	10 4	1205.94	(9/2$^-$)	185.92	9/2$^-$				
1021.6 8	≤1	1818.37	(9/2$^+$)	797.59	11/2$^+$				
[x]1028.4 4	10.6 22								α(K)exp=0.0038.
1035.4 4	20 3	1248.58	(9/2$^-$)	213.42	5/2$^-$	(E2)		0.00385	α(K)= 0.00317; α(L)= 0.000511 Mult.: from α(K)exp=0.0045 17 (1971Ga38).
[x]1051.9 7	12 6								
[x]1053.4 15	4 4								α(K)exp≈0.013.
1061.9 11	≤3	1248.58	(9/2$^-$)	185.92	9/2$^-$				
[x]1067.7 16	13 6								
[x]1071.1 7	4.3 19								
[x]1083.0 8	4.0 18								
1087.7 11	2.9 21	1818.37	(9/2$^+$)	732.6	(5/2$^+$)				
1091.3 9	4.6 10	1466.3	(7/2$^+$)	375.52	7/2$^-$				
1095.7 11	8.0 20	1893.87	(9/2$^+$)	797.59	11/2$^+$	(M1)		0.00688	α(K)= 0.00576; α(L)= 0.000847 Mult.: from α(K)exp=0.008 4 (1971Ga38).

γ(^{175}Hf) (continued)

E_γ [‡]	I_γ [‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [†]	α [c]	Comments
[x]1107.6 *5*	10 *3*							
[x]1114.4 *6*	7.4 *12*							
1118.4 *5*	20 *5*	1466.3	(7/2$^+$)	348.35	7/2$^-$	(E1)	0.00134	α(K)= 0.00113; α(L)= 0.000157 Mult.: from α(K)exp=0.0014 *5* (1971Ga38).
1120.3 *15*	≤8	1468.7	(5/2$^-$)	348.35	7/2$^-$			
1124.5 *7*	3.6 *9*	1205.94	(9/2$^-$)	81.50	7/2$^-$			
1144.1 *5*	28 *8*	1224.88	(7/2$^-$)	81.50	7/2$^-$	(M1)	0.00619	α(K)= 0.00518; α(L)= 0.000761 Mult.: from α(K)exp=0.006 *3* (1971Ga38).
[x]1171.8 *4*	11 *3*							α(K)exp=0.0073.
1174.0 *7*	5.5 *22*	1818.37	(9/2$^+$)	644.12	9/2$^+$	(M1)	0.00582	α(K)= 0.00487; α(L)= 0.000714 Mult.: from α(K)exp=0.007 *6* (1971Ga38).
[x]1177.6 *9*	2 *2*							
[x]1195.5 *6*	5.8 *21*							α(K)exp=0.0052.
[x]1199.1 *11*	2.1 *11*							
1205.8 *6*	12 *4*	1205.94	(9/2$^-$)	0.0	5/2$^-$			
1208.5 *7*	14 *3*	1466.3	(7/2$^+$)	258.00	9/2$^+$			
1212.1 *9*	15 *3*	1468.7	(5/2$^-$)	258.00	9/2$^+$			
1225.6 *4*	62 *9*	1224.88	(7/2$^-$)	0.0	5/2$^-$			
[x]1231.0 *15*	2.6 *16*							
[x]1240.5 *7*	3.0 *12*							
1249.0 *13*	15 *6*	1248.58	(9/2$^-$)	0.0	5/2$^-$			
1249.8 *5*	60 *15*	1893.87	(9/2$^+$)	644.12	9/2$^+$			
1259.2 *8*	12 *4*	1466.3	(7/2$^+$)	207.48	7/2$^+$			
1261.1 *10*	5.3 *25*	1468.7	(5/2$^-$)	207.48	7/2$^+$			
1271.1 *5*	15 *4*	1606.24	(9/2$^+$)	335.30	(11/2$^+$)			
[x]1279.3 *7*	6.8 *23*							
1282.8 *9*	5.1 *19*	1658.91	(5/2$^+$,7/2$^+$)	375.52	7/2$^-$			
1293.3 *6*	11.1 *16*	1606.24	(9/2$^+$)	312.53	11/2$^-$			
[x]1324.7 *10*	5.6 *13*							α(K)exp=0.0043.
1348.9 *10*	7 *3*	1606.24	(9/2$^+$)	258.00	9/2$^+$			
[x]1376.4[f]								
[x]1382.6[f]								
1386 *1*	3 *1*	1466.3	(7/2$^+$)	81.50	7/2$^-$			
1399.2 *6*	7.9 *6*	1606.24	(9/2$^+$)	207.48	7/2$^+$	(E2)	0.00213	α(K)= 0.00178; α(L)= 0.000269 Mult.: from α(K)exp=0.0022 *5* (1971Ga38).
1419.0 *10*	2.4 *10*	1606.24	(9/2$^+$)	185.92	9/2$^-$			
1446.6[d] *7*	4.4[d] *18*	1658.91	(5/2$^+$,7/2$^+$)	213.42	5/2$^-$			
1446.6[d] *7*	4.4[d] *18*	1793.29	(5/2$^+$)	348.35	7/2$^-$			
1451.6 *5*	9.2 *22*	1658.91	(5/2$^+$,7/2$^+$)	207.48	7/2$^+$			
1462.0 *6*	7.3 *18*	1658.91	(5/2$^+$,7/2$^+$)	196.43	3/2$^-$			
1465.6 *13*	5 *3*	1466.3	(7/2$^+$)	0.0	5/2$^-$			
1468.3 *7*	14 *4*	1468.7	(5/2$^-$)	0.0	5/2$^-$	(M1)	0.00338	α(K)= 0.00283; α(L)= 0.000412 Mult.: from α(K)exp=0.0036 *16* (1971Ga38).

γ(^{175}Hf) (continued)

E_γ[‡]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	α[c]	Comments
1483.0 4	8.4 13	1818.37	$(9/2^+)$	335.30	$(11/2^+)$	(M1)	0.00330	α(K)= 0.00277; α(L)= 0.000402 Mult.: from α(K)exp=0.0024 12 (1971Ga38).
1490.1 5	20 3	1802.9	$(9/2^-)$	312.53	$11/2^-$	(E2)	0.00189	α(K)= 0.00158; α(L)= 0.000236 Mult.: from α(K)exp=0.018 6 (1971Ga38).
1506.1 13	12 3	1818.37	$(9/2^+)$	312.53	$11/2^-$			
^{x}1516.1 7	9.0 22							
1525.9 7	3.3 16	1606.24	$(9/2^+)$	81.50	$7/2^-$			
^{x}1536.2 6	4.6 14							α(K)exp=0.0043.
^{x}1544.1 5	6.8 21							α(K)exp=0.0060.
1560.3[d] 6	7.5[d] 18	1818.37	$(9/2^+)$	258.00	$9/2^+$			
1560.3[d] 6	7.5[d] 18	1893.87	$(9/2^+)$	335.30	$(11/2^+)$			
1577.0 9	3.6 14	1658.91	$(5/2^+,7/2^+)$	81.50	$7/2^-$			
^{x}1578.6 22	1.6 12							α(K)exp(1577γ + 1579γ)$\leq$0.0029.
1581.2 8	$\leq$7	1893.87	$(9/2^+)$	312.53	$11/2^-$			
1586.0 4	40 6	1793.29	$(5/2^+)$	207.48	$7/2^+$			E_γ: authors′ value of 1580.0 is possibly a misprint.
^{x}1590.2 13	2.8 14							
1611.3 6	6.7 16	1818.37	$(9/2^+)$	207.48	$7/2^+$	(M1)	0.00273	Mult.: from α(K)exp=0.0022 10 (1971Ga38).
1616 1	$\approx$9	1802.9	$(9/2^-)$	185.92	$9/2^-$			
1618.2 6	33 4	1825.79	$(7/2^+)$	207.48	$7/2^+$	(M1)	0.00268	Mult.: from α(K)exp=0.0018 4 (1971Ga38).
^{x}1620.1 6	10 4							
1631.4 6	$\approx$9	1818.37	$(9/2^+)$	185.92	$9/2^-$			I_γ: includes a contribution from an impurity line.
1636.0 4	42 6	1893.87	$(9/2^+)$	258.00	$9/2^+$	(M1)	0.00261	Mult.: from α(K)exp=0.0024 8 (1971Ga38).
^{x}1641.8 5	$\leq$3							
^{x}1650.0 4	7.7 18							α(K)exp=0.0010.
1659.2 4	27 3	1658.91	$(5/2^+,7/2^+)$	0.0	$5/2^-$	(E1)	0.00068	Mult.: from α(K)exp=0.0008 4 (1971Ga38).
^{x}1669.8 5	3.6 9							α(K)exp=0.0028.
1680.2 5	5.9 15	1887.8		207.48	$7/2^+$			
1686.4 4	2.9 15	1893.87	$(9/2^+)$	207.48	$7/2^+$			I_γ: uncertainty in Iγ is evaluator′ estimate.
^{x}1695.3[f] 5	<6							
1707.7 12	12 3	1893.87	$(9/2^+)$	185.92	$9/2^-$			
1711.8 4	29 4	1793.29	$(5/2^+)$	81.50	$7/2^-$			
1721.8 4	29 4	1802.9	$(9/2^-)$	81.50	$7/2^-$			
^{x}1733.1 13	15 11							α(K)exp$\approx$0.0077.
1736.7 4	23 3	1818.37	$(9/2^+)$	81.50	$7/2^-$	(E1)	0.00063	Mult.: from α(K)exp=0.00074 23 (1971Ga38).
1744.8 5	34 4	1825.79	$(7/2^+)$	81.50	$7/2^-$	(E1)	0.00062	Mult.: from α(K)exp=0.00076 21 (1971Ga38).
^{x}1767.5 4	5.4 12							
1793.1 3	115 14	1793.29	$(5/2^+)$	0.0	$5/2^-$	(E1)	0.00059	
1811.8 6	9.4 22	1893.87	$(9/2^+)$	81.50	$7/2^-$			
1826.1 4	31 5	1825.79	$(7/2^+)$	0.0	$5/2^-$	(E1)	0.00058	Mult.: from α(K)exp=0.00048 21 (1971Ga38).
^{x}1849.3 6	1.5 6							
^{x}1880.8 9	1.5 9							
1887.9 4	9.4 17	1887.8		0.0	$5/2^-$			
^{x}1891.8 5	7.7 16							

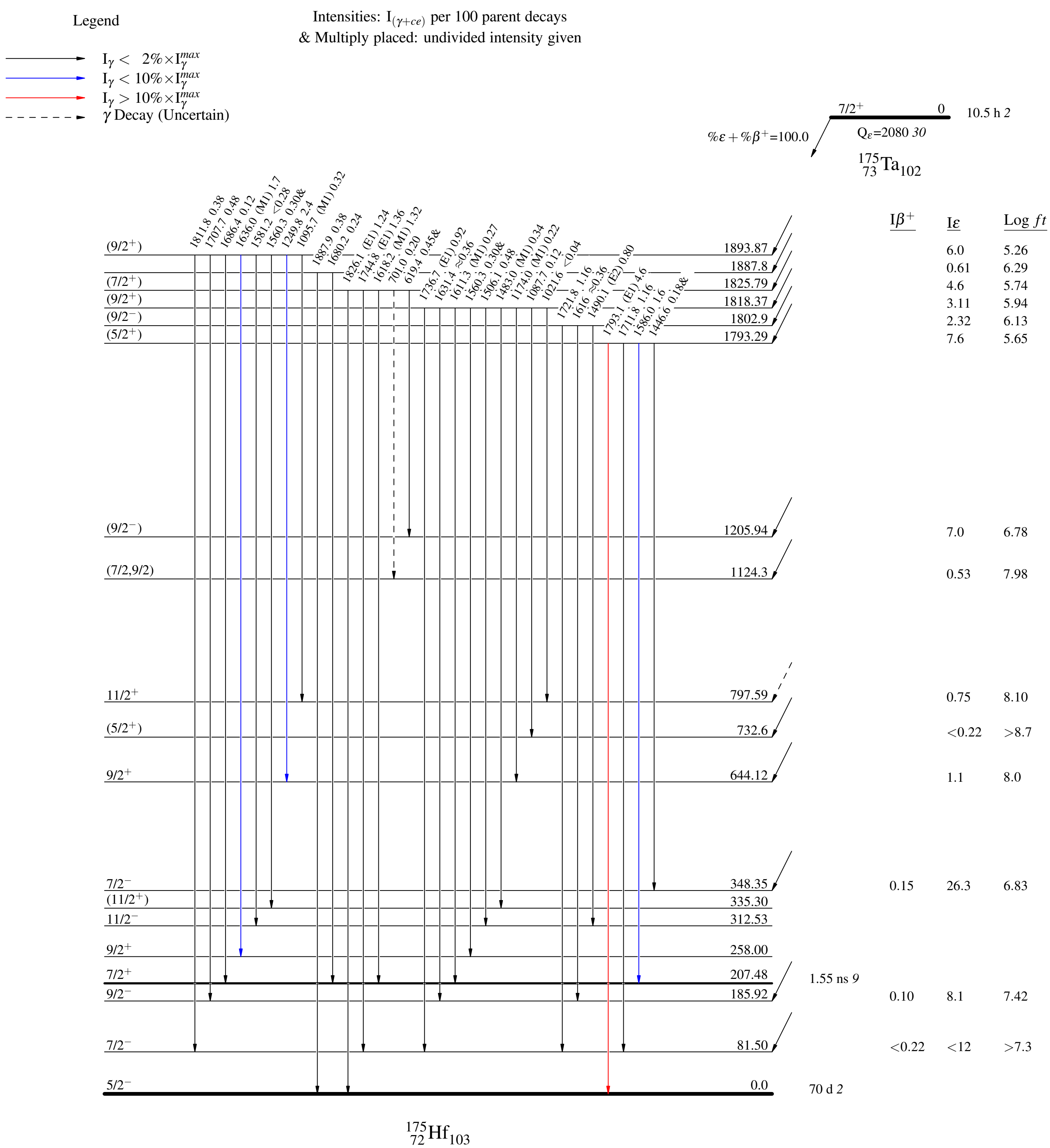
[†] From ce subshell ratios or α(K)exp. Normalization of photon and ce intensities assumed E1, M1, and E1 multipolarities for 207.4γ, 266.9γ, and 1793.2γ, respectively.
[‡] From 1971Ga38, except as noted.
[#] From 1960Ha18, values adopted by 1971Ga38.
[@] From $\gamma\gamma$ coin (1971Ga38).
[&] Iγ<6.5 (for E2) and Iγ<2.2 (for M1), from Ice(K)<3.3.
[a] Iγ for doublet.
[b] For absolute intensity per 100 decays, multiply by 0.040 *3*.
[c] 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.
[d] Multiply placed with undivided intensity.
[e] Multiply placed with intensity suitably divided.
[f] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{175}_{72}Hf_{103}$-10

^{175}Ta ε decay 1971Ga38,1960Ha18

Decay Scheme

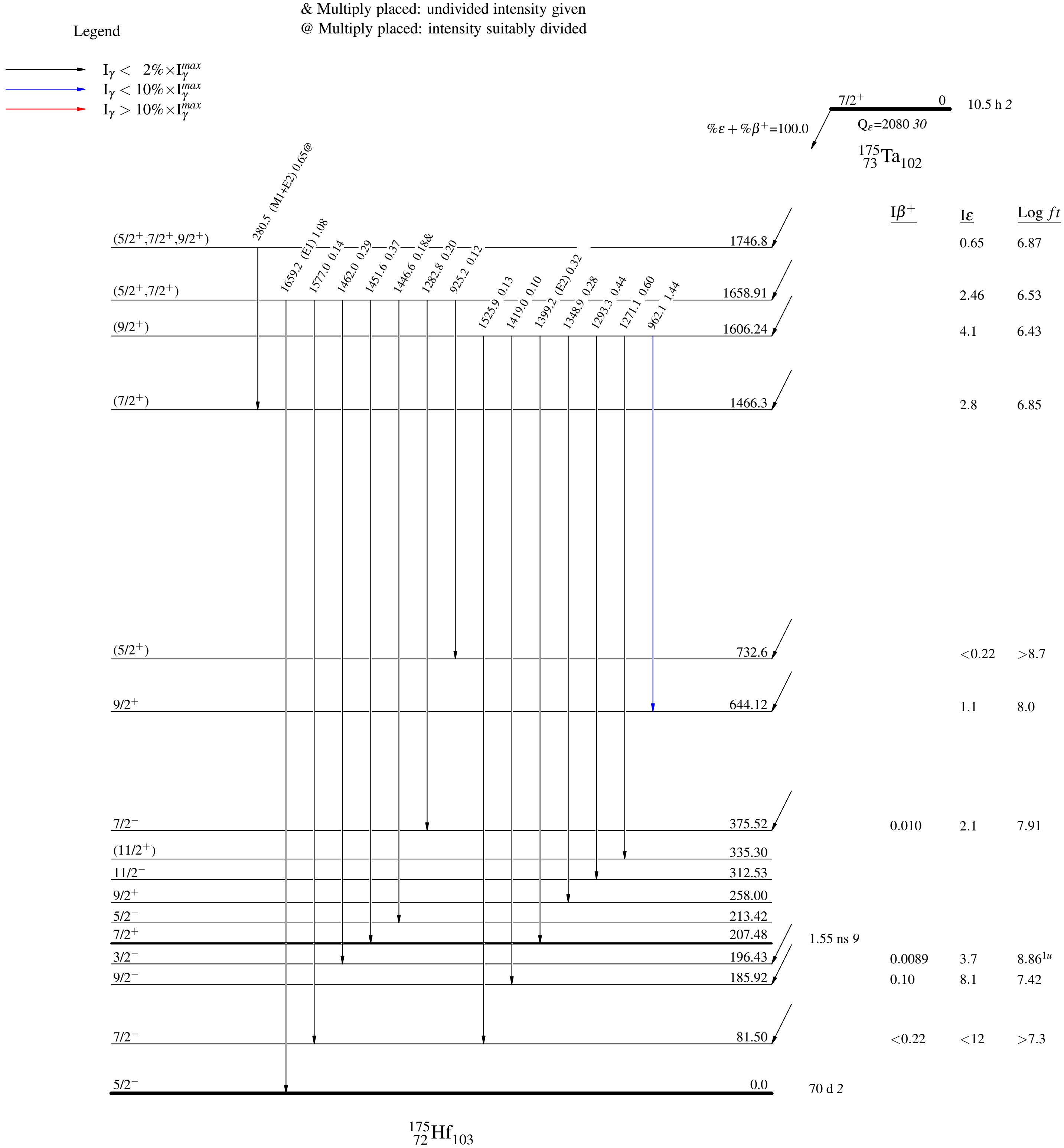
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{175}Ta ε decay 1971Ga38,1960Ha18

Decay Scheme (continued)

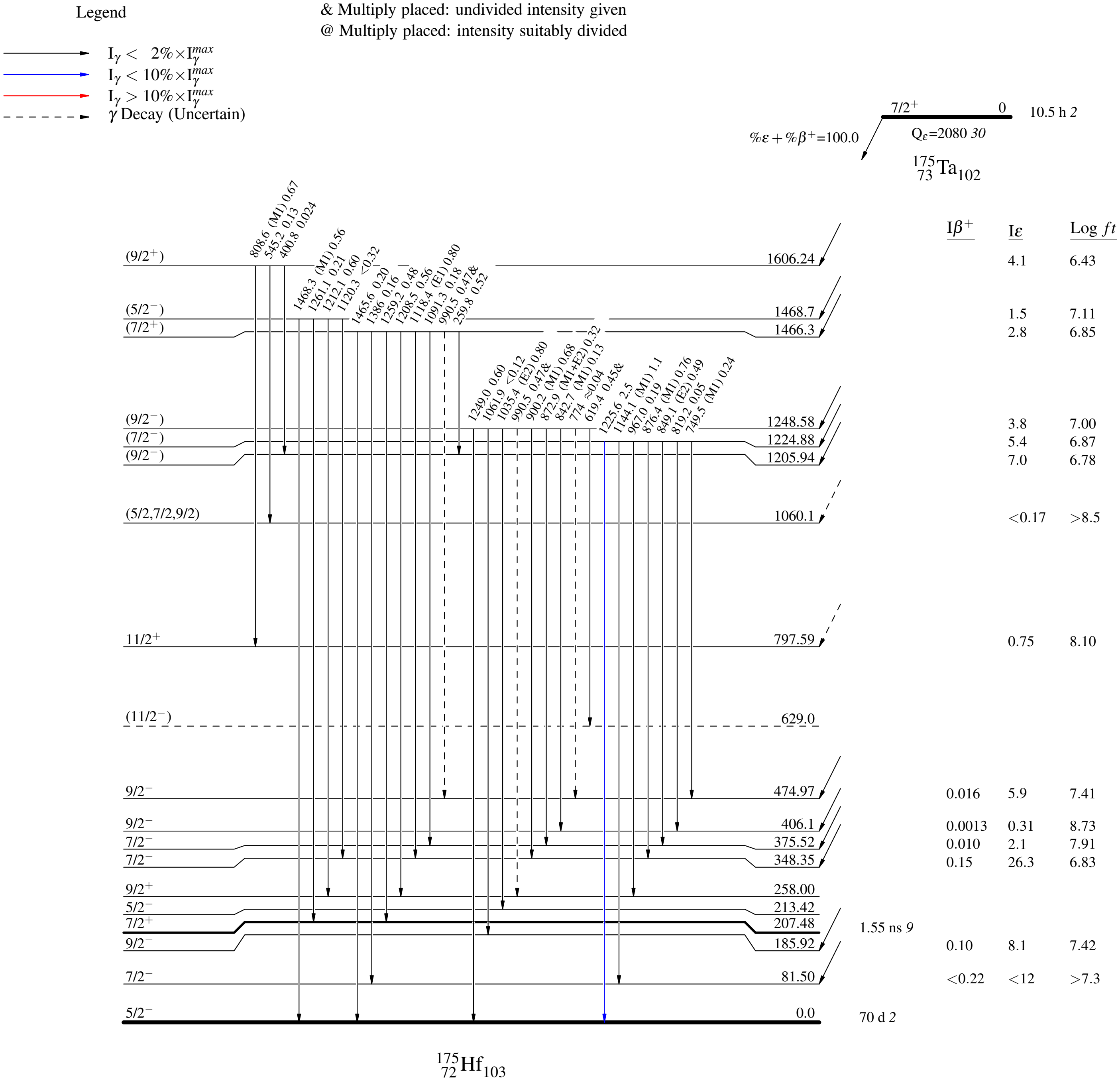
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{175}Ta ε decay 1971Ga38,1960Ha18

Decay Scheme (continued)

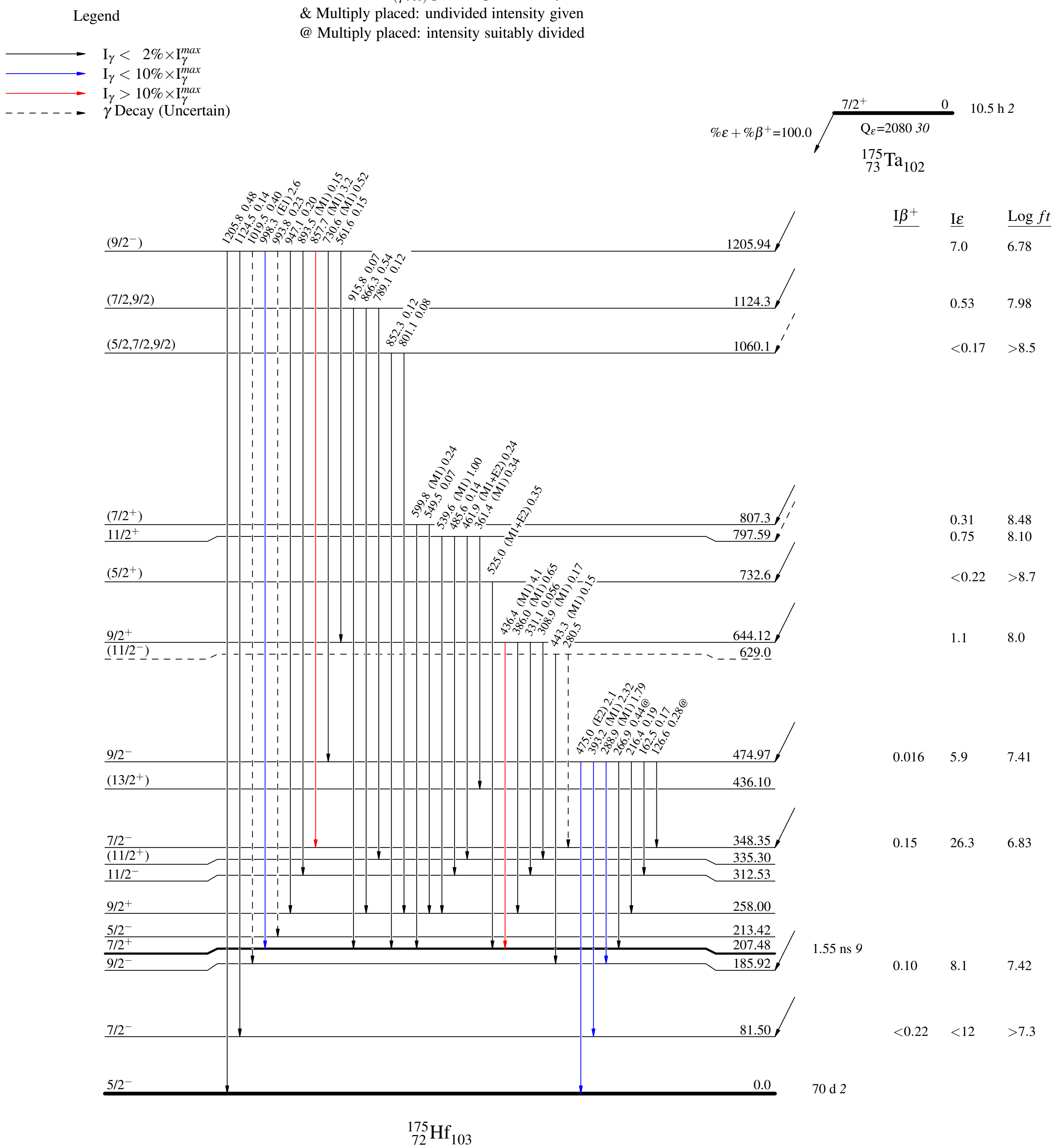
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{175}Ta ε decay 1971Ga38,1960Ha18

Decay Scheme (continued)

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



^{175}Ta ε decay 1971Ga38,1960Ha18

Decay Scheme (continued)

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