

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Update	Balraj Singh		20-Sep-2006

$Q(\beta^-) = -3.02 \times 10^3$ 4; $S(n) = 7.08 \times 10^3$ 4; $S(p) = 5.96 \times 10^3$ 3; $Q(\alpha) = 2.54 \times 10^3$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record -2790 SY6960 SY5830 SY2660 syst [1993Au05](#).

[Additional information 1.](#)

^{173}Hf Levels

Cross Reference (XREF) Flags

- A ^{173}Ta ϵ decay
- B (HI,xn γ)
- C $^{130}\text{Te}(^{48}\text{Ca},5n\gamma)$:SD

E(level) [†]	J π [‡]	T _{1/2}	XREF	Comments
0.0 [#]	1/2 ⁻	23.6 h 1	AB	% ϵ +% β^+ =100 J π : a=0.81 characteristic of K=1/2 (a=0.9 (theory)); structure for band built on g.s. fits to known 1/2[521] bands in region. T _{1/2} : from 1951Wi08 . Other values: 24.4 h 10 (1962Va06), 24.0 h 5 (1963Ra14). Others: 1954Wa02 , 1961Br39 .
69.73 [#] 4	3/2 ⁻		AB	
81.49 [#] 5	5/2 ⁻		AB	J π : 81.5 γ E2 to 1/2 ⁻ .
107.16 [@] 5	5/2 ⁻	180 ns 8	AB	J π : M1+E2 γ to 3/2 ⁻ ; regular spacing of band built on level fits 5/2[512]. T _{1/2} : ce γ (t) in ^{173}Ta ϵ decay.
197.23 [@] 10	7/2 ⁻		AB	
197.47 ^{&} 10	7/2 ⁺	160 ns 40	AB	J π : E1 γ to 5/2 ⁻ ; angular distribution for 90.3 γ consistent with stretched dipole. A=6.2 for band built on level fits 7/2[633]. T _{1/2} : ce γ (t) in ^{173}Ta ϵ decay.
241.90 [#] 7	7/2 ⁻		AB	
255.51 ^{&} 11	9/2 ⁺		AB	
262.14 [#] 8	9/2 ⁻		AB	
312.27 [@] 11	9/2 ⁻		AB	
336.0 ^{&} 3	11/2 ⁺		B	
435.4 ^{&} 3	13/2 ⁺		B	
451.5 [@] 2	11/2 ⁻		AB	
508.6 [#] 2	11/2 ⁻		AB	
536.0 [#] 3	13/2 ⁻		B	
567.4 ^{&} 3	15/2 ⁺		B	
613.7 [@] 2	13/2 ⁻		B	
635.8? 2	5/2 ⁺ , 7/2, 9/2 ⁺		A	J π : γ 's to 7/2 ⁺ and 9/2 ⁺ ; log ft \approx 8.4 from 5/2 ⁻ .
704.2 ^{&} 3	17/2 ⁺		B	
775.2 2	5/2 ⁻ , 7/2		A	J π : γ 's to 5/2 ⁻ and 9/2 ⁻ ; log ft \approx 8.3 from 5/2 ⁻ .
785.3? 2	7/2 ⁻ , 9/2 ⁻		A	J π : E1 γ to 9/2 ⁺ ; M1+E2 γ to 7/2 ⁻ ; uncertain ϵ feeding from 5/2 ⁻ , if real, would eliminate 9/2 ⁻ .
797.5 [@] 3	(15/2 ⁻)		B	
811.7 1	5/2 ⁻		A	J π : γ 's to 1/2 ⁻ and 9/2 ⁻ .
862.2 [#] 3	15/2 ⁻		B	
895.0 [#] 4	17/2 ⁻		B	

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Adopted Levels, Gammas (continued)

^{173}Hf Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
896.0 ^{&} 3	19/2 ⁺		B	
927.5 1	3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 7/2 ⁻ .
942.8 1	7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 11/2 ⁻ .
958.3 [?] 1	3/2 ⁻ , 5/2 ⁻		A	J ^π : γ's to 1/2 ⁻ and 5/2 ⁻ ; log ft≈7.7 from 5/2 ⁻ .
1002.6 [@] 3	(17/2 ⁻)		B	
1020.1 1	5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 9/2 ⁻ .
1060.0 ^{&} 3	21/2 ⁺		B	
1078.3 ^a 4	(13/2 ⁺)		B	J ^π : γ's to 13/2 and 15/2 members of 7/2[633] band; weak population by 19/2 ⁺ isomer of band built on level favors 13/2 for bandhead.
1111.4 1	7/2 ⁺		A	J ^π : E1 γ to 5/2 ⁻ ; γ to 9/2 ⁻ .
1126.9 1	5/2 ⁻		A	J ^π : γ's to 1/2 ⁻ and 9/2 ⁻ .
1192.6 2	3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 5/2 ⁻ and 7/2 ⁻ ; log ft≈7.9 from 5/2 ⁻ .
1208.4 ^a 3	(15/2 ⁺)		B	
1225.8 [@] 3	(19/2 ⁻)		B	
1248.5 1	7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 11/2 ⁻ .
1294.4 [#] 4	19/2 ⁻		B	
1317.5 ^{&} 4	23/2 ⁺		B	
1330.5 [#] 4	21/2 ⁻		B	
1355.2 ^a 3	(17/2 ⁺)		B	
1450.2 1	9/2 ⁺		A	J ^π : E1 γ to 7/2 ⁻ ; γ to 11/2 ⁻ .
1467.2 [@] 3	(21/2 ⁻)		B	
1473.2 ^b 4	(17/2 ⁻)		B	J ^π : bandhead for yrare extension of 1/2[521] g.s. band; first three states populate 17/2 ⁻ , 21/2 ⁻ , and 25/2 ⁻ members of g.s. band.
1498.1 ^{&} 4	25/2 ⁺		B	
1521 [?] ^a 1	(19/2 ⁺)		B	
1574.1 2	3/2 ⁻ , 5/2 ⁻		A	J ^π : γ's to 1/2 ⁻ and 7/2 ⁻ .
1655.5 2	5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 9/2 ⁻ .
1667.3 2	5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 3/2 ⁻ and 9/2 ⁻ .
1694.5 2	5/2 ⁻ , 7/2 ⁻		A	J ^π : γ's to 5/2 ⁻ and 9/2 ⁻ ; log ft≈7.3 from 5/2 ⁻ .
1700.5 ^c 3	19/2 ⁺	≤5 ns	B	J ^π : γ's to 15/2 ⁺ and 23/2 ⁺ ; assigned as the 6 ⁺ , 2-quasiproton excitation, coupled to the 7/2[633] neutron. T _{1/2} : γ(t) in $^{160}\text{Gd}(^{18}\text{O}, 5n\gamma)$. See (HI,xnγ).
1722.3 [@] 4	(23/2 ⁻)		B	
1796.4 [#] 5	(23/2 ⁻)		B	
1812.9 ^b 4	(21/2 ⁻)		B	
1817.3 ^c 4	21/2 ⁺		B	
1822.4 ^{&} 4	27/2 ⁺		B	
1832.5 [#] 4	(25/2 ⁻)		B	
1982.1 ^d 5	(23/2 ⁻)	19.5 ns 6	B	μ=+6.63 23 μ: integral perturbed angular distributions (1989Ra17); correction for Knight shift not included. J ^π : E1 γ to 21/2 ⁺ ; identified with a 3-quasiparticle configuration formed by coupling the 7/2[633] neutron to the 8-, 2-quasiproton excitation. T _{1/2} : time spectra in integral perturbed angular distribution measurements $^{171}\text{Yb}(\alpha, 2n\gamma)$. See (HI,xnγ).
1989.5 [@] 4	(25/2 ⁻)		B	
2006.5 ^c 5	(23/2 ⁺)		B	
2014.3 ^{&} 4	29/2 ⁺		B	
2145.3 ^d 6	(25/2 ⁻)		B	

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Adopted Levels, Gammas (continued) ^{173}Hf Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
2191.0 ^b	4 (25/2 ⁻)		B	
2223.1 ^c	5 (25/2 ⁺)		B	
2263.6 [@]	5 (27/2 ⁻)		B	
2263.6 [?]	3 5/2 ⁻ , 7/2		A	J ^π : γ's to 5/2 ⁻ and 9/2 ⁻ ; log ft≈7.4 from 5/2 ⁻ .
2354.2 ^d	6 (27/2 ⁻)		B	
2357.9 [#]	6 (27/2 ⁻)		B	
2392.7 [#]	5 (29/2 ⁻)		B	
2397.8 ^{&}	5 31/2 ⁺		B	
2464.8 ^c	5 (27/2 ⁺)		B	
2539.4 [@]	4 (29/2 ⁻)		B	
2596.2 ^d	6 (29/2 ⁻)		B	
2601.6 ^{&}	5 33/2 ⁺		B	
2617.6 ^b	5 (29/2 ⁻)		B	
2729.3 ^c	5 (29/2 ⁺)		B	
2814.7 ^e	7 (29/2 ⁻)	≤3.5 ns	B	J ^π : E2 γ to (27/2 ⁻); relative population and decay pattern favor 29/2 ⁻ . T _{1/2} : γ(t) in $^{160}\text{Gd}(^{18}\text{O}, 5n\gamma)$. See (HI,xnγ).
2818.3 [@]	6 (31/2 ⁻)		B	
2865.5 ^d	6 (31/2 ⁻)		B	
2969.6 [#]	7 (31/2 ⁻)		B	
3001.5 [#]	5 (33/2 ⁻)		B	
3015.0 ^c	6 (31/2 ⁺)		B	
3028.2 ^{&}	5 35/2 ⁺		B	
3070.5 ^e	7 (31/2 ⁻)		B	
3094.7 [@]	5 (33/2 ⁻)		B	
3105.2 ^b	4 (33/2 ⁻)		B	
3159.4 ^d	6 (33/2 ⁻)		B	
3251.5 ^{&}	6 37/2 ⁺		B	
3320.0 ^c	6 (33/2 ⁺)		B	
3346.9 ^e	7 (33/2 ⁻)		B	
3382.7 [@]	6 (35/2 ⁻)		B	
3474.8 ^d	6 (35/2 ⁻)		B	
3625.5 [#]	7 (35/2 ⁻)		B	
3640.0 [#]	5 (37/2 ⁻)		B	
3642.2 ^e	7 (35/2 ⁻)		B	
3643.1 ^c	6 (35/2 ⁺)		B	
3660.9 ^b	5 (37/2 ⁻)		B	
3685.5 [@]	5 (37/2 ⁻)		B	
3701.9 ^{&}	6 39/2 ⁺		B	
3811.1 ^d	7 (37/2 ⁻)		B	
3954.5 ^{&}	6 (41/2 ⁺)		B	
3959.0 ^e	7 (37/2 ⁻)		B	
3976.6 [@]	7 (39/2 ⁻)		B	
3982.6 ^c	6 (37/2 ⁺)		B	
4166.1 ^d	7 (39/2 ⁻)		B	
4256.4 [#]	5 (41/2 ⁻)		B	

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Adopted Levels, Gammas (continued) ^{173}Hf Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF
4298.9 ^e 8	(39/2 ⁻)	B	5312.8 [@] 8	(47/2 ⁻)	B	3011+x ^f	J+8	C
4314.0 [@] 6	(41/2 ⁻)	B	5493.7 ^{&} 8	(49/2 ⁺)	B	3867+x ^f	J+10	C
4324.6 [#] 8	(39/2 ⁻)	B	5664 [#] 1	(49/2 ⁻)	B	4773+x ^f	J+12	C
4342.6 ^c 6	(39/2 ⁺)	B	5970.2 ^{&} 8	(51/2 ⁺)	B	5731+x ^f	J+14	C
4414.6 ^{&} 7	(43/2 ⁺)	B	6070.2 [@] 9	(51/2 ⁻)	B	6745+x ^f	J+16	C
4616.2 [@] 8	(43/2 ⁻)	B	6330.1 ^{&} 8	(53/2 ⁺)	B	7818+x ^f	J+18	C
4661 ^e 2	(41/2 ⁻)	B	6826.3 ^{&} 8	(55/2 ⁺)	B	8953+x ^f	J+20	C
4703.5 ^{&} 7	(45/2 ⁺)	B	6885 [@] 2	(55/2 ⁻)	B	10153+x ^f	J+22	C
4717 ^c 1	(41/2 ⁺)	B	7204 ^{&} 2	(57/2 ⁺)	B	11418+x ^f	J+24	C
4930.4 [#] 6	(45/2 ⁻)	B	x ^f	J	C	12751+x ^f	J+26	C
4985 [@] 1	(45/2 ⁻)	B	692+x ^f	J+2	C	14151+x ^f	J+28	C
5070 [#] 2	(43/2 ⁻)	B	1425+x ^f	J+4	C	15620+x ^f	J+30	C
5166.7 ^{&} 7	(47/2 ⁺)	B	2199+x ^f	J+6	C			

[†] From combined least-squares fit of levels and gammas in ^{173}Ta ε decay and (HI,xn γ).

[‡] From γ -ray multiplicities, coincidence data, and complete analysis of rotational structure in (HI,xn γ), except where noted.

Band(A): 1/2[521] band. A=12.8, B=-10.0, a=0.81. (J=1/2, 3/2, 5/2, 7/2, 9/2 levels).

@ Band(B): 5/2[512] band. A=12.9, B=-5.8. (J=5/2, 7/2, 9/2, 11/2 levels).

& Band(C): 7/2[633] (mixed i_{13/2} neutron) band, A=6.2, B=25.7. (J=7/2, 9/2, 11/2, 13/2 levels).

^a Band(D): K^π=13/2⁺ band. A=8.7. (J=13/2, 15/2, 17/2 levels).

^b Band(E): yrare extension of 1/2[521] band.

^c Band(F): K^π=19/2⁺ band.

^d Band(G): K^π=23/2⁻ band.

^e Band(H): K^π=29/2⁻ band.

^f Band(I): Triaxial SD band (2005Ha05,2005Ri16). Q(transition)=14.5 7 (2005Ri16, from lifetime data).

Adopted Levels, Gammas (continued)

E _i (level)	J ^π _i	γ(¹⁷³ Hf)							Comments
		E _γ [†]	I _γ [‡]	E _f	J ^π _f	Mult. [†]	δ [†]	a ^b	
69.73	3/2 ⁻	69.70 [#] 5	100 [#]	0.0	1/2 ⁻	M1+E2 [#]	0.88 [#] 20	13.4 5	
81.49	5/2 ⁻	11.9 [#] 2		69.73	3/2 ⁻				
		81.5 [@] 1	100	0.0	1/2 ⁻	E2 [#]		8.13	
107.16	5/2 ⁻	25.70 [#] 5	11 [#] 3	81.49	5/2 ⁻	M1 [#]		37.7	B(M1)(W.u.)=4.4×10 ⁻⁵ 14
		37.40 [#] 5	100 [#] 11	69.73	3/2 ⁻	M1+E2 [#]	0.029 [#] +8-11	12.6	B(M1)(W.u.)=0.000131 22; B(E2)(W.u.)=0.035 21
		107.2 [#] 2		0.0	1/2 ⁻	(E2) [#]		2.73	
197.23	7/2 ⁻	90.0 [@] 2	100 [#]	107.16	5/2 ⁻	M1+E2 [#]	0.23 [#] 2	5.58	
197.47	7/2 ⁺	90.3 [@] 1	100	107.16	5/2 ⁻	E1		0.472	B(E1)(W.u.)=1.3×10 ⁻⁶ 4
241.90	7/2 ⁻	160.4 [@] 1	9.3 ^{&} 10	81.49	5/2 ⁻	M1+E2 [#]	0.69 [#] +40-30	0.93 8	
		172.2 [@] 1	100 ^{&} 10	69.73	3/2 ⁻	E2 [#]		0.484	
255.51	9/2 ⁺	58.05 [#] 5	100 [#]	197.47	7/2 ⁺	M1+E2 [#]	0.21 [#] 10	4.7 14	
262.14	9/2 ⁻	20.3 [#] 1		241.90	7/2 ⁻				
		180.6 [@] 1	100	81.49	5/2 ⁻	E2 [#]		0.41	
312.27	9/2 ⁻	115.0 [@] 1	100 ^{&} 18	197.23	7/2 ⁻	M1+E2 [#]		2.4 ^a 3	
		205.3 [@] 2	51 ^{&} 12	107.16	5/2 ⁻	(E2)		0.266	
336.0	11/2 ⁺	80.6 3	100 6	255.51	9/2 ⁺				
		138.1 3	37 4	197.47	7/2 ⁺				
435.4	13/2 ⁺	99.2 3	100 4	336.0	11/2 ⁺	M1+E2	-0.49 3	4.12	
		180.0 3	81 6	255.51	9/2 ⁺	(E2)		0.415	
451.5	11/2 ⁻	139.2 [@] 2	96 27	312.27	9/2 ⁻	M1+E2	+0.09 2	1.59	
		254.4 [@] 2	100 32	197.23	7/2 ⁻				
508.6	11/2 ⁻	246.8 [@] 2	34 ^{&} 13	262.14	9/2 ⁻				
		266.9 [@] 2	100 ^{&} 2	241.90	7/2 ⁻	E2		0.114	
536.0	13/2 ⁻	273.8 3	100	262.14	9/2 ⁻	E2		0.106	
567.4	15/2 ⁺	131.9 3	68 3	435.4	13/2 ⁺	M1+E2	-0.21 +29-19	1.84 6	
		231.5 3	100 5	336.0	11/2 ⁺	E2		0.179	
613.7	13/2 ⁻	162.3 3	53 7	451.5	11/2 ⁻	M1+E2	-0.05 11	1.04	
		301.3 3	100 3	312.27	9/2 ⁻	(E2)		0.0788	
635.8?	5/2 ⁺ , 7/2, 9/2 ⁺	380.3 [#] 2	18 [#] 5	255.51	9/2 ⁺				
		438.3 [#] 1	100 [#] 29	197.47	7/2 ⁺				
704.2	17/2 ⁺	136.6 3	30.7 17	567.4	15/2 ⁺	M1+E2	-0.25 +23-16	1.65 5	
		269.0 3	100.0 6	435.4	13/2 ⁺	(E2)		0.111	
775.2	5/2 ⁻ , 7/2	463.4 [#] 1	7.9 [#] 21	312.27	9/2 ⁻				
		577.6 [#] 2	11 [#] 3	197.23	7/2 ⁻				
		667.7 [#] 2	100 [#] 26	107.16	5/2 ⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. †	δ^\dagger	α^b
785.3?	7/2 ⁻ , 9/2 ⁻	529.8 [#] 2	100 [#] 27	255.51	9/2 ⁺	E1 [#]		0.00583
		587.8 [#] 2	46 [#] 12	197.23	7/2 ⁻	M1+E2 [#]	1.9 [#] +31-7	0.0174 17
797.5	(15/2 ⁻)	183.8 3	34 4	613.7	13/2 ⁻			
		346.1 3	100.0 18	451.5	11/2 ⁻	(E2)		0.0524
811.7	5/2 ⁻	549.6 [#] 2	62 [#] 18	262.14	9/2 ⁻			
		569.6 [#] 2	12 [#] 3	241.90	7/2 ⁻			
		730.6 [#] 2	100 [#] 26	81.49	5/2 ⁻	M1 [#]		0.0188
		742.0 [#] 4	≈18 [#]	69.73	3/2 ⁻			
		811.7 [#] 2	68 [#] 18	0.0	1/2 ⁻			
862.2	15/2 ⁻	326 1	35.8 25	536.0	13/2 ⁻			
		353.6 3	100 2	508.6	11/2 ⁻	E2		0.0493
895.0	17/2 ⁻	359.0 3	100	536.0	13/2 ⁻	E2		0.0472
896.0	19/2 ⁺	191.7 3	33 3	704.2	17/2 ⁺	M1+E2	-0.9 +10-5	0.51 7
		328.7 3	100 6	567.4	15/2 ⁺	E2		0.0609
927.5	3/2 ⁻ , 5/2, 7/2 ⁻	685.6 [#] 2	27 [#] 7	241.90	7/2 ⁻			
		846.1 [#] 2	100 [#] 27	81.49	5/2 ⁻			
		857.6 [#] 2	62 [#] 15	69.73	3/2 ⁻			
942.8	7/2 ⁻	434.3 [#] 1	4.5 [#] 12	508.6	11/2 ⁻			
		680.2 [#] 2	7.6 [#] 20	262.14	9/2 ⁻			
		700.6 [#] 2	100 [#] 8	241.90	7/2 ⁻	M1+E2 [#]	1.9 [#] +34-7	0.0114 11
		861.7 [#] 2	7.6 [#] 20	81.49	5/2 ⁻			
		873.0 [#] 2	61 [#] 15	69.73	3/2 ⁻			
958.3?	3/2, 5/2 ⁻	851.0 [#] 2	24 [#] 6	107.16	5/2 ⁻			
		876.6 [#] 2	69 [#] 17	81.49	5/2 ⁻			
		888.7 [#] 2	36 [#] 9	69.73	3/2 ⁻			
		958.6 [#] 2	100 [#] 28	0.0	1/2 ⁻			
1002.6	(17/2 ⁻)	205.1 3	26 10	797.5	(15/2 ⁻)			
		388.9 3	100 2	613.7	13/2 ⁻	E2		0.0378
1020.1	5/2 ⁻ , 7/2 ⁻	707.9 [#] 2	10 [#] 3	312.27	9/2 ⁻			
		778.2 [#] 2	100 [#] 28	241.90	7/2 ⁻			
		822.8 [#] 2	62 [#] 17	197.23	7/2 ⁻			
		938.7 [#] 2	21 [#] 5	81.49	5/2 ⁻			
		950.4 [#] 2	48 [#] 14	69.73	3/2 ⁻			
1060.0	21/2 ⁺	164.0 3	13.0 11	896.0	19/2 ⁺	M1+E2	+0.17 +12-11	0.995
		355.7 3	100.0 6	704.2	17/2 ⁺	E2		0.0485

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. [†]	δ^\ddagger	α^b
1078.3	(13/2 ⁺)	511.0 3		567.4	15/2 ⁺			
		643 ^d 1		435.4	13/2 ⁺			
1111.4	7/2 ⁺	660.0 ^{#d} 2	2.5 [#] 6	451.5	11/2 ⁻			
		799.1 [#] 2	31 [#] 9	312.27	9/2 ⁻			
		914.0 [#] 2	20 [#] 5	197.23	7/2 ⁻			
1126.9	5/2 ⁻	1030.0 [#] 2	100 [#] 12	81.49	5/2 ⁻	E1 [#]		0.00156
		864.6 [#] 2	100 [#] 26	262.14	9/2 ⁻			
		1045.2 [#] 2	89 [#] 26	81.49	5/2 ⁻			
		1057.3 [#] 2	16 [#] 4	69.73	3/2 ⁻			
		1127.0 [#] 2	32 [#] 8	0.0	1/2 ⁻			
1192.6	3/2 ⁻ ,5/2,7/2	995.4 [#] 2	88 [#] 24	197.23	7/2 ⁻			
		1085.5 [#] 2	100 [#] 29	107.16	5/2 ⁻			
1208.4	(15/2 ⁺)	130.2 3	100 38	1078.3	(13/2 ⁺)			
		504.2 3	≤38	704.2	17/2 ⁺			
		641 ^d 1	≤38	567.4	15/2 ⁺			
1225.8	(19/2 ⁻)	223.2 3	16 5	1002.6	(17/2 ⁻)	M1+E2	-0.20 8	0.419
		428.3 3	100.0 15	797.5	(15/2 ⁻)	E2		0.0291
1248.5	7/2 ⁻	739.6 [#] 4	≈19 [#]	508.6	11/2 ⁻			
		986.5 [#] 2	13 [#] 3	262.14	9/2 ⁻			
		1006.6 [#] 2	100 [#] 25	241.90	7/2 ⁻	M1 [#]		0.00848
		1166.9 [#] 2	16 [#] 4	81.49	5/2 ⁻			
		1178.7 [#] 2	47 [#] 13	69.73	3/2 ⁻			
1294.4	19/2 ⁻	400 1	≤2.6	895.0	17/2 ⁻			
		432.2 3	100.0 15	862.2	15/2 ⁻	E2		0.0284
1317.5	23/2 ⁺	257.5 3	19.5 24	1060.0	21/2 ⁺			
		421.5 3	100 5	896.0	19/2 ⁺	E2		0.0303
1330.5	21/2 ⁻	435.4 3	100	895.0	17/2 ⁻	E2		0.0278
1355.2	(17/2 ⁺)	146.8 3	87 78	1208.4	(15/2 ⁺)			
		277 ^d 1	≤22	1078.3	(13/2 ⁺)			
		459.2 3	100 17	896.0	19/2 ⁺			
		651.0 3	48 2	704.2	17/2 ⁺			
1450.2	9/2 ⁺	942.0 ^{#d} 2	6.5 [#] 20	508.6	11/2 ⁻			
		1208.2 [#] 2	100 [#] 10	241.90	7/2 ⁻	E1 [#]		0.00117
		1253.0 [#] 2	5.9 [#] 20	197.23	7/2 ⁻			
		1343.2 ^{c#} 2	<6.5 [#]	107.16	5/2 ⁻			

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. ‡	α^b	Comments
1450.2	9/2 ⁺	1368.2 [#] 2	14 [#] 4	81.49	5/2 ⁻			
		1380.3 [#] 2	20 [#] 5	69.73	3/2 ⁻			
1467.2	(21/2 ⁻)	241.5 3	15 5	1225.8	(19/2 ⁻)	E2	0.0234	
		464.7 3	100 2	1002.6	(17/2 ⁻)			
1473.2	(17/2 ⁻)	578.2 3	100	895.0	17/2 ⁻			
1498.1	25/2 ⁺	180.4 3	4.2 24	1317.5	23/2 ⁺			
		438.3 3	100.0 6	1060.0	21/2 ⁺	E2	0.0273	
1521?	(19/2 ⁺)	166 ^d 1	100	1355.2	(17/2 ⁺)			
1574.1	3/2 ⁻ , 5/2 ⁻	1332.4 [#] 4	71 [#] 19	241.90	7/2 ⁻			
		1492.5 [#] 3	100 [#] 26	81.49	5/2 ⁻			
		1504.3 [#] 3	57 [#] 14	69.73	3/2 ⁻			
		1574.2 ^{c#d} 3	<270 [#]	0.0	1/2 ⁻			
1655.5	5/2 ⁻ , 7/2 ⁻	1343.2 ^{c#d} 2	<24 [#]	312.27	9/2 ⁻			
		1393.5 [#] 3	100 [#] 27	262.14	9/2 ⁻			
		1413.5 [#] 3	17 [#] 4	241.90	7/2 ⁻			
		1574.2 ^{c#} 3	<46 [#]	81.49	5/2 ⁻			
		1585.7 ^{c#} 3	<15 [#]	69.73	3/2 ⁻			
1667.3	5/2 ⁻ , 7/2 ⁻	1405.3 [#] 3	39 [#] 9	262.14	9/2 ⁻			
		1425.2 [#] 5	50 [#] 13	241.90	7/2 ⁻			
		1585.7 ^{c#} 3	<38 [#]	81.49	5/2 ⁻			
		1597.6 [#] 3	100 [#] 25	69.73	3/2 ⁻			
1694.5	5/2 ⁻ , 7/2 ⁻	1432.2 [#] 3	100 [#] 25	262.14	9/2 ⁻			
		1452.7 [#] 5		241.90	7/2 ⁻			
		1613.2 [#] 3	84 [#] 22	81.49	5/2 ⁻			
1700.5	19/2 ⁺	345.2 3	22 4	1355.2	(17/2 ⁺)			
		383.0 3	3.3 22	1317.5	23/2 ⁺			
		492.2 3	4.4 7	1208.4	(15/2 ⁺)			
		640.5 3	45 13	1060.0	21/2 ⁺			
		804.6 3	32 9	896.0	19/2 ⁺			
		996.2 3	100 8	704.2	17/2 ⁺	E2	0.00416	B(E2)(W.u.) \geq 0.00094
		1132.3 3	6 3	567.4	15/2 ⁺			
1722.3	(23/2 ⁻)	255 1	12 6	1467.2	(21/2 ⁻)			
		496.5 3	100.0 24	1225.8	(19/2 ⁻)	E2	0.0198	
1796.4	(23/2 ⁻)	502.0 ^c 3	100	1294.4	19/2 ⁻	(E2)	0.0193	
1812.9	(21/2 ⁻)	339.7 3	94 12	1473.2	(17/2 ⁻)			
		482.4 3	100 18	1330.5	21/2 ⁻			

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. [†]	δ^\dagger	α^b	Comments
1817.3	21/2 ⁺	116.8 3	100	1700.5	19/2 ⁺	M1+E2		2.3 ^a 3	
1822.4	27/2 ⁺	324.2 3	11 4	1498.1	25/2 ⁺				
		504.9 3	100 7	1317.5	23/2 ⁺	E2		0.0191	
1832.5	(25/2 ⁻)	502.0 ^c 3	100	1330.5	21/2 ⁻	(E2)		0.0193	
1982.1	(23/2 ⁻)	164.8 3	100	1817.3	21/2 ⁺	E1		0.0979	B(E1)(W.u.)=2.27×10 ⁻⁶ 8
1989.5	(25/2 ⁻)	267 1	7 4	1722.3	(23/2 ⁻)				
		522.3 3	100 3	1467.2	(21/2 ⁻)	E2		0.0175	
2006.5	(23/2 ⁺)	189.2 3	100 7	1817.3	21/2 ⁺				
		306 ^d 1	≤4.2	1700.5	19/2 ⁺				
2014.3	29/2 ⁺	192.0 3	2.2 17	1822.4	27/2 ⁺				
		516.2 3	100 6	1498.1	25/2 ⁺	E2		0.0180	
2145.3	(25/2 ⁻)	163.3 3	100	1982.1	(23/2 ⁻)				
2191.0	(25/2 ⁻)	358.5 3	30 12	1832.5	(25/2 ⁻)				
		378.0 3	100 9	1812.9	(21/2 ⁻)				
2223.1	(25/2 ⁺)	216.6 3	100 9	2006.5	(23/2 ⁺)				
		405.8 3	18 6	1817.3	21/2 ⁺				
2263.6	(27/2 ⁻)	274 1	6 4	1989.5	(25/2 ⁻)				
		541.3 3	100 3	1722.3	(23/2 ⁻)	E2		0.0160	
2263.6?	5/2 ⁻ , 7/2	2001.3 [#] 5	100 [#] 25	262.14	9/2 ⁻				
		2022.7 [#] 6		241.90	7/2 ⁻				
		2182.0 [#] 4	67 [#] 17	81.49	5/2 ⁻				
2354.2	(27/2 ⁻)	209.1 3	100 13	2145.3	(25/2 ⁻)				
		372.0 3	8 3	1982.1	(23/2 ⁻)				
2357.9	(27/2 ⁻)	561.5 3	100	1796.4	(23/2 ⁻)				
2392.7	(29/2 ⁻)	560.1 3	100	1832.5	(25/2 ⁻)	(E2)		0.0148	
2397.8	31/2 ⁺	383.5 3	5.5 23	2014.3	29/2 ⁺				
		575.3 3	100 11	1822.4	27/2 ⁺	E2		0.0138	
2464.8	(27/2 ⁺)	241.7 3	100 29	2223.1	(25/2 ⁺)				
		458.4 3	77 13	2006.5	(23/2 ⁺)				
2539.4	(29/2 ⁻)	550.0 3	100	1989.5	(25/2 ⁻)				
2596.2	(29/2 ⁻)	242.0 3	100 19	2354.2	(27/2 ⁻)	(M1+E2)	+0.25 4	0.331	
		450.8 3	22 4	2145.3	(25/2 ⁻)				
2601.6	33/2 ⁺	203.7 3	1.9 17	2397.8	31/2 ⁺				
		587.4 3	100 10	2014.3	29/2 ⁺	E2		0.0132	
2617.6	(29/2 ⁻)	426.6 ^c 3	100	2191.0	(25/2 ⁻)				
2729.3	(29/2 ⁺)	264.4 3	100 17	2464.8	(27/2 ⁺)				
		506.1 3	87 15	2223.1	(25/2 ⁺)				
2814.7	(29/2 ⁻)	460.5 3	100	2354.2	(27/2 ⁻)	E2		0.0240	B(E2)(W.u.)≥0.13
2818.3	(31/2 ⁻)	554.7 3	100	2263.6	(27/2 ⁻)	(E2)		0.0151	
2865.5	(31/2 ⁻)	269.2 3	100 20	2596.2	(29/2 ⁻)				

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)							
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. ‡	α^b
2865.5	(31/2 ⁻)	511.3 3	32 5	2354.2	(27/2 ⁻)		
2969.6	(31/2 ⁻)	611.7 3	100	2357.9	(27/2 ⁻)		
3001.5	(33/2 ⁻)	608.8 3	100	2392.7	(29/2 ⁻)	(E2)	0.0121
3015.0	(31/2 ⁺)	285.7 3	49 9	2729.3	(29/2 ⁺)		
		550.3 3	100 13	2464.8	(27/2 ⁺)		
3028.2	35/2 ⁺	426.6 ^c 3	7 3	2601.6	33/2 ⁺		
		630.4 3	100 16	2397.8	31/2 ⁺	E2	0.0112
3070.5	(31/2 ⁻)	255.8 3	100	2814.7	(29/2 ⁻)		
3094.7	(33/2 ⁻)	555.4 3	100	2539.4	(29/2 ⁻)		
3105.2	(33/2 ⁻)	487.6 3	63 8	2617.6	(29/2 ⁻)		
		565.8 3	100 23	2539.4	(29/2 ⁻)		
3159.4	(33/2 ⁻)	293.8 3	100 28	2865.5	(31/2 ⁻)		
		563.3 3	45 7	2596.2	(29/2 ⁻)		
3251.5	37/2 ⁺	649.9 3	100	2601.6	33/2 ⁺	E2	0.0104
3320.0	(33/2 ⁺)	304.8 3	69 18	3015.0	(31/2 ⁺)		
		590.7 3	100 33	2729.3	(29/2 ⁺)		
3346.9	(33/2 ⁻)	276.4 3	100 17	3070.5	(31/2 ⁻)		
		532.2 3	29 7	2814.7	(29/2 ⁻)		
3382.7	(35/2 ⁻)	564.4 3	100	2818.3	(31/2 ⁻)		
3474.8	(35/2 ⁻)	315.5 3	100 33	3159.4	(33/2 ⁻)		
		609.3 3	76 13	2865.5	(31/2 ⁻)		
3625.5	(35/2 ⁻)	655.9 3	100	2969.6	(31/2 ⁻)		
3640.0	(37/2 ⁻)	535 ^d 1	≤6	3105.2	(33/2 ⁻)		
		545.3 3	19 8	3094.7	(33/2 ⁻)	E2	0.0158
		638.4 3	100 13	3001.5	(33/2 ⁻)		
3642.2	(35/2 ⁻)	295.3 3	100 29	3346.9	(33/2 ⁻)		
		571.7 3	66 11	3070.5	(31/2 ⁻)		
3643.1	(35/2 ⁺)	323.1 3	70 32	3320.0	(33/2 ⁺)		
		628.1 3	100 24	3015.0	(31/2 ⁺)		
3660.9	(37/2 ⁻)	659.4 3	100	3001.5	(33/2 ⁻)		
3685.5	(37/2 ⁻)	580.3 3	71 24	3105.2	(33/2 ⁻)		
		590.8 3	100 29	3094.7	(33/2 ⁻)	(E2)	0.0130
3701.9	39/2 ⁺	673.7 3	100	3028.2	35/2 ⁺	E2	0.00958
3811.1	(37/2 ⁻)	336.3 3	100 30	3474.8	(35/2 ⁻)		
		651.8 3	73 15	3159.4	(33/2 ⁻)		
3954.5	(41/2 ⁺)	703.0 3	100	3251.5	37/2 ⁺		
3959.0	(37/2 ⁻)	316.8 3	100 34	3642.2	(35/2 ⁻)		
		612.1 ^d 3	≤17	3346.9	(33/2 ⁻)		
3976.6	(39/2 ⁻)	593.9 3	100	3382.7	(35/2 ⁻)		
3982.6	(37/2 ⁺)	339.6 3	64 21	3643.1	(35/2 ⁺)		
		662.5 3	100 43	3320.0	(33/2 ⁺)		

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π
4166.1	(39/2 ⁻)	355.0 3	88 42	3811.1	(37/2 ⁻)	5970.2	(51/2 ⁺)	803.5 3	100	5166.7	(47/2 ⁺)
		691.3 ^d 3	100 29	3474.8	(35/2 ⁻)	6070.2	(51/2 ⁻)	757.4 3	100	5312.8	(47/2 ⁻)
4256.4	(41/2 ⁻)	595.4 3	38 8	3660.9	(37/2 ⁻)	6330.1	(53/2 ⁺)	836.4 3	100	5493.7	(49/2 ⁺)
		616.4 3	100 31	3640.0	(37/2 ⁻)	6826.3	(55/2 ⁺)	856.1 3	100	5970.2	(51/2 ⁺)
4298.9	(39/2 ⁻)	339.9 3	100	3959.0	(37/2 ⁻)	6885	(55/2 ⁻)	815 1	100	6070.2	(51/2 ⁻)
4314.0	(41/2 ⁻)	628.5 3	100	3685.5	(37/2 ⁻)	7204	(57/2 ⁺)	874 1	100	6330.1	(53/2 ⁺)
4324.6	(39/2 ⁻)	699.0 3	100	3625.5	(35/2 ⁻)	692+x	J+2	692	x	J	
4342.6	(39/2 ⁺)	360.0 3	100 29	3982.6	(37/2 ⁺)	1425+x	J+4	733	692+x	J+2	
		699.5 3	48 24	3643.1	(35/2 ⁺)	2199+x	J+6	774	1425+x	J+4	
4414.6	(43/2 ⁺)	712.7 3	100	3701.9	39/2 ⁺	3011+x	J+8	812	2199+x	J+6	
4616.2	(43/2 ⁻)	639.6 3	100	3976.6	(39/2 ⁻)	3867+x	J+10	856	3011+x	J+8	
4661	(41/2 ⁻)	362 ^d 1	100	4298.9	(39/2 ⁻)	4773+x	J+12	906	3867+x	J+10	
4703.5	(45/2 ⁺)	749.0 3	100	3954.5	(41/2 ⁺)	5731+x	J+14	958	4773+x	J+12	
4717	(41/2 ⁺)	734 ^{cd} 1	100	3982.6	(37/2 ⁺)	6745+x	J+16	1014	5731+x	J+14	
4930.4	(45/2 ⁻)	674.0 3	100	4256.4	(41/2 ⁻)	7818+x	J+18	1073	6745+x	J+16	
4985	(45/2 ⁻)	671 1	100	4314.0	(41/2 ⁻)	8953+x	J+20	1135	7818+x	J+18	
5070	(43/2 ⁻)	745 ^d 1	100	4324.6	(39/2 ⁻)	10153+x	J+22	1200	8953+x	J+20	
5166.7	(47/2 ⁺)	752.1 3	100	4414.6	(43/2 ⁺)	11418+x	J+24	1265	10153+x	J+22	
5312.8	(47/2 ⁻)	696.6 3	100	4616.2	(43/2 ⁻)	12751+x	J+26	1333	11418+x	J+24	
5493.7	(49/2 ⁺)	790.2 3	100	4703.5	(45/2 ⁺)	14151+x	J+28	1400	12751+x	J+26	
5664	(49/2 ⁻)	734 ^{cd} 1	100	4930.4	(45/2 ⁻)	15620+x	J+30	1469	14151+x	J+28	

[†] From (HI,xn γ) except where noted.

[‡] Relative photon branching from each level; values are from (HI,xn γ) except where noted. Upper limits are given for photon branchings affected by multiple placement.

From ¹⁷³Ta ϵ decay.

@ Weighted average from ¹⁷³Ta ϵ decay and (HI,xn γ).

& From combined analysis of branchings in ¹⁷³Ta ϵ decay and (HI,xn γ).

^a Brackets combined range for M1 and E2.

^b Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

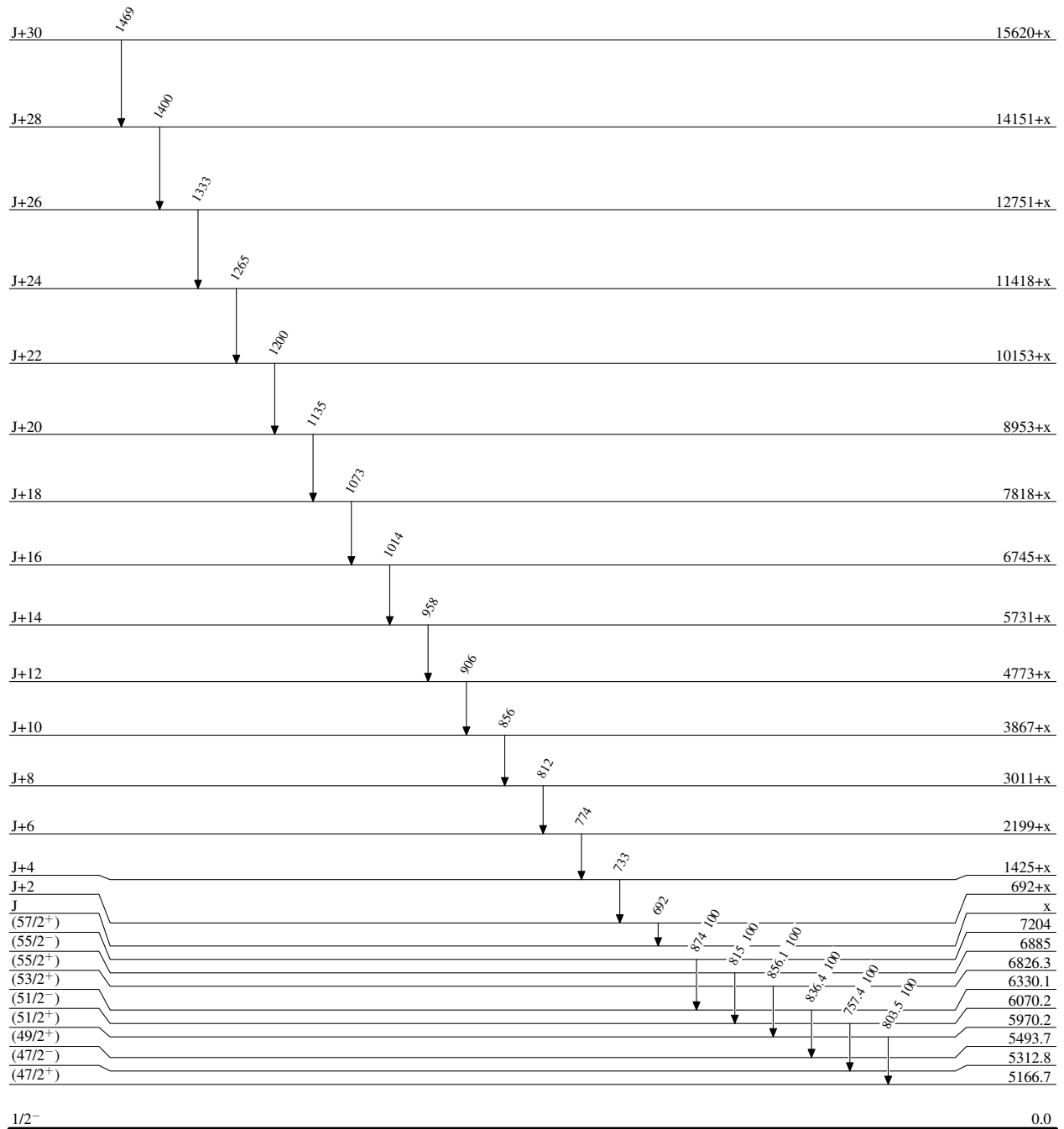
^c Multiply placed.

^d Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



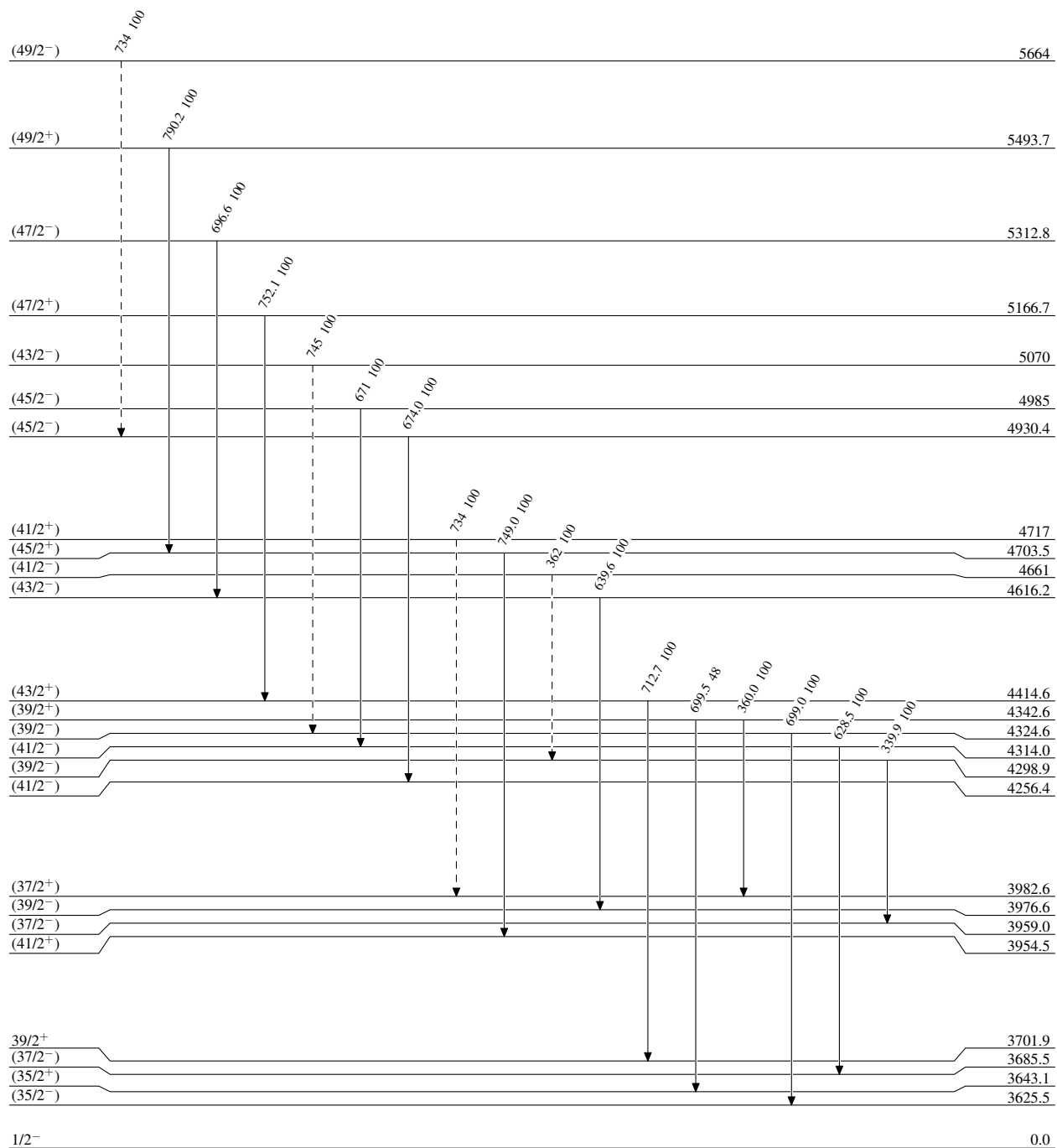
$^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)

23.6 h 1

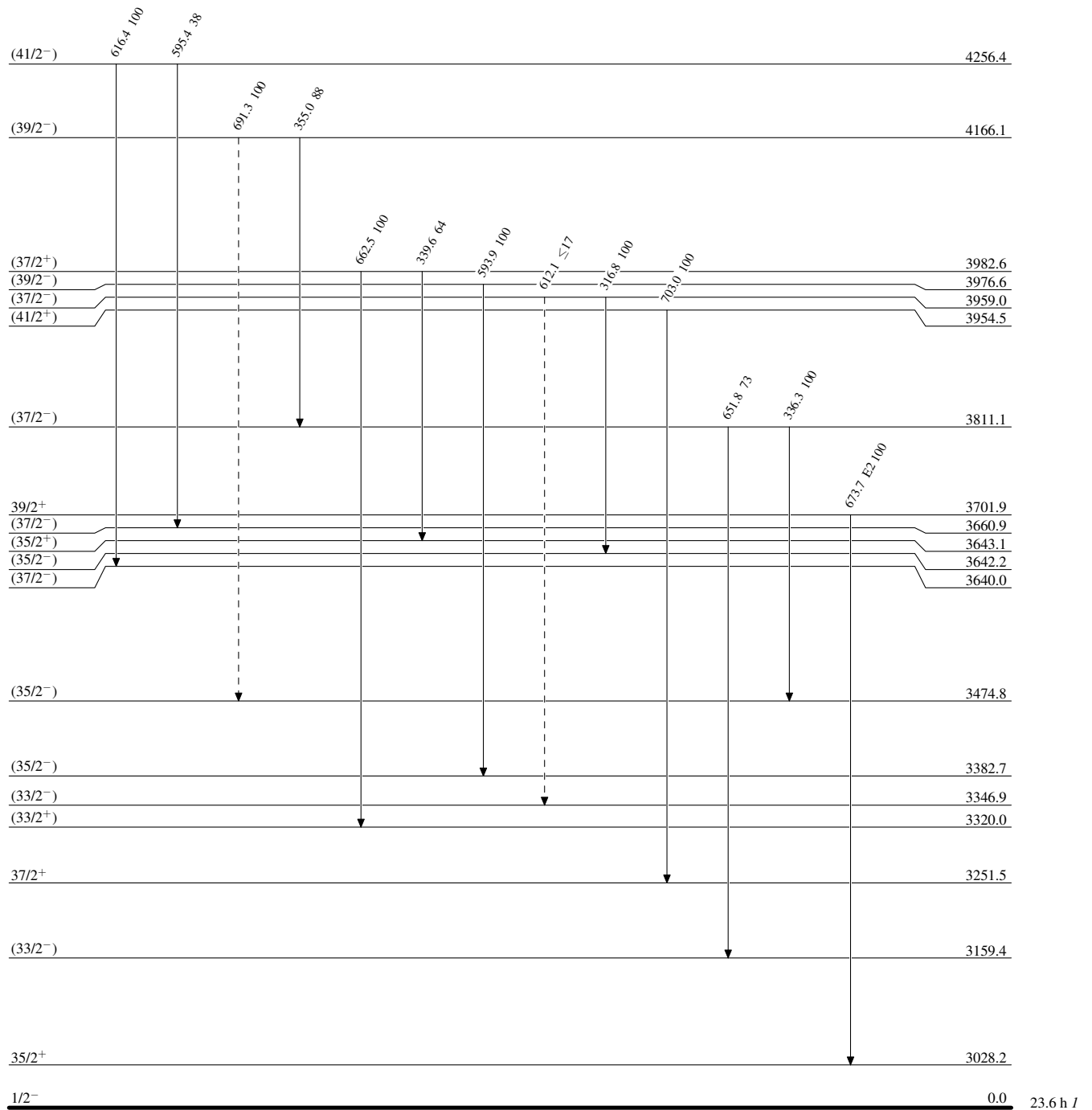
 $^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain) $^{173}_{72}\text{Hf}_{101}$

23.6 h I

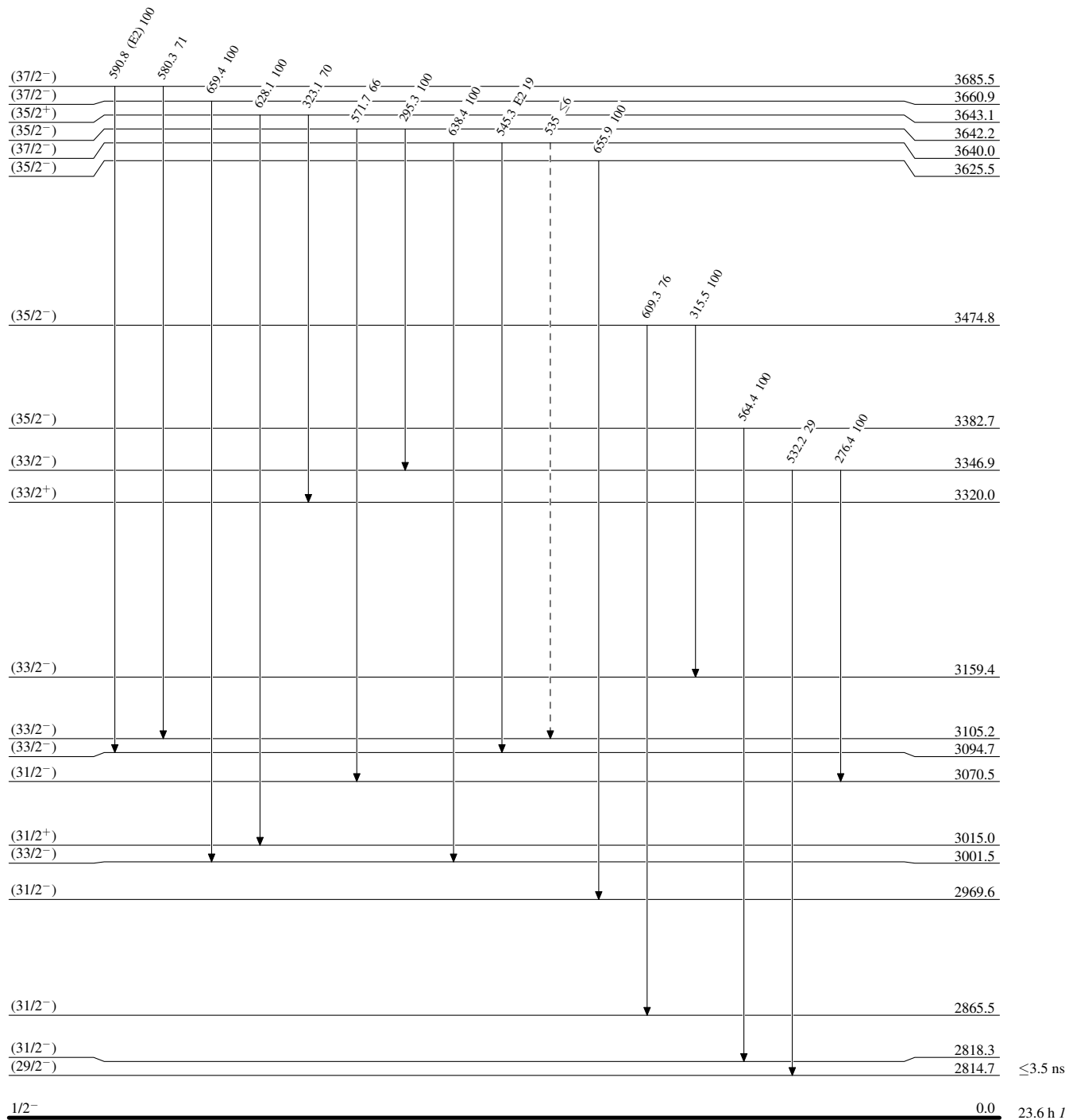
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

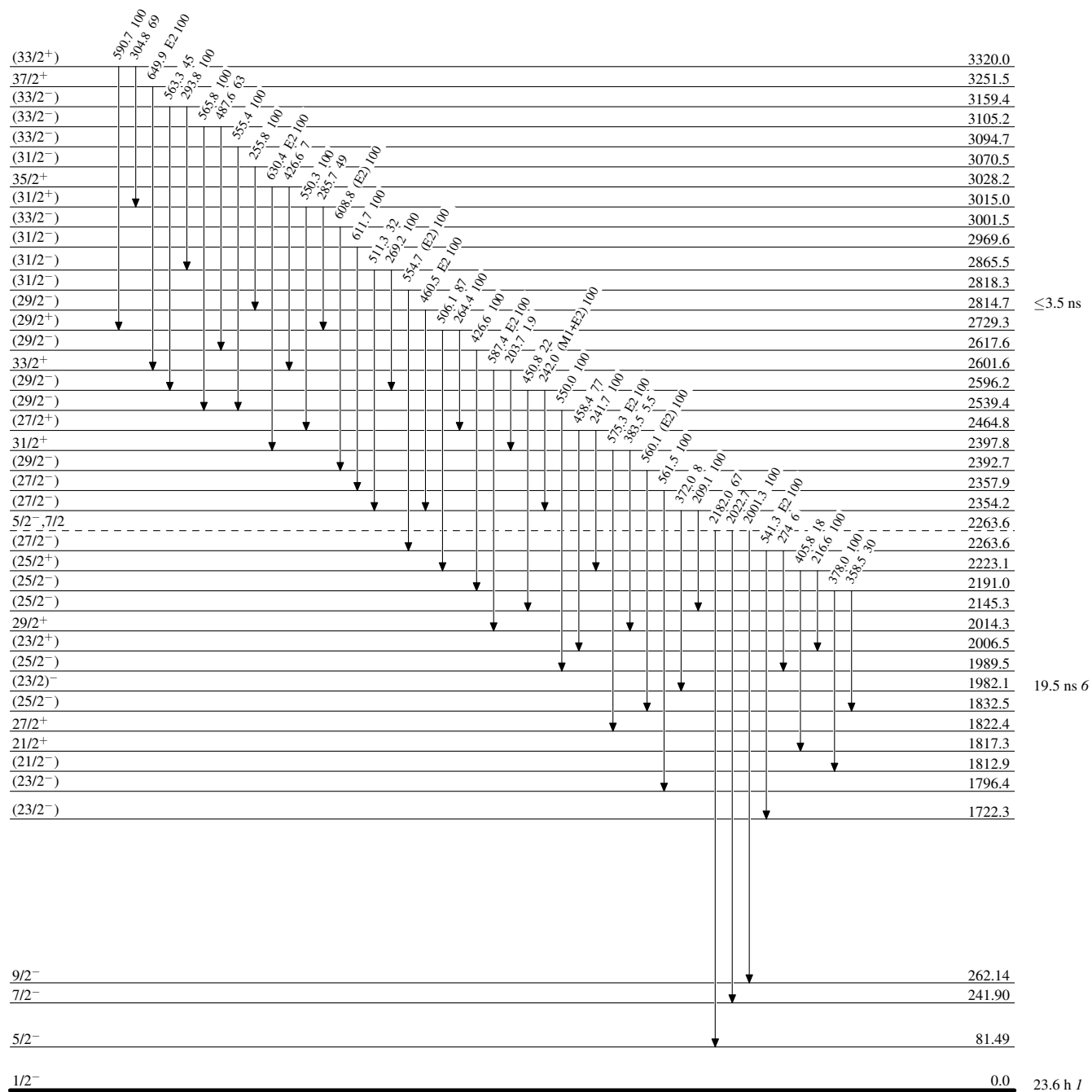
-----▶ γ Decay (Uncertain)



$^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

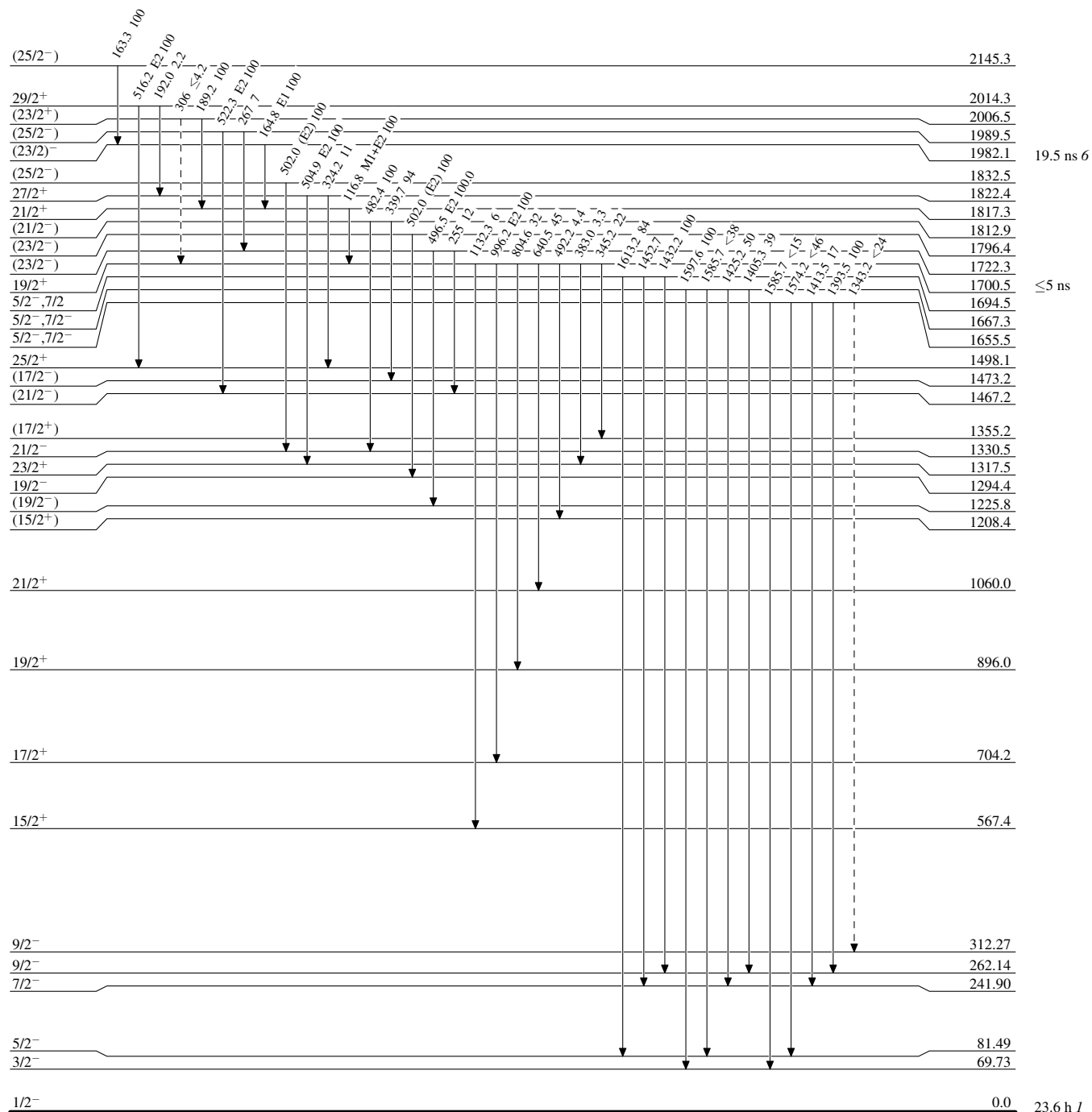


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain) $^{173}_{72}\text{Hf}_{101}$

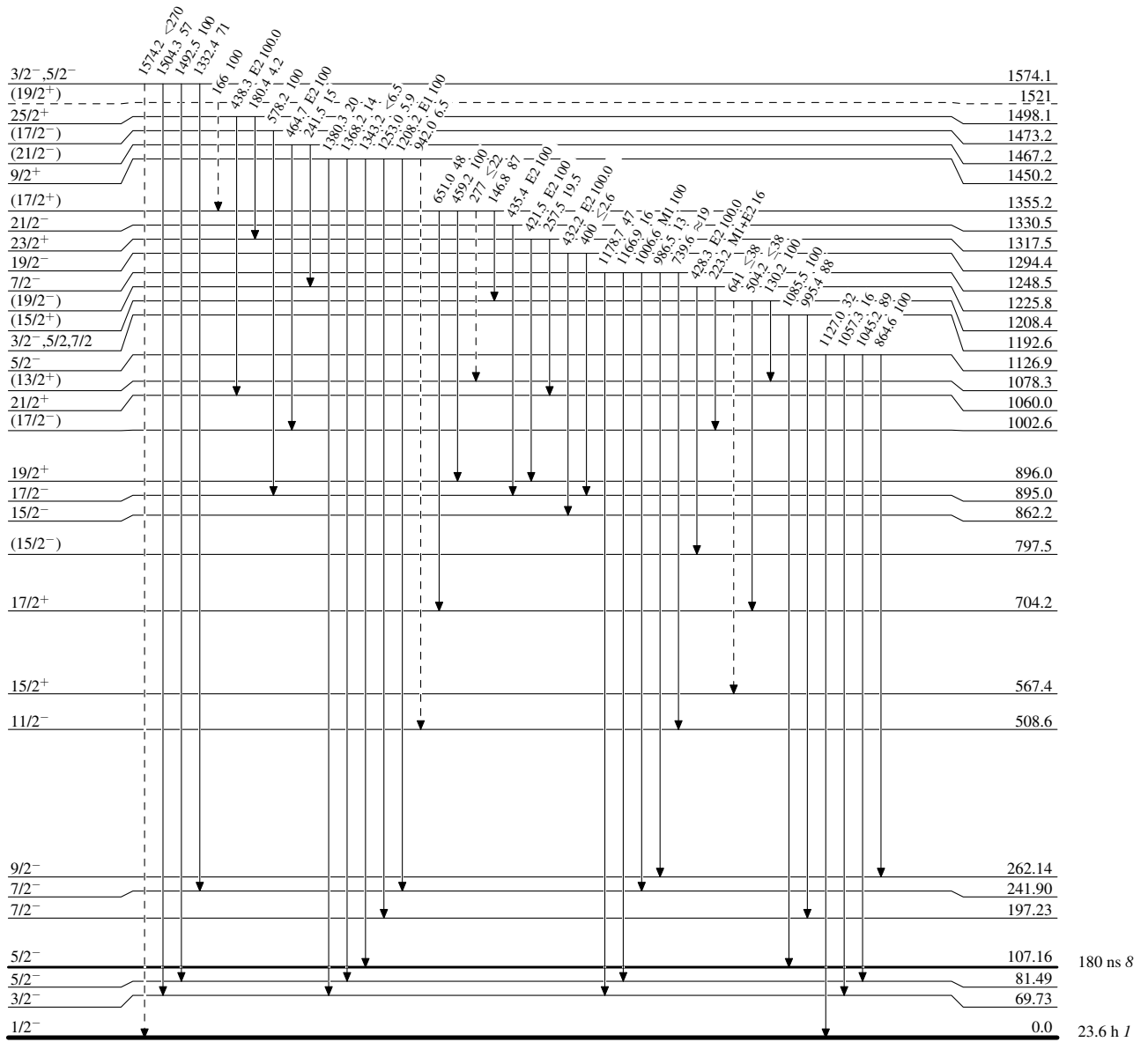
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)



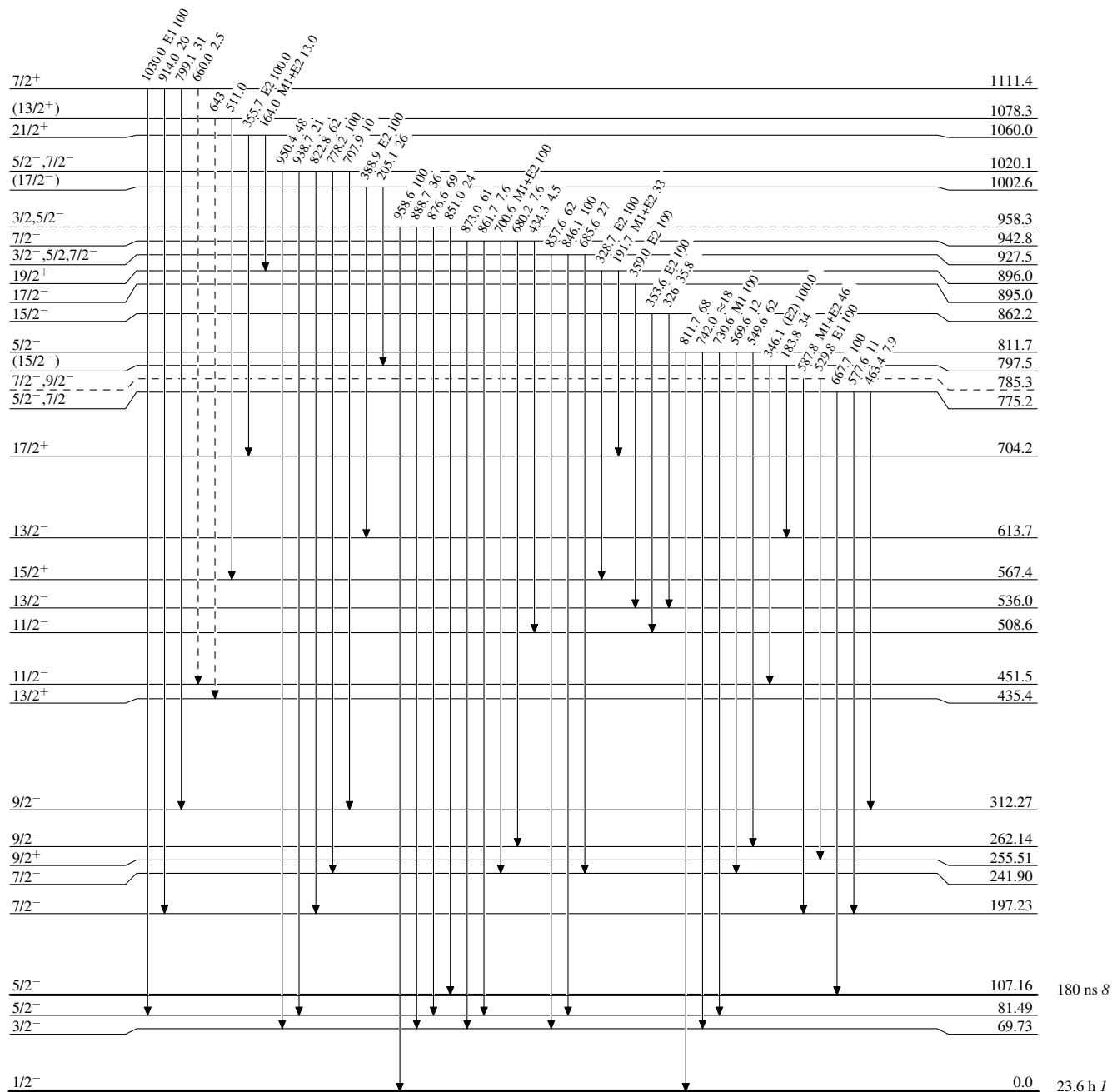
$^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas

Legend

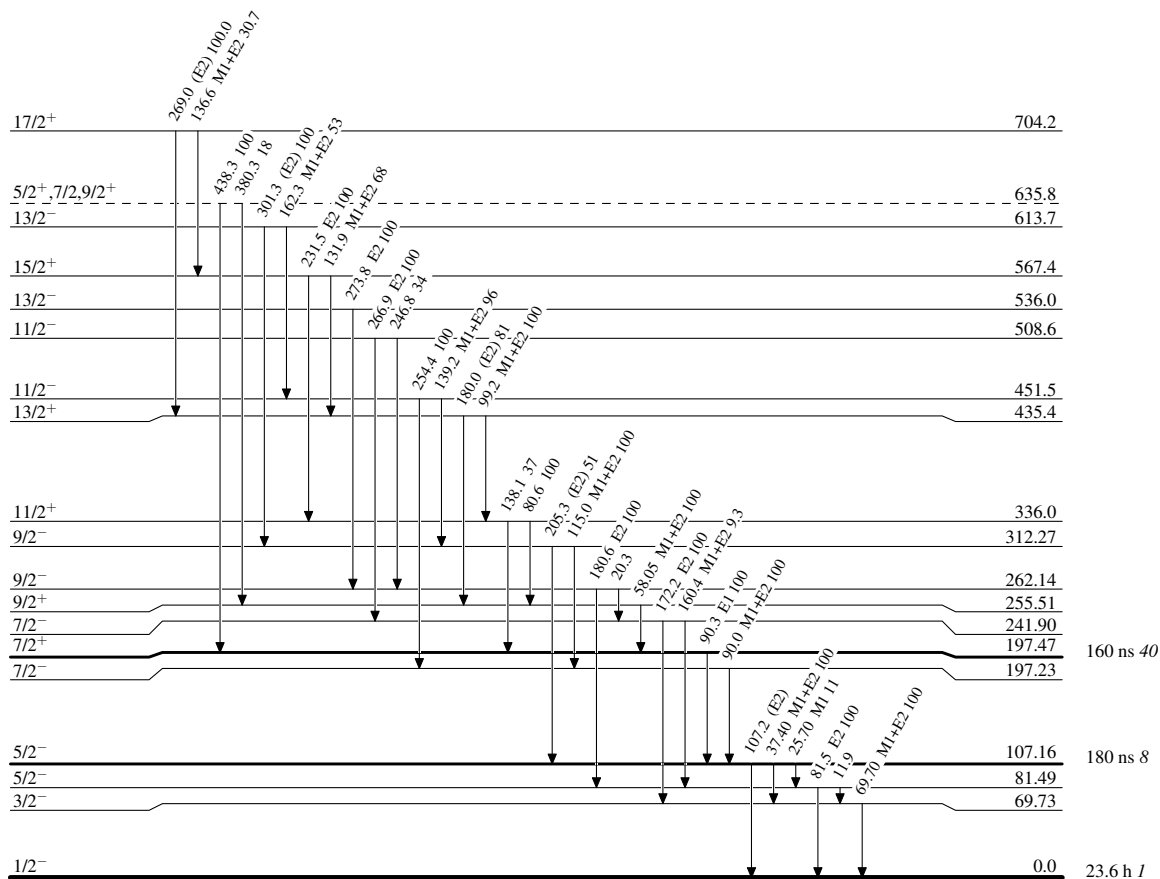
Level Scheme (continued)

Intensities: Relative photon branching from each level

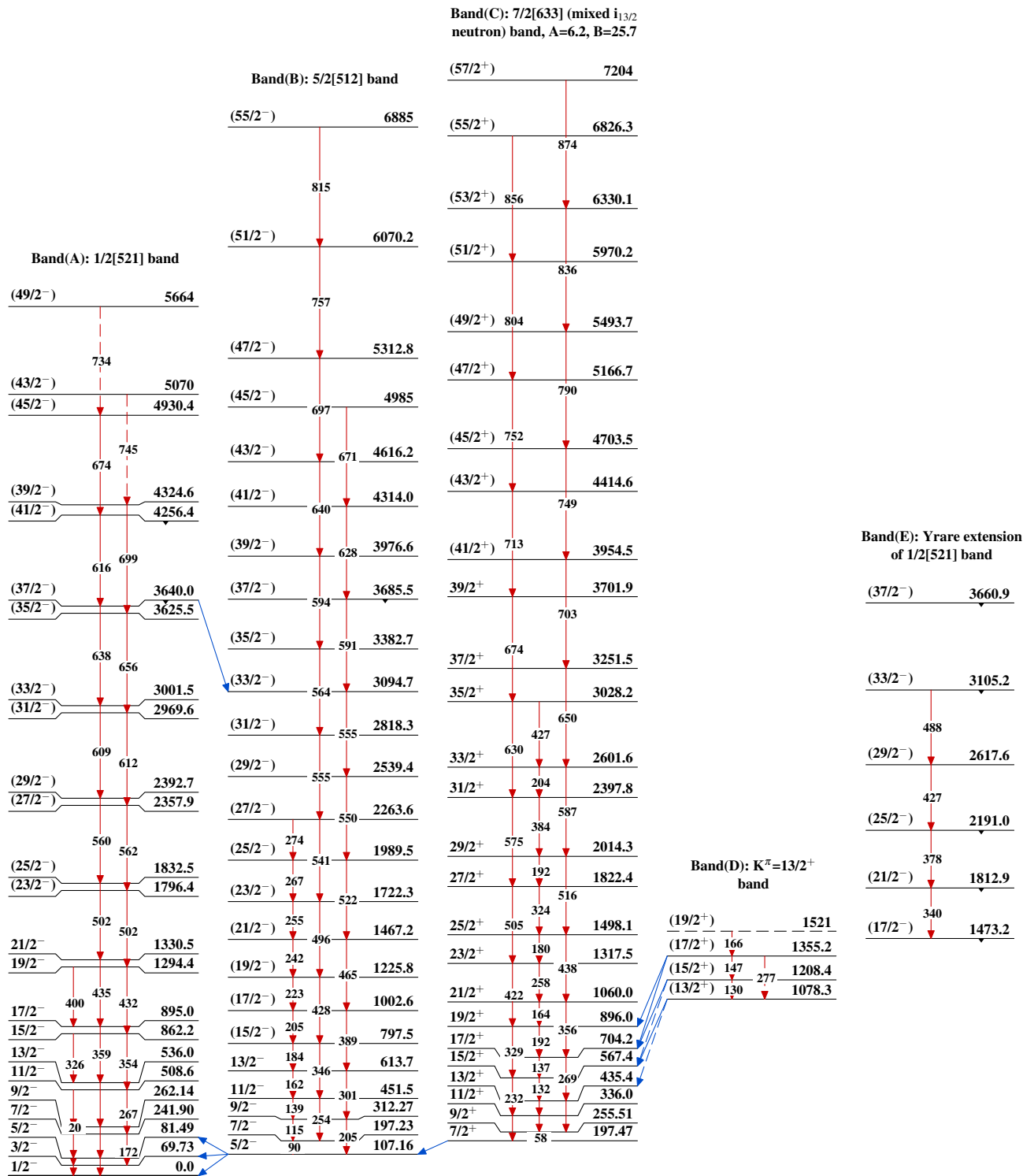
-----▶ γ Decay (Uncertain) $^{173}_{72}\text{Hf}_{101}$

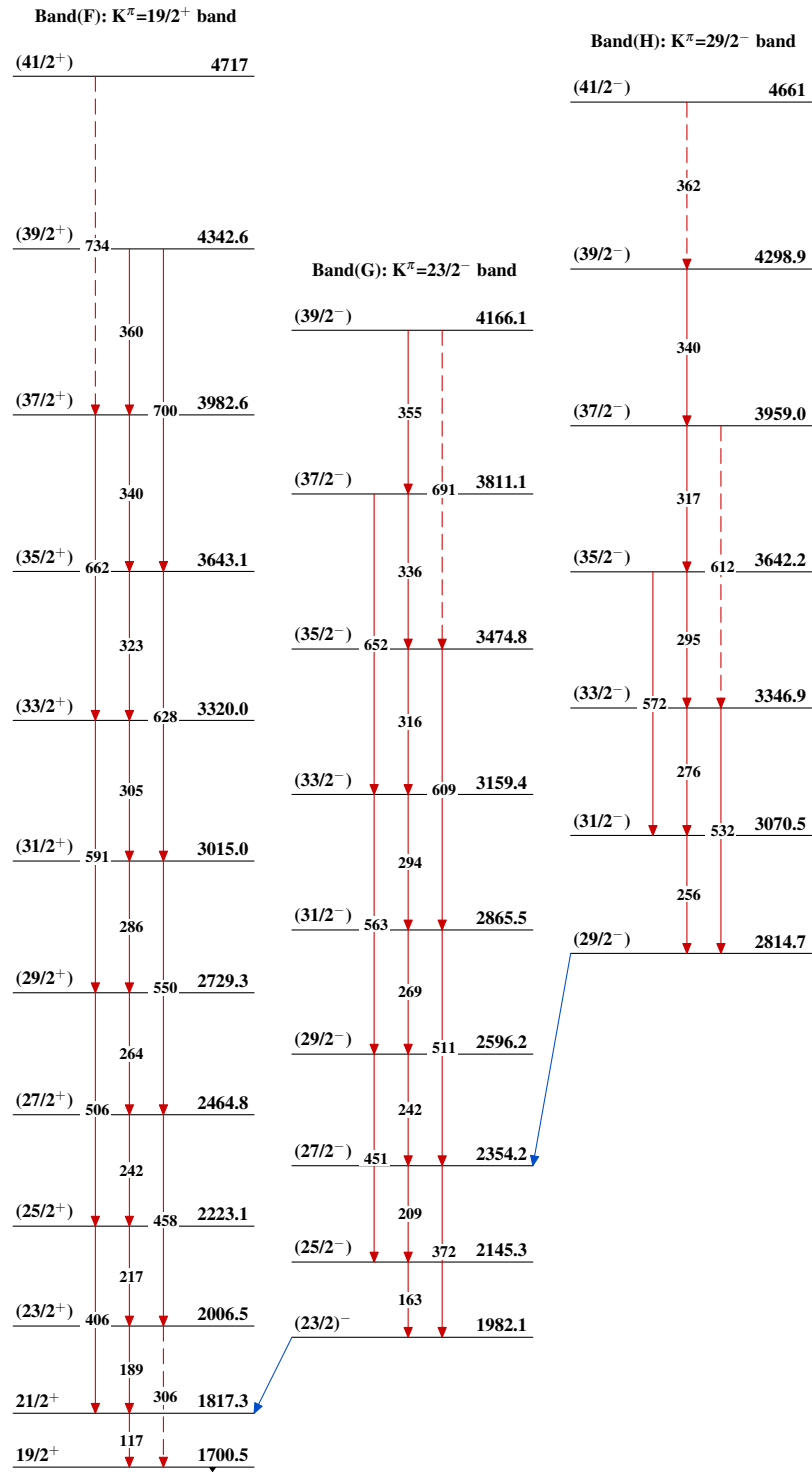
Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

 $^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas

 $^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas (continued) $^{173}_{72}\text{Hf}_{101}$

Adopted Levels, Gammas (continued)

Band(I): Triaxial SD
band (2005Ha05,2005Ri16)

J+30	15620+x
	1469
J+28	14151+x
	1400
J+26	12751+x
	1333
J+24	11418+x
	1265
J+22	10153+x
	1200
J+20	8953+x
	1135
J+18	7818+x
	1073
J+16	6745+x
	1014
J+14	5731+x
	958
J+12	4773+x
	906
J+10	3867+x
	856
J+8	3011+x
	812
J+6	2199+x
	774
J+4	1425+x
	733
J+2	692+x
J	692 x

 $^{173}_{72}\text{Hf}_{101}$