

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

Q(β^-)=1071.1 17; S(n)=6934.18 20; S(p)=6533 6; Q(α)=1340 5 [2012Wa38](#)

¹⁸³Ta Levels

Cross Reference (XREF) Flags

- A ¹⁸³Hf β^- decay
- B ¹⁸²Ta(n, γ) E=thermal
- C ¹⁸¹Ta(¹⁸O,¹⁶O γ)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0 ^{&}	7/2 ⁺ [#]	5.1 d 1	ABC	% β^- =100 μ =(+)2.36 3 (2005St24) J ^π : J from atomic beam (1963Do13); π from μ In agreement with Nilsson model value (=2.19) for π 7/2[404] orbital. T _{1/2} : weighted average of 5.2 d 1 (1953Du20), 5.0 d 1 (1955Po26), 5.0 d 4 (1957Su13), 5.0 d 4 (1966Ba18). μ : from 1984Ed01 (NMR on oriented nuclei; ¹⁸¹ Ta reference standard. Other: 2.28 3 (1981Al21; NMR/rad detection).
73.164 ^a 14	(9/2) ⁻	106 ns 10	ABC	J ^π : E1 73 γ to 7/2 ⁺ g.s.; band assignment. T _{1/2} : weighted average of 107 ns 11 (1967Mo13) in ¹⁸³ Hf β^- decay and 101 ns 20 (2008Vo04) In ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
143.202 ^{&} 16	9/2 ⁺ [#]		ABC	J ^π : M1 143 γ to 7/2 ⁺ g.s.; band assignment.
231.39 ^a 9	(11/2) ⁻		C	J ^π : Q(+D) intraband 158 γ to (9/2) ⁻ 73; band assignment.
317.10 ^{&} 7	11/2 ⁺ [#]		C	J ^π : Q intraband 317 γ to 7/2 ⁺ g.s..
368.3 7	(7/2,9/2,11/2)		B	J ^π : 225 γ to 9/2 ⁺ 143; 295 γ to (9/2) ⁻ 73.
417.07 ^a 12	(13/2) ⁻		C	J ^π : stretched Q intraband 344 γ to (9/2) ⁻ 73; intraband Q(+D) 186 γ to (11/2) ⁻ 231.
459.062 [@] 15	(5/2 ⁺)		ABC	J ^π : 316 γ to 9/2 ⁺ 143; 459 γ to 7/2 ⁺ g.s.; band assignment.
520.11 ^{&} 13	13/2 ⁺ [#]		C	intraband 203 γ to 11/2 ⁺ 317; intraband 377 γ to 9/2 ⁺ 143.
545.6 6	(5/2 ⁺ ,7/2,9/2 ⁺)		B	J ^π : 87 γ to (5/2 ⁺) 459; 402 γ to 9/2 ⁺ 143.
572.79 [@] 3	(7/2 ⁺)		ABC	J ^π : M1 intraband 114 γ to (5/2 ⁺) 459.
629.31 ^a 15	(15/2) ⁻		C	J ^π : Q intraband 398 γ to (11/2) ⁻ 231; Q(+D) intraband 212 γ to (13/2) ⁻ 417.
716.89 [@] 11	(9/2 ⁺)		C	J ^π : intraband 144 γ to (7/2 ⁺) 573.
730.9 8			B	J ^π : 158 γ to (7/2 ⁺) 573 so J=(3/2 to 11/2).
735.05 8			A	J ^π : 735 γ to 7/2 ⁺ g.s. so J=(3/2 to 11/2).
749.7 ^{&} 5	15/2 ⁺ [#]		C	J ^π : 229 γ to 13/2 ⁺ 520; Q intraband 433 γ to 11/2 ⁺ 317.
806.4 5			B	J ^π : 807 γ to 7/2 ⁺ g.s., 663 γ to 9/2 ⁺ 143 so J ^π =(5/2 ⁺ ,7/2,9/2,11/2 ⁺).
856.911 20	(5/2 ⁻)		AB	J ^π : 784 γ to (9/2) ⁻ 73; 284 γ to (5/2 ⁺) 459 imply J ^π =(5/2 ⁻ ,7/2,9/2 ⁺); possible K-2 9/2[514] γ vibrational state (1969Mc08).
867.68 ^a 18	(17/2) ⁻		C	J ^π : stretched Q intraband 450 γ to (13/2) ⁻ 417; intraband 238 γ to (15/2) ⁻ 629.
890.06 [@] 21	(11/2 ⁺)		C	J ^π : intraband 173 γ to (9/2 ⁺) 717.
905.86 ^b 10	(13/2) ⁻		C	J ^π : (Q) 833 γ to (9/2) ⁻ 73; band assignment.
940.2 7	(5/2 ⁺ ,7/2,9/2 ⁺)		B	J ^π : 481 γ to (5/2 ⁺) 459; 797 γ to 9/2 ⁺ 143.
948.58? 12			A	J ^π : possible 376 γ to (7/2 ⁺) 573, possible 876 γ to (9/2) ⁻ 73, possible 807 γ to 9/2 ⁺ 143, so J ^π =(7/2,9/2,11/2 ⁺).
960.05? 13			A	possible 225 γ to 735.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{183}Ta Levels (continued)

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
971.4 8			B	J^π : 399 γ to (7/2 ⁺) 573.
1030.26? 12			A	possible 295 γ to 735.
1091.42 [@] 23	(13/2 ⁺)		C	J^π : intraband 201 γ to (11/2 ⁺) 890; intraband 375 γ to (9/2 ⁺) 717.
1102.35 ^b 12	(15/2 ⁻)		C	J^π : intraband D+Q 196 γ to (13/2 ⁻) 906; stretched Q 871 γ to (11/2 ⁻) 231.
1127.8 6	(5/2 ⁺ , 7/2, 9/2 ⁺)		B	J^π : 985 γ to 9/2 ⁺ 143; 668 γ to (5/2 ⁺) 459.
1129.99 ^a 20	(19/2 ⁻)		C	J^π : intraband stretched Q 501 γ to (15/2 ⁻) 629; intraband 262 γ to (17/2 ⁻) 868.
1150.79 10	(\leq 5/2)		AB	J^π : 692 γ to (5/2 ⁺) 459; log ft =7.8, log $f^{A_u}t$ <8.5 from (3/2 ⁻).
1310.16 ^b 15	(17/2 ⁻)		C	J^π : stretched Q 893 γ to (13/2 ⁻) 417; intraband 208 γ to (15/2 ⁻) 1102.
1310.16+x		0.9 μ s 3	C	%IT=100 possible γ to (17/2 ⁻) 1310. $T_{1/2}$: from (^{18}O , ^{16}O γ).
1319.4 [@] 4	(15/2 ⁺)		C	J^π : intraband 228 γ to (13/2 ⁺) 1091.
1455.40+x 10			C	145 γ to 1310+x.
1543.39 8	(5/2 ⁻)		A	J^π : 687 γ to (5/2 ⁻) 857; 1470 γ to (9/2 ⁻) 73; log ft \approx 5.9 from (3/2 ⁻).
1565.2+x 10			C	255 γ to 1310+x.
1784.31? 20	(3/2 ⁺ , 5/2)		A	J^π : possible 1784 γ to 7/2 ⁺ g.s.; log ft =6.7, log $f^{A_u}t$ <8.5 from (3/2 ⁻).

[†] From least-squares fit to adopted E_γ , assigning 1 keV uncertainty to E_γ data for which authors did not state an uncertainty and omitting uncertainly-placed transitions, unless all transitions from a given level are of that character.

[‡] Values given without further justification are based on rotational band structure.

Definite J^π assigned to all members of g.s. band based on independently-determined $J^\pi(\text{g.s.})=7/2^+$ and mult(143 γ)=M1.

[@] Band(A): π 5/2[402] band. Band parameters: $E_0=418$, $\alpha=16.4$, $B=-14.7$ ($J=5/2, 7/2, 9/2$ levels).

[&] Band(B): π 7/2[404] band. Band parameters: $E_0=-56$, $\alpha=16.0$, $B=-5.0$ ($J=7/2, 9/2, 11/2$ levels).

^a Band(C): π 9/2[514] band. Band parameters: $E_0=8.1$, $\alpha=14.5$, $B=-4.2$ ($J=9/2, 11/2, 13/2$ levels).

^b Band(D): γ cascade based on (13/2⁻). Probable γ -vibrational state coupled to 9/2[514]. Band parameters: $E_0=186$, $\alpha=16.2$, $B=-27.4$ ($J=13/2, 15/2, 17/2$ levels).

Adopted Levels, Gammas (continued)

E _i (level)	J _i ^π	<u>γ(¹⁸³Ta)</u>						Comments
		E _γ [‡]	I _γ [‡]	E _f	J _f ^π	Mult.#	α [†]	
73.164	(9/2) ⁻	73.160 15	100	0.0	7/2 ⁺	E1	0.815	B(E1)(W.u.)=2.8×10 ⁻⁶ 3 other E _γ (mult): 73.6 I (Q or D+Q) from (¹⁸ O, ¹⁶ Oγ). other E _γ : 143.6 I from (¹⁸ O, ¹⁶ Oγ).
143.202	9/2 ⁺	143.19 2	100	0.0	7/2 ⁺	M1	1.566	other E _γ : 143.6 I from (¹⁸ O, ¹⁶ Oγ).
231.39	(11/2) ⁻	158.3 & 1	100 &	73.164	(9/2) ⁻	Q(+D)		Mult.: D+Q or Q from γ asymmetry In ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
317.10	11/2 ⁺	173.7 & 1	100 & 11	143.202	9/2 ⁺			
		317.3 & 1	59 & 30	0.0	7/2 ⁺	(E2)	0.0695	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
368.3	(7/2,9/2,11/2)	225.1 @	100 @	143.202	9/2 ⁺			
		295.1 @	61 @	73.164	(9/2) ⁻			
417.07	(13/2) ⁻	185.7 & 1	100 & 6	231.39	(11/2) ⁻	Q(+D)		Mult.: D+Q or Q from γ asymmetry In ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
		344.0 & 3	9 & 3	73.164	(9/2) ⁻	(E2)	0.0549	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
459.062	(5/2 ⁺)	315.855 20	4.1 4	143.202	9/2 ⁺	[E2]	0.0704	other I _γ : 37 from (n,γ) E=thermal; γ not observed In (¹⁸ O, ¹⁶ Oγ).
		459.073 20	100 3	0.0	7/2 ⁺	[M1,E2]	0.045 20	
520.11	13/2 ⁺	203.0 & 1	100 & 33	317.10	11/2 ⁺			
		376.8 & 10	83 & 50	143.202	9/2 ⁺			
545.6	(5/2 ⁺ ,7/2,9/2 ⁺)	86.5 @	100 @	459.062	(5/2 ⁺)			
		402.4 @	58 @	143.202	9/2 ⁺			
572.79	(7/2 ⁺)	113.72 3	100	459.062	(5/2 ⁺)	M1	3.02	other E _γ (mult): 114.2 I (D+Q or Q) from (¹⁸ O, ¹⁶ Oγ).
629.31	(15/2) ⁻	212.3 & 1	100 & 10	417.07	(13/2) ⁻	Q(+D)		Mult.: D+Q or Q from γ asymmetry In ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
		397.7 & 3	13 & 7	231.39	(11/2) ⁻	(E2)	0.0366	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
716.89	(9/2 ⁺)	144.1 & 1	100 &	572.79	(7/2 ⁺)			
730.9		158.1 @	100 @	572.79	(7/2 ⁺)			
735.05		735.05 ^a 8	100	0.0	7/2 ⁺			
749.7	15/2 ⁺	229.3 & 6	67 & 17	520.11	13/2 ⁺			
		432.8 & 6	100 & 33	317.10	11/2 ⁺	(E2)	0.0292	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).
806.4		75.5 @	43 @	730.9				
		233.6 @	3.2 @	572.79	(7/2 ⁺)			
		663.2 @	52 @	143.202	9/2 ⁺			
		806.5 @	100 @	0.0	7/2 ⁺			
856.911	(5/2 ⁻)	284.10 5	0.55 6	572.79	(7/2 ⁺)	[E1]	0.0252	
		311.4 @	1.6 @	545.6	(5/2 ⁺ ,7/2,9/2 ⁺)			
		397.86 2	4.4 5	459.062	(5/2 ⁺)			other I _γ : 7.1 from (n,γ) E=thermal.
		783.73 3	100 3	73.164	(9/2) ⁻			
		856.78 ^a 15	0.17 5	0.0	7/2 ⁺			
867.68	(17/2) ⁻	238.4 & 1	100 & 20	629.31	(15/2) ⁻			
		450.0 & 5	20 & 10	417.07	(13/2) ⁻	(E2)	0.0264	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ Oγ).

Adopted Levels, Gammas (continued)

$\gamma(^{183}\text{Ta})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π	Mult. #	α^\dagger	Comments
890.06	(11/2 ⁺)	173.0 & 2	100 &	716.89	(9/2 ⁺)			
905.86	(13/2 ⁻)	832.6 & 1	100 &	73.164	(9/2 ⁻)	(Q)		Mult.: from ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
940.2	(5/2 ⁺ , 7/2, 9/2 ⁺)	481.2 @	100 @	459.062	(5/2 ⁺)			
		796.9 @	37 @	143.202	9/2 ⁺			
948.58?		375.78 ^a 12	63 14	572.79	(7/2 ⁺)			
		806.5 ^a 2	100 21	143.202	9/2 ⁺			
		875.5 ^a 3	43 21	73.164	(9/2 ⁻)			
960.05?		225.00 ^a 10	100	735.05				
971.4		165.1 @	57 @	806.4				
		398.6 @	100 @	572.79	(7/2 ⁺)			
1030.26?		295.21 ^a 8	100	735.05				
1091.42	(13/2 ⁺)	201.2 & 2	100 & 20	890.06	(11/2 ⁺)			
		374.9 & 3	40 & 20	716.89	(9/2 ⁺)	[E2]	0.0431	
1102.35	(15/2 ⁻)	196.4 & 1	56 & 22	905.86	(13/2 ⁻)	D+Q		Mult.: from ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
		685.2 & 3	33 & 22	417.07	(13/2 ⁻)			
		871.3 & 2	100 & 33	231.39	(11/2 ⁻)	Q		Mult.: from ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
1127.8	(5/2 ⁺ , 7/2, 9/2 ⁺)	321.7 @	15 @	806.4				
		668.4 @	21 @	459.062	(5/2 ⁺)			
		984.6 @	100 @	143.202	9/2 ⁺			
1129.99	(19/2 ⁻)	262.3 & 1	100 & 33	867.68	(17/2 ⁻)			
		501.0 & 9	33 & 17	629.31	(15/2 ⁻)	(E2)	0.0201	Mult.: Q intraband γ from ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
1150.79	(\leq 5/2)	344.3 @	5.4 @	806.4				
		691.73 10	100 10	459.062	(5/2 ⁺)			
1310.16	(17/2 ⁻)	207.8 & 1	100 & 10	1102.35	(15/2 ⁻)	Q(+D)		Mult.: D+Q or Q from γ asymmetry In ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
		404.4 & 10	<5 &	905.86	(13/2 ⁻)			
		682.2 & 10	<5 &	629.31	(15/2 ⁻)			
1310.16+x		893.0 & 10	24 & 10	417.07	(13/2 ⁻)	Q		Mult.: from ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
		x		1310.16	(17/2 ⁻)			E_γ : x<50 keV if mult(x)=M1 or <100 keV if mult(x)=M1,E2; due to high internal conversion and low detection efficiency, a γ with this energy could not have been detected in ¹⁸¹ Ta(¹⁸ O, ¹⁶ O γ).
1319.4	(15/2 ⁺)	228.0 & 3	100 &	1091.42	(13/2 ⁺)			
1455.40+x		144.8 & 1	100 &	1310.16+x				
1543.39	(5/2 ⁻)	594.8 ^a 3	8 4	948.58?				
		686.50 10	8.9 9	856.911	(5/2 ⁻)			
		1470.2 1	100 11	73.164	(9/2 ⁻)			
		1543.0 10	\approx 0.74	0.0	7/2 ⁺			

Adopted Levels, Gammas (continued)

$\gamma(^{183}\text{Ta})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\ddagger	I_γ^\ddagger	E_f	J_f^π
1565.2+x		254.6& 10	100&	1310.16+x	
1784.31?	(3/2 ⁺ , 5/2)	1784.3 ^a 2	100	0.0	7/2 ⁺

† Additional information 1.

‡ From ¹⁸³Hf β^- decay, except As noted.

From $\alpha(\text{K})\text{exp}$ or intensity balance In β^- decay, except As noted.

@ From ¹⁸²Ta(n, γ) E=thermal.

& From ¹⁸¹Ta(¹⁸O,¹⁶O γ).

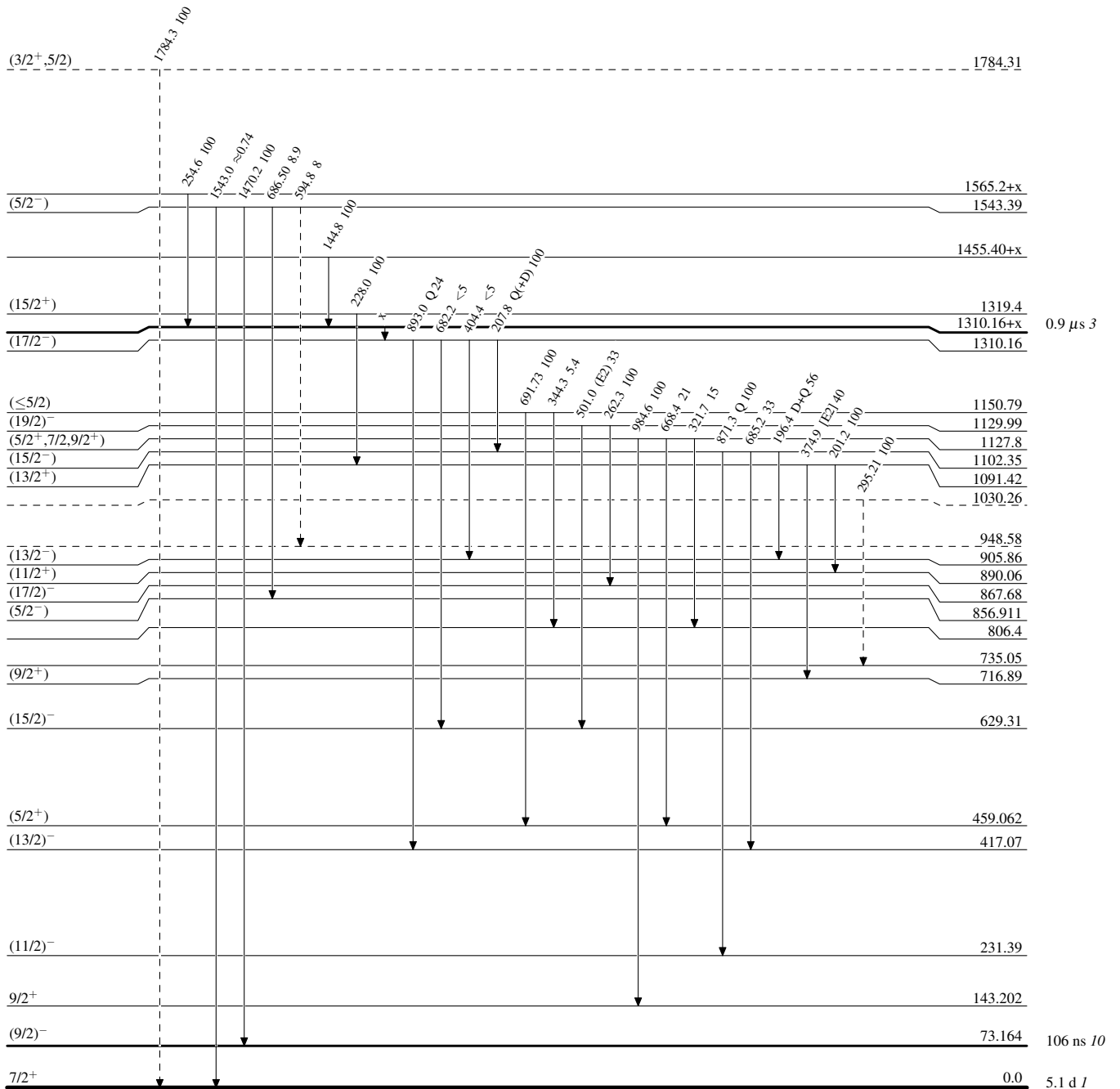
^a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

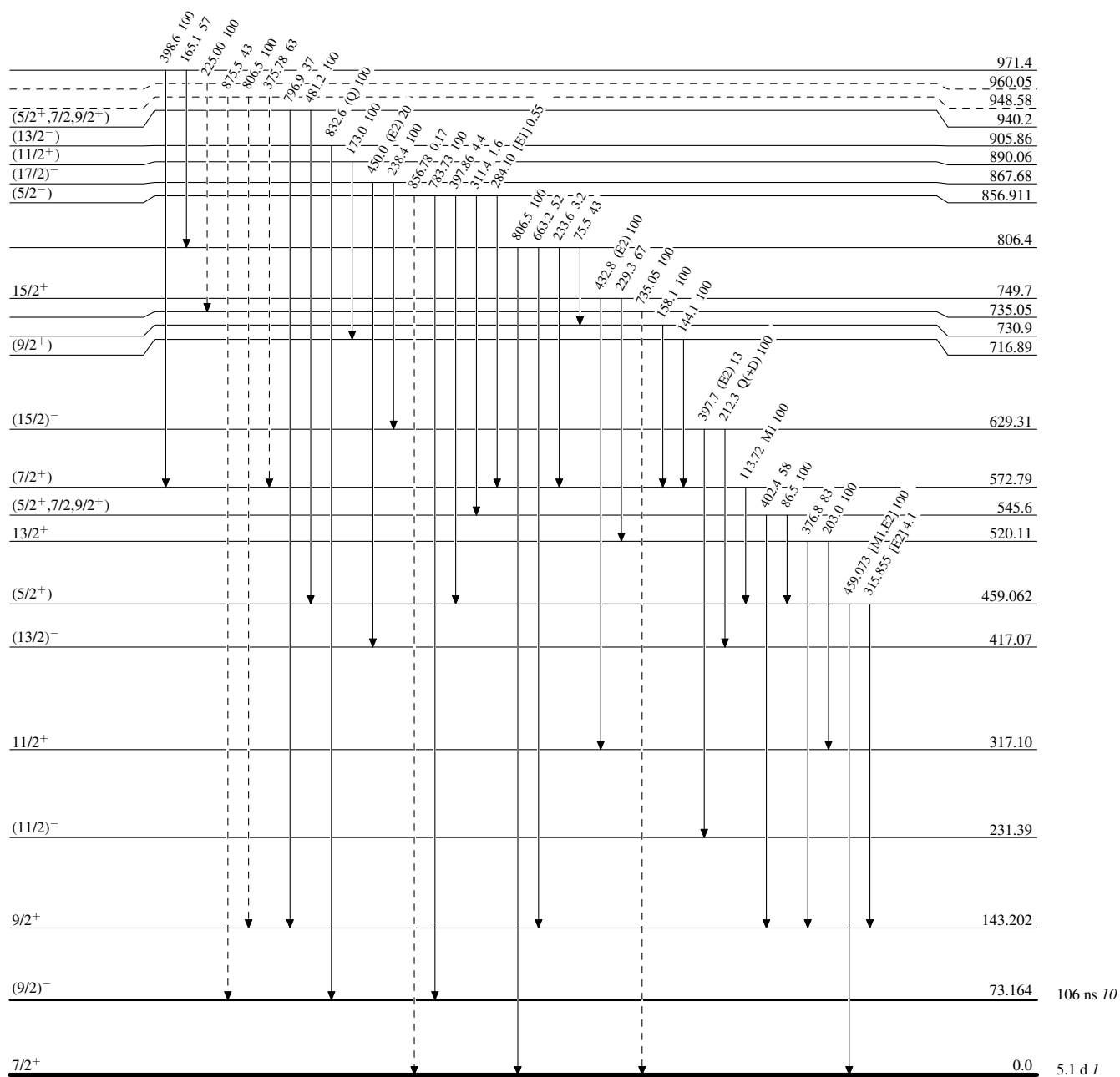
-----► γ Decay (Uncertain) $^{183}_{73}\text{Ta}_{110}$

Adopted Levels, Gammas

Legend

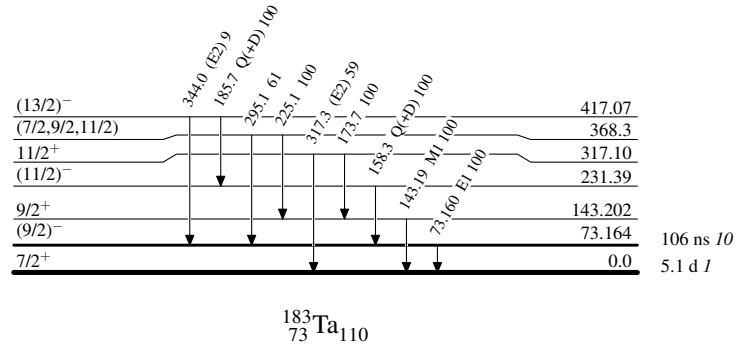
Level Scheme (continued)

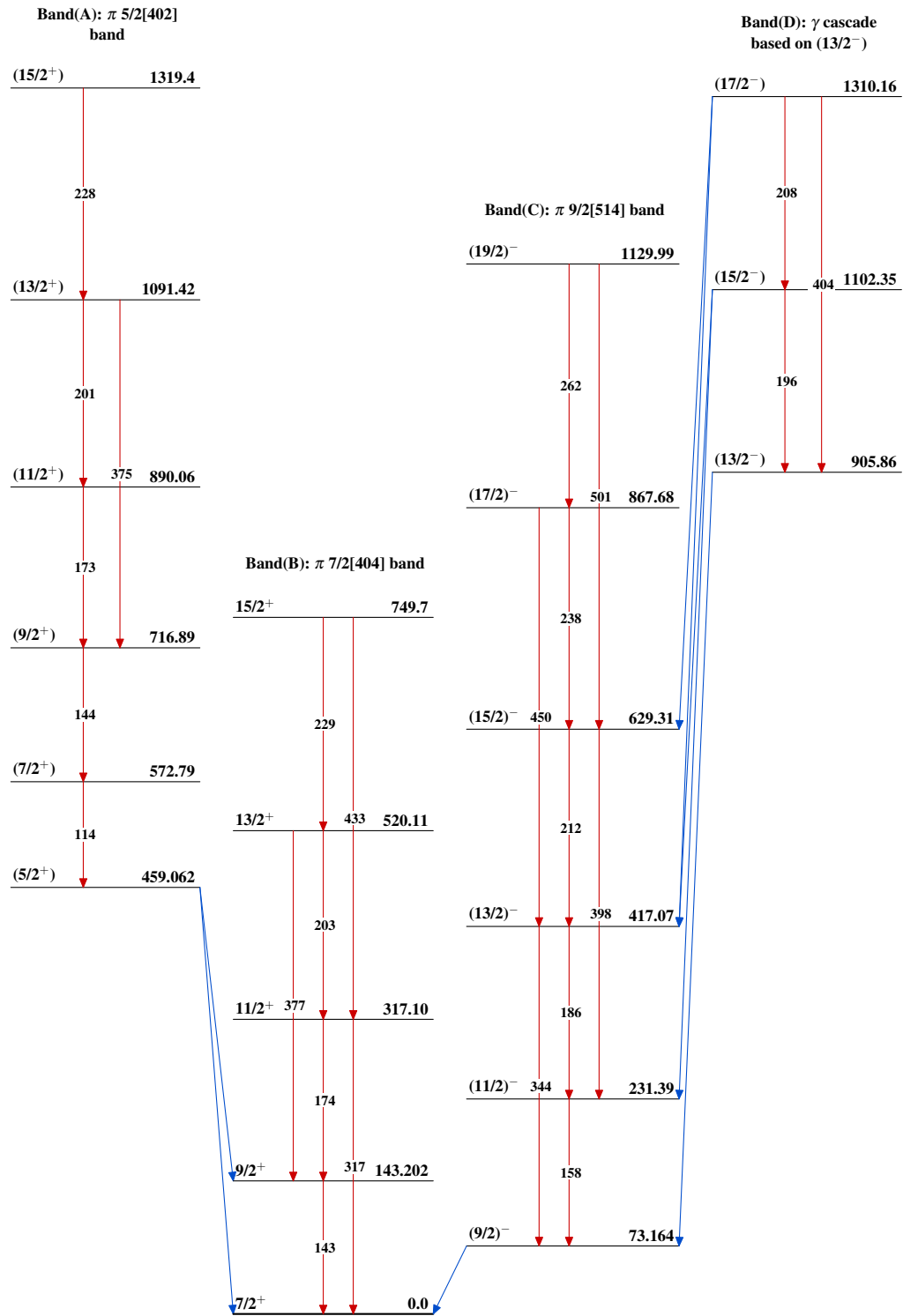
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{183}_{73}\text{Ta}_{110}$

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

Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{183}_{73}\text{Ta}_{110}$