^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 130, 21 (2015)	15-Jul-2015

1979Va10: measured Eγ, Iγ, $\gamma\gamma$, ce. The secondary γ rays were measured with bent-crystal spectrometer for singles data and with a pair of Ge(Li) detectors for $\gamma\gamma$ coincidences. The conversion electrons were measured with β spectrograph in the 30-400 keV.

1971He13: measured Eγ, Iγ with Ge(Li) detectors. A total of 100 secondary and 74 primary γ rays were reported. Several bands proposed based on two-quasiparticle orbitals.

1974An12: measured lifetimes by $\gamma\gamma$(t).

1970Ei04: (pol n,γ) E=thermal. Measured circular polarization of γ rays in the region 1.7-8 MeV. Deduced J=4 component in the capture state.

1957Ba33: secondary γ rays with a bent crystal spectrometer, 40 γ rays reported from 91 to 1205 keV.

1957Ba33, 1953Ba76: primary γ rays (22 γ rays from 3680 to 6060 keV) measured with a 180° spectrometer using electron-positron pair formation of high-energy γ rays.

1968Al23, 1969GoZX, 1973PrZI: ce data.

Others: 2007Sh15 (average cross section measured), 1986Se14 (some evidence of 5% E2 transitions from the capture state based on measurement of cross sections of g.s. and isomer), 1963Gi06, 1959Dr75, 1958Gr12, 1958Sk59. Most detailed studies are from 1957Ba33 (secondary γ rays with a bent crystal spectrometer); 1953Ba76 and 1957Ba33 (primary γ rays with a magnetic spectrometer using electron-positron pair formation).

The γ-ray energies and cross section data have been measured at Budapest reactor facility with very low (neutron) background during 1999-2003. Detailed reports of this work are available on the following (IAEA and LBNL) websites: www-nds.iaea.org/pgaa/pgaa7/index.html and ie.lbl.gov/pgaadatabase/pgaa.htm. See also IAEA publication 2007ChZX and a book by G. Molnar: Handbook of Prompt Gamma Activation Analysis. In this work 151 secondary and 51 primary γ rays are assigned to capture in ^{181}Ta. Another 39 γ rays below 1 MeV and 51 γ rays between 1004 and 3802 keV are reported as unassigned which probably belong to capture in ^{181}Ta. Note that in the published literature the region between 1 and 3.80 MeV was not covered. The strongest primary and secondary γ rays (three in each case) from this work are used to adjust the intensity scale of the primary γ rays from 1971He13 to match the scale of the intensities of the secondary γ rays from 1979Va10. See also 2011Fi11.

^{182}Ta Levels

All band assignments are from 1979Va10, some were proposed earlier by 1971He13.

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]
0.0[@]	3−	
16.273[g] *4*	5+	
97.8304[@] *16*	4−	
114.3126[&] *17*	4−	
150.150[h] *3*	4+	
163.047[g] *4*	6+	
173.2370[a] *21*	5−	
237.2860[@] *20*	5−	
249.982[i] *3*	(3)+	
269.047[h] *3*	(5)+	
270.4027[b] *21*	2−	1.2 ns *2*
292.9352[&] *22*	5−	
316.403[a] *3*	6−	
334.627[g] *5*	7+	
360.518[b] *3*	(3)−	
364.359[i] *3*	4+	
390.154[j] *7*	(6)+	
396.335[@] *4*	(6−)	
402.626[c] *4*	2+	1.00 ns *5*
411.306[h] *7*	(6+)	
443.610[m] *3*	1−	2.2 ns *2*
475.558[c] *6*	(3)+	
480.036[b] *3*	4−	
488.247[&] *3*	(6−)	
491.423[m] *3*	2−	
505.613[i] *3*	5+	
547.1030[k] *25*	(3)−	
558.286[e] *3*	(1)−	
565.693[m] *3*	(3)−	
571.638[c] *6*	4+	
579.436[h] *6*	(7+)	
581.196[@] *12*	(7−)	
583.272[e] *4*	(0−)	
592.960[d] *4*	(1)+	
628.425[b] *4*	5−	
647.431[d] *5*	(2+)	
647.652[l] *3*	(2)−	
651.215[k] *3*	(4)−	
659.862[m] *3*	(4)−	
666.149[e] *4*	2−	
673.040[i] *4*	(6+)	
701.967[e] *4*	3−	
719.552[l] *3*	(3)−	
723.981[d] *6*	3+	
740.132[o] *3*	2−	
749.080[n] *5*	(3)+	
776.39[f] *3*	7−	
781.396[k] *4*	5−	

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^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12 (continued)

^{182}Ta Levels (continued)

E(level)[†]	Jπ[‡]
782.538[m] 4	(5⁻)
805.071[b] 13	(6⁻)
817.021[l] 4	(4)⁻
835.289[o] 5	3⁻
856.052[e] 4	(4)⁻
881.4 6	
897.5 5	
909.8 6	
915.4 5	
939.634[l] 5	5⁻
960.415[o] 6	(4⁻)
960.528[e] 5	(5⁻)
987.0 8	3⁻,4⁻
1000.3 6	3⁻,4⁻
1028.2 6	3⁻,4⁻
1057.3 6	3⁻,4⁻
1082.7 6	3⁻,4⁻
1101.2 5	5⁻
1113.6 6	5⁻
1125.1 6	(2⁻,5⁻)
1137.0 6	3⁻,4⁻
1150.3 6	3⁻,4⁻
1172.3 8	3⁻,4⁻
1229.7 6	3⁻,4⁻
1241.1 6	3⁻,4⁻
1260.0 6	3⁻,4⁻
1269.8 6	3⁻,4⁻
1280.6 6	3⁻,4⁻
1323.5 6	
1371.2 6	3⁻,4⁻
1389.5 6	3⁻,4⁻
1396.3 8	
1433.2 6	
1444.9 6	3⁻,4⁻
1482.9 6	
1496.5 6	3⁻,4⁻
1526.8 6	3⁻,4⁻
1579.8 6	
1604.7 6	3⁻,4⁻
1618.9 6	3⁻,4⁻
1679.7 6	3⁻,4⁻
1696.7 6	3⁻,4⁻
1714.1 6	
1747.3 6	3⁻,4⁻
1843.1 6	
1890.2 6	
1905.0 6	
1924.5 6	
1944.8 6	
1960.3 6	
2009.0 6	
2017.2 6	
2029.8 6	
2080.8 6	
2160.6 7	

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^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12 (continued)

^{182}Ta Levels (continued)

E(level)[†]	J^{π}[‡]	Comments
2180.2 *6*		
(6062.92 *11*)	$3^+,4^+$	E(level): S(n)=6062.94 *11* (2012Wa38), neutron-capture state. J^{π}: s-wave capture in $7/2^+$ g.s. of ^{181}Ta. Component of J=4 is deduced as 73% *24* from (pol n,γ) experiment (1970Ei04) with circular polarization of integral γ-ray spectrum in 1.7-8 MeV region.

[†] From least-squares fit to Eγ data. Reduced χ^2=2.8 compared to critical χ^2=1.3. Eight γ rays out of 275 γ rays deviate in energy by 3 or more σ.
[‡] From Adopted Levels.
[#] From 1974An12, measured by $\gamma\gamma$(t).
[@] Band(A): $K^{\pi}=3^-$, π7/2[404]-ν1/2[510].
[&] Band(B): $K^{\pi}=4^-$, π7/2[404]+ν1/2[510].
[a] Band(C): $K^{\pi}=5^-$, π7/2[404]+ν3/2[512].
[b] Band(D): $K^{\pi}=2^-$, π7/2[404]-ν3/2[512].
[c] Band(E): $K^{\pi}=2^+$, π7/2[404]-ν11/2[615].
[d] Band(F): $K^{\pi}=1^+$, π7/2[404]-ν9/2[624].
[e] Band(G): $K^{\pi}=0^-$, π7/2[404]-ν7/2[503].
[f] Band(H): $K^{\pi}=7^-$, π7/2[404]+ν7/2[503].
[g] Band(I): $K^{\pi}=5^+$, π9/2[514]+ν1/2[510].
[h] Band(J): $K^{\pi}=4^+$, π9/2[514]-ν1/2[510].
[i] Band(K): $K^{\pi}=3^+$, π9/2[514]-ν3/2[512].
[j] Band(L): $K^{\pi}=6^+$, π9/2[514]+ν3/2[512] (?). Configuration is tentative.
[k] Band(M): $K^{\pi}=3^-$, π5/2[402]+ν1/2[510].
[l] Band(N): $K^{\pi}=2^-$, π5/2[402]-ν1/2[510].
[m] Band(O): $K^{\pi}=1^-$, π5/2[402]-ν3/2[512].
[n] Band(P): $K^{\pi}=3^+$, π5/2[402]-ν11/2[615] (?). Configuration is tentative.
[o] Band(Q): $K^{\pi}=2^-$, π1/2[411]+ν3/2[512] (?). Configuration is tentative.

γ(^{182}Ta)

Iγ normalization: from estimated (by 1979Va10) Iγ≈15 for 270.406γ. From Σ(I(γ+ce) of γ rays to g.s.+16.273 level)=100, Iγ normalization= 0.20 *1*, which implies that many transitions to the g.s. or the 16.73 level are missed. From Budapest cross section=2.60 b 6 (2007ChZX) for 270.4γ and capture cross section=20.5 b 5 (2006MuZX), Iγ normalization=0.127 *4*. To obtain absolute cross sections (in units of barns) for photon intensity of a γ ray in ^{181}Ta thermal neutron capture, multiply the relative intensity given in this dataset by a factor of 0.0255 *16*, deduced from normalizing the relative intensities given in this dataset with absolute cross sections given in the Budapest measurements discussed above for three prominent secondary γ rays. Thermal capture cross section σ_n=20.5 b *5* (2006MuZX).

E_γ [†]	I_γ [‡h]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	α [i]	$I_{(\gamma+ce)}$ [h]	Comments
(16.273 *4*)		16.273	5$^+$	0.0	3$^-$	(M2)	4.30×10^4	162 *15*	α(L)=3.21×10^4 *5*; α(M)=8.54×10^3 *12*; α(N+..)=2.40×10^3 *4* α(N)=2.07×10^3 *3*; α(O)=309 *5*; α(P)=15.30 *22* $I_{(\gamma+ce)}$: from intensity balance at 16.273 level. This should be considered as lower limit since there may be additional γ rays feeding this level.
^{x}44.6249 *22*	1.9 *4*								
^{x}45.677 *5*	0.6 *3*								
^{x}46.496 *3*	4.6 *18*								
^{x}47.726 *4*	0.7 *3*								
47.8096 *17*	5.0 *13*	491.423	2$^-$	443.610	1$^-$	M1	6.35		α(L1)exp=29 *10*; α(L2)exp=2.9 *20*; α(M)exp=9 *3* α(L)=4.92 *7*; α(M)=1.117 *16* α(N)=0.267 *4*; α(O)=0.0423 *6*; α(P)=0.00292 *4* Additional information 36.
^{x}49.2098 *23*	1.0 *3*								
^{x}52.812 *4*	0.7 *3*								
^{x}53.141 *3*	2.0 *4*								α(L1)exp=(8 *5*) Additional information 1.
^{x}53.949 *4*	1.7 *9*								
^{x}54.080 *4*	1.3 *4*								
^{x}54.383 *5*	0.6 *3*								
54.4710 *24*	2.0 *5*	647.431	(2$^+$)	592.960	(1)$^+$	[M1]	4.33		α(L1)exp=(8 *5*) α(L)=3.36 *5*; α(M)=0.762 *11* α(N)=0.182 *3*; α(O)=0.0288 *4*; α(P)=0.00199 *3* Mult.: quoted α(L1)exp is consistent with M1, but no assignment was made by 1979Va10 since the assignment of L1 ce line is questionable. Additional information 43.
^{x}55.756 *4*	3.1 *12*								
^{x}56.677 *3*	2.7 *10*								
^{x}56.717 *3*	3.7 *11*								
^{x}57.102 *4*	1.6 *8*								
^{x}57.124 *4*	1.7 *8*								
^{x}58.117 *4*	2.0 *8*								

γ(^{182}Ta) (continued)

Eγ[†]	Iγ[‡h]	Ei(level)	J^π_i	E_f	J^π_f	Mult.[b]	α[i]	Comments
[x]58.371 5	1.5 8							
[x]58.885 4	1.1 5							
58.9277 19	1.9 3	173.2370	5⁻	114.3126	4⁻	(M1)	3.44	α(L)=2.67 4; α(M)=0.605 9 α(N)=0.1447 21; α(O)=0.0229 4; α(P)=0.001580 23 Mult.: from ^{182}Hf β^- decay (61.5 min).
[x]59.255 3	2.9 8							
[x]59.280 3	5.8 12							
59.692 4	1.6 5	719.552	(3)⁻	659.862	(4)⁻			
[x]64.005 3	1.4 3							
[x]64.278 5	1.0 4							
[x]65.540 4	1.6 5							
65.573[ck] 4	3.0 6	334.627	7⁺	269.047	(5)⁺			
[x]65.623 4	4.0 9							
[x]65.667 4	4.2 9							
[x]66.357 4	2.2 5							
[x]66.394 4	1.3 4							
[x]66.424 5	1.1 4							
[x]66.473 4	1.1 4							
[x]67.245 3	1.8 4							
[x]67.409 4	2.3 7							
[x]69.482 6	1.8 7							
71.900 5	2.3 6	719.552	(3)⁻	647.652	(2)⁻			
[x]72.551 7	3.0 16							
[x]72.866 9	1.7 8							
72.929 6	2.1 7	475.558	(3)⁺	402.626	2⁺			
[x]73.244 7	2.3 9							α(L1)exp=(0.9 6) α(L1)exp for 73.24+73.33+73.50+73.58. Additional information 2.
[x]73.335 5	5.5 12							Additional information 3.
73.499 8	2.2 10	856.052	(4)⁻	782.538	(5⁻)			For ce data see 73.244γ.
[x]73.576 7	2.8 10							Additional information 4.
74.266 3	5.5 13	565.693	(3)⁻	491.423	2⁻	(M1)	10.25	α(L1)exp=1.3 5 α(K)=8.50 12; α(L)=1.355 19; α(M)=0.308 5 α(N)=0.0736 11; α(O)=0.01164 17; α(P)=0.000804 12 Additional information 41.
[x]74.300 6	2.4 12							
75.414 5	3.0 8	173.2370	5⁻	97.8304	4⁻	(M1)	9.81	α(K)=8.14 12; α(L)=1.296 19; α(M)=0.294 5 α(N)=0.0703 10; α(O)=0.01113 16; α(P)=0.000769 11 Mult.: from ^{182}Hf β^- decay (61.5 min).
[x]75.507 5	3.6 13							
76.557 10	1.1 5	723.981	3⁺	647.431	(2⁺)			
[x]78.027 8	1.5 6							
[x]79.299 8	1.3 5							
81.951 5	0.94 32	647.652	(2)⁻	565.693	(3)⁻			

$^{182}_{73}$Ta$_{109}$-5

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	α[i]	Comments
[x]82.000 *6*	0.8 *4*							
[x]82.655 *6*	4.5 *14*							
82.880 *9*	1.1 *5*	666.149	2⁻	583.272	(0⁻)			
[x]83.370 *6*	2.3 *9*							
[x]85.285 *18*	2.0 *7*							
[x]85.600 *8*	2.5 *12*							
[x]86.527 *8*	1.9 *8*							
[x]87.849 *7*	0.6 *3*							
[x]89.116 *6*	0.7 *3*							
90.120[jk] *6*	2.0 *15*	360.518	(3)⁻	270.4027	2⁻			
90.120[jek] *6*		565.693	(3)⁻	475.558	(3)⁺			
[x]91.543 *5*	1.2 *3*							
92.480 *3*	2.5 *3*	740.132	2⁻	647.652	(2)⁻	M1	5.46	α(L1)exp=0.7 *5* α(K)=4.53 *7*; α(L)=0.717 *10*; α(M)=0.1626 *23* α(N)=0.0389 *6*; α(O)=0.00616 *9*; α(P)=0.000426 *6* Additional information 51.
94.1677 *25*	5.9 *11*	659.862	(4)⁻	565.693	(3)⁻	M1	5.18	α(L1)exp=0.8 *3*; α(M)exp=0.70 *25* α(K)=4.31 *6*; α(L)=0.680 *10*; α(M)=0.1543 *22* α(N)=0.0369 *6*; α(O)=0.00584 *9*; α(P)=0.000404 *6* ce(M) mixed with ce(K)(159.0+159.2). Additional information 48.
95.155 *3*	3.1 *3*	835.289	3⁻	740.132	2⁻	(M1,E2)	4.8 *3*	α(L1)exp=0.5 *4* α(K)=2.6 *16*; α(L)=1.7 *10*; α(M)=0.4 *3* α(N)=0.10 *6*; α(O)=0.013 *8*; α(P)=0.00023 *16* Mult.: from α(K)exp, 1979Va10 suggest M1. Additional information 54.
96.077 *6*	0.79 *26*	571.638	4⁺	475.558	(3)⁺			
[x]96.588 *6*	1.1 *2*							
97.466 *4*	2.5 *3*	817.021	(4)⁻	719.552	(3)⁻			
[x]97.601 *6*	0.68 *22*							
97.8318 *19*	12 *2*	97.8304	4⁻	0.0	3⁻	M1	4.64	α(K)exp=4.0 *8*; α(L1)exp=0.80 *16*; α(L2)exp=0.27 *19*; α(M)exp=0.19 *13*; α(N)exp=0.18 *9* α(K)=3.86 *6*; α(L)=0.609 *9*; α(M)=0.1382 *20* α(N)=0.0331 *5*; α(O)=0.00523 *8*; α(P)=0.000362 *5* Mult.: α(K)exp agrees with M1 with δ<0.5, K/L1 is lower than for pure M1; α(L1)exp exceeds value for pure M1. ce(L2) mixed with ce(K)(154.0); ce(N) mixed with ce(M)(99.8γ). Additional information 11.
[x]98.555 *17*	0.6 *3*							
[x]99.477 *6*	0.72 *22*							
99.8304 *22*	12.0 *15*	249.982	(3)⁺	150.150	4⁺	M1	4.38	α(K)exp=3.8 *6*; α(L1)exp=0.80 *12*; α(L2)exp=0.26 *18*; α(M)exp=0.18 *9*; α(N)exp=0.12 *6* α(K)=3.64 *5*; α(L)=0.575 *8*; α(M)=0.1303 *19*

From ENSDF

γ(^{182}Ta) (continued)

Eγ[†]	Iγ[‡h]	Ei(level)	J^{π}_{i}	Ef	J^{π}_{f}	Mult.[b]	α[i]	Comments
								α(N)=0.0312 5; α(O)=0.00494 7; α(P)=0.000341 5 Mult.: α(K)exp agrees with M1 with δ<0.45, K/L1 is lower than for pure M1; α(L1)exp exceeds value for pure M1. ce(L2) mixed with ce(L1)(100.5γ) and ce(K)(156.0γ). ce(M) mixed with ce(N)(97.8γ). Additional information 17.
100.553 3	2.3 4	647.652	(2)$^-$	547.1030	(3)$^-$			α(L1)exp=1.3 9 ce(L1) mixed with ce(L2)(99.8) and ce(K)(156.0γ). Additional information 44.
101.442 7	0.62 25	749.080	(3)$^+$	647.652	(2)$^-$			
^{x}103.533 3	1.7 2							
^{x}104.063 6	0.65 20							
104.115 3	2.8 7	651.215	(4)$^-$	547.1030	(3)$^-$	M1,E2	3.5 4	α(L1)exp=0.5 4 α(K)=2.0 12; α(L)=1.1 7; α(M)=0.28 17 α(N)=0.07 4; α(O)=0.009 5; α(P)=0.00018 13 Mult.: from α(L1)exp. 1979Va10 assign M1. Additional information 47.
104.476 5	0.81 16	960.528	(5$^-$)	856.052	(4)$^-$			
^{x}104.576 6	1.2 5							
^{x}105.792 3	1.7 2							
^{x}105.867 9	1.7 6							
^{x}105.957 10	1.5 6							
106.006 11	0.64 15	269.047	(5)$^+$	163.047	6$^+$			
107.865 4	5.0 5	666.149	2$^-$	558.286	(1)$^-$	M1	3.51	α(K)exp=3.0 21; α(L1)exp=0.28 20 α(K)=2.92 4; α(L)=0.460 7; α(M)=0.1043 15 α(N)=0.0249 4; α(O)=0.00395 6; α(P)=0.000273 4 Additional information 49.
^{x}108.163 5	1.4 3							
^{x}109.773 9	0.9 5							
^{x}112.249 12	1.3 6							
114.3151 25	23 3	114.3126	4$^-$	0.0	3$^-$	(M1)	2.97	α(K)exp=3.3 7; α(L1)exp=0.40 10; α(L2)exp=0.13 7; α(M)exp=0.15 8; α(N)exp=0.11 6 α(K)=2.47 4; α(L)=0.389 6; α(M)=0.0882 13 α(N)=0.0211 3; α(O)=0.00334 5; α(P)=0.000231 4 Conversion coefficients are for 114.31+114.38, but the contribution from the 114.38γ is expected to be small. ce(L2) mixed with ce(L1)(114.6γ); ce(N) mixed with ce(L1)(125.0γ+125.1γ) and ce(K)(180.9γ). Additional information 12.
114.376 3	6.8 7	364.359	4$^+$	249.982	(3)$^+$			For conversion coefficients see ce data for 114.3151γ.
114.6788 24	7.4 7	558.286	(1)$^-$	443.610	1$^-$	M1	2.95	α(K)exp=2.7 4; α(L1)exp=0.4 2 α(K)=2.45 4; α(L)=0.385 6; α(M)=0.0874 13 α(N)=0.0209 3; α(O)=0.00331 5; α(P)=0.000229 4 ce(L1) mixed with ce(L2)(114.31γ+114.37γ). Additional information 40.

γ(^{182}Ta) (continued)

E_γ †	I_γ ‡h	E_i(level)	J_i^π	E_f	J_f^π	Mult. b	α i	Comments
x115.096 5	0.92 19							
x117.004 3	1.7 2							
x117.164 8	0.45 15							
x117.674 7	0.59 16							
118.8960 25	7.6 7	269.047	(5)$^+$	150.150	4$^+$	M1	2.66	α(K)exp=4.0 12; α(L1)exp=0.5 3 α(K)=2.21 3; α(L)=0.347 5; α(M)=0.0788 11 α(N)=0.0189 3; α(O)=0.00298 5; α(P)=0.000207 3 Additional information 19.
119.516 4	1.5 2	480.036	4$^-$	360.518	(3)$^-$	(M1)	2.62	α(K)=2.18 3; α(L)=0.342 5; α(M)=0.0776 11 α(N)=0.0186 3; α(O)=0.00294 5; α(P)=0.000204 3 For α(K)exp and α(L1)exp see ce data for 119.700γ.
119.700 3	1.6 2	292.9352	5$^-$	173.2370	5$^-$	(M1)	2.61	α(K)exp=3.1 22; α(L1)exp=1.3 7 α(K)=2.17 3; α(L)=0.341 5; α(M)=0.0773 11 α(N)=0.0185 3; α(O)=0.00293 4; α(P)=0.000203 3 α(K)exp and α(L1)exp for 119.51+119.70. Additional information 23.
121.534 3	1.2 1	781.396	5$^-$	659.862	(4)$^-$			
122.612 3	1.4 2	939.634	5$^-$	817.021	(4)$^-$			For α(K)exp and α(L1)exp see ce data for 122.675γ.
122.675 3	3.9 4	782.538	(5$^-$)	659.862	(4)$^-$	(M1)	2.43	α(K)exp=7.7 23; α(L1)exp=(0.4 2) α(K)=2.02 3; α(L)=0.318 5; α(M)=0.0720 10 α(N)=0.01724 25; α(O)=0.00273 4; α(P)=0.000189 3 α(K)exp and α(L1)exp for 122.61+122.67. ce(K) mixed with KLM Auger electrons, ce(L1) mixed with ce(L1)(122.9γ) and ce(K)(178.6γ). Additional information 53.
122.9727 25	2.9 3	237.2860	5$^-$	114.3126	4$^-$	M1,E2	2.0 4	α(K)exp=1.7 12; α(L1)exp=0.5 3 α(K)=1.3 7; α(L)=0.6 3; α(M)=0.14 7 α(N)=0.033 16; α(O)=0.0045 19; α(P)=0.00011 8 ce(K) mixed with KLM Auger electrons; ce(L1) mixed with ce(L1)(122.61$^+$122.67γ)+ce(K)(178.6γ). Additional information 15.
x123.608 4	0.63 10							
x124.283 6	0.45 12							
x125.024 3	1.10 14							For α(K)exp and α(L1)exp see ce data for 125.126γ.
125.126 3	2.2 2	960.415	(4$^-$)	835.289	3$^-$	(M1)	2.30	α(K)exp=4.5 14; α(L1)exp=1.2 6 α(K)=1.91 3; α(L)=0.300 5; α(M)=0.0681 10 α(N)=0.01629 23; α(O)=0.00258 4; α(P)=0.0001785 25 α(K)exp and α(L1)exp for 125.02+125.13. ce(L1) mixed with ce(N)(114.31γ+114.37γ) and ce(K)(180.9γ). @B@0@0@@@@ @B@0@1@@@@@56 ce(N)(114.31γ+114.37γ) and ce(K)(180.9γ).
x127.166 4	0.49 10							
x128.934 11	0.6 3							
x129.298 3	0.95 10							
130.182 3	1.5 2	781.396	5$^-$	651.215	(4)$^-$			

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	α[i]	Comments
[x]130.509 *7*	0.31 *10*							
130.910 *6*	0.45 *9*	491.423	2^-	360.518	$(3)^-$			
[x]131.050 *4*	0.66 *12*							
[x]131.157 *11*	0.33 *10*							
132.231 *10*	0.34 *9*	402.626	2^+	270.4027	2^-			
[x]132.550 *3*	1.10 *13*							α(K)exp=(1.3 *9*) α(K)exp for 132.55+132.69; not fully resolved from ce(K)(133.88γ). Additional information 5.
[x]132.692 *4*	1.2 *2*							For ce data see 132.550γ.
[x]133.739 *13*	1.1 *3*							
133.877 *3*	46 *5*	150.150	4^+	16.273	5^+	M1	1.89	α(K)exp=1.7 *3*; α(L1)exp=0.22 *4*; α(L2)exp=0.05 *1*; α(M)exp=0.070 *14*; α(N)exp=0.024 *12* α(K)=1.576 *22*; α(L)=0.247 *4*; α(M)=0.0561 *8* α(N)=0.01343 *19*; α(O)=0.00213 *3*; α(P)=0.0001472 *21* Mult.,δ: α(K)exp and α(L1)exp consistent with M1 with δ(E2/M1)<0.5. Conversion coefficients are for 132.55+132.69+133.88. ce(L2) mixed with ce(K)(190.3γ); ce(M) mixed with ce(L1)(142.2γ) and ce(N) mixed with ce(L3)(143.1γ). Additional information 13.
136.256[d] *8*	0.37 *8*	701.967	3^-	565.693	$(3)^-$			
[x]137.271 *4*	0.84 *9*							
[x]137.492 *5*	0.50 *9*							
[x]138.603 *18*	0.6 *3*							
[x]138.692 *7*	0.33 *8*							
139.455 *3*	5.3 *5*	237.2860	5^-	97.8304	4^-	M1	1.687	α(K)exp=1.4 *4*; α(L1)exp=0.64 *13* α(K)=1.403 *20*; α(L)=0.220 *3*; α(M)=0.0500 *7* α(N)=0.01195 *17*; α(O)=0.00189 *3*; α(P)=0.0001310 *19* ce(L1) mixed with ce(K)(195.1γ). Additional information 16.
139.662 *3*	1.1 *1*	583.272	(0^-)	443.610	1^-			
141.245 *3*	3.3 *5*	505.613	5^+	364.359	4^+	M1	1.627	α(K)exp=1.4 *4*; α(L1)exp=(0.33 *17*) α(K)=1.353 *19*; α(L)=0.212 *3*; α(M)=0.0482 *7* α(N)=0.01153 *17*; α(O)=0.00182 *3*; α(P)=0.0001264 *18* ce(L1) mixed with ce(K)(197.6γ). Additional information 37.
142.270[&] *20*	1.6 *5*	411.306	(6^+)	269.047	$(5)^+$	(M1)	1.594	α(K)exp=1.9 *13*; α(L1)exp=2.1 *8* α(K)=1.326 *19*; α(L)=0.208 *3*; α(M)=0.0472 *7* α(N)=0.01129 *16*; α(O)=0.00179 *3*; α(P)=0.0001238 *18* ce(L1) mixed with ce(M)(133.8γ). Additional information 32.
143.177[af] *3*	10 *2*	316.403	6^-	173.2370	5^-	(M1,E2)	1.3 *3*	α(K)exp=0.30 *21*; α(L2)exp=0.11 *6* α(K)=0.9 *5*; α(L)=0.31 *11*; α(M)=0.07 *3*

γ(^{182}Ta) (continued)

E_γ [†]	I_γ [‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [b]	α [i]	Comments
								α(N)=0.018 *7*; α(O)=0.0025 *8*; α(P)=7.E−5 *5* E_γ: level-energy difference=143.166. ce(K) mixed with impurity line from ^{183}Ta. ce(L3) is mixed with ce(N)(133.8γ). @B@0@0@@@@ @B@0@1@@@@@26 ce(L3) is mixed with ce(N)(133.8γ).
143.511 *6*	0.55 *10*	960.528	(5$^-$)	817.021	(4)$^-$			
143.684 *4*	0.87 *10*	701.967	3$^-$	558.286	(1)$^-$			
144.464 *5*	0.42 *8*	547.1030	(3)$^-$	402.626	2$^+$			
^{x}144.731 *15*	0.35 *16*							
146.7731 *25*	8.0 *7*	163.047	6$^+$	16.273	5$^+$	M1	1.460	α(K)exp=1.1 *3*; α(L1)exp=0.40 *8* α(K)=1.214 *17*; α(L)=0.190 *3*; α(M)=0.0432 *6* α(N)=0.01033 *15*; α(O)=0.001636 *23*; α(P)=0.0001133 *16* Additional information 14.
148.391 *4*	0.77 *8*	628.425	5$^-$	480.036	4$^-$			
^{x}148.901 *7*	0.48 *12*							
^{x}149.237 *11*	0.44 *15*							
149.345 *7*	0.50 *9*	592.960	(1)$^+$	443.610	1$^-$			
150.142 *4*	0.59 *8*	150.150	4$^+$	0.0	3$^-$			
^{x}151.927 *3*	0.67 *7*							
152.341 [@] *4*	0.65 *8*	723.981	3$^+$	571.638	4$^+$			
^{x}153.736 *7*	0.47 *7*							
154.085 *3*	4.4 *4*	856.052	(4)$^-$	701.967	3$^-$	(M1,E2)	1.0 *3*	α(K)exp=0.7 *5*; α(L1)exp=(0.23 *12*) α(K)=0.7 *4*; α(L)=0.23 *7*; α(M)=0.056 *19* α(N)=0.013 *5*; α(O)=0.0019 *5*; α(P)=6.E−5 *4* Mult.: from α(K)exp, 1979Va10 suggest (M1). ce(K) mixed with ce(L2)(97.8γ). Additional information 55.
155.650 *7*	0.33 *7*	558.286	(1)$^-$	402.626	2$^+$			
156.089 *3*	10 *1*	270.4027	2$^-$	114.3126	4$^-$	(E2)	0.700	α(K)exp=0.31 *22*; α(L2)exp=0.30 *6*; α(L3)exp=0.20 *4*; α(M)exp=0.10 *5* α(K)=0.327 *5*; α(L)=0.284 *4*; α(M)=0.0706 *10* α(N)=0.01654 *24*; α(O)=0.00222 *4*; α(P)=2.26×10^{-5} *4* ce(K) mixed with ce(L2)(99.8γ) and ce(L1)(100.5γ). Additional information 21.
156.233 *4*	1.8 *1*	647.652	(2)$^-$	491.423	2$^-$			
^{x}158.930 *7*	0.38 *8*							
159.047 *3*	2.3 *2*	396.335	(6$^-$)	237.2860	5$^-$	(M1)	1.164	α(K)exp=2.0 *6* α(K)=0.968 *14*; α(L)=0.1517 *22*; α(M)=0.0344 *5* α(N)=0.00823 *12*; α(O)=0.001303 *19*; α(P)=9.03×10^{-5} *13* α(K)exp for 159.0+159.2; ce(K) mixed with ce(M)(94.1γ). Additional information 30.
^{x}159.279 *3*	0.80 *10*							For α(K)exp see ce data for 159.047γ.
^{x}159.469 *10*	0.49 *12*							
^{x}159.639 *17*	0.48 *15*							

^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12 (continued)

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	δ	α[i]	Comments
161.267 *9*	0.50 *17*	719.552	$(3)^-$	558.286	$(1)^-$				
163.637 *10*	0.54 *24*	480.036	4^-	316.403	6^-				
[x]164.744 *16*	0.29 *12*								
[x]165.061[#] *3*	0.84 *13*								
165.809 *5*	0.42 *6*	817.021	$(4)^-$	651.215	$(4)^-$				
[x]166.544 *11*	0.19 *6*								
[x]166.686 *4*	0.52 *6*								
167.412[e] *3*	1.2 *1*	673.040	(6^+)	505.613	5^+				E_γ: level-energy difference=167.428.
[x]167.718 *11*	0.42 *22*								
168.132 *5*	0.78 *7*	579.436	(7^+)	411.306	(6^+)				
168.462 *10*	0.25 *7*	659.862	$(4)^-$	491.423	2^-				
[x]171.50 *3*	0.22 *18*								
171.579[j] *3*	2.0 *1*	334.627	7^+	163.047	6^+	M1		0.940	α(K)=0.782 *11*; α(L)=0.1224 *18*; α(M)=0.0278 *4* α(N)=0.00664 *10*; α(O)=0.001052 *15*; α(P)=7.29×10^{-5} *11* Mult.: from Adopted Gammas.
171.579[jek] *3*		659.862	$(4)^-$	488.247	(6^-)				
171.868[f] *5*	0.50 *10*	488.247	(6^-)	316.403	6^-				E_γ: level-energy difference=171.844.
172.456 *5*	0.48 *7*	719.552	$(3)^-$	547.1030	$(3)^-$				
172.563 *9*	0.41 *8*	270.4027	2^-	97.8304	4^-				
173.204 *3*	58 *4*	443.610	1^-	270.4027	2^-	M1		0.916	α(K)exp=0.86 *9*; α(L1)exp=0.14 *3*; α(L2)exp=0.017 *9*; α(M)exp=0.062 *13*; α(N)exp=0.016 *8* α(K)=0.762 *11*; α(L)=0.1192 *17*; α(M)=0.0270 *4* α(N)=0.00647 *9*; α(O)=0.001024 *15*; α(P)=7.10×10^{-5} *10* Additional information 33.
[x]173.292 *8*	1.9 *6*								
[x]174.268 *5*	0.42 *6*								
174.453 *8*	0.32 *6*	740.132	2^-	565.693	$(3)^-$				
174.722 *6*	0.35 *6*	666.149	2^-	491.423	2^-				
[x]175.991 *16*	0.35 *10*								
[x]176.157[#] *3*	6.6 *8*								
[x]177.329 *3*	1.30 *10*					M1(+E2)	<1	0.75 *11*	α(K)exp=1.0 *5* α(K)=0.59 *12*; α(L)=0.125 *14*; α(M)=0.029 *4* α(N)=0.0069 *9*; α(O)=0.00104 *9*; α(P)=5.4×10^{-5} *13* Mult.: 1979Va10 assign M1. Additional information 6.
178.621 *3*	3.4 *2*	292.9352	5^-	114.3126	4^-				α(K)exp=0.44 *22* α(K)exp mixed with ce(L1)(122.61γ+122.67γ+122.9γ). Additional information 24.
[x]178.969[@] *5*	0.46 *6*								
[x]180.271 *6*	0.66 *17*								α(K)exp=(3.4 *17*) α(K)exp for 180.27+180.90+180.97+181.62; mixed with ce(N)(114.31γ+114.37γ) and ce(L1)(125.0γ+125.1γ). Additional information 7.

$^{182}_{73}Ta_{109}$-11

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	α[i]	Comments
[x]180.903 *4*	0.76 *7*							For α(K)exp see ce data for 180.271γ.
[x]180.970 *12*	0.38 *18*							For α(K)exp see ce data for 180.271γ.
[x]181.620 *14*	0.39 *15*							For α(K)exp see ce data for 180.271γ.
182.750 *3*	1.9 *1*	547.1030	(3)$^-$	364.359	4$^+$			α(K)exp=0.7 *4* Additional information 38.
[x]183.628 *6*	0.56 *16*							
[x]184.560 *6*	0.44 *7*							
184.810[f] *3*	0.40 *18*	673.040	(6$^+$)	488.247	(6$^-$)			E_γ: level-energy difference=184.793.
184.859 *14*	0.35 *9*	581.196	(7$^-$)	396.335	(6$^-$)			
[x]184.902 *6*	0.39 *7*							
[x]185.591[#] *4*	0.60 *8*							
[x]185.822 *18*	0.19 *7*							
[x]185.917 *7*	0.36 *9*							
188.662[e] *22*	0.30 *10*	817.021	(4)$^-$	628.425	5$^-$			E_γ: level-energy difference=188.596.
[x]189.076 *6*	0.33 *6*							
189.909 *7*	0.27 *5*	856.052	(4)$^-$	666.149	2$^-$			
190.338 *3*	7.9 *6*	592.960	(1)$^+$	402.626	2$^+$	E2	0.351	α(K)exp=0.30 *6*; α(L2)exp=0.18 *9*; α(L3)exp=0.11 *6* α(K)=0.192 *3*; α(L)=0.1212 *17*; α(M)=0.0300 *5* α(N)=0.00703 *10*; α(O)=0.000956 *14*; α(P)=1.382×10^{-5} *20* Mult.: from L2/L3 ratio. 1979Va10 give E2,M1. ce(K) mixed with ce(L2)(133.8γ). Additional information 42.
[x]193.087 *8*	0.33 *5*							α(K)exp=(2.3 *12*) Additional information 8.
[x]193.222 *5*	0.53 *5*							
195.111 *3*	2.8 *2*	292.9352	5$^-$	97.8304	4$^-$			α(K)exp=1.20 *24*; α(L1)exp=0.32 *16* ce(K) mixed with ce(L1)(139.4γ), ce(L1) mixed with ce(K)(250.9γ). Additional information 25.
195.329[f] *5*	0.64 *6*	488.247	(6$^-$)	292.9352	5$^-$			E_γ: level-energy difference=195.312.
[x]196.056 *15*	0.23 *5*							
196.24 *4*	0.17 *14*	856.052	(4)$^-$	659.862	(4)$^-$			
[x]197.604 *6*	0.43 *6*							α(K)exp=(2.6 *13*) ce(K) mixed with ce(L1)(141.2γ). Additional information 9.
[x]202.950 *12*	0.26 *8*							
[x]203.53 *3*	0.25 *11*							
204.039 *4*	1.00 *7*	647.652	(2)$^-$	443.610	1$^-$			α(K)exp=3.2 *13* Additional information 45.
[x]204.986[@] *10*	0.43 *7*							
[x]205.662 *19*	0.28 *12*							
209.633 *4*	0.70 *2*	480.036	4$^-$	270.4027	2$^-$			
210.544 *3*	3.3 *2*	701.967	3$^-$	491.423	2$^-$	M1	0.532	α(K)exp=0.60 *12* α(K)=0.443 *7*; α(L)=0.0690 *10*; α(M)=0.01564 *22*

$^{182}_{73}$Ta$_{109}$-12

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	α[i]	Comments
								α(N)=0.00374 *6*; α(O)=0.000593 *9*; α(P)=4.11×10^{-5} *6* Additional information 50.
[x]212.124 *7*	0.28 *5*							
214.207 *3*	2.3 *1*	364.359	4$^+$	150.150	4$^+$	M1	0.507	α(K)exp=0.43 *22* α(K)=0.422 *6*; α(L)=0.0658 *10*; α(M)=0.01491 *21* α(N)=0.00357 *5*; α(O)=0.000565 *8*; α(P)=3.92×10^{-5} *6* Additional information 28.
[x]215.04 *4*	0.25 *13*							
216.822 *14*	0.20 *4*	782.538	(5$^-$)	565.693	(3)$^-$			
[x]218.235 *23*	0.26 *13*							
218.550 *14*	0.29 *4*	316.403	6$^-$	97.8304	4$^-$			
220.16 *4*	0.28 *13*	939.634	5$^-$	719.552	(3)$^-$			
[x]220.227 *17*	0.17 *5*							
222.541 *7*	0.31 *4*	666.149	2$^-$	443.610	1$^-$			
[x]223.761 *7*	0.71 *7*							
[x]226.001 *18*	0.18 *4*							
227.112 *12*	0.23 *5*	390.154	(6)$^+$	163.047	6$^+$			
228.117 *6*	0.28 *4*	719.552	(3)$^-$	491.423	2$^-$			
[x]228.713 *4*	1.30 *10*							
[x]230.440[@] *11*	0.23 *4*							
[x]231.473 *5*	0.72 *6*							
232.079 *9*	0.27 *4*	628.425	5$^-$	396.335	(6$^-$)			
233.24 *9*	0.70 *23*	396.335	(6$^-$)	163.047	6$^+$			
[x]233.447 *16*	0.33 *10*							
[x]233.603 *21*	0.30 *16*							
233.714 *4*	2.8 *2*	249.982	(3)$^+$	16.273	5$^+$			Additional information 18.
234.276 *9*	0.33 *5*	781.396	5$^-$	547.1030	(3)$^-$			
236.561 *4*	0.79 *6*	505.613	5$^+$	269.047	(5)$^+$			
237.287 *4*	1.10 *8*	237.2860	5$^-$	0.0	3$^-$			
[x]237.761 *5*	0.57 *5*							
239.513 *13*	0.25 *4*	719.552	(3)$^-$	480.036	4$^-$			
[x]240.631 *12*	0.36 *8*							
[x]242.186 *7*	0.37 *4*							
242.745 *8*	0.43 *4*	480.036	4$^-$	237.2860	5$^-$			
244.808 *4*	1.5 *1*	579.436	(7$^+$)	334.627	7$^+$			
246.204 *5*	1.2 *1*	360.518	(3)$^-$	114.3126	4$^-$			
[x]247.683 *19*	0.7 *3*							
248.268 *21*	0.17 *4*	411.306	(6$^+$)	163.047	6$^+$			
248.701 *11*	0.20 *3*	740.132	2$^-$	491.423	2$^-$			
[x]248.953 *16*	0.20 *5*							
249.955[f] *7*	0.29 *4*	249.982	(3)$^+$	0.0	3$^-$			E_γ: level-energy difference=249.982.
250.972 *6*	0.54 *4*	488.247	(6$^-$)	237.2860	5$^-$			α(K)exp=(1.7 *9*)

$^{182}_{73}$Ta$_{109}$-13

γ(^{182}Ta) (continued)

E_γ [†]	I_γ [‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [b]	δ	α [i]	Comments
									α(K)exp for 250.97+251.32+251.77; mixed with ce(L1)(195.1γ). Additional information 35.
251.322 *7*	0.42 *4*	817.021	(4)$^-$	565.693	(3)$^-$				For α(K)exp see ce data for 250.972γ.
^{x}251.772 *6*	0.50 *5*								For α(K)exp see ce data for 250.972γ.
^{x}251.990 *20*	0.30 *14*								
252.769 *5*	1.2 *1*	269.047	(5)$^+$	16.273	5$^+$				α(K)exp=0.8 *4* Additional information 20.
255.607 *8*	0.33 *4*	505.613	5$^+$	249.982	(3)$^+$				
^{x}257.141 *19*	0.35 *8*								
257.639 [#f] *6*	0.54 *5*	749.080	(3)$^+$	491.423	2$^-$				E_γ: level-energy difference=257.657.
^{x}257.817 *10*	0.47 *14*								
258.551 *11*	0.32 *4*	960.528	(5$^-$)	701.967	3$^-$				
^{x}258.818 *12*	0.32 *4*								
^{x}259.196 *4*	1.20 *9*								
260.085 *4*	1.5 *1*	740.132	2$^-$	480.036	4$^-$				
261.18 *3*	0.15 *5*	411.306	(6$^+$)	150.150	4$^+$				
^{x}261.93 *4*	0.11 *6*								
^{x}262.11 *6*	0.21 *10*								
^{x}262.328 *8*	0.20 *8*								
262.666 *16*	0.20 *4*	360.518	(3)$^-$	97.8304	4$^-$				
^{x}263.91 *3*	0.14 *5*								
267.908 *5*	0.82 *6*	628.425	5$^-$	360.518	(3)$^-$				
268.19 *5*	0.20 *14*	505.613	5$^+$	237.2860	5$^-$				
^{x}268.712 *7*	0.45 *4*								
269.646 *17*	0.7 *4*	835.289	3$^-$	565.693	(3)$^-$				
^{x}269.734 *18*	0.27 *8*								
270.406 *4*	100 *6*	270.4027	2$^-$	0.0	3$^-$	E2(+M1)	>3	0.120 *8*	α(K)exp=0.080 *8*; α(L1)exp+α(L2)exp=0.019 *4*; α(L3)exp=0.010 *2*; α(M)exp=0.008 *4* α(K)=0.081 *8*; α(L)=0.0298 *5*; α(M)=0.00722 *11* α(N)=0.00170 *3*; α(O)=0.000239 *5*; α(P)=6.5$\times10^{-6}$ *8* δ: from ce data. I_γ: 1979Va10 state that intensity per 100 neutron captures is ≈15 for this γ ray. Additional information 22.
^{x}274.855 *4*	1.30 *10*								
^{x}275.444 *13*	1.3 *5*								
^{x}276.037 *12*	0.24 *4*								
^{x}276.514 *9*	0.41 *7*								
276.713 *5*	0.96 *8*	547.1030	(3)$^-$	270.4027	2$^-$				
^{x}276.853 *18*	0.25 *11*								
^{x}277.64 *3*	0.25 *6*								
^{x}277.743 *19*	0.24 *6*								
^{x}278.244 *7*	0.37 *4*								
278.705 *22*	0.26 *6*	571.638	4$^+$	292.9352	5$^-$				

γ(^{182}Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	α[i]	Comments
279.777 *10*	0.34 *5*	939.634	5^-	659.862	$(4)^-$			
[x]280.196 *16*	0.35 *8*							
[x]280.441 *9*	0.29 *3*							
[x]280.85 *3*	0.25 *14*							
[x]281.72 *3*	0.22 *8*							
282.026 *12*	0.31 *4*	396.335	(6^-)	114.3126	4^-			
[x]283.430 *18*	0.8 *4*							
[x]284.117 *5*	1.00 *7*							
[x]284.252 *22*	0.8 *4*							
[x]284.584 *17*	0.9 *4*							
[x]285.17 *3*	0.22 *9*							
[x]286.442[#] *5*	0.77 *9*							
286.861 *6*	0.85 *9*	651.215	$(4)^-$	364.359	4^+			
287.135 *6*	0.89 *10*	647.652	$(2)^-$	360.518	$(3)^-$			
[x]287.758[#] *8*	0.48 *7*							
[x]289.152 *7*	0.63 *5*							
[x]289.64 *4*	0.23 *10*							
290.363 *6*	0.84 *7*	856.052	$(4)^-$	565.693	$(3)^-$			
[x]291.900 *24*	0.43 *17*							
[x]292.520 *27*	0.21 *7*							
[x]293.62 *4*	0.19 *5*							
[x]295.66 *3*	0.6 *3*							
296.537 *8*	0.78 *14*	740.132	2^-	443.610	1^-			
297.123 *5*	24 *1*	547.1030	$(3)^-$	249.982	$(3)^+$	E1	0.0226	α(K)exp=0.025 *13* α(K)=0.0189 *3*; α(L)=0.00288 *4*; α(M)=0.000650 *10* α(N)=0.0001542 *22*; α(O)=2.37×10^{-5} *4*; α(P)=1.445×10^{-6} *21* Additional information 39.
298.501 *13*	0.42 *4*	396.335	(6^-)	97.8304	4^-			
299.33[j] *4*	0.19 *9*	659.862	$(4)^-$	360.518	$(3)^-$			
299.33[jek] *4*		701.967	3^-	402.626	2^+			
300.649 *16*	0.26 *4*	960.528	(5^-)	659.862	$(4)^-$			
306.76 *3*	0.24 *4*	480.036	4^-	173.2370	5^-			
[x]308.413 *7*	0.91 *6*							
308.683 *22*	0.23 *8*	673.040	(6^+)	364.359	4^+			
308.85 *6*	0.22 *8*	856.052	$(4)^-$	547.1030	$(3)^-$			
[x]310.53 *3*	0.20 *3*							
315.003 *11*	0.46 *5*	488.247	(6^-)	173.2370	5^-			
[x]316.156[#] *11*	0.68 *9*							
[x]316.465[#] *9*	0.82 *16*							
[x]317.18 *4*	0.17 *8*							
[x]317.406 *23*	0.37 *4*							
[x]317.62 *3*	0.55 *24*							

$^{182}_{73}Ta_{109}$-15

γ(^{182}Ta) (continued)

E_γ [†]	I_γ [‡h]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	α [i]	Comments
318.381 *23*	0.28 *4*	334.627	7$^+$	16.273	5$^+$	E2	0.0688	α(K)=0.0478 *7*; α(L)=0.01604 *23*; α(M)=0.00388 *6* α(N)=0.000913 *13*; α(O)=0.0001293 *19*; α(P)=3.81×10^{-6} *6* Mult.: from Adopted Gammas.
[x]319.18 *3*	0.19 *6*							
[x]319.78 *4*	0.19 *8*							
321.355 *11*	0.43 *4*	723.981	3$^+$	402.626	2$^+$			
322.546 *6*	1.5 *1*	592.960	(1)$^+$	270.4027	2$^-$			
[x]323.906 *23*	0.26 *5*							
325.041 *14*	0.41 *4*	805.071	(6$^-$)	480.036	4$^-$			
[x]326.019 *19*	0.43 *5*							
[x]326.26 *3*	0.26 *9*							
[x]330.23 *3*	0.23 *9*							
332.30 *3*	0.23 *6*	505.613	5$^+$	173.2370	5$^-$			
[x]333.28 *4*	0.37 *7*							
[x]333.52 *3*	0.33 *10*							
336.953 *25*	0.30 *10*	817.021	(4)$^-$	480.036	4$^-$			
[x]337.291 *20*	0.32 *7*							
342.544 *23*	0.21 *5*	505.613	5$^+$	163.047	6$^+$			
[x]343.233 *17*	0.24 *6*							
343.912[j] *18*	0.23 *4*	581.196	(7$^-$)	237.2860	5$^-$			
343.912[jek] *18*		835.289	3$^-$	491.423	2$^-$			
[x]345.277 *9*	0.52 *6*							
346.465 *7*	3.7 *3*	749.080	(3)$^+$	402.626	2$^+$	M1	0.1370	α(K)exp=0.22 *11* α(K)=0.1143 *16*; α(L)=0.01761 *25*; α(M)=0.00399 *6* α(N)=0.000954 *14*; α(O)=0.0001512 *22*; α(P)=1.055×10^{-5} *15* Additional information 52.
[x]346.76 *3*	0.7 *4*							
348.086 *7*	0.95 *7*	364.359	4$^+$	16.273	5$^+$			
[x]349.937 *7*	1.30 *8*							
[x]352.059 *9*	0.72 *6*							
355.477 *14*	0.40 *4*	505.613	5$^+$	150.150	4$^+$			
[x]357.45 *4*	0.48 *23*							
[x]357.742 *20*	0.21 *14*							
358.40 *6*	0.19 *11*	651.215	(4)$^-$	292.9352	5$^-$			
359.001 *16*	0.42 *5*	719.552	(3)$^-$	360.518	(3)$^-$			
360.531 *8*	6.9 *4*	360.518	(3)$^-$	0.0	3$^-$	M1,E2	0.09 *4*	α(K)exp=0.07 *4* α(K)=0.07 *4*; α(L)=0.013 *3*; α(M)=0.0030 *6* α(N)=0.00072 *14*; α(O)=0.00011 *3*; α(P)=6.E−6 *4* Additional information 27.
[x]360.99 *3*	0.8 *4*							
[x]361.786 *23*	0.48 *5*							
[x]362.915 *21*	0.53 *5*							
365.73[&] *5*	0.21 *4*	480.036	4$^-$	114.3126	4$^-$			

γ(^{182}Ta) (continued)

E_γ [†]	I_γ [‡h]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [b]	α [i]	Comments
[x]367.36 *3*	0.34 *9*							
[x]367.551 *17*	0.53 *12*							
[x]368.984 *21*	0.22 *4*							
[x]370.42[#] *4*	0.25 *5*							
373.880 *7*	1.9 *1*	390.154	(6)$^+$	16.273	5$^+$	M1,E2	0.08 *4*	α(K)exp=0.05 *3* α(K)=0.06 *3*; α(L)=0.012 *3*; α(M)=0.0027 *6* α(N)=0.00065 *14*; α(O)=9.9×10^{-5} *25*; α(P)=6.E−6 *3* Additional information 29.
[x]375.72 *6*	0.34 *11*							
377.248 *7*	4.6 *2*	647.652	(2)$^-$	270.4027	2$^-$	E2,M1	0.08 *4*	α(K)exp=0.043 *22* α(K)=0.06 *3*; α(L)=0.011 *3*; α(M)=0.0026 *6* α(N)=0.00063 *13*; α(O)=9.6×10^{-5} *25*; α(P)=5.E−6 *3* Additional information 46.
[x]380.92 *3*	0.27 *8*							
[x]381.49 *3*	0.47 *6*							
[x]381.81 *5*	0.29 *12*							
382.186 *10*	2.5 *1*	480.036	4$^-$	97.8304	4$^-$	M1,E2	0.07 *4*	α(K)exp=0.08 *4* α(K)=0.06 *3*; α(L)=0.011 *3*; α(M)=0.0025 *6* α(N)=0.00060 *13*; α(O)=9.2×10^{-5} *24*; α(P)=5.E−6 *3* Mult.: 1979Va10 assign M1, but α(K)exp overlaps M1 and E2. Additional information 34.
[x]383.245[#] *16*	0.68 *10*							
[x]383.61 *4*	0.16 *13*							
386.27 *4*	0.64 *8*	776.39	7$^-$	390.154	(6)$^+$			
[x]389.528 *20*	0.34 *5*							
[x]389.87 *4*	0.51 *13*							
390.40 *3*	0.26 *7*	488.247	(6$^-$)	97.8304	4$^-$			
391.140 *16*	0.65 *5*	628.425	5$^-$	237.2860	5$^-$			
391.83 *6*	0.45 *12*	835.289	3$^-$	443.610	1$^-$			
[x]392.13 *4*	0.47 *22*							
[x]394.01 *3*	1.1 *6*							
395.01 *3*	0.29 *7*	411.306	(6$^+$)	16.273	5$^+$			
[x]396.031 *12*	0.67 *6*							
396.952 *9*	2.4 *1*	547.1030	(3)$^-$	150.150	4$^+$			
[x]397.21 *5*	0.5 *3*							
[x]397.909[#] *25*	0.36 *20*							
[x]398.85 *4*	1.1 *6*							
[x]399.638 *17*	0.66 *7*							
401.221 *10*	1.7 *1*	651.215	(4)$^-$	249.982	(3)$^+$			
[x]401.58 *4*	1.0 *2*							
[x]402.12 *3*	0.55 *17*							
[x]402.42 *3*	1.2 *6*							
402.619 *7*	47 *3*	402.626	2$^+$	0.0	3$^-$	E1	0.01106	α(K)exp=0.009 *4*; α(L)exp=0.0021 *11*

γ(^{182}Ta) (continued)

E_γ †	I_γ ‡h	E_i(level)	J^π_i	E_f	J^π_f	Comments
						α(K)=0.00928 *13*; α(L)=0.001383 *20*; α(M)=0.000311 *5* α(N)=7.40×10^{-5} *11*; α(O)=1.147×10^{-5} *16*; α(P)=7.27×10^{-7} *11* Additional information 31.
x403.87 *3*	0.54 *9*					
x405.747 *18*	0.69 *9*					α(K)exp=0.08 *4* α(K)exp for 405.7+406.21+406.88. Additional information 10.
x406.211 *10*	1.90 *14*					For α(K)exp see ce data for 405.747γ.
x406.885 *12*	1.40 *16*					For α(K)exp see ce data for 405.747γ.
408.67jek *4*		571.638	4$^+$	163.047	6$^+$	
408.67j *4*	0.35 *5*	805.071	(6$^-$)	396.335	(6$^-$)	
x412.14 *4*	0.26 *6*					
x414.45 *3*	0.58 *10*					
x415.76 *3*	0.60 *11*					
416.36 *5*	0.26 *7*	579.436	(7$^+$)	163.047	6$^+$	
416.95 *6*	0.49 *7*	781.396	5$^-$	364.359	4$^+$	
x420.410 *14*	1.30 *8*					
422.76 *7*	0.45 *8*	659.862	(4)$^-$	237.2860	5$^-$	
x423.290 *23*	0.72 *9*					
x423.66 *3*	0.78 *11*					
x425.34 *13*	0.21 *9*					
x428.29 *4*	0.38 *8*					
x431.18 *7*	0.30 *13*					
431.68 *5*	0.35 *9*	701.967	3$^-$	270.4027	2$^-$	
x432.33 *3*	0.53 *8*					
432.81j *6*	0.27 *9*	547.1030	(3)$^-$	114.3126	4$^-$	
432.81jek *6*		835.289	3$^-$	402.626	2$^+$	
x434.55 *4*	0.31 *6*					
x437.37 *4*	0.29 *8*					
x440.75 *17*	0.20 *10*					
443.591 *13*	1.8 *1*	443.610	1$^-$	0.0	3$^-$	
x443.95 *6*	0.5 *3*					
x446.76 *8*	0.35 *15*					
x447.03 *5*	0.7 *3*					
x448.34 *4*	0.44 *10*					
449.137 *22*	0.82 *7*	719.552	(3)$^-$	270.4027	2$^-$	
453.74 *6*	0.40 *6*	723.981	3$^+$	270.4027	2$^-$	
456.57 *3*	0.54 *8*	817.021	(4)$^-$	360.518	(3)$^-$	
x461.29 *5*	0.41 *11*					
x463.08 *3*	0.61 *9*					
464.56 *5*	0.63 *7*	701.967	3$^-$	237.2860	5$^-$	
465.11 *9*	0.48 *24*	781.396	5$^-$	316.403	6$^-$	
x466.722 *20*	1.30 *13*					

$^{182}_{73}$Ta$_{109}$-18

$\gamma(^{182}$Ta) (continued)

E_γ[†]	I_γ[‡h]	E_i(level)	J_i^π	E_f	J_f^π
^{x}468.29 6	0.47 9				
^{x}471.33 8	0.45 14				
473.796 16	2.0 2	571.638	4^+	97.8304	4^-
^{x}474.60 6	0.9 4				
^{x}476.07 4	0.95 23				
^{x}477.383 24	1.40 18				
478.694 19	1.5 2	749.080	$(3)^+$	270.4027	2^-
480.022[j] 15	2.1 3	480.036	4^-	0.0	3^-
480.022[jek] 15		749.080	$(3)^+$	269.047	$(5)^+$
^{x}481.241 15	4.0 6				
482.17 7	0.8 4	719.552	$(3)^-$	237.2860	5^-
483.67 9	0.58 9	776.39	7^-	292.9352	5^-
488.44 7	0.47 14	781.396	5^-	292.9352	5^-
488.89 8	0.45 18	805.071	(6^-)	316.403	6^-
489.525[k] 22	1.4 1	782.538	(5^-)	292.9352	5^-
^{x}490.00 5	0.85 16				
491.26 7	0.61 21	491.423	2^-	0.0	3^-
^{x}495.052 23	1.5 3				
^{x}496.73 5	0.54 9				
499.05 4	1.7 3	749.080	$(3)^+$	249.982	$(3)^+$
^{x}499.31 4	1.30 16				
501.08 3	1.3 1	651.215	$(4)^-$	150.150	4^+
^{x}503.83 7	0.66 11				
^{x}505.14 5	0.46 22				
^{x}506.04[#] 4	1.2 3				
^{x}507.74 5	2.5 19				
^{x}508.02 3	0.20 12				
^{x}508.65 5	0.4 3				
^{x}508.92 4	2.3 9				
^{x}509.31 5	0.7 5				
509.936 21	2.1 5	673.040	(6^+)	163.047	6^+
^{x}510.44 4	0.4 4				
^{x}510.67 5	1.7 9				
^{x}510.952 20	0.49 8				
^{x}511.20 5	6.9 15				
^{x}511.70 3	0.45 17				
^{x}512.27 3	0.55 17				
512.43 4	2.0 9	781.396	5^-	269.047	$(5)^+$
^{x}513.11 4	1.6 6				
^{x}513.91 5	1.0 6				
514.11 4	0.51 16	628.425	5^-	114.3126	4^-
^{x}514.70 4	0.25 19				
^{x}525.20 8	0.47 21				
^{x}530.16 8	1.0 5				
530.63 3	1.4 1	628.425	5^-	97.8304	4^-
^{x}535.26 7	2.9 13				
536.80[#] 4	1.1 2	651.215	$(4)^-$	114.3126	4^-
538.85 9	0.52 20	776.39	7^-	237.2860	5^-
^{x}541.01 6	0.49 9				
547.16 4	0.67 9	547.1030	$(3)^-$	0.0	3^-
549.51[k] 4	0.78 9	939.634	5^-	390.154	$(6)^+$
550.25 16	0.52 14	647.652	$(2)^-$	97.8304	4^-
^{x}552.28 6	1.1 4				
^{x}552.65 3	1.6 4				
^{x}553.71 8	0.67 11				
558.29 9	0.54 9	558.286	$(1)^-$	0.0	3^-
^{x}559.10 6	2.1 6				
^{x}559.47 3	1.7 5				
563.54[j] 19	0.51 17	579.436	(7^+)	16.273	5^+
563.54[jek] 19		856.052	$(4)^-$	292.9352	5^-
563.54[jek] 19		960.415	(4^-)	396.335	(6^-)
566.92 9	0.59 18	817.021	$(4)^-$	249.982	$(3)^+$
567.71 5	0.81 10	805.071	(6^-)	237.2860	5^-
573.73[k] 15	0.31 18	723.981	3^+	150.150	4^+
^{x}574.31 3	1.0 2				
^{x}579.97 5	0.36 24				
^{x}583.07 8	0.43 12				
^{x}584.22 5	0.63 9				
^{x}589.50 6	0.87 17				
^{x}591.05 5	0.56 9				
^{x}593.50 7	0.62 12				
597.72 24	0.59 21	835.289	3^-	237.2860	5^-
^{x}600.94 6	1.2 4				
^{x}602.10 11	1.0 4				
603.14 4	1.40 13	776.39	7^-	173.2370	5^-
^{x}605.72 11	0.65 15				
613.23 14	0.52 17	776.39	7^-	163.047	6^+
^{x}617.52 14	0.34 17				
^{x}627.25 6	0.75 15				
^{x}629.64 4	2.10 15				
^{x}632.03 5	1.3 3				
^{x}633.59 11	0.57 13				
^{x}642.58 6	0.90 17				
^{x}645.89 5	1.20 15				
647.46 5	1.20 13	647.431	(2^+)	0.0	3^-
651.34[j] 7	0.98 14	651.215	$(4)^-$	0.0	3^-

$^{182}_{73}$Ta$_{109}$-19

^{181}Ta(n,γ) E=thermal **1979Va10,1971He13,1974An12 (continued)**

γ(^{182}Ta) (continued)

E_γ [†]	I_γ [‡h]	E_i(level)	J_i^π	E_f	J_f^π
651.34[jek] 7		749.080	(3)$^+$	97.8304	4$^-$
^{x}657.25 5	2.3 2				
^{x}661.56 6	1.7 3				
^{x}668.39[#] 9	1.1 3				
^{x}675.65 6	1.40 16				
683.58 14	1.6 2	781.396	5$^-$	97.8304	4$^-$
708.10[k] 22	0.8 4	723.981	3$^+$	16.273	5$^+$
^{x}709.03 8	2.0 3				
^{x}717.21[#] 5	4.9 4				
^{x}721.65 16	0.8 3				
^{x}725.33 8	4.9 25				
^{x}726.06[#] 5	3.1 4				
^{x}727.92 9	1.6 3				
^{x}728.94 8	6 3				
732.41 15	0.87 29	749.080	(3)$^+$	16.273	5$^+$
^{x}739.37 5	1.9 5				
^{x}744.94 9	2.1 5				
^{x}759.85 7	2.9 5				
^{x}760.13 9	2.5 5				
^{x}764.46 12	1.5 5				
^{x}773.45 11	1.4 3				
^{x}790.10 9	1.6 3				
^{x}791.86[#] 8	3.6 4				
^{x}795.94 20	1.2 5				
^{x}796.96[#] 12	2.4 4				
^{x}804.26 18	2.9 15				
^{x}818.12 8	2.0 5				
^{x}833.8 4	1.0 4				
^{x}837.52 22	1.1 5				
^{x}871.28 8	4.9 6				
^{x}875.25 16	3.8 6				
^{x}885.75 25	3.1 9				
^{x}887.8 3	1.7 5				
^{x}894.75 13	3.0 15				
^{x}905.94 26	3.2 11				
^{x}909.15 16	1.9 7				
^{x}959.02 18	3.9 10				
^{x}984.64 22	6.5 24				
^{x}987.48 18	3.1 8				
3882.7 6	1.6 6	(6062.92)	3$^+$,4$^+$	2180.2	
3902.3 7	1.2 5	(6062.92)	3$^+$,4$^+$	2160.6	
3982.1 6	2.1 6	(6062.92)	3$^+$,4$^+$	2080.8	
4033.1 5	0.8 4	(6062.92)	3$^+$,4$^+$	2029.8	
4045.7 5	1.9 6	(6062.92)	3$^+$,4$^+$	2017.2	
4053.9 5	1.8 7	(6062.92)	3$^+$,4$^+$	2009.0	
4102.6 6	0.8 4	(6062.92)	3$^+$,4$^+$	1960.3	
4118.1 6	0.56 30	(6062.92)	3$^+$,4$^+$	1944.8	
4138.4 6	1.1 3	(6062.92)	3$^+$,4$^+$	1924.5	
4157.9 5	1.4 5	(6062.92)	3$^+$,4$^+$	1905.0	
4172.7 5	1.4 5	(6062.92)	3$^+$,4$^+$	1890.2	
4219.8 5	1.7 5	(6062.92)	3$^+$,4$^+$	1843.1	
4315.6 5	4.3 4	(6062.92)	3$^+$,4$^+$	1747.3	3$^-$,4$^-$
4348.8 5	0.8 4	(6062.92)	3$^+$,4$^+$	1714.1	
4366.2 6	1.4 4	(6062.92)	3$^+$,4$^+$	1696.7	3$^-$,4$^-$
4383.2 5	1.1 3	(6062.92)	3$^+$,4$^+$	1679.7	3$^-$,4$^-$
4444.0 5	1.6 3	(6062.92)	3$^+$,4$^+$	1618.9	3$^-$,4$^-$
4458.2 6	0.9 4	(6062.92)	3$^+$,4$^+$	1604.7	3$^-$,4$^-$
4483.1 5	2.6 5	(6062.92)	3$^+$,4$^+$	1579.8	
4536.1 5	1.6 3	(6062.92)	3$^+$,4$^+$	1526.8	3$^-$,4$^-$
4566.4 6	1.5 4	(6062.92)	3$^+$,4$^+$	1496.5	3$^-$,4$^-$
4580.0 6	1.6 3	(6062.92)	3$^+$,4$^+$	1482.9	
4618.0 5	2.3 4	(6062.92)	3$^+$,4$^+$	1444.9	3$^-$,4$^-$
4629.7 5	0.69 25	(6062.92)	3$^+$,4$^+$	1433.2	
4666.6 8	0.56 25	(6062.92)	3$^+$,4$^+$	1396.3	
4673.4 6	0.81 25	(6062.92)	3$^+$,4$^+$	1389.5	3$^-$,4$^-$
4691.7 5	1.9 4	(6062.92)	3$^+$,4$^+$	1371.2	3$^-$,4$^-$
4739.4 5	1.6 3	(6062.92)	3$^+$,4$^+$	1323.5	
4782.3 5	4.6 4	(6062.92)	3$^+$,4$^+$	1280.6	3$^-$,4$^-$
4793.1 5	2.3 4	(6062.92)	3$^+$,4$^+$	1269.8	3$^-$,4$^-$
4802.9 5	2.1 4	(6062.92)	3$^+$,4$^+$	1260.0	3$^-$,4$^-$
4821.8 5	0.69 25	(6062.92)	3$^+$,4$^+$	1241.1	3$^-$,4$^-$
4833.2 5	1.6 3	(6062.92)	3$^+$,4$^+$	1229.7	3$^-$,4$^-$
4890.6 8	0.21 8	(6062.92)	3$^+$,4$^+$	1172.3	3$^-$,4$^-$
4912.6 5	1.38 25	(6062.92)	3$^+$,4$^+$	1150.3	3$^-$,4$^-$
4925.9 6	0.31 13	(6062.92)	3$^+$,4$^+$	1137.0	3$^-$,4$^-$
4937.8 5	0.75 25	(6062.92)	3$^+$,4$^+$	1125.1	(2$^-$,5$^-$)
4949.3 5	0.50 19	(6062.92)	3$^+$,4$^+$	1113.6	5$^-$
4961.7 4	0.31 19	(6062.92)	3$^+$,4$^+$	1101.2	5$^-$
4980.2 5	1.31 13	(6062.92)	3$^+$,4$^+$	1082.7	3$^-$,4$^-$
5005.6 5	1.81 19	(6062.92)	3$^+$,4$^+$	1057.3	3$^-$,4$^-$
5034.6 5	0.81 19	(6062.92)	3$^+$,4$^+$	1028.2	3$^-$,4$^-$
5062.5 6	0.25 10	(6062.92)	3$^+$,4$^+$	1000.3	3$^-$,4$^-$
5075.8 8	0.25 10	(6062.92)	3$^+$,4$^+$	987.0	3$^-$,4$^-$
5102.2[g] 5	0.94 19	(6062.92)	3$^+$,4$^+$	960.528	(5$^-$)

γ(^{182}Ta) (continued)

$E_γ$[†]	$I_γ$[‡h]	E_i(level)	$J^π_i$	E_f	$J^π_f$
5123.0 *5*	0.56 *19*	(6062.92)	3⁺,4⁺	939.634	5⁻
5147.4 *4*	0.56 *19*	(6062.92)	3⁺,4⁺	915.4	
5153.0 *6*	0.69 *19*	(6062.92)	3⁺,4⁺	909.8	
5165.4 *5*	0.44 *13*	(6062.92)	3⁺,4⁺	897.5	
5181.4 *5*	0.31 *9*	(6062.92)	3⁺,4⁺	881.4	
5206.8 *5*	1.88 *19*	(6062.92)	3⁺,4⁺	856.052	(4)⁻
5227.7 *6*	0.44 *13*	(6062.92)	3⁺,4⁺	835.289	3⁻
5245.8 *5*	2.38 *25*	(6062.92)	3⁺,4⁺	817.021	(4)⁻
5280.6 *5*	0.56 *11*	(6062.92)	3⁺,4⁺	782.538	(5⁻)
5343.3 *5*	2.19 *25*	(6062.92)	3⁺,4⁺	719.552	(3)⁻
5396.6 *5*	0.44 *25*	(6062.92)	3⁺,4⁺	666.149	2⁻
5402.7 *5*	0.26 *13*	(6062.92)	3⁺,4⁺	659.862	(4)⁻
5411.9 *5*	0.44 *19*	(6062.92)	3⁺,4⁺	651.215	(4)⁻
5434.6 *5*	0.44 *19*	(6062.92)	3⁺,4⁺	628.425	5⁻
5497.0 *5*	0.63 *13*	(6062.92)	3⁺,4⁺	565.693	(3)⁻

$E_γ$[†]	$I_γ$[‡h]	E_i(level)	$J^π_i$	E_f	$J^π_f$	Mult.[b]
5515.7 *5*	1.13 *11*	(6062.92)	3⁺,4⁺	547.1030	(3)⁻	
5557.4 *5*	0.50 *10*	(6062.92)	3⁺,4⁺	505.613	5⁺	
5583.8 *6*	0.63 *13*	(6062.92)	3⁺,4⁺	480.036	4⁻	
5665.5 *8*	0.16 *6*	(6062.92)	3⁺,4⁺	396.335	(6⁻)	[M2,E3]
5702.1 *6*	0.25 *5*	(6062.92)	3⁺,4⁺	360.518	(3)⁻	
5769.9 *5*	0.75 *8*	(6062.92)	3⁺,4⁺	292.9352	5⁻	
5792.5 *5*	1.25 *13*	(6062.92)	3⁺,4⁺	270.4027	2⁻	
5812.6 *8*	0.19 *6*	(6062.92)	3⁺,4⁺	249.982	(3)⁺	
5825.0 *8*	0.11 *5*	(6062.92)	3⁺,4⁺	237.2860	5⁻	
5889.6 *7*	0.41 *8*	(6062.92)	3⁺,4⁺	173.2370	5⁻	
5912.1 *6*	0.19 *8*	(6062.92)	3⁺,4⁺	150.150	4⁺	
5948.7 *5*	0.88 *9*	(6062.92)	3⁺,4⁺	114.3126	4⁻	
5965.0 *5*	6.3	(6062.92)	3⁺,4⁺	97.8304	4⁻	
6062.9 *5*	3.8 *2*	(6062.92)	3⁺,4⁺	0.0	3⁻	

[†] Primary transitions from 1971He13, secondary transitions from 1979Va10 (curved-crystal spectrometer) and from ^{182}Hf $β^-$ decay.

[‡] Basic data are taken from 1979Va10 for secondary γ rays and from 1971He13 for primary γ rays. The intensities of the secondary γ rays available from 1971He13 (from Ge(Li) data) are on the same relative scale as those of 1979Va10 and are in general agreement. Primary γ-ray intensities from 1971He13 are on a separate scale. The evaluators have divided all primary intensities by a factor of 16 to match this scale to that of the secondary γ rays. This factor of 16 was obtained from a comparison of the intensities of prominent (three secondary and three primary) from 1971He13 and 1979Va10 with those of the Budapest cross-section data discussed above.

[#] Possibly belongs to ^{183}Ta.

[@] Possibly belongs to ^{181}Ta.

[&] Doublet with ^{183}W line. A time dependent shift in energy and intensity was observed, consistent with the proposed doublet.

[a] Observed in ^{182}Hf isomeric decay and ^{182}Hf decay. Assigned to ^{182}Hf isomer by 1979Va10 despite poor energy fit.

[b] Except where noted, from conversion electron data of 1979Va10. The relative Iγ and I(ce) intensities are normalized assuming the 173.2γ is M1. In several cases the conversion lines are mixed with those from other transitions. 1979Va10 state that in such cases the conversion coefficients should be treated as upper limits implying that the contributions from other lines were not subtracted.

[c] Placement shown from 334.6 to 269.0 level in Eγ, Iγ table I of 1979Va10. The energy agreement is satisfactory, but the placement is suspect for the following reasons: 1. this placement is not shown in level-scheme figure 3 of 1979Va10, 2. this γ not reported in 61.5-min ^{182}Hf decay and 15.84-min ^{182}Ta IT decay. This transition is not included in Adopted Levels, Gammas dataset.

[d] Poor fit in the level scheme, deviates by ≈3σ.

[e] Possible double placement. Intensity is listed only with the preferred placement according to 1979Va10.

[f] Poor fit in the level scheme.

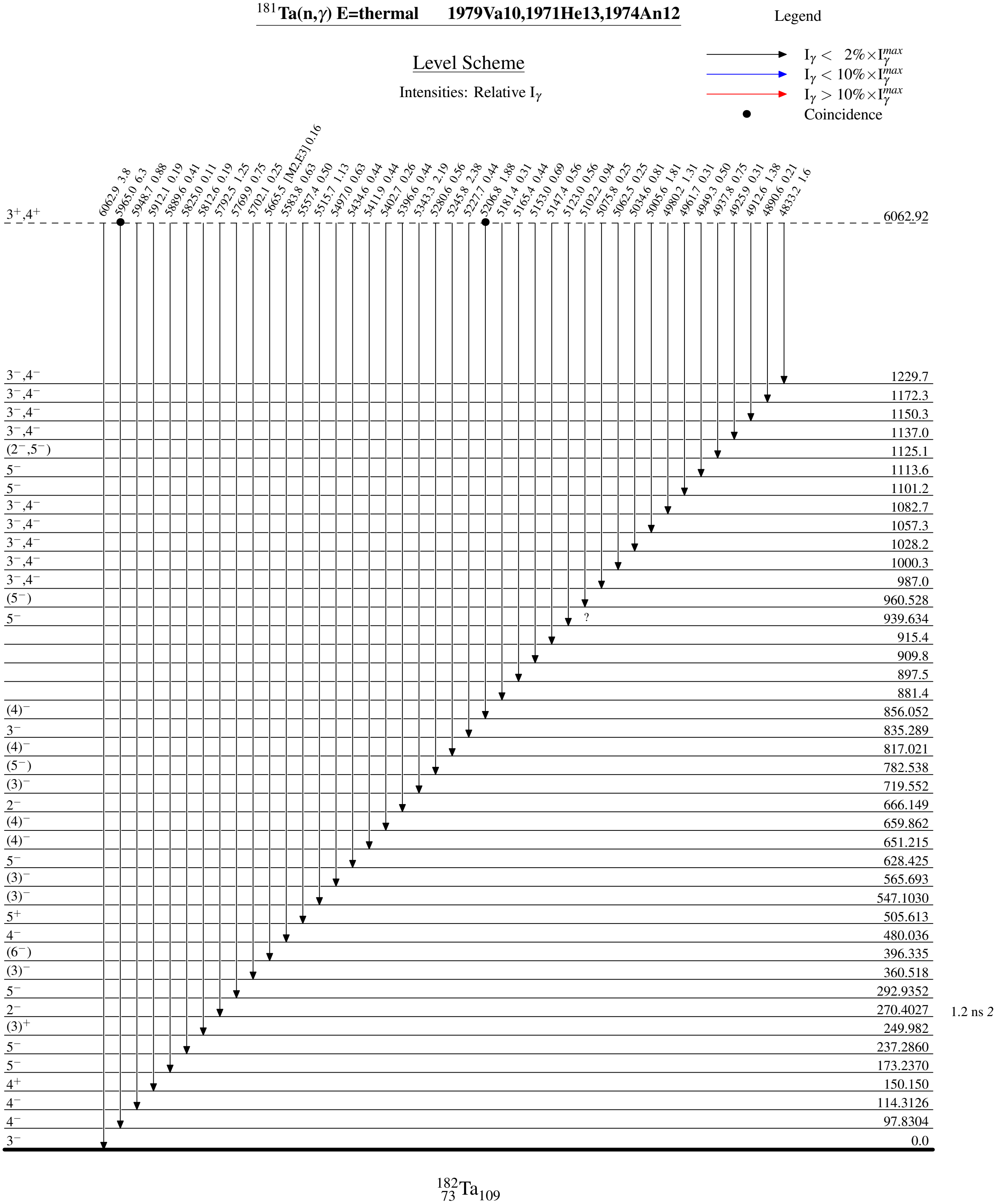
[g] This γ proceeds to 960.415 and/or 960.528 level.

[h] For intensity per 100 neutron captures, multiply by ≈0.15.

γ(^{182}Ta) (continued)

[i] 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.
[j] Multiply placed.
[k] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{182}_{73}$Ta$_{109}$-22


^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12
Legend
Level Scheme
Intensities: Relative Iγ
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
Coincidence
3+,4+ 6062.92
6062.9 3.8
5965.0 6.3
5948.7 0.88
5912.1 0.19
5889.6 0.41
5825.0 0.11
5812.6 0.19
5792.5 1.25
5769.9 0.75
5702.1 0.25
5665.5 [M2,E3] 0.16
5583.8 0.63
5557.4 0.50
5515.7 1.13
5497.0 0.63
5434.6 0.44
5411.9 0.44
5402.7 0.26
5396.6 0.44
5343.3 2.19
5280.6 0.56
5245.8 2.38
5227.7 0.44
5206.8 1.88
5181.4 0.31
5165.4 0.44
5153.0 0.69
5147.4 0.56
5123.0 0.56
5102.2 0.94
5075.8 0.25
5062.5 0.25
5034.6 0.81
5005.6 1.81
4980.2 1.31
4961.7 0.31
4949.3 0.50
4937.8 0.75
4925.9 0.31
4912.6 1.38
4890.6 0.21
4833.2 1.6
3−,4− 1229.7
3−,4− 1172.3
3−,4− 1150.3
3−,4− 1137.0
(2−,5−) 1125.1
5− 1113.6
5− 1101.2
3−,4− 1082.7
3−,4− 1057.3
3−,4− 1028.2
3−,4− 1000.3
3−,4− 987.0
(5−) 960.528
5− 939.634
?
915.4
909.8
897.5
881.4
(4)− 856.052
3− 835.289
(4)− 817.021
(5−) 782.538
(3)− 719.552
2− 666.149
(4)− 659.862
(4)− 651.215
5− 628.425
(3)− 565.693
(3)− 547.1030
5+ 505.613
4− 480.036
(6−) 396.335
(3)− 360.518
5− 292.9352
2− 270.4027 1.2 ns 2
(3)+ 249.982
5− 237.2860
5− 173.2370
4+ 150.150
4− 114.3126
4− 97.8304
3− 0.0
$^{182}_{73}$Ta$_{109}$

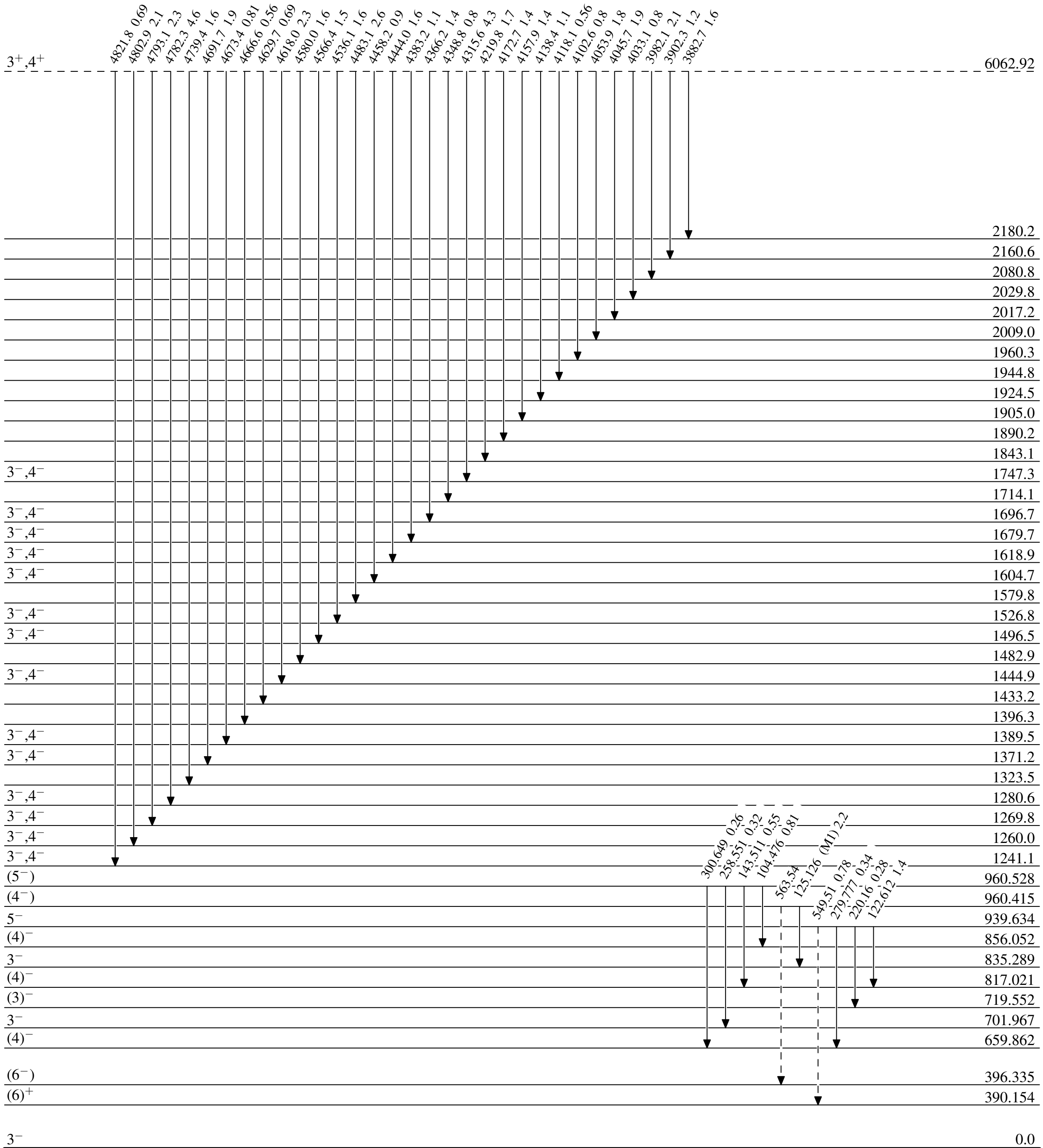
^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)

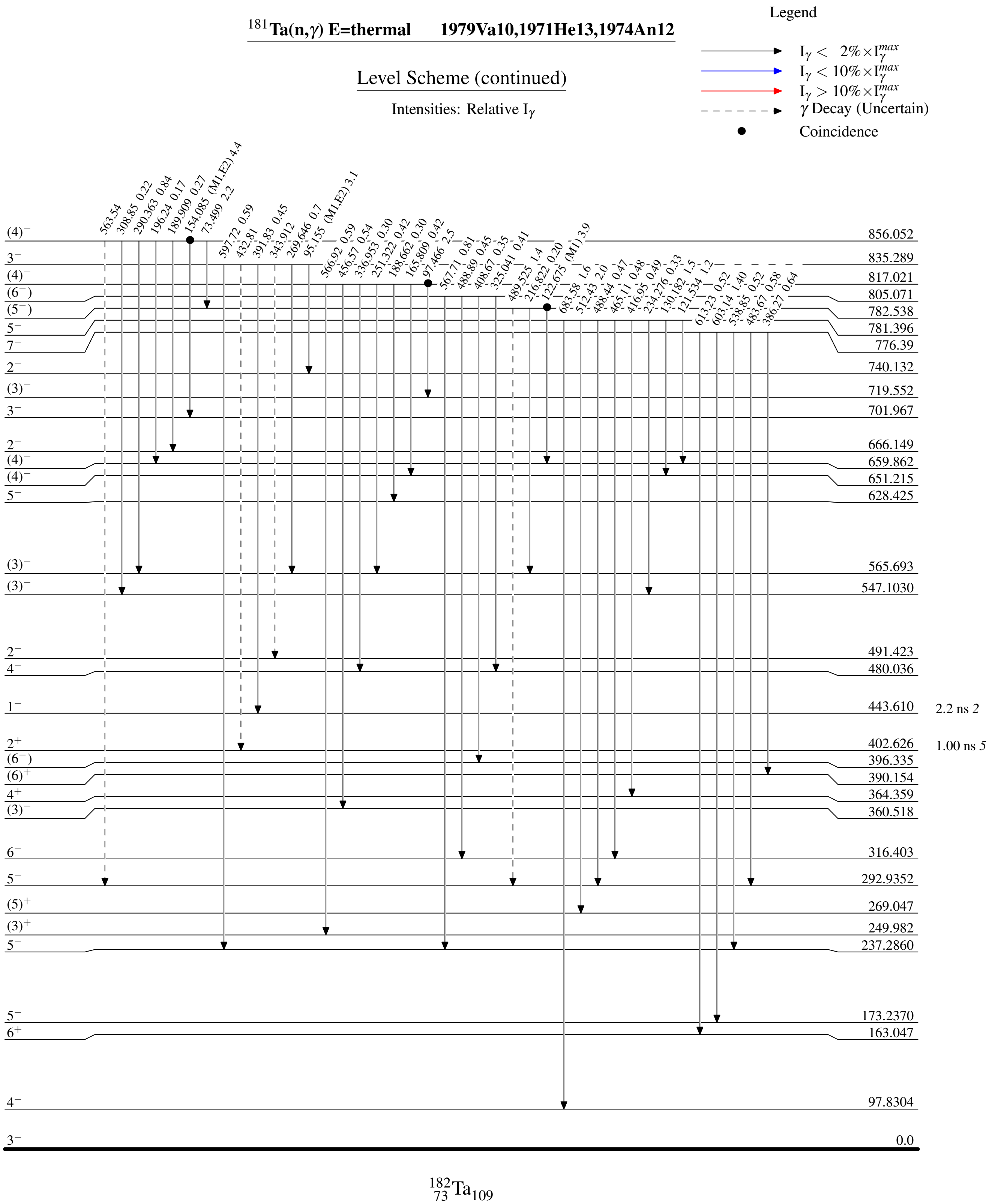


$^{182}_{73}Ta_{109}$

^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

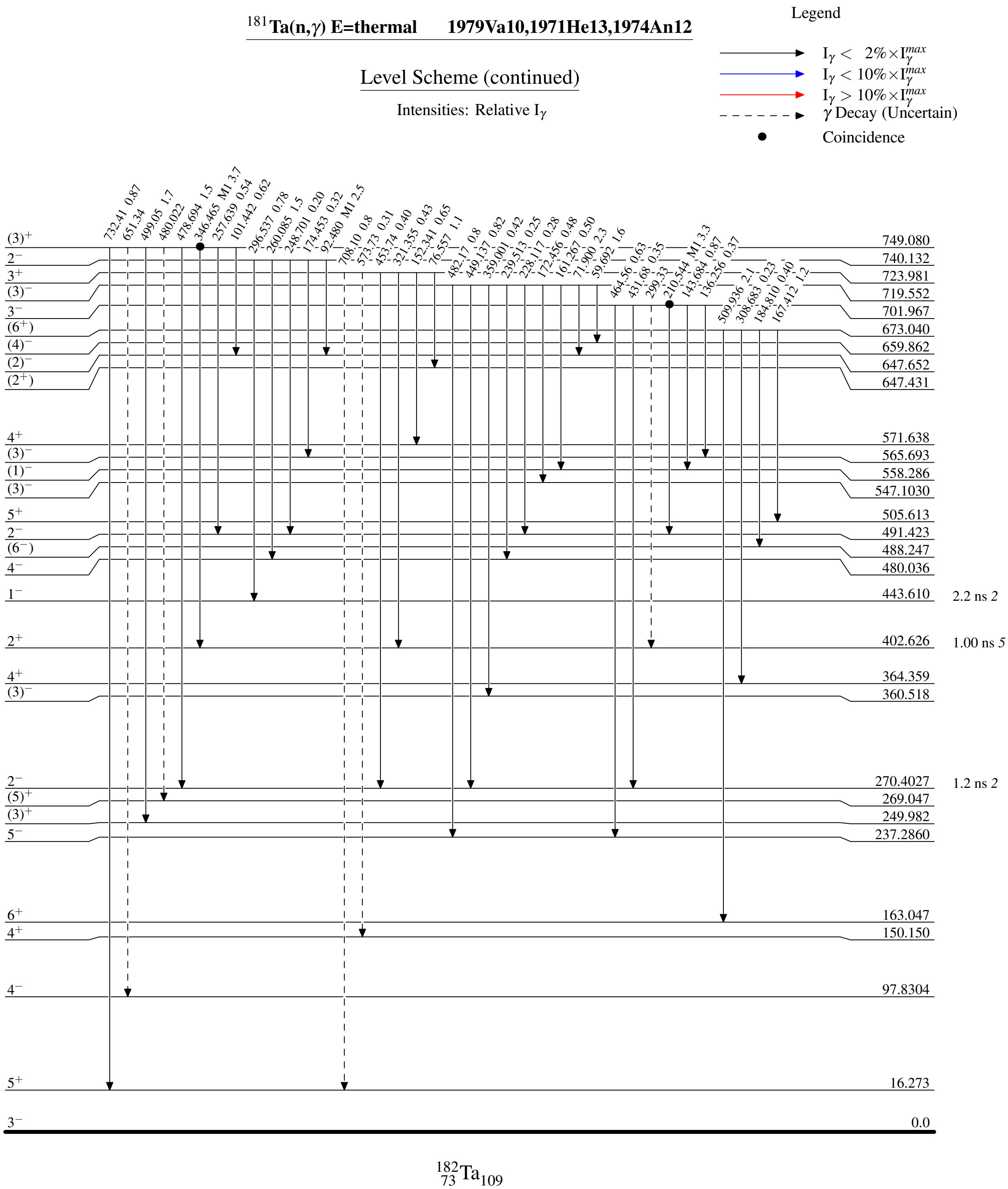
Intensities: Relative I_γ



^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

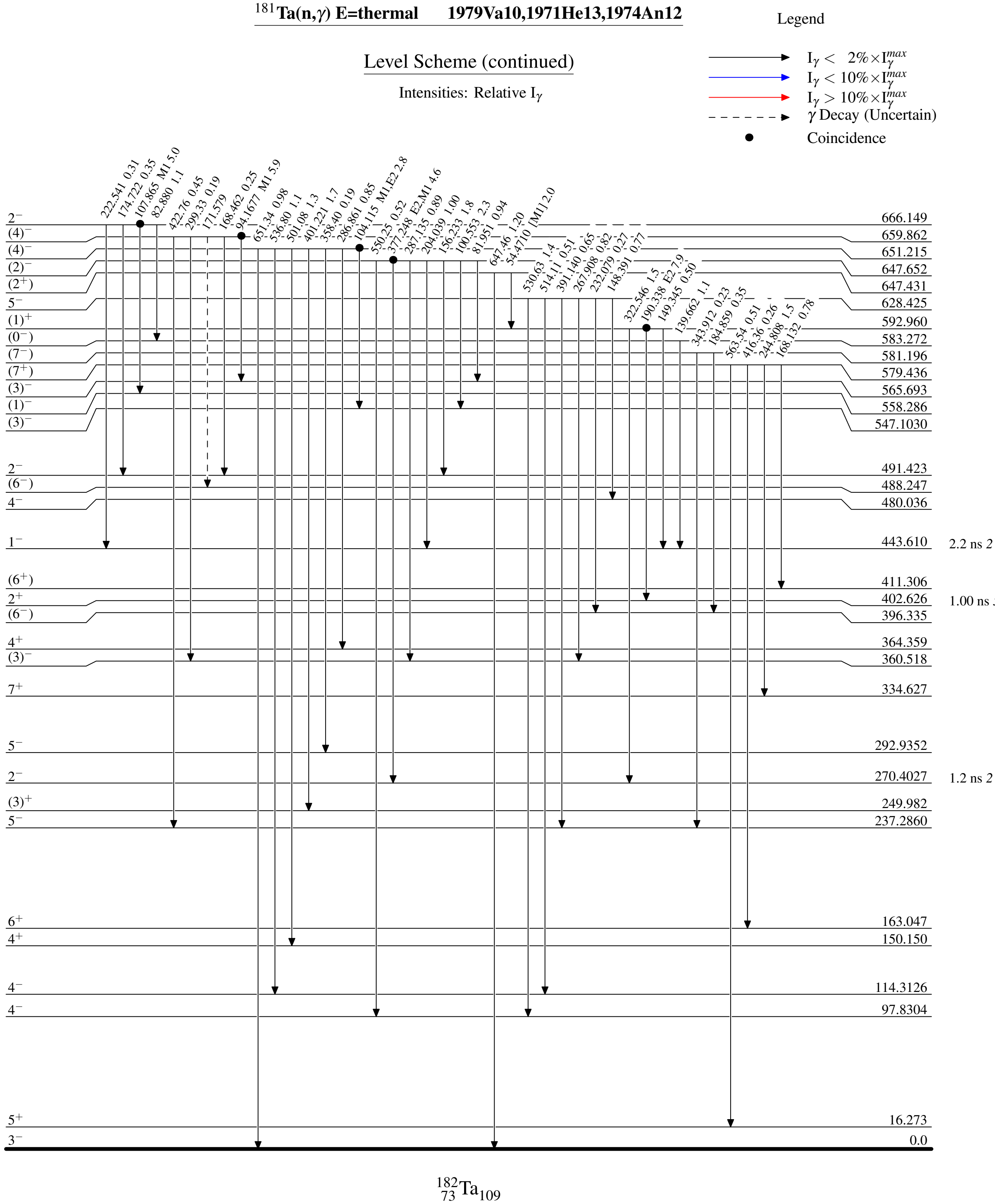
Intensities: Relative I_γ



$^{181}Ta(n,\gamma)$ E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

Intensities: Relative I_γ



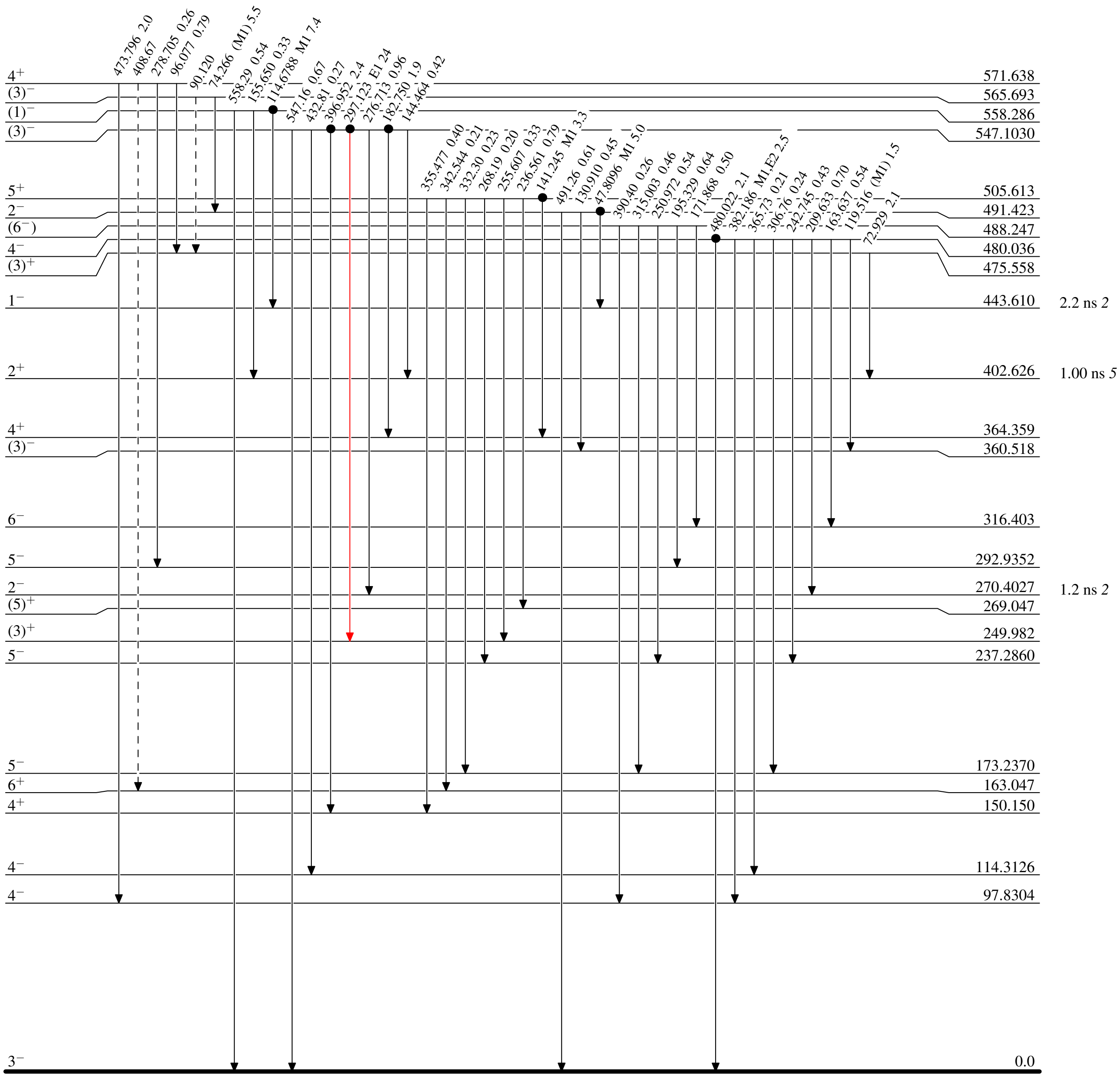
^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{182}_{73}Ta_{109}$

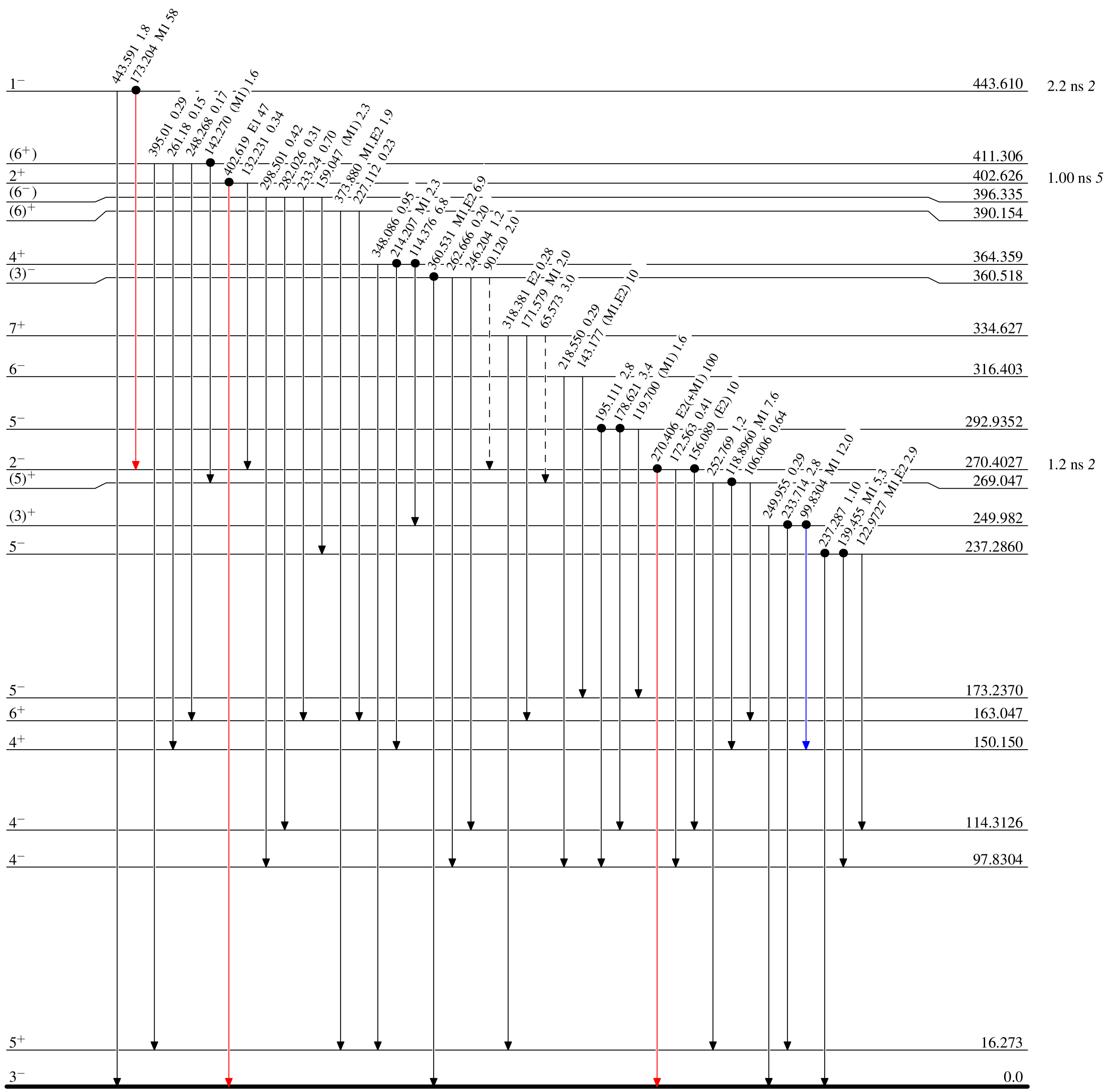
^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

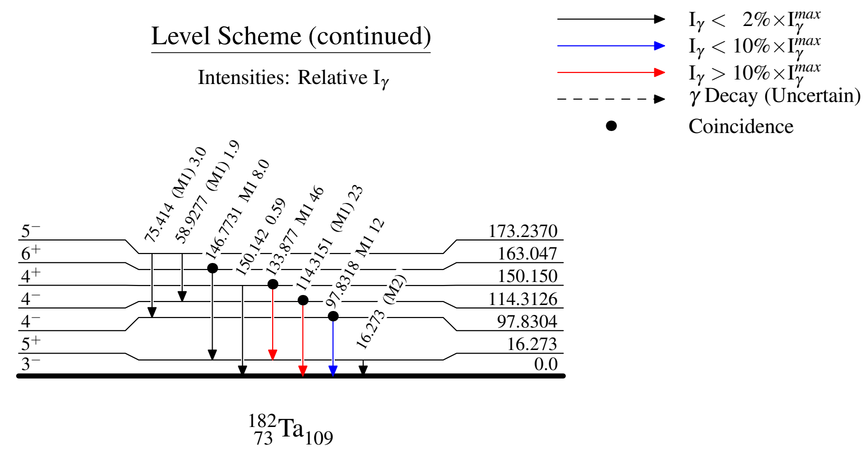


$^{182}_{73}Ta_{109}$

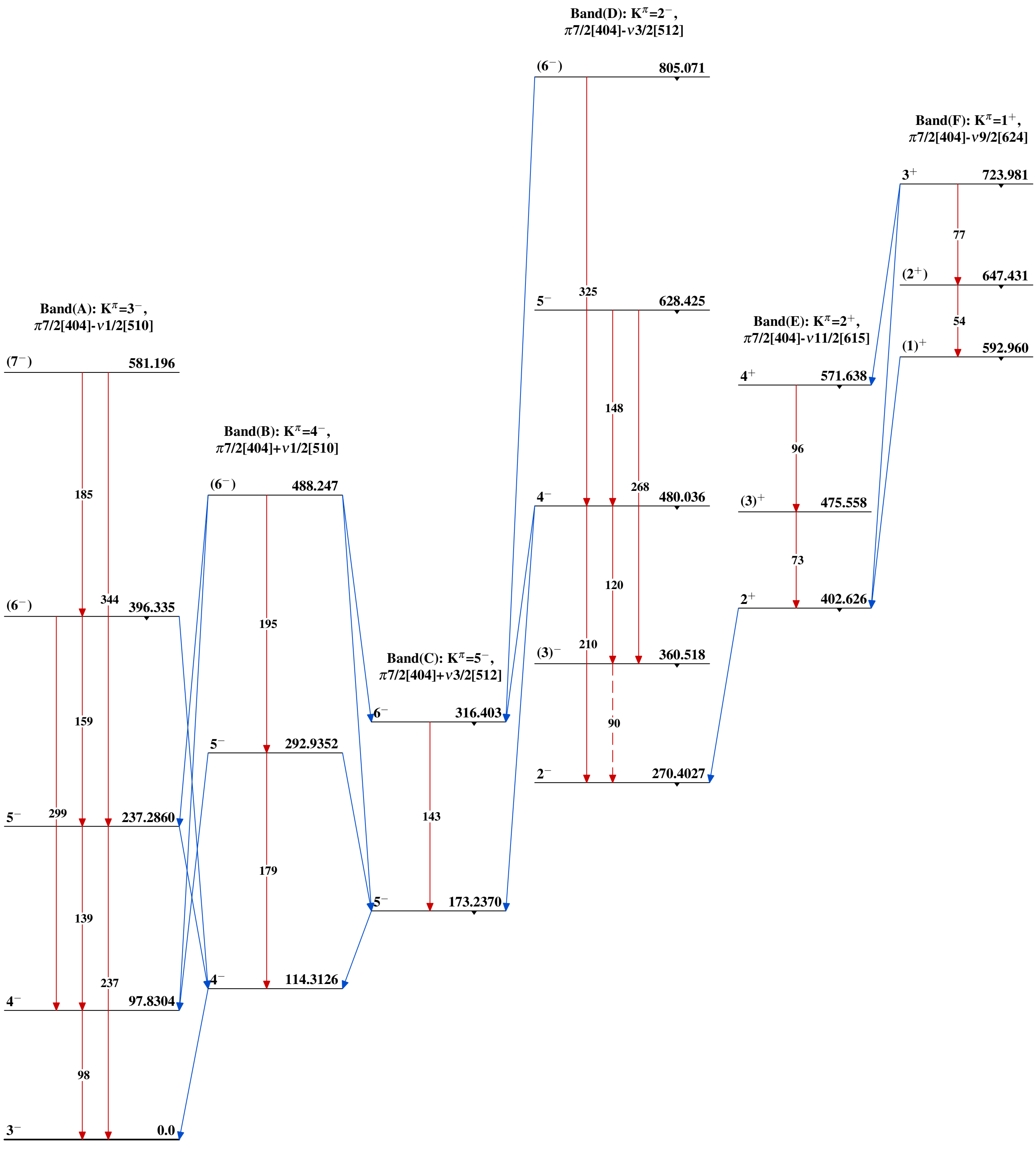
$^{181}Ta(n,\gamma)$ E=thermal 1979Va10,1971He13,1974An12

Level Scheme (continued)

Intensities: Relative I_γ

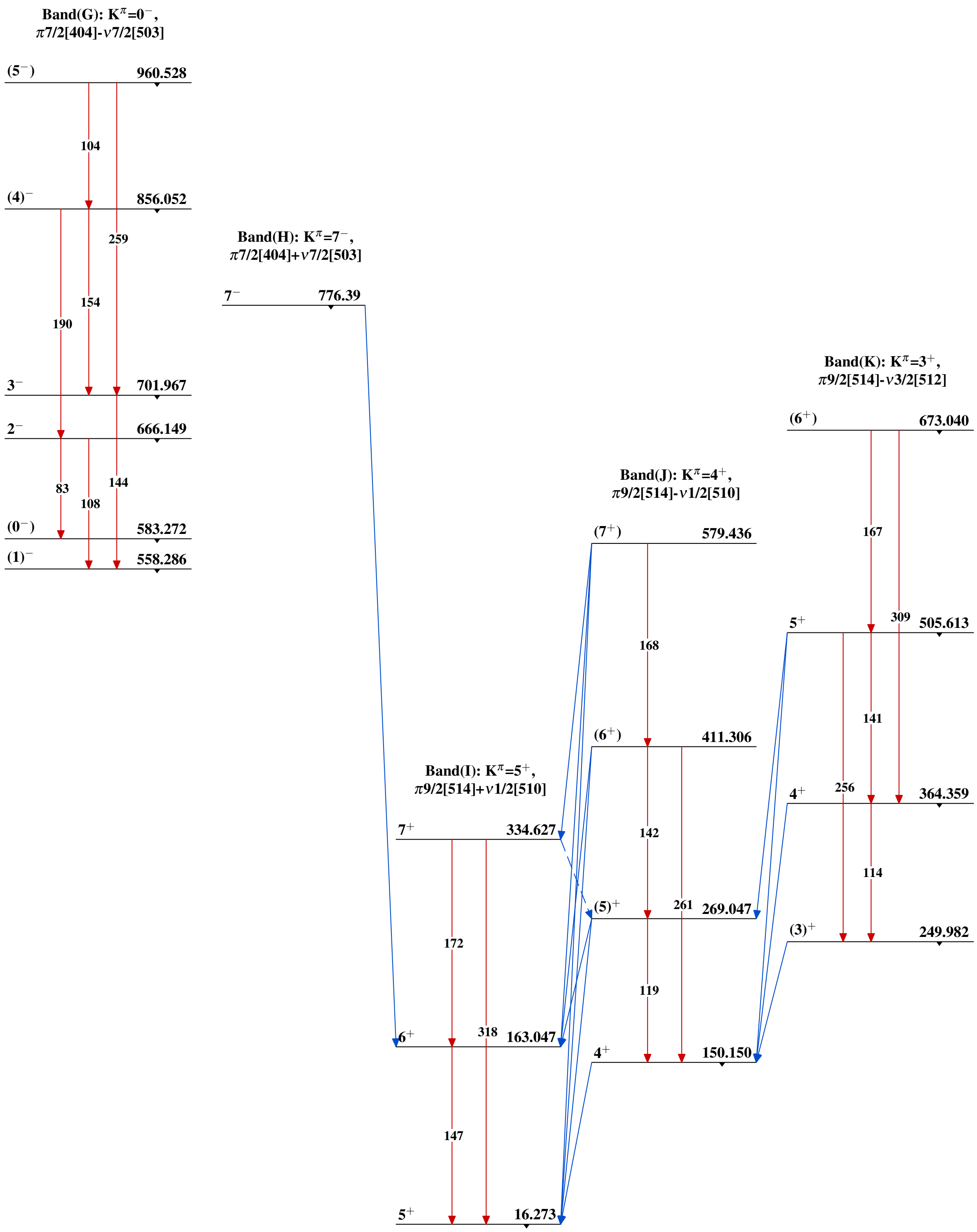


^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12



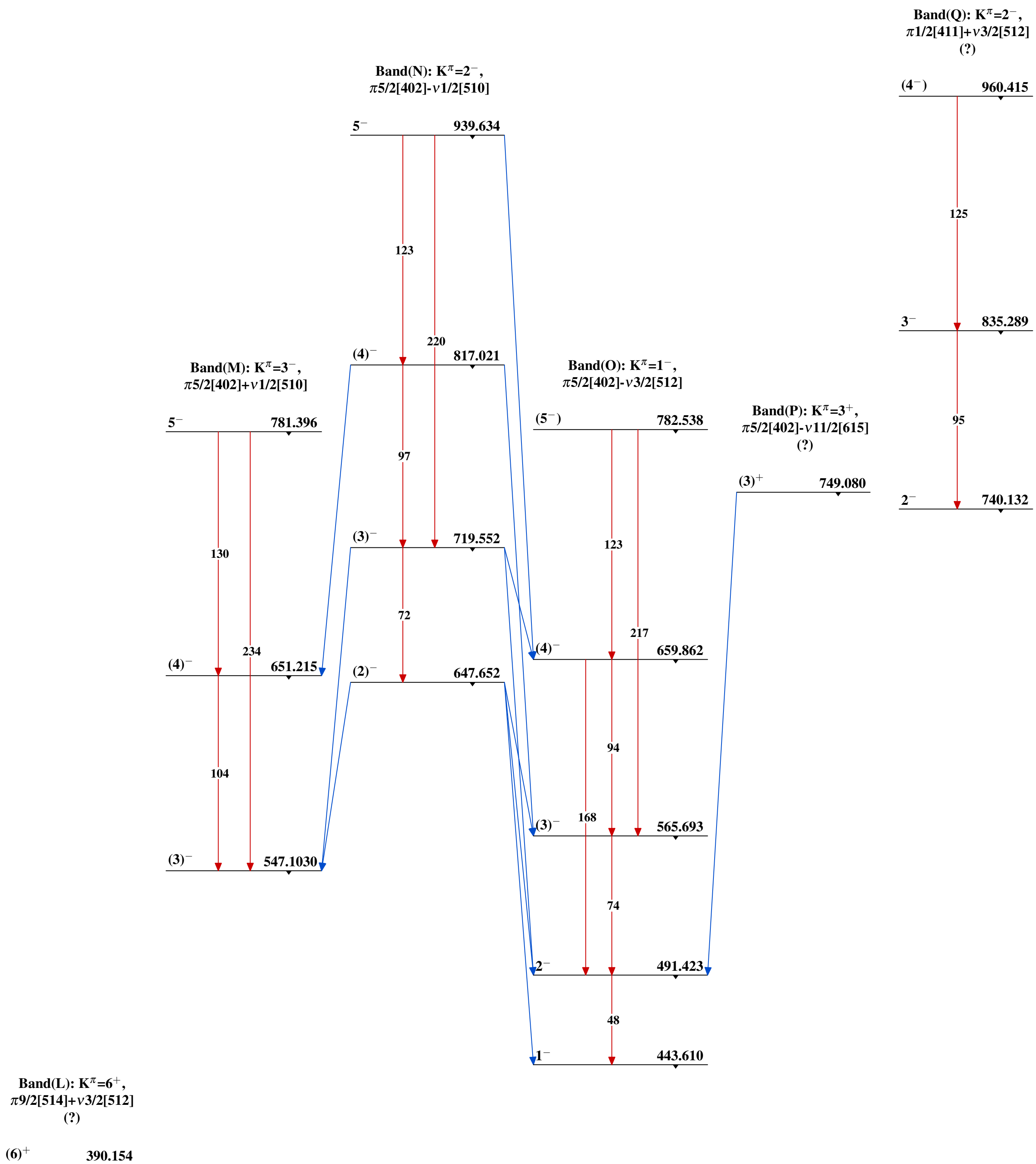
$^{182}_{73}Ta_{109}$

^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12 (continued)



$^{182}_{73}Ta_{109}$

^{181}Ta(n,γ) E=thermal 1979Va10,1971He13,1974An12 (continued)



$^{182}_{73}Ta_{109}$