Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. -c. Wu	NDS 106,367 (2005)	31-Aug-2005

Q(β^-)=−188 *5*; S(n)=7576.8 *14*; S(p)=5948.8 *23*; Q(α)=1519.3 *23* 2012Wa38
Note: Current evaluation has used the following Q record $ −188 5 *7576.8* *13* 5942.2 *21* 1522.5 *22* 2003Au03.
Other Reactions:
^{180}Hf(p,γ): 1987Ra23.
^{181}Ta(e,e),^{181}Ta(e,e′),^{181}Ta(e,e′γ): 1991Ta23, 1987Dz03, 1985Ni07, 1985Ni02, 1985Dz06, 1984Sa27, 1983Oc01, 1983Dz03, 1982Ts01, 1982Dz01, 1980Ra14, 1980Dz02, 1979Dz05, 1978Ra02, 1977Mi12, 1977Hi02, 1977Br37, 1976Dz04, 1974Wh05, 1971Mo06, 1970Gr18.
^{181}Ta(μ^-,e$^-$): 2002Ko55.
^{181}Ta(pol p,p): 1981Ro03, 1978Fr12, 1971Gr06.
^{181}Ta(pol ^{7}Li,^{7}Li): 1981Mo05.
^{181}Ta elastic scattering, inelastic scattering: 2002Pa24, 2001Ev02, 1998Ev05, 1995Zh46, 1995An36, 1991Sh08, 1988Ka17, 1987Za06, 1986Ti05, 1986Su08, 1986Ha31, 1985Ha02, 1983Si15, 1983Ra02, 1983Ha33, 1983Ch16, 1982Mo27, 1981Mu07, 1981Ko26, 1980Ho23, 1980Da08, 1980Bu16, 1979Yu02, 1979Gl12, 1978Wo13, 1978Do05, 1978Al34, 1977Vi02, 1977Bi10, 1976We19, 1976Mi20, 1976Fe06, 1976Da21, 1975Ma07, 1974Wh09, 1974Ro20, 1974Be40, 1972Ri14, 1972Ra01, 1971Si34, 1971Ro26, 1970Ro05, 1970Ho18, 1970Ar02, 1968Ko18, 1968Ch32, 1968Ca17, 1967Po03, 1966Du08, 1966As02.
^{181}Ta(^{19}C,n^{18}C),^{181}Ta(^{20}Ne,α^{16}O): 1998Ba45, 1985Gu08.
^{182}W(γ,p): 1987Da29.

^{181}Ta Levels

Cross Reference (XREF) Flags

A	^{181}Hf β^- decay	E	^{181}Ta IT decay (18.9 μs)	I	^{176}Yb(^{11}B,α2nγ)
B	^{181}W ε decay	F	^{181}Ta(γ,γ'):Mossbauer	J	^{181}Ta(^{238}U,^{238}U′γ)
C	^{180}Ta(n,γ) E=th	G	Coulomb excitation		
D	^{181}Ta(γ,γ')	H	^{181}Ta(d,d′), (n,n′), (p,p′)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[c]	7/2$^+$	stable	ABCDE GHIJ	μ=+2.3705 *7*; Q=+3.17 *2* (2001StZZ) μ: measured by NMR (1973Er17). Q: by hyperfine structure of pionic x rays (1983Ol03) Others: +3.28 *6* by hyperfine structure of muonic x rays (1981Ko11); +3.35 *2* by hyperfine structure of pionic x rays (1981Ba07); +3.35 *11* by hyperfine structure of kaonic x rays (1981Ba07); 3.4 *2* by atomic beam magnetic resonance (1981Ka10); +3.30 *6* by hyperfine structure of pionic x rays (1978Be31); 3.18 *3* by hyperfine structure of muonic x rays (1977Po02); 3.44 *6* by hyperfine structure of muonic x rays (1976Mc03); J$^\pi$: from optical spectroscopy, parity from analysis of μ with Schmidt diagram. <r^2>$^{1/2}$=5.351 fm 3 for ^{181}Ta based on a global fit to charge radius data for all nuclides (2004An14).
6.237[a] *20*	9/2$^-$	6.05 μs *12*	ABC HIJ	μ=+5.28 *9*; Q=+3.71 *7* (2001StZZ) μ: measured by Mossbauer effect (1970Ka16) Other: +5.3 *2* by Mossbauer effect (1978We18). Q: measured by Mossbauer effect (1983Ei02). J$^\pi$: from optical spectroscopy and NMR, parity from E1 to 7/2$^+$. T$_{1/2}$: from ^{181}W ε decay.
136.262[d] *13*	9/2$^+$	39.5 ps *16*	ABCDEFGHI	μ=+2.6 *7* (2001StZZ)

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Adopted Levels, Gammas (continued)

^{181}Ta Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
				μ: measured by integral perturbed angular correlation (1983Ak02). Jπ: M1+E2 to 7/2$^+$, Coulomb excitation, perturbed angular correlations, rotational band member. $T_{1/2}$: weighted average of 38 ps *2* from Mossbauer and 42.0 ps *25* from Coulomb excitation.
158.554[&] *24*	11/2$^-$		BC HIJ	Jπ: M1+E2 to 9/2$^-$, member of 9/2[514] rotational band.
301.622[c] *22*	11/2$^+$	16 ps *3*	C GHI	Jπ: M1+E2 to 9/2$^+$, E2 to 7/2$^+$, Coulomb excitation, member of 7/2[404] rotational band. $T_{1/2}$: from Coulomb excitation (1976In07).
337.54[a] *3*	13/2$^-$		C HIJ	Jπ: γ's to 9/2$^-$ and 11/2$^-$, member of 9/2[514] rotational band.
482.168[f] *23*	5/2$^+$	10.8 ns *1*	A C E GHI	μ=+3.29 *3*; Q=(+)2.35 *6* (2001StZZ) μ: measured by differential perturbed angular correlation (1964Ag02,1963Ma10). Q: measured by differential perturbed angular correlation (1983Bu23). Jπ: M1+E2 to 7/2$^+$, M2+E3 to 9/2$^-$, E2 to 9/2$^+$. Band head of 5/2[402] band. $T_{1/2}$: from ^{181}Hf β^- decay.
495.184[d] *22*	13/2$^+$	6.3 ps *8*	C GHI	Jπ: M1+E2 γ to 11/2$^+$, E2 γ to 9/2$^+$, band structure. $T_{1/2}$: from Coulomb excitation (1976In07).
542.51[&] *3*	15/2$^-$		C IJ	Jπ: γ's to 11/2$^-$, 13/2$^-$, fed by primary γ in (n,γ), band structure.
590.06[g] *23*	7/2$^+$		G I	Jπ: γ to 5/2$^+$, band structure.
615.19 *3*	1/2$^+$	18 μs *1*	A C E H	Jπ: M3 to 7/2$^+$, E2 to 5/2$^+$, β-feeding from ^{181}Hf (Jπ=1/2$^-$) with log *ft*=7.2. $T_{1/2}$: 17.6 Ms *2* from ^{181}Hf β^- decay 18.9 Ms *5* and ^{181}Ta IT decay. The uncertainty has been increased by the evaluator to account for the wide variability in the measurements.
618.99 *5*	3/2$^+$	0.87 ns *2*	A C H	Jπ: M1 to 5/2$^+$, (E2) to 7/2$^+$, γ to 1/2$^+$, β decay from 1/2$^-$ with log *ft*=8.3. $T_{1/2}$: from ^{181}Hf β^- decay.
716.659[c] *25*	15/2$^+$	3.0 ps *4*	C GHI	μ=+2 *2* (2001StZZ) μ: measured by transient field integral perturbed angular correlation (1996HaZX). Jπ: M1+E2 to 13/2$^+$, E2 to 11/2$^+$, fed by primary γ in (n,γ), Rotational band assignment. $T_{1/2}$: from Coulomb excitation (1976In07).
727.31[f] *23*	9/2$^+$		G I	Jπ: γ to 5/2$^+$ and 7/2$^+$, band structure.
772.97[a] *4*	17/2$^-$		C IJ	Jπ: γ's to 13/2$^-$ and 15/2$^-$, fed by primary γ in (n,γ), band structure.
892.9[g] *3*	11/2$^+$		I	Jπ: γ to 7/2$^+$ and 9/2$^+$, band structure.
964.99[d] *4*	17/2$^+$	1.93 ps *24*	C G I	μ=+4 *2* (2001StZZ) μ: measured by transient field integral perturbed angular correlation (1996HaZX). Jπ: M1+E2 to 15/2$^+$, E2 to 13/2$^+$, fed by primary γ in (n,γ), Rotational band assignment. $T_{1/2}$: from Coulomb excitation (1976In07).
993.7 *3*			I	
994.2[h] *10*	(5/2$^-$)		I	Jπ: γ to 9/2$^-$, band head of π1/2[541].
1022.6[h] *10*	(9/2$^-$)		I	Jπ: γ to 11/2$^-$, band structure.
1027.94[&] *5*	19/2$^-$		C IJ	Jπ: γ's to 17/2$^-$ and 15/2$^-$, rotational band assignment.
1085.6[f] *3*	13/2$^+$		I	Jπ: γ to 9/2$^+$ and 11/2$^+$, band structure.
1156.6 *5*			I	
1163.6[h] *15*	(13/2$^-$)		I	Jπ: γ to (9/2$^-$), band structure.
1205.7[b] *6*	(3/2$^+$)		G	Jπ: γ to 7/2$^+$ and 5/2$^+$, K-2 γ-vibrational band with K=3/2.
1233.1			C H	

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Adopted Levels, Gammas (continued)

^{181}Ta Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
1239.47[c] *5*	19/2$^+$	1.12 ps *14*	C G I	μ=+4 *5* (2001StZZ) μ: measured by transient field integral perturbed angular correlation (1996HaZX). J^{π}: E2 to 15/2$^+$, γ to 17/2$^+$, fed by primary γ in (n,γ), rotational band assignment. $T_{1/2}$: from Coulomb excitation (1976In07).
1278.1[b] *6*	(5/2$^+$)		G	J^{π}: γ to 7/2$^+$ and 9/2$^+$, band structure.
1304.8[g] *4*	15/2$^+$		I	J^{π}: γ to 11/2$^+$ and 13/2$^+$, rotational band structure.
1307.11[a] *5*	21/2$^-$		C IJ	J^{π}: γ's to 17/2$^-$ and 19/2$^-$, rotational band assignment.
1340 *15*			H	
1380.1[b] *5*	(7/2$^+$)		G	J^{π}: γ to 7/2$^+$ and 11/2$^+$, band structure.
1380.6[e] *6*	(11/2$^+$)		G	J^{π}: γ to 7/2$^+$ and 11/2$^+$, K+2 γ-vibrational band with K=11/2.
1390			H	
1403.2[@] *6*	15/2$^-$		C I	XREF: C(1403). E(level): Level observed in 1998Sa60, deexcites by emitting 861, 1066 and 1244 keV γ's to the 9/2$^-$ band, is identified (by the evaluator) as a different state from the levels at 1403 and 1404 keV by 1998Dr09 However, there might be some chance that this level is actually the doublet of 1403.3+1403.9 from 1998Dr09. In this case, one might attribute the level 1403.4+x as the 1472.9 state from 1998Dr09 with x=69.0.
1403.35 *22*	(17/2)		C I	XREF: C(1403). E(level): The level at 1403.9 keV deexcites by emitting γ's of similar energies but very different branching ratios compared with this state; hence identified as two levels by 1998Dr09. There is a state at 1403.4 observed by 1998Sa60. It is not clear which state it corresponds to, but identified as the state at 1403.90 (15/2) in this evaluation. $T_{1/2}$: 3.3 ns for 1403.4 or 1403.9 from ^{176}Yb(^{11}B,α2nγ) (1998Dr09).
1403.90 *22*	(15/2)		C I	XREF: C(1403). See comments on 1403.3 level.
1419.6[h] *18*	(17/2$^-$)		I	J^{π}: γ to (13/2$^-$), band structure.
1472.7			C I	J^{π}: fed by primary γ in (n,γ), γ to (15/2).
1483.43 *21*	21/2$^-$	25 μs *2*	IJ	J^{π}: γ to 17/2$^-$ and 21/2$^-$. Configuration: π9/2[514]π7/2[404]π5/2[402], K^{π}=21/2$^-$. $T_{1/2}$: From (^{238}U,^{238}U$'\gamma$). Other:23 μs *+6−2* from ^{176}Yb(^{11}B,α2nγ) (1998Dr09).
1507.9[b] *7*	(9/2$^+$)		G	J^{π}: γ to 9/2$^+$ and 11/2$^+$, band structure.
1539.31[d] *9*	21/2$^+$	0.76 ps *10*	C G I	J^{π}: γ to 19/2$^+$ and to 17/2$^+$, rotational band structure. $T_{1/2}$: from Coulomb excitation (1976In07).
1548.4[f] *4*	17/2$^+$		I	J^{π}: γ to 13/2$^+$ and to 15/2$^+$, rotational band structure.
1563.4[e] *7*	(13/2$^+$)		G	J^{π}: γ to 9/2$^+$ and 11/2$^+$, band structure.
1583.8[@] *10*	(17/2)		I	
1591.9 *4*	(19/2)		I	J^{π}: γ to (17/2).
1608.85[&] *20*	23/2$^-$		IJ	J^{π}: γ to 19/2$^-$ and 21/2$^-$, band structure.
1661.1			C	
1664.9[b] *7*	(11/2$^+$)		G	J^{π}: γ to 11/2$^+$ and 13/2$^+$, band structure.
1685.3 *5*	(19/2)		I	J^{π}: γ to (17/2).
1771.9[e] *7*	(15/2$^+$)		G	J^{π}: γ to 11/2$^+$ and 13/2$^+$, band structure.
1776.3 *9*	23/2$^-$		J	J^{π}: γ to 21/2$^-$.
1786.6[h] *20*	(21/2$^-$)		I	J^{π}: γ to (17/2$^-$), band structure.
1787.6[@] *10*	(19/2)		I	
1803.7 *5*	(21/2)		I	J^{π}: γ to (19/2).

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Adopted Levels, Gammas (continued)

^{181}Ta Levels (continued)

E(level)[†]	Jπ[‡]	T1/2	XREF	Comments
1819.1[g] 4	(19/2+)		I	Jπ: γ to 15/2+ and 17/2+, band structure.
1863.09[c] 22	23/2+		I	Jπ: γ to 19/2+ and 21/2+, band structure.
1866.0 10			D	
1932.76[a] 24	25/2−		IJ	Jπ: γ to 21/2− and 23/2−, band structure.
1935.0 10			D	
2001.2[e] 10	(17/2+)		G	Jπ: γ to 13/2+, band structure.
2014.7[@] 12	(21/2)		I	
2020			H	
2097.0 10			D	
2098.1 11	25/2−		J	Jπ: γ to 23/2−.
2105.0 10			D	
2122.5[f] 5	(21/2+)		I	Jπ: γ to 17/2+ and (19/2+), band structure.
2210.1[d] 3	25/2+		I	Jπ: γ to 21/2+, band structure.
2227.9 9		210 μs 20	IJ	T1/2: from ^{181}Ta(^{238}U,^{238}U′γ) (1998Wh02).
2240.0 10			D	
2253.0 10			D	
2260.6[h] 23	(25/2−)		I	Jπ: γ to (21/2−), band structure.
2262.6[@] 13	(23/2)		I	
2272.0 10			D	
2276.3[&] 8	27/2−		I	E(level): Ex=2287 from 1998Dr09, depopulated by 678.0 keV γ. Jπ: γ to 23/2− and 25/2−, band structure.
2289.0 10			D	
2297.1 7			D	
2361.4			C	
2400.1 7			D	
2418.1 7			D	
2448.1 7			D	
2519.0 10			D	
2525.7			C	
2533.7[@] 15	(25/2)		I	
2570			H	
2580.1[c] 4	27/2+		I	Jπ: γ to 23/2+, band structure.
2642.8[a] 11	29/2−		I	Jπ: γ to 25/2−, band structure.
2761.0 10			D	
2800.0 10			D	
2807.0 10			D	
2812.0 10			D	
2835.0 10			D	
2845.0 10			D	
2890			H	
2892.0 10			D	
2898.0 10			D	
2929.0 10			D	
2967.0 10			D	
2968.1[d] 11	29/2+		I	Jπ: γ to 25/2+, band structure.
3010		0.78 ps	D	T1/2: calculated from Γ=5.9×10^{-4} eV and γ branching measured in (γ,γ′).
3016.0 10			D	
3021.3[&] 13	31/2−		I	Jπ: γ to 27/2−, band structure.
3023.0 10			D	
3029.0 10			D	
3035.0 10			D	
3054.1 7			D	

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Adopted Levels, Gammas (continued)

^{181}Ta Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
3065.0 *10*			D	
3074.2 *7*			D	
3081.0 *10*			D	
3086.0 *10*			D	
3092.0 *10*			D	
3108.1 *7*			D	
3320.0 *10*			D	
3329.0 *10*			D	
3407.0 *10*			D	
6417.7 *7*		1.7 ps	D	$T_{1/2}$: calculated from $\Gamma=2.7\times10^{-4}$ eV and γ branching measured in (γ,γ').
6759		25 ps	D	$T_{1/2}$: calculated from $\Gamma=1.8\times10^{-5}$ eV and γ branching measured in (γ,γ').
1403.2+x[#]	$(19/2^+)$	140 ns *36*	I	Additional information 1. $T_{1/2}$: from ^{176}Yb(^{11}B,α2nγ) (1998Sa60). This level feeds 1402 level through, as yet, unidentified transitions of x<50.
1617.2+x[#] *8*	$(21/2^+)$		I	
1853.3+x[#] *7*	$(23/2^+)$		I	
2113.0+x[#] *8*	$(25/2^+)$		I	
2393.7+x[#] *10*	$(27/2^+)$		I	

[†] From least-squares fit (by evaluator) to Eγ's.
[‡] Spin and parity assignments are based on assumed rotational band structure. Specific arguments are given to individual levels.
[#] Band(A): $K^{\pi}=(19/2^+)$, π9/2[514]ν(1/2[510]9/2[624]). Rotational parameters: A=9.62, B=2.45, fit to levels J=$(19/2^+)$ to $(25/2^+)$.
[@] Band(B): $K^{\pi}=15/2^-$, π7/2[404]ν(1/2[510]9/2[624]). Rotational parameters: A=10.3, B=2.5, fit to levels J=(15/2) to (21/2).
[&] Band(C): 9/2[514], $\alpha=-1/2$ Rotational parameters: A=13.9, B=−3.54, fit to levels J=$11/2^-$ to $23/2^-$.
[a] Band(c): 9/2[514], $\alpha=+1/2$ Rotational parameters: A=13.9, B=−3.52, fit to levels J=$9/2^-$ to $21/2^-$.
[b] K-2 gamma vibration band K=3/2 built on the ground state.
[c] Band(D): 7/2[404], $\alpha=-1/2$. Rotational parameters: A=15.2, B=−4.9, fit to levels J=$7/2^+$ to $19/2^+$.
[d] Band(d): 7/2[404], $\alpha=+1/2$. Rotational parameters: A=15.2, B=−4.6, fit to levels J=$9/2^+$ to $21/2^+$.
[e] K+2 gamma vibration band K=11/2 built on the ground state.
[f] Band(E): 5/2[402], $\alpha=+1/2$. Rotational parameters: A=15.5, B=−8.8, fit to levels J=$5/2^+$ to $17/2^+$.
[g] Band(e): 5/2[402], $\alpha=-1/2$. Rotational parameters: A=15.4, B=−7.4, fit to levels J=$7/2^+$ to $(19/2^+)$.
[h] Band(F): band associate with a π1/2[541] configuration. Rotational parameters: A=9.9, B=−16.7, a=8.33, fit to levels J=$(5/2^-)$ to $(21/2^-)$.

Adopted Levels, Gammas (continued)

$\gamma(^{181}Ta)$

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[a]	$I_{(\gamma+ce)}$	Comments
6.237	9/2⁻	6.240 20	100	0.0	7/2⁺	E1		70.5 25		B(E1)(W.u.)=2.01×10⁻⁶ 11 Mult.: from ^{181}W ε decay. α: penetration parameter λ=−9 1.
136.262	9/2⁺	136.269 13	100	0.0	7/2⁺	M1+E2	+0.396 11	1.75 1		B(M1)(W.u.)=0.068 4; B(E2)(W.u.)=260 40 δ: weighted average of +0.41 3 from β-decay and +0.394 11 from Coulomb excitation.
158.554	11/2⁻	152.320 14	100	6.237	9/2⁻	M1+E2	0.5 2	1.23 8		δ: from ε-decay. Other: 0.17 2 from ^{176}Yb(^{11}B,α2nγ).
301.622	11/2⁺	165.40 2	100	136.262	9/2⁺	M1+E2	+0.363 10	1.01		B(M1)(W.u.)=0.093 19; B(E2)(W.u.)=280 90 Mult.,δ: from Coulomb Excitation.
		301.57 21	68[&] 5	0.0	7/2⁺	E2		0.0814		B(E2)(W.u.)=59 12 Mult.: from Coulomb Excitation.
337.54	13/2⁻	179.00 2		158.554	11/2⁻					
		331.29 3		6.237	9/2⁻					
482.168	5/2⁺	345.97 4	18.78 12	136.262	9/2⁺	E2		0.0544		B(E2)(W.u.)=0.0264 3
		475.99 9	0.873 7	6.237	9/2⁻	M2+E3	0.5 1	0.168 8		B(M2)(W.u.)=0.0207 17; B(E3)(W.u.)=15 5
		482.17 3	100.00 14	0.0	7/2⁺	M1+E2	4.76 4	0.0295 8		B(M1)(W.u.)=6.21×10⁻⁷ 12; B(E2)(W.u.)=0.0256 3 α: penetration parameter λ=150 1.
495.184	13/2⁺	193.72 5	65[&]	301.622	11/2⁺	M1+E2	0.53 +12−9	0.61 3		B(M1)(W.u.)=0.118 21; B(E2)(W.u.)=370 150 Mult.,δ: from Coulomb Excitation.
		358.881 20	100[&] 8	136.262	9/2⁺	E2		0.0490		B(E2)(W.u.)=117 17 Mult.: from Coulomb Excitation.
542.51	15/2⁻	204.98 2		337.54	13/2⁻					
		383.90 5		158.554	11/2⁻					
590.06	7/2⁺	107.9		482.168	5/2⁺					
615.19	1/2⁺	133.027 18	100.0 11	482.168	5/2⁺	E2		1.265		B(E2)(W.u.)=0.0055 4 α: penetration parameters λ(1)=22 4, λ(2)=−11 4 (1989Ki23).
		615.17 11	0.54 4	0.0	7/2⁺	M3(+E4)		0.194		B(M3)(W.u.)=0.13 1 δ: 0.7 3 from β⁻ decay doubtful because B(E4)(W.u.)=320. RUL requires B(E4)(W.u.)<10 for A>150.
618.99	3/2⁺	3.90 10		615.19	1/2⁺	[M1]		2684	78 37	
		136.97 6	100 21	482.168	5/2⁺	M1		1.83		B(M1)(W.u.)=0.00075 15
		618.66 8	2.91 14	0.0	7/2⁺	(E2)		0.01216		B(E2)(W.u.)=0.00042 13
716.659	15/2⁺	221.479 20	43[&]	495.184	13/2⁺	M1+E2	0.49 +7−12	0.424 19		B(M1)(W.u.)=0.142 24; B(E2)(W.u.)=290 90 Mult.,δ: from Coulomb Excitation.
		415.07 3	100[&] 9	301.622	11/2⁺	E2		0.0328		B(E2)(W.u.)=153 24 Mult.,δ: from Coulomb Excitation.

$^{181}_{73}Ta_{108}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{181}Ta)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.‡	δ‡	α[a]	Comments
727.31	9/2+	137.1		590.06	7/2+				
		245.0		482.168	5/2+				
772.97	17/2−	230.470 *20*		542.51	15/2−				
		435.42 *3*		337.54	13/2−				
892.9	11/2+	165.5		727.31	9/2+				
		303.0		590.06	7/2+				
964.99	17/2+	248.41 *4*	31&	716.659	15/2+	M1+E2	0.33 *+14−10*	0.327 *17*	B(M1)(W.u.)=0.15 *3*; B(E2)(W.u.)=110 *90* Mult.,δ: from Coulomb Excitation.
		469.77 *3*	100& *13*	495.184	13/2+	E2		0.02374	B(E2)(W.u.)=146 *25* Mult.: from Coulomb Excitation.
993.7		511.5		482.168	5/2+				
994.2	(5/2−)	988		6.237	9/2−				
1022.6	(9/2−)	864		158.554	11/2−				
1027.94	19/2−	255.07 *5*		772.97	17/2−				
		485.35 *5*		542.51	15/2−				
1085.6	13/2+	192.6		892.9	11/2+				
		358.3		727.31	9/2+				
1156.6		162.9		993.7					
1163.6	(13/2−)	141		1022.6	(9/2−)	[E2]			
1205.7	(3/2+)	616		590.06	7/2+				
		723		482.168	5/2+				
		1206		0.0	7/2+				
1239.47	19/2+	274.51 *9*	20&	964.99	17/2+	[M1+E2]			B(M1)(W.u.)=0.076 *25*; B(E2)(W.u.)=430 *140*
		522.81 *5*	100& *33*	716.659	15/2+	E2		0.01820	B(E2)(W.u.)=170 *60* Mult.: from Coulomb Excitation.
1278.1	(5/2+)	688		590.06	7/2+				
		1142		136.262	9/2+				
		1278		0.0	7/2+				
1304.8	15/2+	219.2		1085.6	13/2+				
		412.0		892.9	11/2+				
1307.11	21/2−	279.18 *3*		1027.94	19/2−				
		534.09 *7*		772.97	17/2−				
1380.1	(7/2+)	651		727.31	9/2+				
		1078		301.622	11/2+				
		1244		136.262	9/2+				
		1382		0.0	7/2+				
1380.6	(11/2+)	1078		301.622	11/2+				
		1244		136.262	9/2+				
		1382		0.0	7/2+				
1403.2	15/2−	861@		542.51	15/2−				

From ENSDF

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Adopted Levels, Gammas (continued)

γ(^{181}Ta) (continued)

E_i(level)	J^π_i	E_γ[†]	E_f	J^π_f	Mult.[‡]	α[a]	Comments
1403.2	15/2⁻	1066[@]	337.54	13/2⁻			
		1244[@]	158.554	11/2⁻	Q		Mult.: from DCO ratios (1998Sa60).
1403.35	(17/2)	860.7[b]	542.51	15/2⁻			E_γ: Observed in (n,γ).
		1065.7[@]	337.54	13/2⁻			
		1244.9[@]	158.554	11/2⁻			
1403.90	(15/2)	860.7[b]	542.51	15/2⁻			E_γ: Observed in (n,γ).
		1066.2[@]	337.54	13/2⁻			
		1245.5[@]	158.554	11/2⁻			
1419.6	(17/2⁻)	256	1163.6	(13/2⁻)	[E2]		
1472.7		69.0	1403.90	(15/2)			
1483.43	21/2⁻	177	1307.11	21/2⁻			
		455.3	1027.94	19/2⁻			
		710.6	772.97	17/2⁻			
1507.9	(9/2⁺)	1206	301.622	11/2⁺			
		1372	136.262	9/2⁺			
1539.31	21/2⁺	300.05 *21*	1239.47	19/2⁺			
		574.29 *9*	964.99	17/2⁺	E2	0.01449	B(E2)(W.u.)=190 *30* Mult.: from Coulomb Excitation.
1548.4	17/2⁺	243.7	1304.8	15/2⁺			
		462.6	1085.6	13/2⁺			
1563.4	(13/2⁺)	1262	301.622	11/2⁺			
		1427	136.262	9/2⁺			
1583.8	(17/2)	181	1403.2	15/2⁻			
1591.9	(19/2)	188.5	1403.35	(17/2)			
1608.85	23/2⁻	301.5	1307.11	21/2⁻			
		581.3	1027.94	19/2⁻			
1664.9	(11/2⁺)	1169	495.184	13/2⁺			
		1364	301.622	11/2⁺			
1685.3	(19/2)	212.4	1472.7				
1771.9	(15/2⁺)	1278	495.184	13/2⁺			
		1469	301.622	11/2⁺			
1776.3	23/2⁻	293	1483.43	21/2⁻			
1786.6	(21/2⁻)	367	1419.6	(17/2⁻)	[E2]		
1787.6	(19/2)	204	1583.8	(17/2)			
		384	1403.2	15/2⁻			
1803.7	(21/2)	211.8	1591.9	(19/2)			
1819.1	(19/2⁺)	270.2	1548.4	17/2⁺			
		514.3	1304.8	15/2⁺			
1863.09	23/2⁺	324.0	1539.31	21/2⁺			
		623.4	1239.47	19/2⁺			

Adopted Levels, Gammas (continued)

γ(^{181}Ta) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.‡
1866.0		1866#	100#	0.0	7/2+	
1932.76	25/2−	324.0		1608.85	23/2−	
		625.5		1307.11	21/2−	
1935.0		1935#	100#	0.0	7/2+	
2001.2	(17/2+)	1506		495.184	13/2+	
2014.7	(21/2)	227		1787.6	(19/2)	
		431		1583.8	(17/2)	
2097.0		2097#	100#	0.0	7/2+	
2098.1	25/2−	322		1776.3	23/2−	
2105.0		2105#	100#	0.0	7/2+	
2122.5	(21/2+)	303.0		1819.1	(19/2+)	
		574.5		1548.4	17/2+	
2210.1	25/2+	347		1863.09	23/2+	
		670.8		1539.31	21/2+	
2227.9		130		2098.1	25/2−	
		295		1932.76	25/2−	
2240.0		2240#	100#	0.0	7/2+	
2253.0		2253#	100#	0.0	7/2+	
2260.6	(25/2−)	474		1786.6	(21/2−)	[E2]
2262.6	(23/2)	248		2014.7	(21/2)	
		475		1787.6	(19/2)	
2272.0		2272#	100#	0.0	7/2+	
2276.3	27/2−	343		1932.76	25/2−	
		668		1608.85	23/2−	
2289.0		2289#	100#	0.0	7/2+	
2297.1		2161#	20# *2*	136.262	9/2+	
		2297#	100#	0.0	7/2+	
2400.1		2264#	100#	136.262	9/2+	
		2400#	90# *19*	0.0	7/2+	
2418.1		2412#	65# *18*	6.237	9/2−	
		2418#	100#	0.0	7/2+	
2448.1		2312#	40# *8*	136.262	9/2+	
		2448#	100#	0.0	7/2+	
2519.0		2519#	100#	0.0	7/2+	
2533.7	(25/2)	519		2014.7	(21/2)	
2580.1	27/2+	717.0		1863.09	23/2+	
2642.8	29/2−	710		1932.76	25/2−	

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f
2761.0		2761#	100#	0.0	7/2+
2800.0		2800#	100#	0.0	7/2+
2807.0		2807#	100#	0.0	7/2+
2812.0		2812#	100#	0.0	7/2+
2835.0		2835#	100#	0.0	7/2+
2845.0		2845#	100#	0.0	7/2+
2892.0		2892#	100#	0.0	7/2+
2898.0		2898#	100#	0.0	7/2+
2929.0		2929#	100#	0.0	7/2+
2967.0		2967#	100#	0.0	7/2+
2968.1	29/2+	758		2210.1	25/2+
3016.0		3016#	100#	0.0	7/2+
3021.3	31/2−	745		2276.3	27/2−
3023.0		3023#	100#	0.0	7/2+
3029.0		3029#	100#	0.0	7/2+
3035.0		3035#	100#	0.0	7/2+
3054.1		3048#	100#	6.237	9/2−
		3054#	85# *21*	0.0	7/2+
3065.0		3065#	100#	0.0	7/2+
3074.2		2938#	100#	136.262	9/2+
		3074#	71# *16*	0.0	7/2+
3081.0		3081#	100#	0.0	7/2+
3086.0		3086#	100#	0.0	7/2+
3092.0		3092#	100#	0.0	7/2+
3108.1		3102#	87# *14*	6.237	9/2−
		3108#	100#	0.0	7/2+
3320.0		3320#	100#	0.0	7/2+
3329.0		3329#	100#	0.0	7/2+
3407.0		3407#	100#	0.0	7/2+
6417.7		6281#		136.262	9/2+
		6418#		0.0	7/2+
1617.2+x	(21/2+)	213		1403.2+x	(19/2+)
1853.3+x	(23/2+)	236		1617.2+x	(21/2+)
		450		1403.2+x	(19/2+)
2113.0+x	(25/2+)	260		1853.3+x	(23/2+)
		496		1617.2+x	(21/2+)
2393.7+x	(27/2+)	281		2113.0+x	(25/2+)
		540		1853.3+x	(23/2+)

From ENSDF

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$\gamma(^{181}Ta)$ (continued)

† Except those noted, Eγ′s are weighted averages of values from ^{181}Hf β- decay, ^{181}W ε decay, ^{180}Ta(n,γ), ^{181}Ta IT decay, Coulomb Excitation, ^{176}Yb(^{11}B,α2nγ) and ^{181}Ta(^{238}U,^{238}U′γ). Δ(Eγ)=0.3 keV assumed for those from ^{176}Yb(^{11}B,α2nγ) (1998Dr09); and Δ(Eγ)=1 keV assumed for those from ^{176}Yb(^{11}B,α2nγ) (1998Sa60) and from ^{181}Ta(^{238}U,^{238}U′γ).

‡ From ^{181}Hf β- decay, except as noted.

From ^{181}Ta(γ,γ′).

@ See comments in Adopted Levels at 1403.3.

& From Coulomb Excitation.

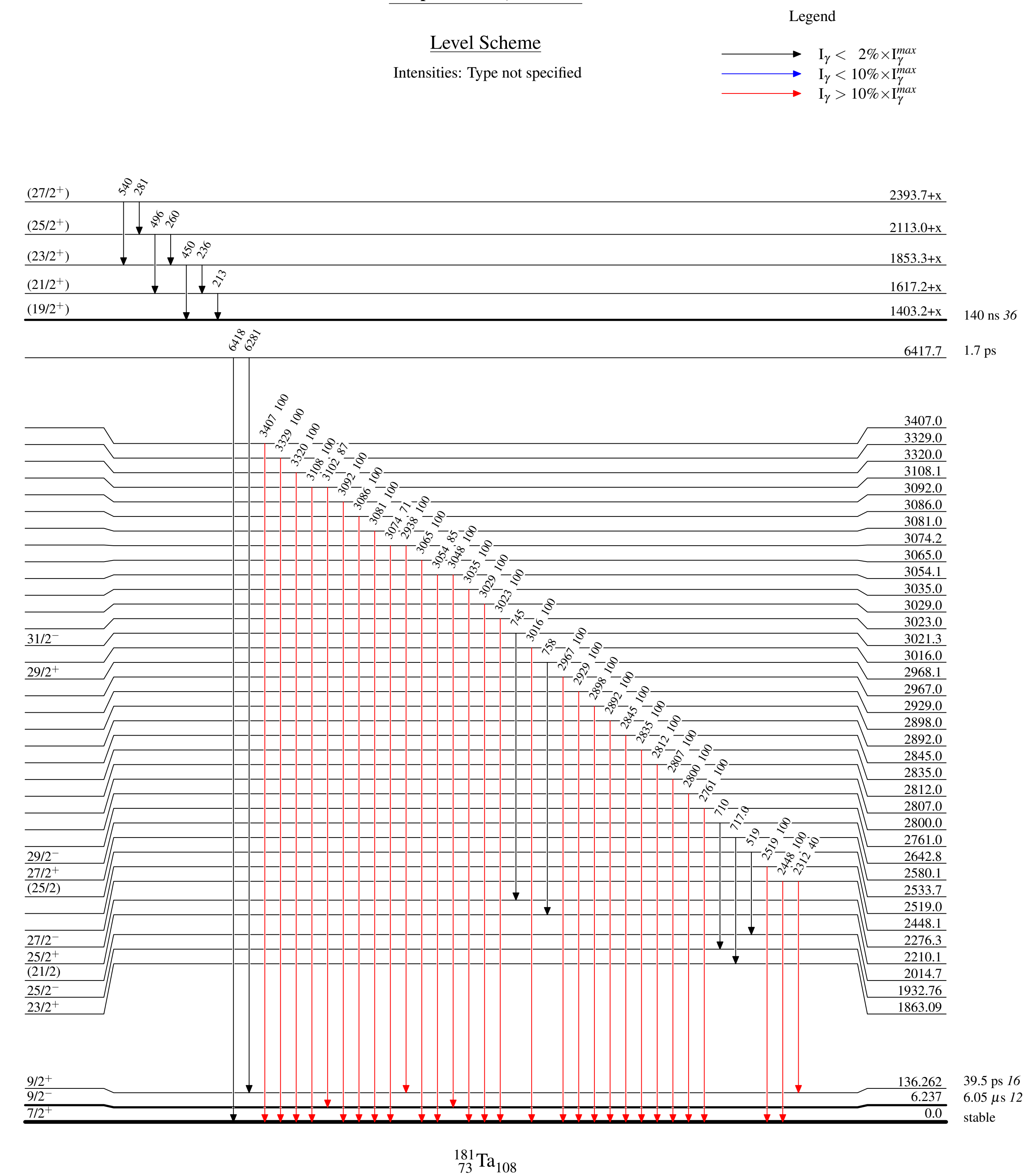
a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

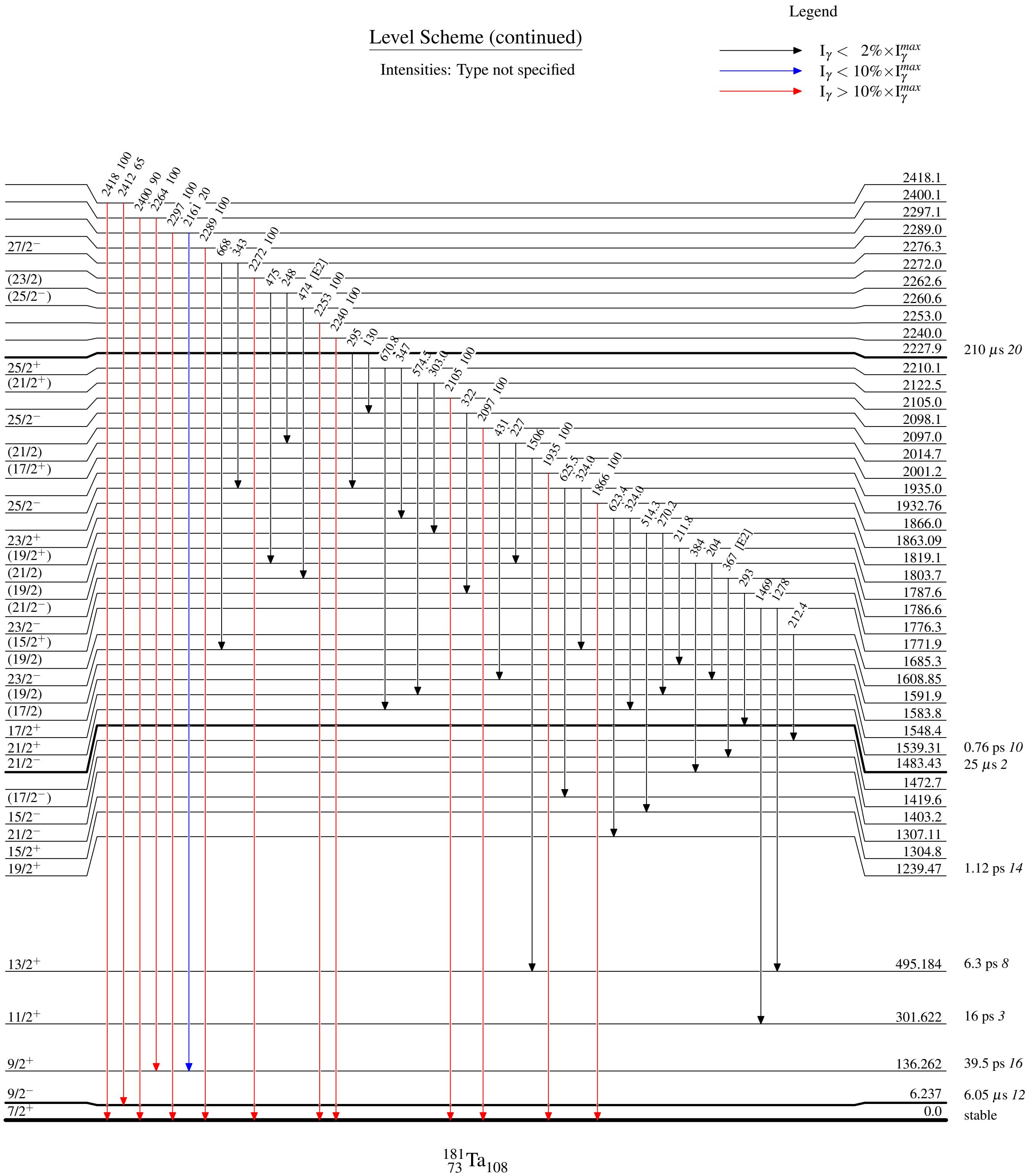
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

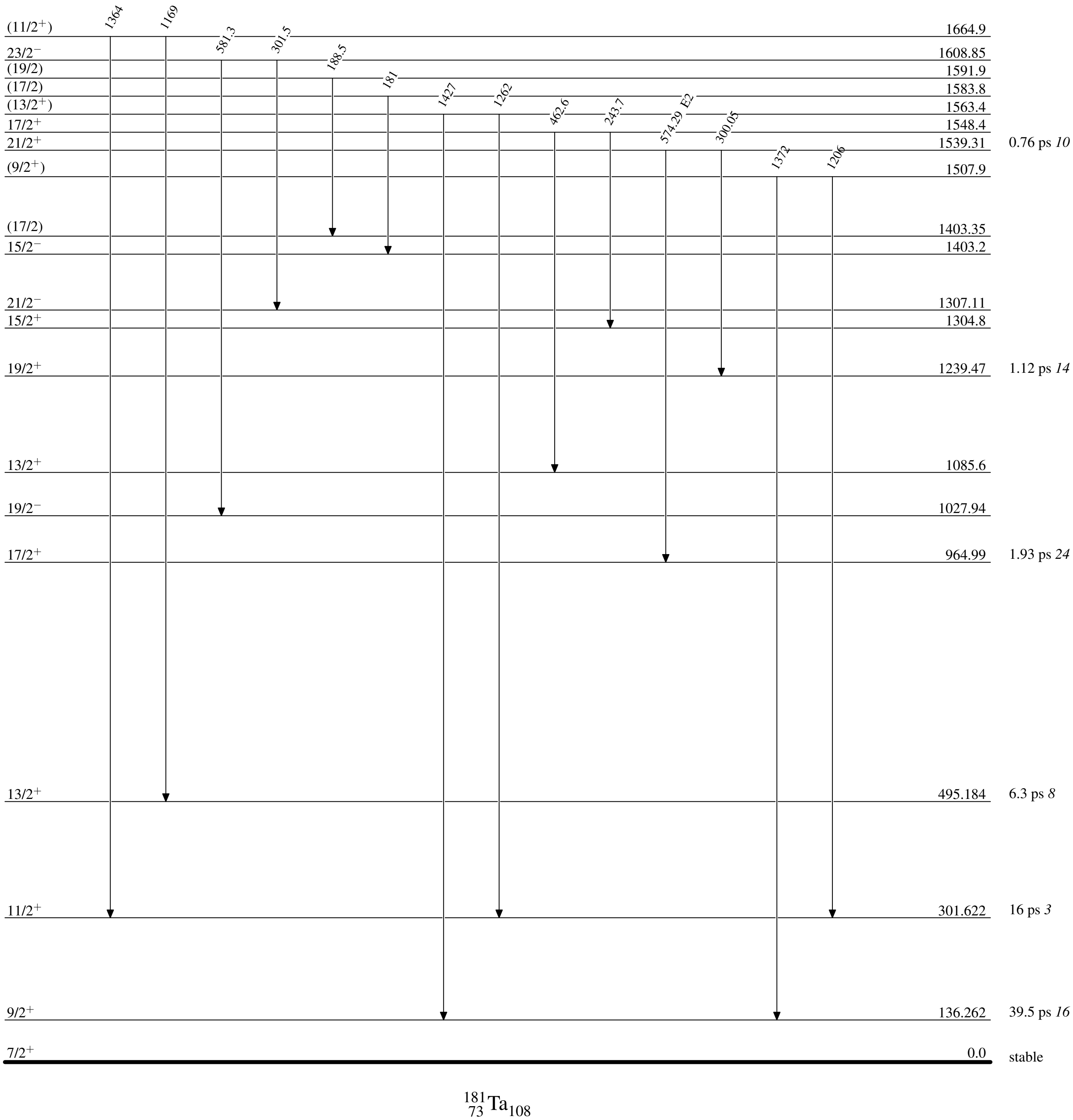
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

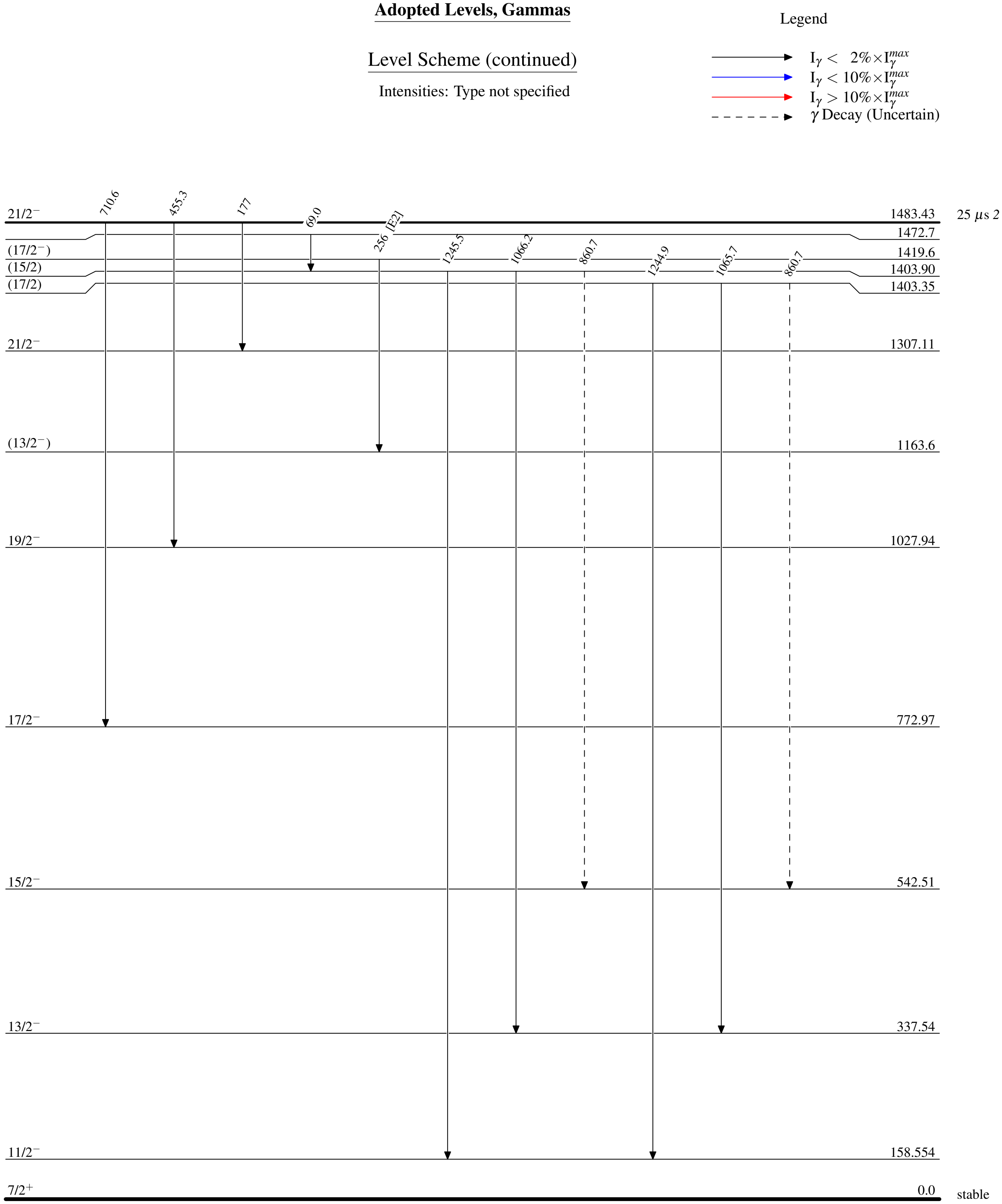
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

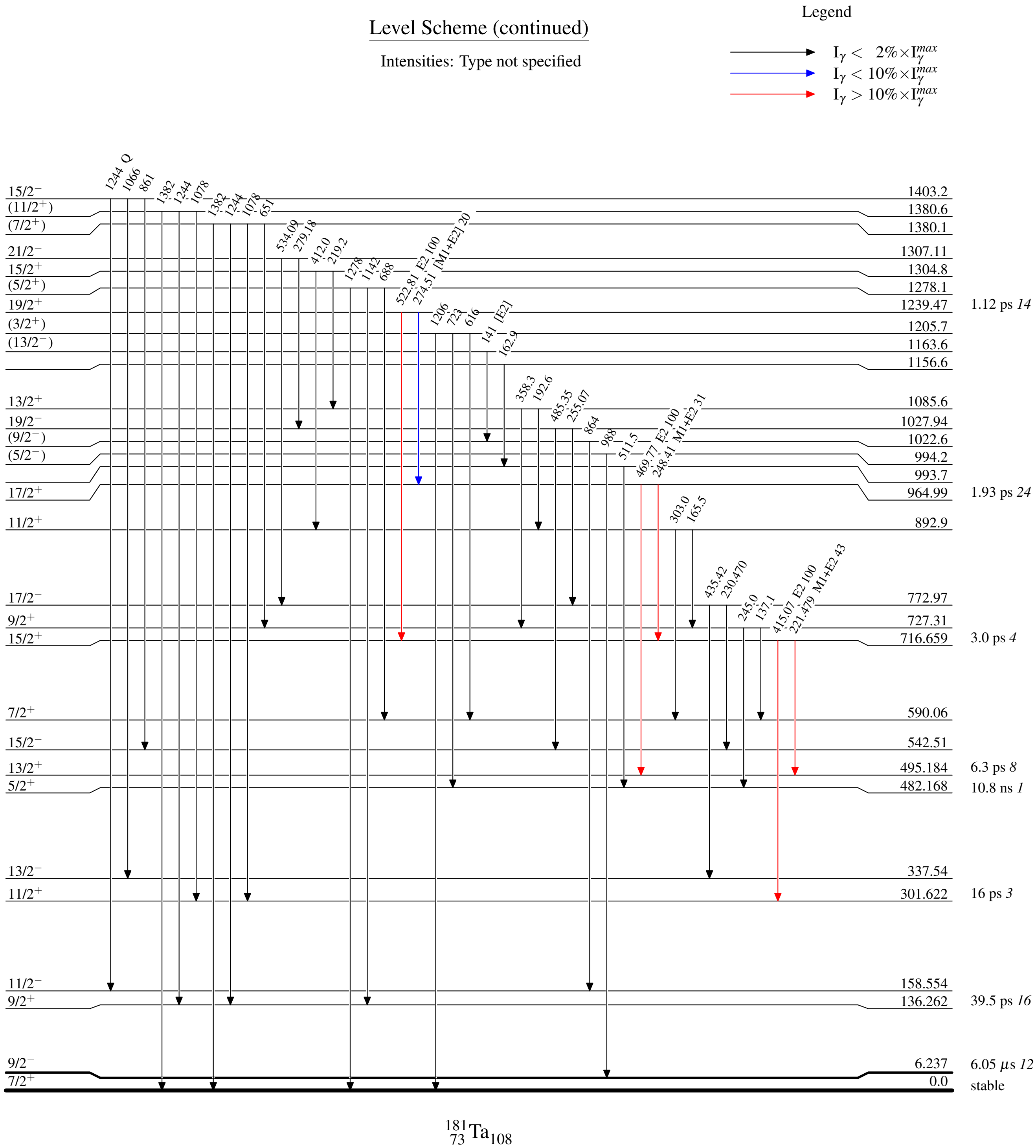


$^{181}_{73}Ta_{108}$

Adopted Levels, Gammas

Level Scheme (continued)

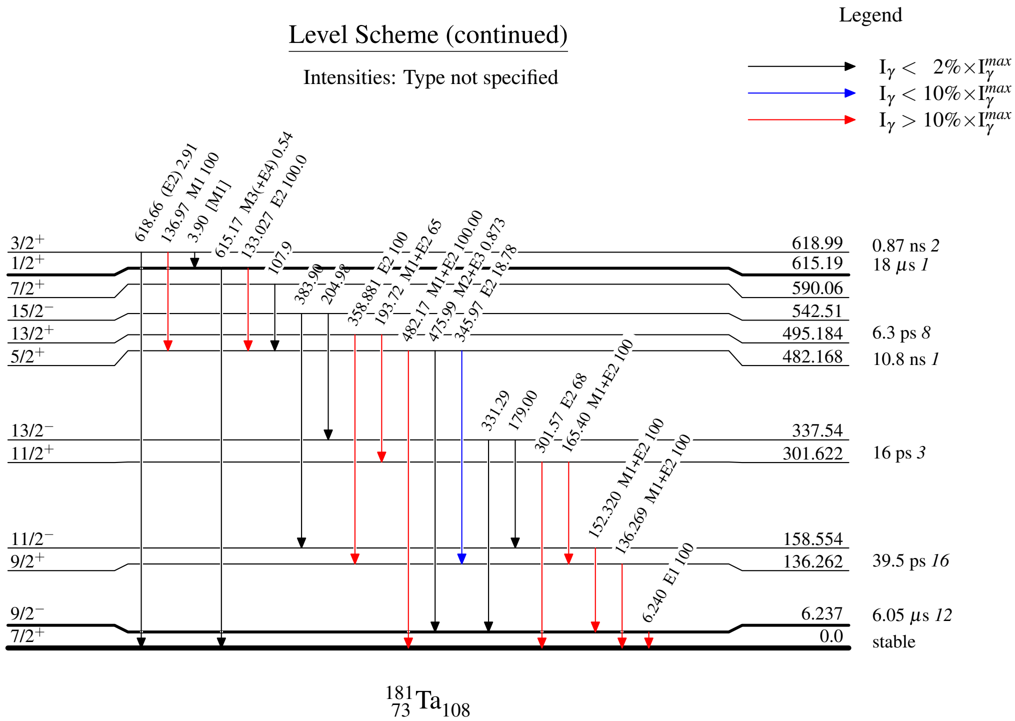
Intensities: Type not specified



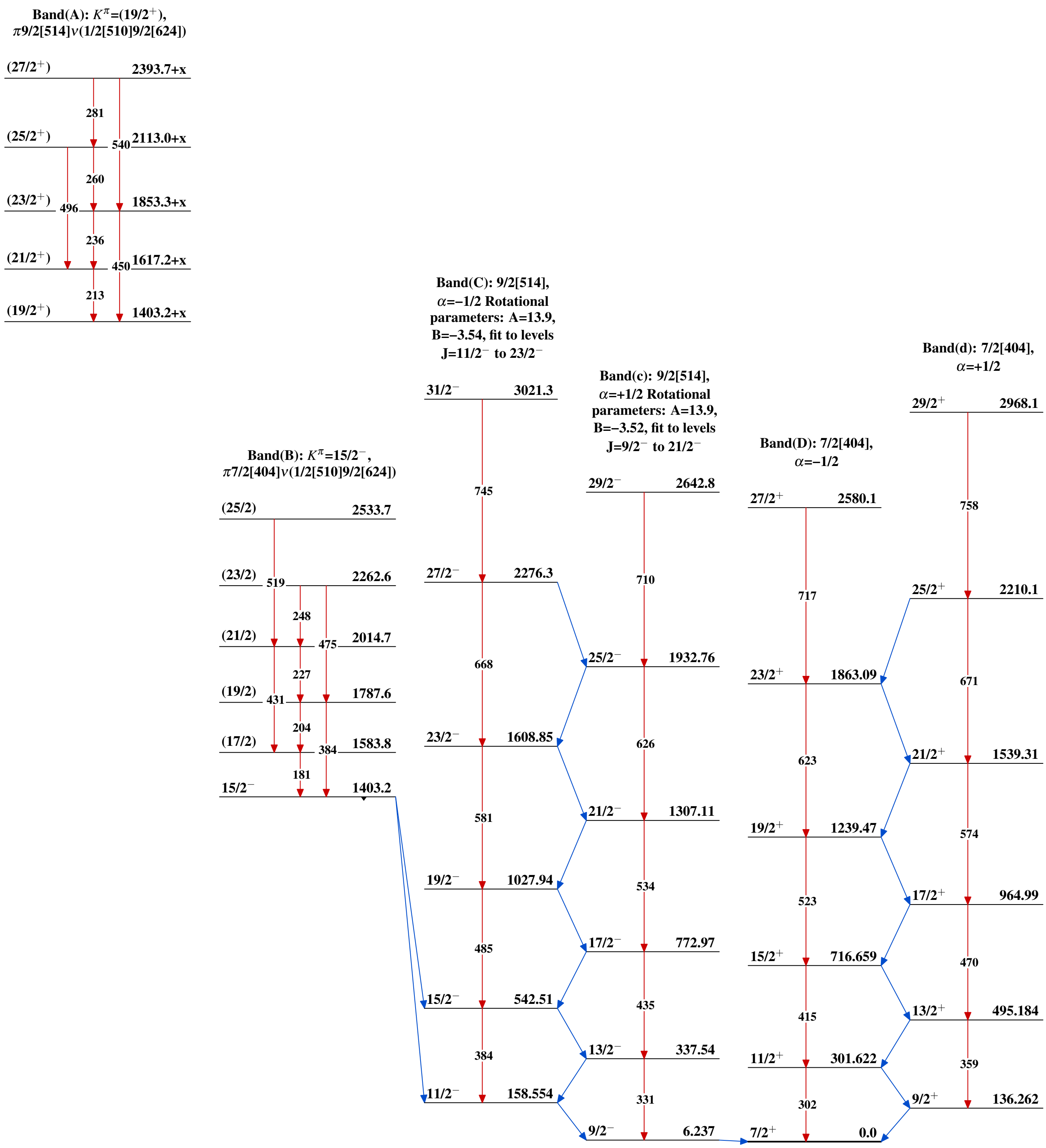
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

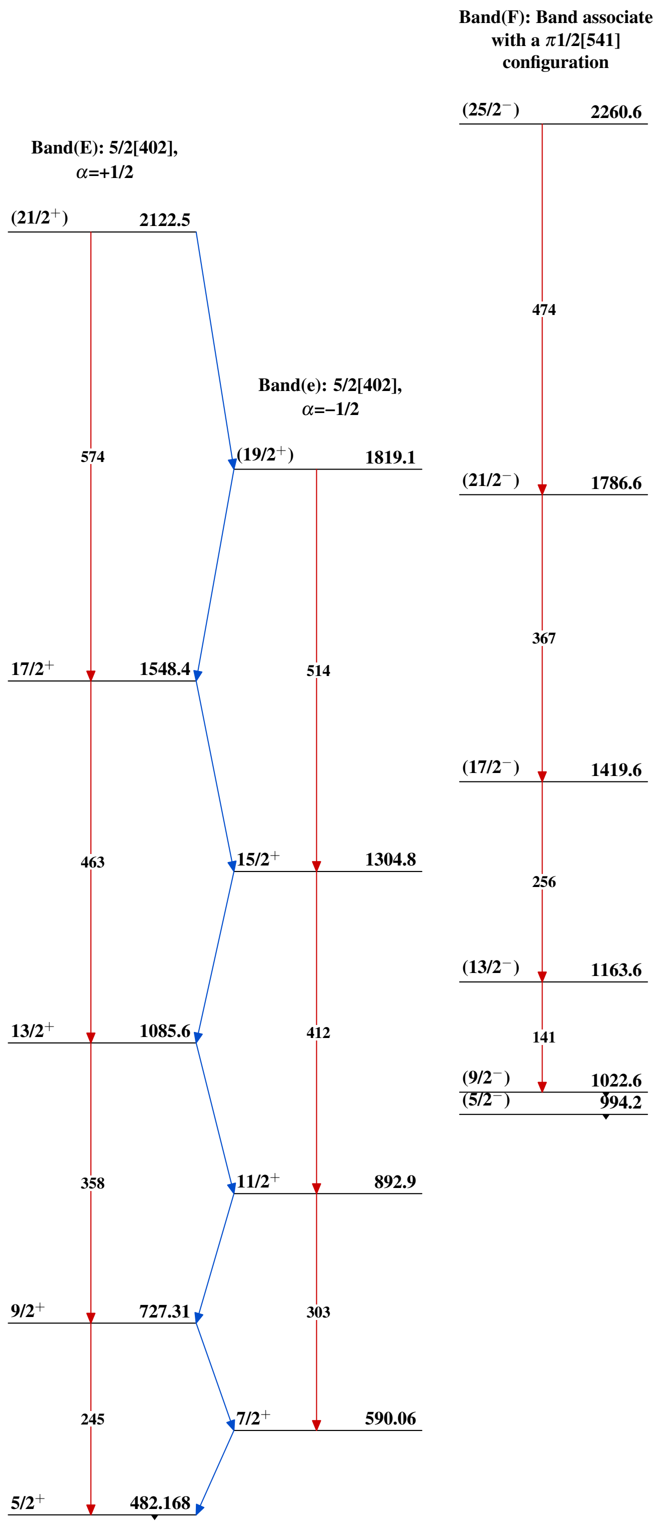


Adopted Levels, Gammas



$^{181}_{73}Ta_{108}$

Adopted Levels, Gammas (continued)



$^{181}_{73}Ta_{108}$