^{181}Ta(p,2nγ) 1979Ma08

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

E(p)=17 MeV. Measured Eγ, Iγ, γγ coin, pγ(θ), pγ(t), excitation function using Ge(Li) and LEPS detectors. Subset of results are published in 1978Sh09.
Others: 1984Zh02, 1971Ko17, 1967Co20, 1967Co26, 1967Bo08, 1967Iv04, 1966Gr04, 1963Re02, 1960Mo19.

^{180}W Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0&	0^+		
103.567& *5*	2^+		
337.557& *11*	4^+		
688.456& *15*	6^+		
1006.396@ *18*	2^-		
1082.386@ *18*	3^-		
1117.22a *6*	2^+		
1138.475& *25*	8^+		
1184.898@ *19*	4^-		
1232.68a *4*	3^+		
1307.581@ *19*	5^-		
1322.10 *19*			
1360.49a *3*	4^+		
1461.836@ *21*	6^-		
1529.05# *3*	8^-	5.53 ms *10*	$T_{1/2}$: from 1967Co20, 1967Co26. Other: 1967Iv04 report a $T_{1/2}$ of 5.2 ms *5* for a level in ^{180}W, however, do not assign the value to a specific level.
1535.63a *6*	5^+		
1568.17 *10*			
1624.21@ *3*	7^-		
1634.59c *6*	(3^-)		
1639.805b *24*	5	19.2 ns *3*	$T_{1/2}$: from 1979Ma08.
1664.19& *4*	10^+		
1693.60 *15*			
1702.98a *8*	6^+		
1725.59# *4*	9^-		
1729.85 *7*			
1764.44b *3*	6		
1784.95 *7*			
1830.85@ *4*	8^-		
1851.16 *6*			
1855.20 *16*			
1911.59b *3*	7		
1918.13 *19*			
1926.44 *16*			
1932.19a *11*	7^+		
1945.07# *5*	10^-		
1954.45 *15*			
2024.49@ *8*	9^-		
2059.35 *12*			
2082.55b *5*	8		

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^{181}Ta(p,2nγ) 1979Ma08 (continued)

^{180}W Levels (continued)

E(level)†	E(level)†	Jπ‡	E(level)†	Jπ‡
2117.53 *12*	2186.98# *12*	11⁻	2284.00@ *14*	10⁻
2127.40 *8*	2235.19& *11*	12⁺	2451.63# *13*	12⁻
2133.10 *8*	2273.70*b* *7*	9	2501.09@ *13*	11⁻

† From a least-squares fit to Eγ by evaluator.
‡ Spin, parity, and configuration assignments from 1979Mo08; based on band structure and γ-ray angular distribution results.
# Band(A): Kπ=8⁻ band. Probable configuration=((π7/2[404])+(π9/2[514]))+(ν7/2[514])+(ν9/2[624]).
@ Band(B): Kπ=2⁻ octupole rotational band. 1979Ma08 suggest that there is a significant 2-qp component with a configuration of ((π5/2[402)+(π9/2[514])).
& Band(C): Kπ=0⁺ g.s. rotational band.
a Band(D): Kπ=2⁺ γ rotational band.
b Band(E): K=5 rotational band.
c Band(F): Kπ=(3⁻) bandhead.

γ(^{180}W)

Eγ†	Iγ	Ei(level)	Jiπ	Ef	Jfπ	Mult.‡	Comments
75.987 *10*	20	1082.386	3⁻	1006.396	2⁻		
102.513 *20*	22	1184.898	4⁻	1082.386	3⁻		
103.567 *20*	280	103.567	2⁺	0.0	0⁺	E2	Mult.: from α(K)exp=3.0 *5* (1967Co26).
x105.15 *25*	3						
122.688 *20*	14	1307.581	5⁻	1184.898	4⁻		
124.631 *20*	21	1764.44	6	1639.805	5		
x126.26 *26*	2						
147.156 *20*	14	1911.59	7	1764.44	6		
154.232 *35*	5	1461.836	6⁻	1307.581	5⁻		
162.43 *5*	2	1624.21	7⁻	1461.836	6⁻		
170.948 *50*	5	2082.55	8	1911.59	7		
178	5	1639.805	5	1461.836	6⁻		
178.509 *20*	100	1184.898	4⁻	1006.396	2⁻		
191.5 *3*	1	2273.70	9	2082.55	8		
x195.3	5						
196.54 *3*	50	1725.59	9⁻	1529.05	8⁻		
206.7 *7*	1	1830.85	8⁻	1624.21	7⁻		
211.35 *5*	11	1851.16		1639.805	5		
219.49 *4*	13	1945.07	10⁻	1725.59	9⁻		
225.189 *20*	150	1307.581	5⁻	1082.386	3⁻	(Q)	
233.985 *30*	1000	337.557	4⁺	103.567	2⁺	E2	Mult.: from ce(K)/ce(L)=2.1 *3* (1967Co26), ce(K)/ce(L)=2.1 *5*, α(K)exp=0.11 (1967Bo08).
x235.80 *15*	8						
241.92 *16*	5	2186.98	11⁻	1945.07	10⁻		
x258.84 *17*	3						
264.7 *6*	≤9	2451.63	12⁻	2186.98	11⁻		
271.75 *5*	13	1911.59	7	1639.805	5		
276.941 *20*	110	1461.836	6⁻	1184.898	4⁻	(Q)	
279.306 *35*	20	1639.805	5	1360.49	4⁺		
x285.15 *16*	4						
316.625 *30*	70	1624.21	7⁻	1307.581	5⁻	(Q)	
318.24 *11*	8	2082.55	8	1764.44	6		
319.74@ *17*	8	1954.45		1634.59	(3⁻)		

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^{181}Ta(p,2nγ) 1979Ma08 (continued)

γ(^{180}W) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
329.5 *1*	9	2059.35		1729.85			
332.241 *30*	60	1639.805	5	1307.581	5^-		
350.898 *10*	660	688.456	6^+	337.557	4^+	E2	Mult.: from α(K)exp=0.039 *10*, ce(K)/ce(L)=3.6 *10* (1967Bo08).
x353.11 *38*	3						
362.10 *6*	4	2273.70	9	1911.59	7		
369.015 *30*	32	1830.85	8^-	1461.836	6^-	(Q)	
390.579 *30*	170	1529.05	8^-	1138.475	8^+	E1	Mult.: from α(K)exp=0.012 *4* (1967Bo08).
400.26 *8*	25	2024.49	9^-	1624.21	7^-	(Q)	
401.84 *12*	18	1634.59	(3^-)	1232.68	3^+		
x409.10 *11*	7						
415.94 *10*	6	1945.07	10^-	1529.05	8^-	(Q)	
x419.47 *15*	7						
424.50 *8*	8	1784.95		1360.49	4^+		
x447.44 *14*	5						
450.0 *5*	7	1634.59	(3^-)	1184.898	4^-		
450.02 *3*	240	1138.475	8^+	688.456	6^+	E2	Mult.: from α(K)exp=0.018 *3*, ce(K)/ce(L)=3.6 *11* (1967Bo08).
453.15 *14*	7	2284.00	10^-	1830.85	8^-		
454.88 *3*	44	1639.805	5	1184.898	4^-		
461.39 *17*	3	2186.98	11^-	1725.59	9^-		
x465.71 *5*	15						
476.6 *1*	2	2501.09	11^-	2024.49	9^-		
x493.83 *15*	5						
506.56 *12*	8	2451.63	12^-	1945.07	10^-		
517.37 *4*	26	1634.59	(3^-)	1117.22	2^+		
525.71 *3*	27	1664.19	10^+	1138.475	8^+	(Q)	
x534.4[@] *3*	1						
552.0 *3*	4	1634.59	(3^-)	1082.386	3^-		
552.4 *2*	4	1784.95		1232.68	3^+		
571.0 *1*	4	2235.19	12^+	1664.19	10^+		
x609.24	4						
619.24 *22*	6	1307.581	5^-	688.456	6^+		E_γ: value of 609.24 in Table 1 of 1979Ma08 is considered a misprint by the evaluator.
669.09 *15*	5	1006.396	2^-	337.557	4^+		
x669.32 *10*	12						
x673.46[@] *13*	8						
x724.10 *10*	10						
x741.57 *14*	7						
744.78 *3*	35	1082.386	3^-	337.557	4^+		
x755.3 *3*	4						
780[@]	≤2	1117.22	2^+	337.557	4^+		
x780.54 *8*	18						
788.0 *3*	3	1926.44		1138.475	8^+		
794	2	1932.19	7^+	1138.475	8^+		
847.0	3	1535.63	5^+	688.456	6^+		
847.20 *5*	25	1184.898	4^-	337.557	4^+		
x853.4 *2*	5						
x859.5 *19*	5						
x876.7 *4*	2						
879.6[@] *3*	4	1568.17		688.456	6^+		
886.6[@] *2*	4	2024.49	9^-	1138.475	8^+		
895.26 *10*	7	1232.68	3^+	337.557	4^+		

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^{181}Ta(p,2nγ) 1979Ma08 (continued)

γ(^{180}W) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ	α [#]	Comments
902.84 *2*	440	1006.396	2^-	103.567	2^+	E1+M2	−0.16 *7*	0.0029 *8*	α(K)=0.0024 *7*; α(L)=0.00037 *11* Mult.: from A_2=0.47 *7*, A_4=−0.10 *15* from γ(θ) in (p,2nγ), and α(K)exp=0.0046 *6* (^{180}Re ε decay). Additional E3 mixing with δ(E3/E1)=−0.64 *17* is consistent with these data (1971Ko17).
951.25 *12*	6	1639.805	5	688.456	6^+				
969.83 *18*	9	1307.581	5^-	337.557	4^+				
979.05 *12*	9	2117.53		1138.475	8^+				
984.2 *3*	3	1322.10		337.557	4^+				
988.92 *8*	9	2127.40		1138.475	8^+				
994.62 *8*	8	2133.10		1138.475	8^+				
1006.46 *10*	4	1006.396	2^-	0.0	0^+				
[x]1011.82 *15*	11								
1013.4 *2*	29	1117.22	2^+	103.567	2^+				
1014.49 *10*	30	1702.98	6^+	688.456	6^+				
1022.92 *6*	29	1360.49	4^+	337.557	4^+				
1041.40 *7*	19	1729.85		688.456	6^+				
[x]1066.8 *3*	3								
[x]1077.7 *5*	2								
1081.52 *12*	7	1184.898	4^-	103.567	2^+				
[x]1089.5 *6*	1								
1096.3 *2*	3	1784.95		688.456	6^+				
[x]1100.1 *4*	2								
1117.24 *7*	20	1117.22	2^+	0.0	0^+				
1129.09 *4*	44	1232.68	3^+	103.567	2^+				
1166.74 *16*	10	1855.20		688.456	6^+				
1198.07 *6*	25	1535.63	5^+	337.557	4^+				
1218.8 *3*	5	1322.10		103.567	2^+				
1229.6 *2*	5	1918.13		688.456	6^+				
1230.62 *11*	8	1568.17		337.557	4^+				
1237.96 *18*	22	1926.44		688.456	6^+				
1243.73 *11*	15	1932.19	7^+	688.456	6^+				
1257.16 *9*	17	1360.49	4^+	103.567	2^+	(Q)			
1266.2 *3*	5	1954.45		688.456	6^+				
1297.4 *3*	5	1634.59	(3^-)	337.557	4^+				
1302 [@]	≤1	1639.805	5	337.557	4^+				
1322.2 *4*	3	1322.10		0.0	0^+				
[x]1333.0 *2*	7								
1356.04 *15*	10	1693.60		337.557	4^+				
1365.46 *13*	14	1702.98	6^+	337.557	4^+				
1392.22 *16*	8	1729.85		337.557	4^+				
1447.2 *2*	7	1784.95		337.557	4^+				
[x]1458.2 *5*	3								
[x]1461.1 *5*	3								
[x]1476.4 *5*	3								
[x]1483.6 *3*	7								
[x]1505.5 *3*	4								
[x]1529.8 *5*	3								
1581.2 *6*	3	1918.13		337.557	4^+				
1617.6 *5*	2	1954.45		337.557	4^+				
[x]1632.9 *6*	3								
[x]1778.8 *5*	3								

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^{181}Ta(p,2nγ) 1979Ma08 (continued)

$\gamma(^{180}W)$ (continued)

† From 1979Ma08. Uncertainties are increased from those given in Table 1 to reflect the systematic uncertainty stated by the authors to be ≈20 eV at 200 keV and ≈50 eV at 1 MeV.

‡ From $\gamma(\theta)$ in 1979Ma08, except where noted. The angular distribution coefficients A_2 and A_4 have large uncertainties due to low statistics. Therefore, only those coefficients which indicated stretched Q transitions are used to tentatively assign multipolarities.

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.

@ Placement of transition in the level scheme is uncertain.

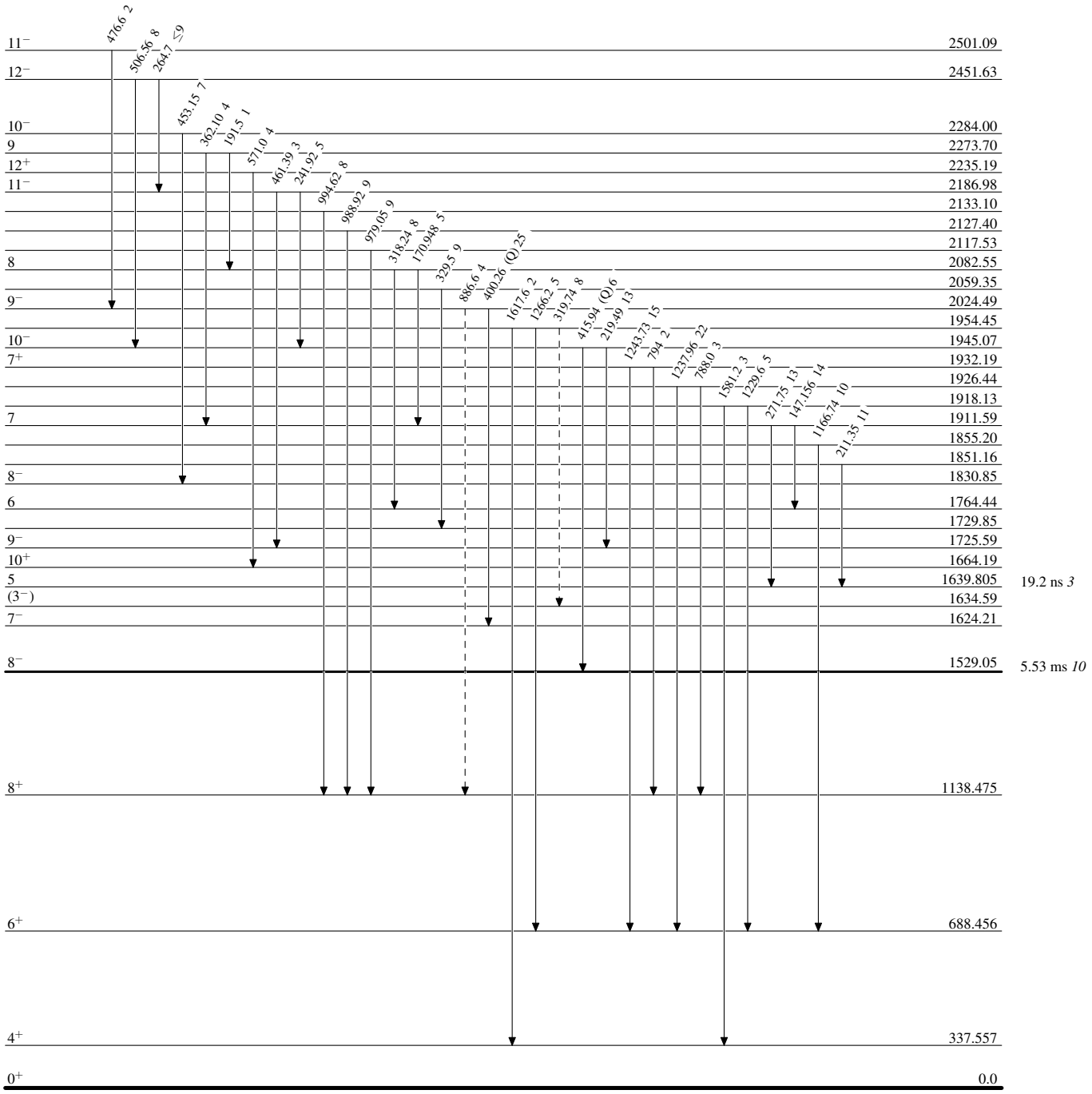
x γ ray not placed in level scheme.

^{181}Ta(p,2nγ) 1979Ma08

Level Scheme

Intensities: Type not specified

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)

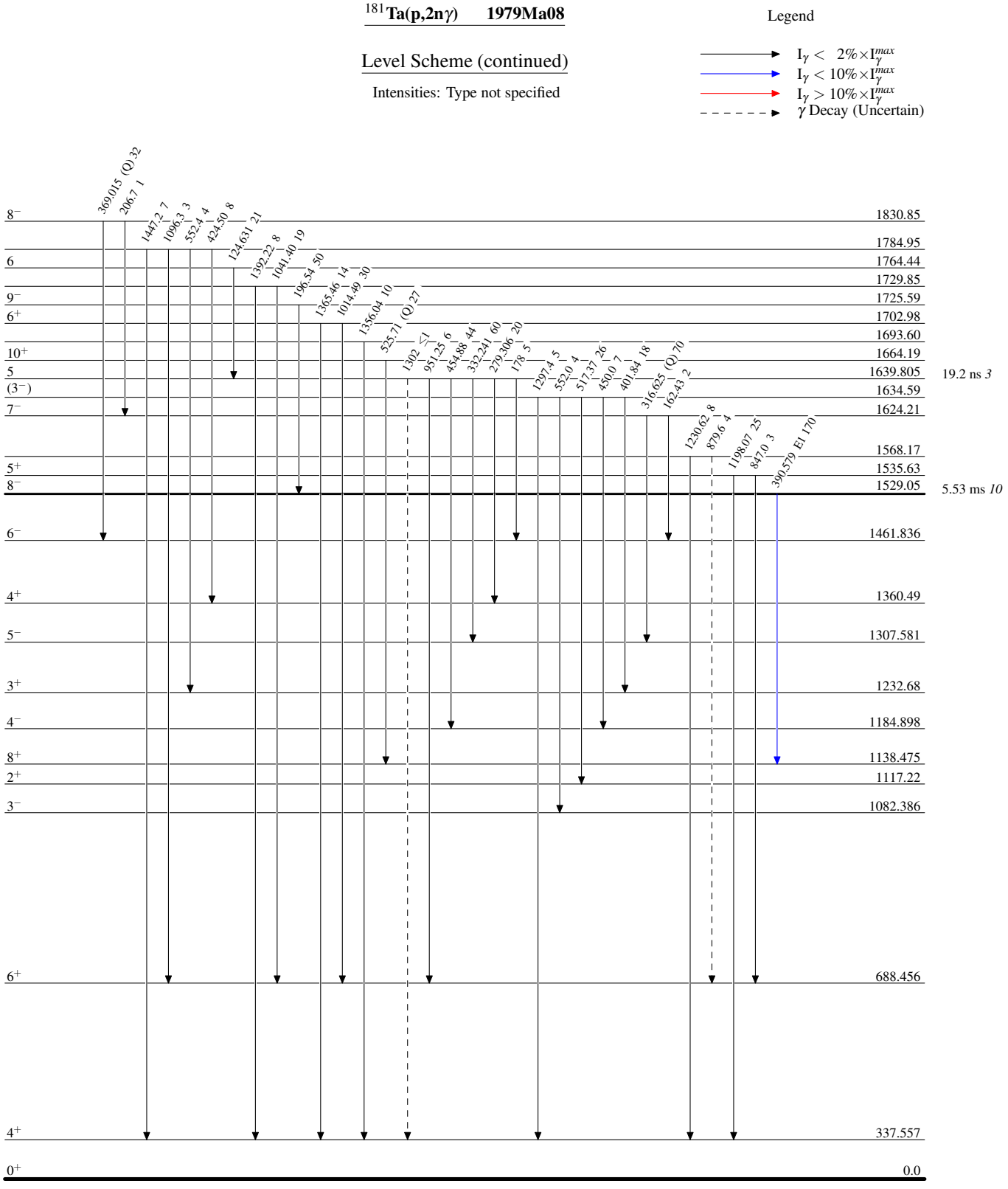


$^{180}_{74}W_{106}$

^{181}Ta(p,2nγ) 1979Ma08

Level Scheme (continued)

Intensities: Type not specified

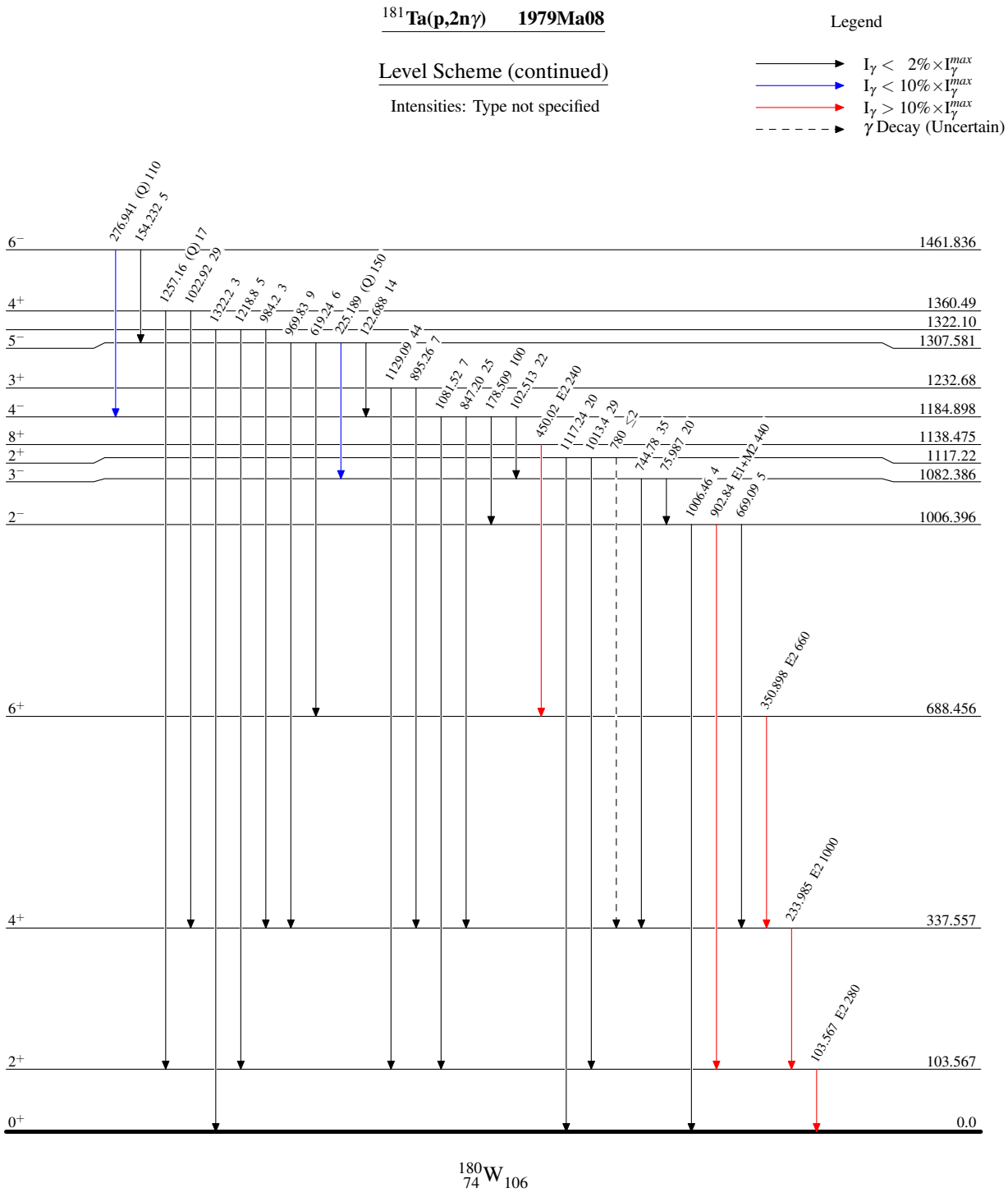


$^{180}_{74}W_{106}$

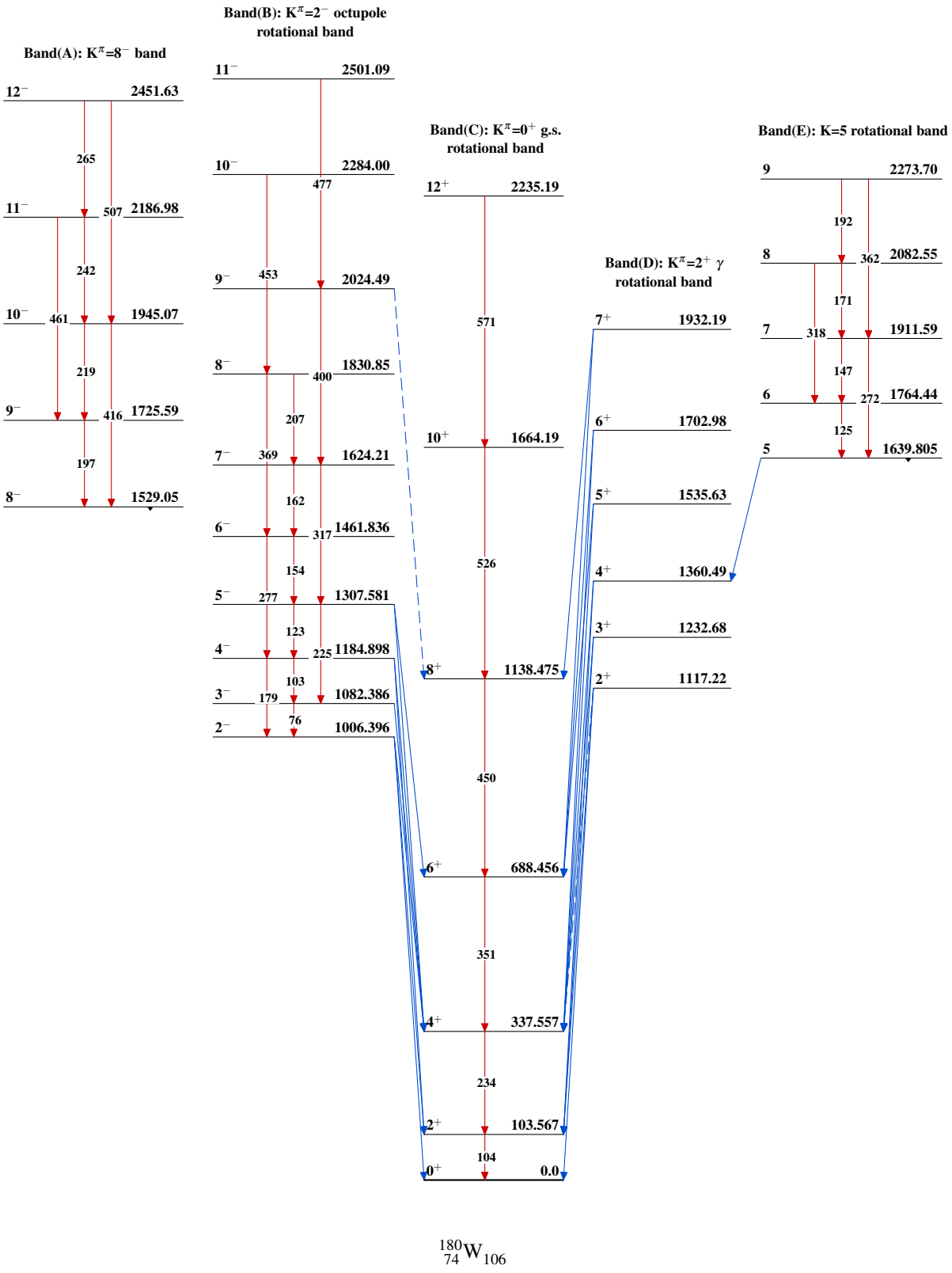
^{181}Ta(p,2nγ) 1979Ma08

Level Scheme (continued)

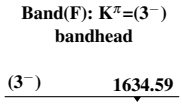
Intensities: Type not specified



^{181}Ta(p,2nγ) 1979Ma08



^{181}Ta(p,2nγ) 1979Ma08 (continued)



$^{180}_{74}W_{106}$