^{181}Ta(n,γ) E=0.002-3 keV 1977St15

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

$J^{\pi}(^{181}\text{Ta g.s.})=7/2^+$.

1977St15: energies and intensities of primary γ rays were measured for 19 resonances in 4-200 eV region: 4.28, 4^+; 10.34, 3^+; 13.95, 4^+; 20.3, 3^+; 23.9, 4^+; 30.0, 3^+; 35.2, 3^+; 35.9, 4^+; 39.1, 4^+; 49.2, 3^+; 63.1, 4^+; 82.9, 4^+; 99.32, 3^+; 103.5+105.5, 3^+; 115.1, 4^+; 126.5, 3^+; 166.4, 4^+; 194.8, 4^+; 200.0, 3. The γ-ray spectra were summed over groups of resonances in the broad regions: 20-100, 100-200, 200-400, 600-1000, and 1000-3000 eV. From the relative strength of the primary γ rays in broad resonance capture, strong M1,E1 feeding of J=3,4 levels was distinguished from weak M1,E1 feeding of J=2,5 levels. Population of levels by discrete resonance capture primary γ rays provided a discrimination between J=2 and J=5.

^{182}Ta Levels

E(level)	J^{π}[‡]	Dipole strength functions[†]	Comments
0.0	$3^-,4^-$	1.74,1.28	
16.9 *7*	5^+	<0.01,0.10	
90.2? *17*	5^+[@]	0.04,<0.01	
98.2 *5*	$3^-,4^-$	2.35,2.16	
114.6 *5*	$3^-,4^-$	1.62,1.09	
149.9[d] *11*			
173.0 *5*	5^-	<0.01,0.40	
237.3 *5*	5^-	0.07,0.62	
245.8[d] *16*			
251.5 *10*	$3^+,4^+$	0.17,0.15	
270.1[c] *5*	2^-[&]	0.98,0.19	
292.5 *4*	5^-	0.05,0.93	
359.6 *13*	$3^-,4^-$[#]	0.28,0.25	
366.5 *13*	$3^+,4^+$	0.11,0.15	
458.2[d] *12*			
477.4 *5*	$3^-,4^-$	1.15,0.67	
491.0 *14*	2^-	0.60,0.09	
505.4 *6*	5^+	<0.01,0.16	
547.0 *5*	$3^-,4^-$	0.61,0.61	
566.5 *5*	$3^-,4^-$	0.94,0.49	
571.8[d] *22*			
627.8 *5*	5^-	0.14,0.62	
650.5 *5*	$3^-,4^-$	0.95,1.91	
659.2 *5*	$2^-,3^-,4^-$	1.27,0.51	Additional information 1.
662.8[d] *10*			
667.9 *14*	2^-	1.00,<0.01	
701.1 *5*	5^-	0.17,0.78	
719.6 *5*	$3^-,4^-$	0.93,0.40	
740.9 *9*	$2^-,3^-,4^-$	0.72,0.18	
781.9 *5*	5^-	0.06,2.46	
791.0[d] *16*			
816.7 *5*	$3^-,4^-$	1.12,0.91	
830.5[d] *16*			
835.9 *5*	$3^-,4^-$	0.62,0.80	
842.0 *12*	$3^-,4^-,5^-$	0.25,0.74	
856.1 *5*	$3^-,4^-$[#]	0.41,0.23	
881.2 *8*	$3^+,4^+,5^+$	0.03,0.20	
897.5 *5*	$3^-,4^-$	0.37,0.80	
910.3 *5*	5^-	0.01,1.31	

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^{181}Ta(n,γ) E=0.002-3 keV 1977St15 (continued)

^{182}Ta Levels (continued)

E(level)	J$^{\pi}$‡	Dipole strength functions†
914.7 *5*	3$^-$,4$^-$	0.73,0.78
939.6 *15*	5$^-$	<0.01,0.17
960.0 *15*	3$^-$,4$^-$#	0.24,0.29
985.6 *5*	3$^-$,4$^-$	0.74,0.38
999.8 *8*	3$^-$,4$^-$	0.27,0.20
1021.6 *15*	3$^+$,4$^+$#	0.16,0.07
1028.4 *6*	3$^-$,4$^-$	1.81,0.25
1049.9 *9*	3$^-$,4$^-$	0.56,0.54
1056.6 *5*	3$^-$,4$^-$	0.85,1.13
1082.0 *5*	3$^-$,4$^-$	0.55,1.45
1101.2 *8*	5$^-$	0.02,0.39
1113.6 *5*	5$^-$	0.20,1.10
1125.0[d] *15*		
1136.9 *6*	3$^-$,4$^-$	0.27,0.38
1150.4 *5*	3$^-$,4$^-$	0.45,0.60
1170.4 *6*	3$^-$,4$^-$	0.31,1.06
1196.0 *10*	2$^-$,3$^-$,4$^-$	0.73,0.29
1203.1 *18*	3$^+$,4$^+$,5$^+$	0.27,0.27
1216.1 *11*	2$^-$	0.52,0.05
1229.7 *5*	3$^-$,4$^-$	0.30,1.77
1240.4 *5*	3$^-$,4$^-$	0.76,0.39
1260.1 *5*	3$^-$,4$^-$	0.97,0.30
1269.5 *5*	3$^-$,4$^-$	0.35,1.74
1279.8 *5*	3$^-$,4$^-$	0.42,1.94
1284.4 *5*	3$^-$,4$^-$	0.71,0.47
1298.6 *10*	(2 to 5)	
1302.5 *6*	3$^-$,4$^-$	0.33,0.70
1321.0 *15*	3$^-$,4$^-$	1.56,1.04
1326.0 *22*	5$^-$	<0.01,0.80
1350.5 *9*	3$^-$,4$^-$	0.42,0.68
1360.4 *8*	5$^-$	0.15,0.60
1371.1 *5*	3$^-$,4$^-$	1.06,2.15
1377.3 *14*	3$^-$,4$^-$	1.59,0.42
1389.0 *5*	3$^-$,4$^-$	1.33,0.92
1393.4 *8*	3$^-$,4$^-$	0.72,1.33
1416.7 *15*	3$^-$,4$^-$	0.85,0.21
1445.1 *16*	3$^-$,4$^-$	0.63,1.26
1452.2 *30*	3$^-$,4$^-$	0.56,0.55
1471.9 *7*	3$^-$,4$^-$	1.16,0.65
1479.7 *5*	3$^-$,4$^-$	1.58,1.74
1490.4 *15*	3$^-$,4$^-$	0.81,0.45
1496.4 *5*	3$^-$,4$^-$	1.44,1.66
1527.1 *5*	3$^-$,4$^-$	0.29,2.11
1538.1 *15*	3,4,5	0.68,0.28
1541.7 *6*	3$^-$,4$^-$	0.77,0.82
1545.6 *23*	2$^-$	0.53,0.23
1551.6 *5*	5$^-$	0.01,<0.71
1555.7 *8*	5$^-$	<0.01,0.95
1570.8 *12*	2$^-$	0.49,0.12
1577.2 *8*	3$^-$,4$^-$	1.20,0.93
1582.3 *6*	3$^-$,4$^-$	1.35,2.23
1604.9 *17*	3$^-$,4$^-$	0.60,1.91
1612.0 *8*	3$^-$,4$^-$	0.74,0.42
1617.5 *25*	3$^-$,4$^-$	2.5,1.11
1628.3 *8*	3$^-$,4$^-$	0.40,1.55
1635.6 *8*	3$^-$,4$^-$	0.52,0.54
1641.8 *15*	3$^-$,4$^-$	0.59,0.97
1646.1[d] *20*	(2 to 5)	
1650.5 *27*	5$^-$	<0.01,0.87
1657.6 *6*	2$^-$,3$^-$,4$^-$	1.10,0.37
1661.7 *6*	5$^-$	0.10,0.75
1667.0[d] *15*	(2 to 5)	
1674.3 *6*	3$^-$,4$^-$	0.55,0.62
1679.6 *5*	3$^-$,4$^-$	0.98,1.18
1695.4 *5*	3$^-$,4$^-$	1.30,0.86
1701.1 *15*	3$^-$,4$^-$	0.55,1.13
1711.6 *12*	3$^-$,4$^-$	1.50,0.69
1724.7 *9*	3$^-$,4$^-$	0.38,0.58
1734.1 *9*	3,4	0.03,0.19
1746.5 *9*	3$^-$,4$^-$	0.53,2.19
1756.3 *14*	5$^-$	<0.01,0.16
1762.5 *12*	5$^-$	<0.01,0.63
1765.9[d] *19*	(2 to 5)	
1769.6 *10*	3,4	0.22,0.01
1778.3 *12*	3$^-$,4$^-$	0.56,0.63
(S(n)+x[ae])	3$^+$,4$^+$[b]	

† Dipole strength function is defined in 1977St15, it is proportional to (Eγ)$^{-3}$, The units are (MeV^{-3}x10^7). The first value is for J(resonance)=3$^+$, second for 4$^+$ resonance.

‡ As proposed by 1977St15 based on comparison of partial strength functions for dipole radiations (deduced from measured gamma-ray intensities and energies) with expected values for different spin combinations.

Parity from averaged γ-ray spectra.

@ 3$^+$,4$^+$ not completely ruled out.

& 3$^-$,4$^-$ not completely ruled out.

[a] S(n)+E(n), where E(n)=0.002-3 keV, S(n)=6062.94 *11* (2012Wa38).

[b] s-wave capture in ^{181}Ta (g.s. J^{π}=7/2$^+$).

[c] This doublet was predicted by 1977St15 and confirmed by 1979Va10.

[d] According to 1977St15, this level is seen only in averaged resonance capture data, not from any of the individual resonances.

[e] x=E(n).

^{181}Ta(n,γ) E=0.002-3 keV 1977St15 (continued)

$\gamma(^{182}Ta)$

x=E(n).

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
4284.6	(S(n)+x)	$3^+,4^+$			4793.4	(S(n)+x)	$3^+,4^+$	1769.6	3,4
4293.3	(S(n)+x)	$3^+,4^+$			4802.8	(S(n)+x)	$3^+,4^+$	1762.5	5^-
4297.0	(S(n)+x)	$3^+,4^+$			4822.5	(S(n)+x)	$3^+,4^+$	1746.5	$3^-,4^-$
4300.4	(S(n)+x)	$3^+,4^+$			4833.2	(S(n)+x)	$3^+,4^+$	1734.1	3,4
4306.6	(S(n)+x)	$3^+,4^+$			4846.8	(S(n)+x)	$3^+,4^+$	1711.6	$3^-,4^-$
4316.4	(S(n)+x)	$3^+,4^+$			4859.8	(S(n)+x)	$3^+,4^+$	1701.1	$3^-,4^-$
4328.8	(S(n)+x)	$3^+,4^+$			4866.9	(S(n)+x)	$3^+,4^+$	1695.4	$3^-,4^-$
4338.2	(S(n)+x)	$3^+,4^+$			4892.5	(S(n)+x)	$3^+,4^+$	1667.0	(2 to 5)
4351.3	(S(n)+x)	$3^+,4^+$			4912.5	(S(n)+x)	$3^+,4^+$	1650.5	5^-
4361.8	(S(n)+x)	$3^+,4^+$			4926.0	(S(n)+x)	$3^+,4^+$	1635.6	$3^-,4^-$
4367.5	(S(n)+x)	$3^+,4^+$			4937.9	(S(n)+x)	$3^+,4^+$	1628.3	$3^-,4^-$
4383.3	(S(n)+x)	$3^+,4^+$			4949.3	(S(n)+x)	$3^+,4^+$	1612.0	$3^-,4^-$
4388.6	(S(n)+x)	$3^+,4^+$			4961.7	(S(n)+x)	$3^+,4^+$	1604.9	$3^-,4^-$
4395.9	(S(n)+x)	$3^+,4^+$			4980.9	(S(n)+x)	$3^+,4^+$	1582.3	$3^-,4^-$
4401.2	(S(n)+x)	$3^+,4^+$			5006.3	(S(n)+x)	$3^+,4^+$	1555.7	5^-
4405.3	(S(n)+x)	$3^+,4^+$			5013.0	(S(n)+x)	$3^+,4^+$	1551.6	5^-
4412.4	(S(n)+x)	$3^+,4^+$			5034.5	(S(n)+x)	$3^+,4^+$	1527.1	$3^-,4^-$
4416.8	(S(n)+x)	$3^+,4^+$			5041.3	(S(n)+x)	$3^+,4^+$		
4421.1	(S(n)+x)	$3^+,4^+$			5063.1	(S(n)+x)	$3^+,4^+$	1496.4	$3^-,4^-$
4427.3	(S(n)+x)	$3^+,4^+$			5077.3	(S(n)+x)	$3^+,4^+$	1490.4	$3^-,4^-$
4434.6	(S(n)+x)	$3^+,4^+$			5102.9	(S(n)+x)	$3^+,4^+$	1452.2	$3^-,4^-$
4445.4	(S(n)+x)	$3^+,4^+$			5123.3	(S(n)+x)	$3^+,4^+$	1445.1	$3^-,4^-$
4450.9	(S(n)+x)	$3^+,4^+$			5148.2	(S(n)+x)	$3^+,4^+$	1416.7	$3^-,4^-$
4458.0	(S(n)+x)	$3^+,4^+$			5152.6	(S(n)+x)	$3^+,4^+$		
4480.6	(S(n)+x)	$3^+,4^+$			5165.4	(S(n)+x)	$3^+,4^+$	1393.4	$3^-,4^-$
4485.7	(S(n)+x)	$3^+,4^+$			5181.7	(S(n)+x)	$3^+,4^+$	1377.3	$3^-,4^-$
4492.1	(S(n)+x)	$3^+,4^+$			5206.8	(S(n)+x)	$3^+,4^+$	1360.4	5^-
4507.2	(S(n)+x)	$3^+,4^+$			5220.9	(S(n)+x)	$3^+,4^+$	1350.5	$3^-,4^-$
4511.3	(S(n)+x)	$3^+,4^+$			5227.0	(S(n)+x)	$3^+,4^+$		
4517.3	(S(n)+x)	$3^+,4^+$			5232.4	(S(n)+x)	$3^+,4^+$	1326.0	5^-
4521.2	(S(n)+x)	$3^+,4^+$			5246.2	(S(n)+x)	$3^+,4^+$	1321.0	$3^-,4^-$
4524.8	(S(n)+x)	$3^+,4^+$			5271.9	(S(n)+x)	$3^+,4^+$	1284.4	$3^-,4^-$
4535.8	(S(n)+x)	$3^+,4^+$			5281.0	(S(n)+x)	$3^+,4^+$	1279.8	$3^-,4^-$
4566.5	(S(n)+x)	$3^+,4^+$			5322.0	(S(n)+x)	$3^+,4^+$	1240.4	$3^-,4^-$
4572.5	(S(n)+x)	$3^+,4^+$			5343.3	(S(n)+x)	$3^+,4^+$	1216.1	2^-
4583.2	(S(n)+x)	$3^+,4^+$			5361.8	(S(n)+x)	$3^+,4^+$	1203.1	$3^+,4^+,5^+$
4591.0	(S(n)+x)	$3^+,4^+$			5395.0	(S(n)+x)	$3^+,4^+$	1170.4	$3^-,4^-$
4610.7	(S(n)+x)	$3^+,4^+$			5400.1	(S(n)+x)	$3^+,4^+$		
4617.8	(S(n)+x)	$3^+,4^+$			5403.7	(S(n)+x)	$3^+,4^+$		
4646.2	(S(n)+x)	$3^+,4^+$			5412.4	(S(n)+x)	$3^+,4^+$	1150.4	$3^-,4^-$
4669.5	(S(n)+x)	$3^+,4^+$			5435.1	(S(n)+x)	$3^+,4^+$	1125.0	
4673.9	(S(n)+x)	$3^+,4^+$			5491.1	(S(n)+x)	$3^+,4^+$		
4685.6	(S(n)+x)	$3^+,4^+$			5496.4	(S(n)+x)	$3^+,4^+$		
4691.8	(S(n)+x)	$3^+,4^+$			5515.9	(S(n)+x)	$3^+,4^+$	1049.9	$3^-,4^-$
4702.5	(S(n)+x)	$3^+,4^+$			5557.5	(S(n)+x)	$3^+,4^+$	999.8	$3^-,4^-$
4712.4	(S(n)+x)	$3^+,4^+$			5571.9	(S(n)+x)	$3^+,4^+$	985.6	$3^-,4^-$
4736.9	(S(n)+x)	$3^+,4^+$			5585.5	(S(n)+x)	$3^+,4^+$		
4741.9	(S(n)+x)	$3^+,4^+$			5604.7	(S(n)+x)	$3^+,4^+$	960.0	$3^-,4^-$
4760.4	(S(n)+x)	$3^+,4^+$			5696.3	(S(n)+x)	$3^+,4^+$		
4764.3	(S(n)+x)	$3^+,4^+$			5703.2	(S(n)+x)	$3^+,4^+$	856.1	$3^-,4^-$
4778.5	(S(n)+x)	$3^+,4^+$			5770.3	(S(n)+x)	$3^+,4^+$	791.0	
4783.1	(S(n)+x)	$3^+,4^+$	1778.3	$3^-,4^-$	5792.7	(S(n)+x)	$3^+,4^+$		

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^{181}Ta(n,γ) E=0.002-3 keV 1977St15 (continued)

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

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
5811.3	(S(n)+x)	$3^+,4^+$			5948.2	(S(n)+x)	$3^+,4^+$		
5817.0	(S(n)+x)	$3^+,4^+$			5964.6	(S(n)+x)	$3^+,4^+$		
5825.5	(S(n)+x)	$3^+,4^+$	740.9	$2^-,3^-,4^-$	5972.6[‡]	(S(n)+x)	$3^+,4^+$		
5889.8	(S(n)+x)	$3^+,4^+$	667.9	2^-	6045.9	(S(n)+x)	$3^+,4^+$		
5912.9	(S(n)+x)	$3^+,4^+$	650.5	$3^-,4^-$	6062.8	(S(n)+x)	$3^+,4^+$	505.4	5^+

[†] From S(n)-E(level). Explicit Eγ values were not listed by 1977St15.

[‡] Placement of transition in the level scheme is uncertain.

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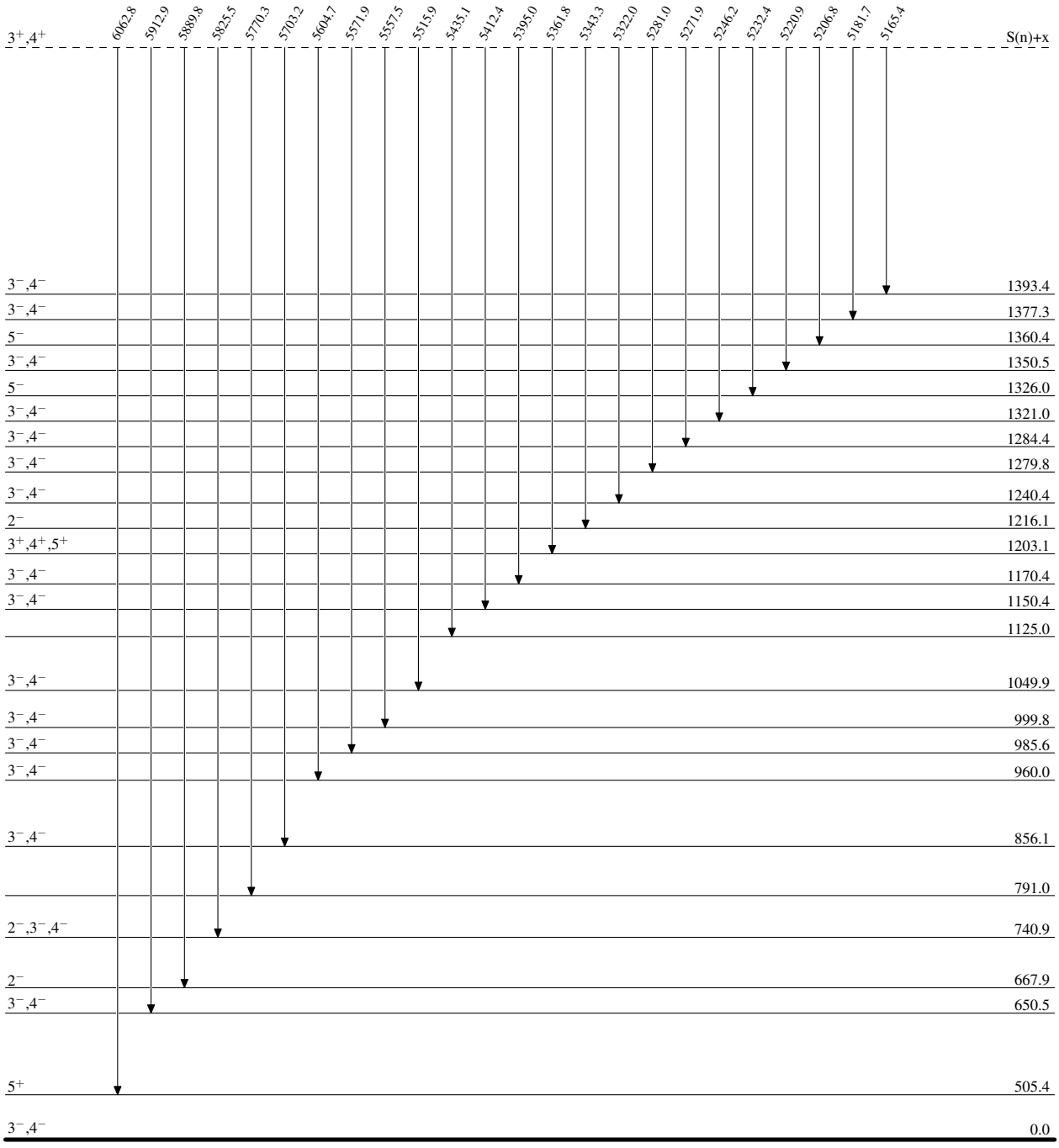
Level Scheme



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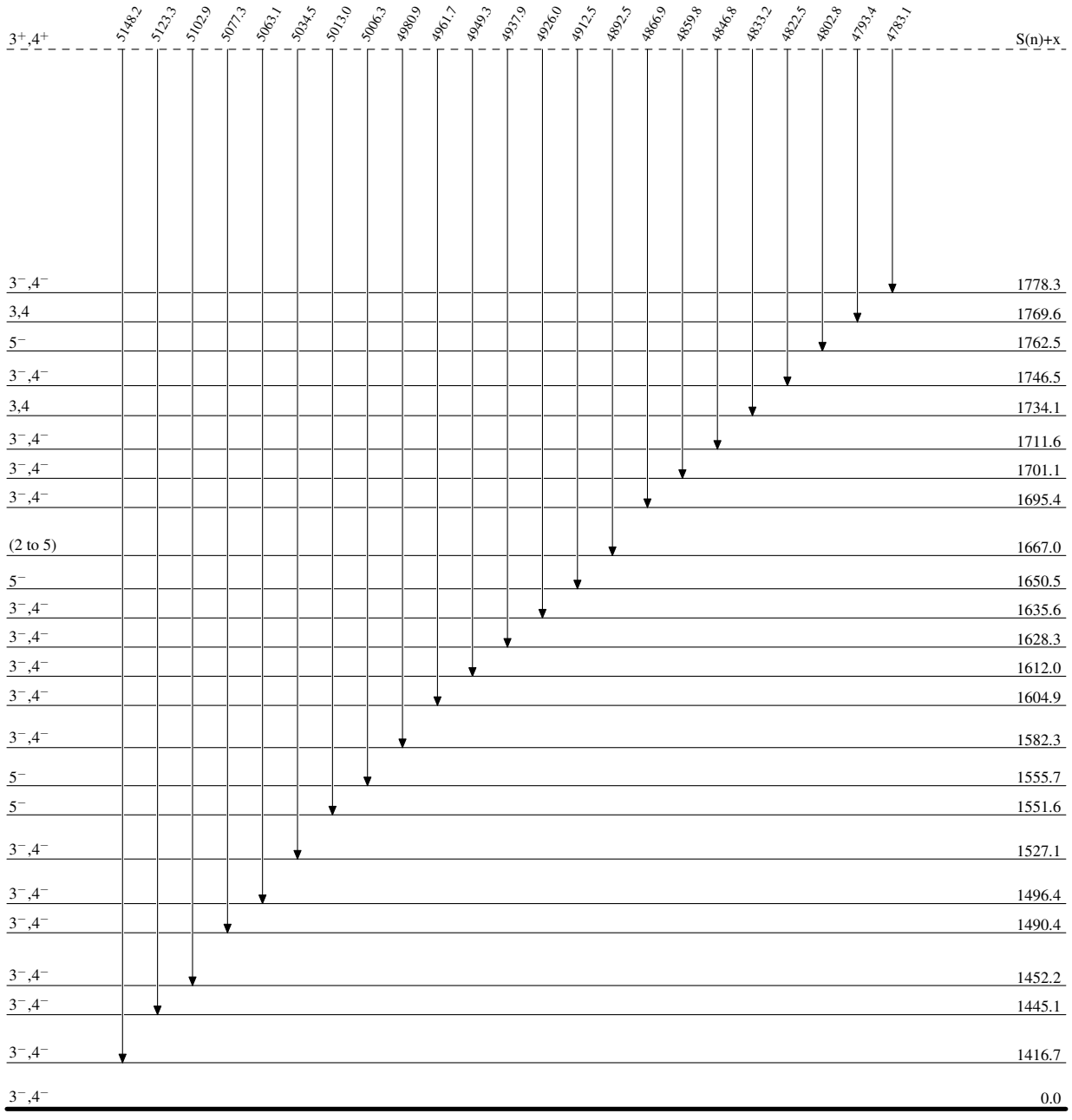
Level Scheme (continued)



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