^{183}W(n,γ) E=7.6 eV 1973Ca02

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,275 (2010)	1-Oct-2009

Others: 1963Bo30, 1967Ra06, 1967Sp03, 1968Fa07, 1969Sa01, 1970We04. These authors measured E(γ), I(γ) from several resonances.

The decay scheme for the 7.6-eV, $J^\pi=1^-$ resonance is that of 1973Ca02, with the addition of possible levels at 1322, 1345, 1523 and 1808, and other changes as follows:

1) 1973Ca02 place the 418.8γ as deexciting the 1424 level. However, a comparison of branching ratios with those in ^{184}Ta and ^{184}Re decays rules out this placement. In (n,γ) E=th, 1974Gr11 propose a level at 1322 depopulated solely by a 418.85γ.
2) the 339.6γ, unplaced by 1973Ca02, may be the same as the 339.34γ deexciting a 1345 level in (n,γ) E=th (1974Gr11).
3) 1973Ca02 place the 1411.9γ as deexciting the 1775 level. However, the ratio I(γ)/I(872γ) does not agree with that in (n,γ) E=th (1974Gr11). 1974Gr11 propose a level at 1523 depopulated solely by a 1412.05γ.
4) 1973Ca02 place the≈1698γ as deexciting the 2062 level. However, the ratio I(γ)/I(1949.6γ) does not agree with that reported in (n,γ) E=th (1974Gr11). 1974Gr11 place a 1697.49γ as deexciting a level at 1808.
5) 1973Ca02 report a 635.8γ which is unplaced. This may be the same transition as the 635.92γ reported in (n,γ) E=th by 1974Gr11, and tentatively placed by these authors as deexciting the 2062 level. However, the ratios I(γ)/I(1949.6γ) are not in good agreement.
6) 1973Ca02 show both a 145γ and a 1570γ deexciting the 1570 level. A 1570.2γ is reported in (n,γ) E=th (1974Gr11) and is unplaced. No 145γ is seen. If the two 1570γ's are the same transition, then the 145γ does not deexcite the 1570 level.
7) 1973Ca02 suggest that the 1319.5γ may deexcite both the 1431 level and a 2223 level. A comparison of the ratio I(γ)/I(1431γ) with that in Re decay suggests that most of the intensity of the 1319.5γ should be placed from the 1431 level.

^{184}W Levels

E(level)†	Jπ#	E(level)†	Jπ#	E(level)†	Jπ#	E(level)†	Jπ#
0.0	0^+	1130.12 *20*	$(2)^-$	1430.88 *16*	2^+	2060.6? *3*	
111.24 *13*	2^+	1133.41 *20*	4^+	1523.15 *24*	(3^+)	2126.2 *3*	
363.96 *17*	4^+	1221.03 *22*	3^-	1570.4 *7*	(2^+)	2167.92 *23*	$(1)^+$
748 *3*	6^+	1284.8 *3*	5^-	1614.95 *24*	(1^+)	2222.7 *3*	$(2^+,3,4^+)$
903.16 *14*	2^+	1321.96 *25*	$(0)^+$	1627.48 *24*	$(1)^+$	2246.7 *5*	$(2)^+$
1002.31 *24*	0^+	1345.2? *8*	(4^-)	1774.9 *3*	$(2)^+$	2328.6? *5*	$(1,2^+)$
1005.63 *19*	3^+	1386.14 *14*	2^+	1808.59 *22*	(2^+)	7413.0‡ *3*	1^-
1121.27 *15*	2^+	1424.76 *18*	$(3)^+$	1846.4? *16*			

† From least-squares fit to Eγ, omitting the 1951.7γ which fits its placement very poorly.
‡ Resonance capture state. E(resonance)=7.63 *1* eV, J=1, L=0, Γ_γ=73 *2* meV (2006MuZX).
# From Adopted Levels.

γ(^{184}W)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ#	α c	Comments
111.2 *7*	167 *58*	111.24	2^+	0.0	0^+	E2		2.57	
145.6 bd *7*	4.7 *23*	1570.4	(2^+)	1424.76	$(3)^+$				
x201.8 *7*	1.9 *10*								
204.5 *7*	1.4 *7*	1424.76	$(3)^+$	1221.03	3^-	[E1]		0.0592 *11*	
215.6 *7*	10 *5*	1221.03	3^-	1005.63	3^+	E1		0.0518 *9*	
226.8 *7*	72 *25*	1130.12	$(2)^-$	903.16	2^+	E1+M2+E3		0.059 *5*	
252.8 *7*	85 *30*	363.96	4^+	111.24	2^+	E2		0.1438	
x273.3 *7*	1.3 *7*								
295.3 d *7*	9 *4*	1424.76	$(3)^+$	1130.12	$(2)^-$	E1		0.0238	
318.3 *7*	17 *9*	1221.03	3^-	903.16	2^+	E1+M2	−0.020 *10*	0.0202 *5*	
339.6 d *7*	3.6 *18*	1345.2?	(4^-)	1005.63	3^+	[E1]		0.0170 *3*	placed by evaluator.
x383.3 *7*	5.5 & *22*								
≈384.5	1.4 & *6*	748	6^+	363.96	4^+	E2		0.0417	
418.8 *2*	5.8 *12*	1321.96	$(0)^+$	903.16	2^+	[E2]		0.0331	
x479.4 *2*	5.7 *11*								
483.0 *2*	2.5 *5*	1386.14	2^+	903.16	2^+	M1+E2		0.15 *10*	
x551.3 *2*	1.20 *24*								
635.8 d *2*	1.20 *24*	2060.6?		1424.76	$(3)^+$				placed by evaluator.
641.8 *2*	7.7 *15*	1005.63	3^+	363.96	4^+	M1+E2	−8.5 *8*	0.01183 *18*	
x646.6 *2*	3.1 *6*								
678.1 *2*	3.1 *6*	1808.59	(2^+)	1130.12	$(2)^-$				
x≈710.5	4.2 a *19*								
≈710.5	3.2 a *11*	1614.95	(1^+)	903.16	2^+				
724.3 *2*	15 *3*	1627.48	$(1)^+$	903.16	2^+				
743.2 *2*	3.3 *7*	2167.92	$(1)^+$	1424.76	$(3)^+$				
757.4 *2*	23 *5*	1121.27	2^+	363.96	4^+	E2		0.00803	
x763.1 *2*	5.8 *12*								
769.3 *2*	6.3 @ *12*	1133.41	4^+	363.96	4^+	M1+E2	−6.3 *+20−32*	0.0080 *4*	
769.3 *2*	7 @ *3*	1774.9	$(2)^+$	1005.63	3^+				
792.0 *2*	95 *18*	903.16	2^+	111.24	2^+	M1+E2	−16.8 *5*	0.00733	
803.3 *2*	0.80 *16*	1808.59	(2^+)	1005.63	3^+				
x810.3 *2*	2.1 *4*								
≈871.7	6.4 *13*	1774.9	$(2)^+$	903.16	2^+				
x882.6 *2*	1.9 *4*								
891.1 *2*	60 *12*	1002.31	0^+	111.24	2^+	[E2]			
894.6 *2*	62 *13*	1005.63	3^+	111.24	2^+	M1+E2	−13.2 *9*	0.00569 *8*	
903.1 *2*	100	903.16	2^+	0.0	0^+	E2		0.00554 *8*	
920.8 d *2*	2.5 *5*	1284.8	5^-	363.96	4^+	E1+M2+E3		0.0030 *2*	
996.0 *2*	4.0 *8*	2126.2		1130.12	$(2)^-$				
≈1004.5	2.5 *5*	2126.2		1121.27	2^+				

$^{184}_{74}W_{110}$-2

^{183}W(n,γ) E=7.6 eV 1973Ca02 (continued)

γ(^{184}W) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ#	α[c]	Comments
1010.1 *2*	35 *7*	1121.27	2^+	111.24	2^+	M1+E2+E0			
1018.5 *2*	3.9 *8*	1130.12	$(2)^-$	111.24	2^+	(E1)			
1022.3 *2*	4.6 *9*	1133.41	4^+	111.24	2^+	E2		0.00431 *6*	
≈1033.9[d]	0.9 *4*	2167.92	$(1)^+$	1133.41	4^+				E_γ: placement of this transition is doubtful because an M3 multipolarity would be unlikely and the energy is only poorly known. Not included In Adopted Levels, Gammas.
≈1045.9	1.7 *3*	2167.92	$(1)^+$	1121.27	2^+				
1060.7 *2*	1.20 *24*	1424.76	$(3)^+$	363.96	4^+	E2		0.00401 *6*	
[x]1063.1 *2*	1.20 *24*								
1109.8 *2*	2.6 *5*	1221.03	3^-	111.24	2^+	E1+M2	+0.08 *3*	0.00159 *10*	
1121.1 *2*	14 *3*	1121.27	2^+	0.0	0^+	E2		0.00359	
≈1264.7	1.0[&] *4*	2167.92	$(1)^+$	903.16	2^+				E_γ: authors also place this transition from the 1628 level but this is rejected by the evaluator because that implies M3 multipolarity.
1274.8 *2*	18 *4*	1386.14	2^+	111.24	2^+	M1+E2			
[x]≈1302.9	1.4 *3*								
[x]≈1305.5	≤3.1								
1313.5 *2*	5.1 *10*	1424.76	$(3)^+$	111.24	2^+	E2		0.00266 *4*	
1319.5 *2*	9.3 *19*	1430.88	2^+	111.24	2^+	M1+E2+E0		0.0038 *12*	
≈1319.5[d]		2222.7	$(2^+,3,4^+)$	903.16	2^+				tentatively placed from this level by 1973Ca02.
[x]1368.0 *2*	2.0 *4*								
[x]1376.4 *2*	1.10 *22*								
1386.2 *2*	15 *3*	1386.14	2^+	0.0	0^+	E2		0.00242 *4*	
1411.9 *2*	7.1 *14*	1523.15	(3^+)	111.24	2^+				
[x]1421.4 *2*	1.4 *3*								
1431.0 *2*	8.1 *16*	1430.88	2^+	0.0	0^+	E2		0.00230 *4*	
[x]1501.3 *2*	1.7 *3*								
1503.7 *2*	1.7 *3*	1614.95	(1^+)	111.24	2^+				
[x]1545.9 *2*	1.6 *3*								
[x]1557.6 *2*	1.5 *6*								
≈1570.6[b]	1.8 *7*	1570.4	(2^+)	0.0	0^+				
[x]1624.5 *2*	1.30 *26*								
[x]1668.9 *2*	3.2 *6*								
≈1698.1	2.6 *5*	1808.59	(2^+)	111.24	2^+				
[x]≈1849.2	2.4[&] *5*								
1858.7 *2*	0.60 *12*	2222.7	$(2^+,3,4^+)$	363.96	4^+				
[x]1877.4 *2*	1.9 *4*								
[x]1945.2 *2*	3.8 *8*								
1951.7[d] *2*	14 *3*	2060.6?		111.24	2^+				E_γ: significantly higher than adopted Eγ=1949.60 *25*, so placement shown As tentative.
[x]1996.0 *2*	6.6 *13*								
[x]2000.5 *2*	2.4 *5*								

$^{184}_{74}W_{110}$-3

^{183}W(n,γ) E=7.6 eV 1973Ca02 (continued)

γ(^{184}W) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π
[x]2004.9 *2*	1.7 *3*					5350.6 *10*	13.9 *21*	7413.0	1^-	2060.6?	
2015.0 *5*	6.1 *24*	2126.2		111.24	2^+	5566.5 *15*	1.3 *4*	7413.0	1^-	1846.4?	
2056.5 *5*	5.0 *20*	2167.92	$(1)^+$	111.24	2^+	5603.6 *15*	3.8 *6*	7413.0	1^-	1808.59	(2^+)
[x]2090.6 *5*	1.1 *4*					5637.9 *10*	15.7 *24*	7413.0	1^-	1774.9	$(2)^+$
[x]2097.6 *5*	3.7 *15*					5785.0 *10*	10 *3*	7413.0	1^-	1627.48	$(1)^+$
2135.4 *5*	3.2 *13*	2246.7	$(2)^+$	111.24	2^+	5797 *3*	1.9 *6*	7413.0	1^-	1614.95	(1^+)
2168.0 *5*	0.50 *20*	2167.92	$(1)^+$	0.0	0^+	5841 *3*	2.0 *6*	7413.0	1^-	1570.4	(2^+)
≈2245[d]	1.2[&] *5*	2246.7	$(2)^+$	0.0	0^+	5981.9 *10*	2.1 *3*	7413.0	1^-	1430.88	2^+
2328.7[d] *5*	3.0 *12*	2328.6?	$(1,2^+)$	0.0	0^+	6026.6 *10*	21 *3*	7413.0	1^-	1386.14	2^+
5084.8 *12*	2.3 *7*	7413.0	1^-	2328.6?	$(1,2^+)$	6292.0 *10*	36 *5*	7413.0	1^-	1121.27	2^+
5166.1 *10*	15 *4*	7413.0	1^-	2246.7	$(2)^+$	6411.6 *10*	69 *10*	7413.0	1^-	1002.31	0^+
5190.4 *10*	3.6 *11*	7413.0	1^-	2222.7	$(2^+,3,4^+)$	6510.4 *10*	9.9 *15*	7413.0	1^-	903.16	2^+
5245.6 *10*	8.3 *12*	7413.0	1^-	2167.92	$(1)^+$	7302.1 *10*	6.7 *20*	7413.0	1^-	111.24	2^+
5286.5 *10*	21 *3*	7413.0	1^-	2126.2		7413.1 *10*	100	7413.0	1^-	0.0	0^+

† From 1973Ca02. For primary transitions, the uncertainty given is the relative value. Authors suggest absolute uncertainties of 3 keV. Note that 1967Sp03 report additional primary γ-rays with Eγ As follows: 4906, 4862, 4767, 4724, 4709, 4657, 4646, 4615, 4524, 4466 (uncertainty=4-5 keV); most of these transitions are present In thermal N capture also.

‡ Relative photon intensity; normalized so I(7413γ)=100 for primary transitions and so I(903γ)=100 for secondary transitions. Data are from 1973Ca02. for Eγ<340, 1973Ca02 report that uncertainty ranges from 35% to 50%, depending on transition strength; the evaluator has assigned 35% uncertainty if Iγ>50, 50% uncertainty otherwise.

ADOPTED values.

@ Iγ(769γ)=13.2 *26* (1973Ca02). Based on I(γ)/I(1022γ)=1.37 *7* from Adopted Gammas and I(1022γ)=4.6 *9* here, I(769γ from 1133 level)=6.3 *13*; thus, I(769γ from 1775 level)=6.9 *29*.

& Broad peak or partially resolved peak with approximate energies given (1973Ca02).

a I(710γ)=7.4 *15* (1973Ca02). based on I(1504γ)=1.7 *4* and adopted branching, I(γ)=3.2 *11* is expected for the component of this complex line which deexcites the 1615 level, leaving Iγ=4.2 *19* unplaced.

b An unplaced 1570.2γ is seen by 1974Gr11 in (n,γ) E=thermal, but those authors report no 145.6γ. consequently, the placements of the 146γ is shown As tentative here. If the two 1570 transitions are the same, then the 145γ does not deexcite the 1570 level.

c 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.

d Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

$^{184}_{74}W_{110}$-4

^{183}W(n,γ) E=7.6 eV 1973Ca02

Level Scheme

Intensities: Relative I_γ

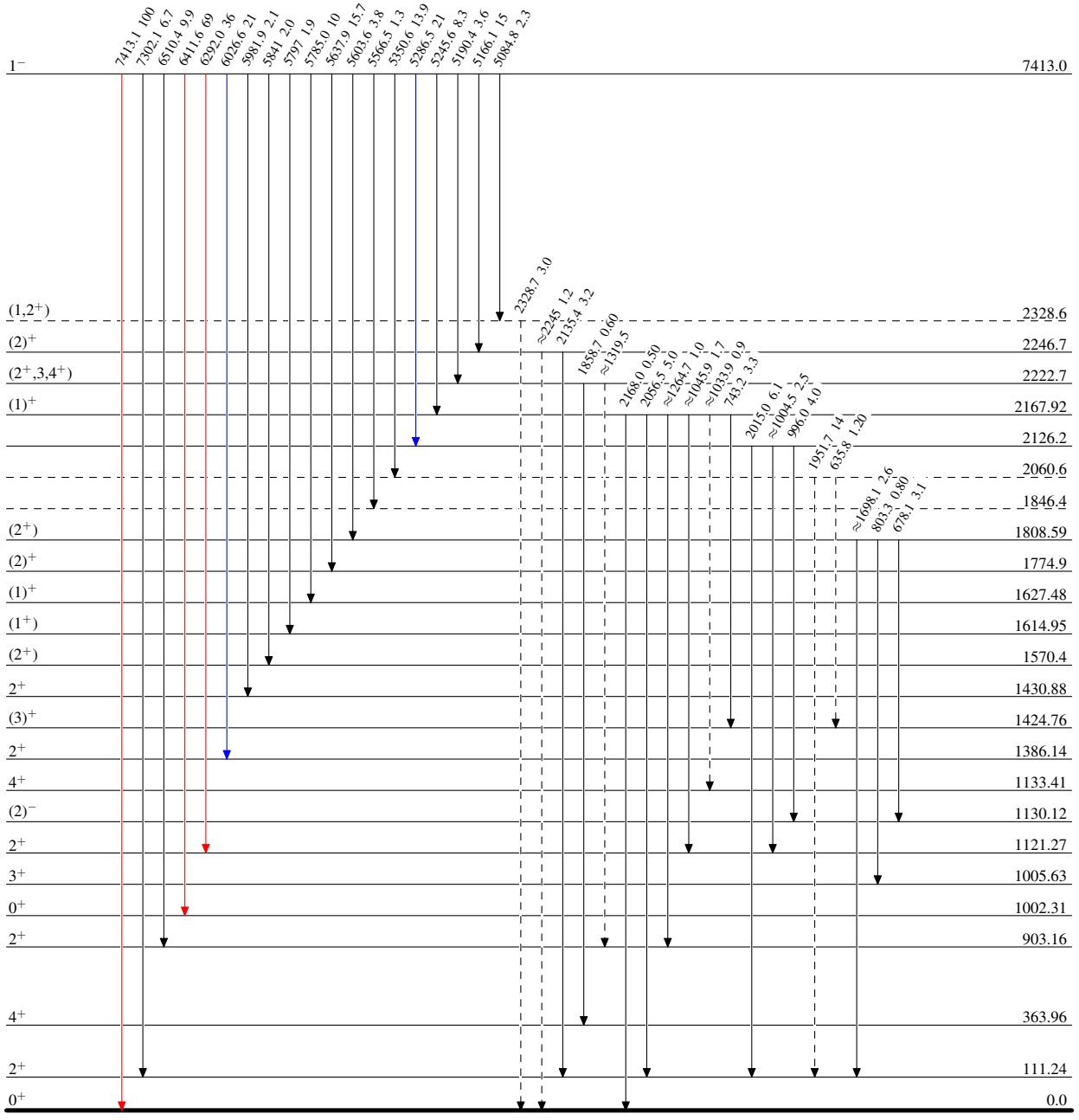
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{184}_{74}W_{110}$

^{183}W(n,γ) E=7.6 eV 1973Ca02

Level Scheme (continued)

Intensities: Relative I_γ

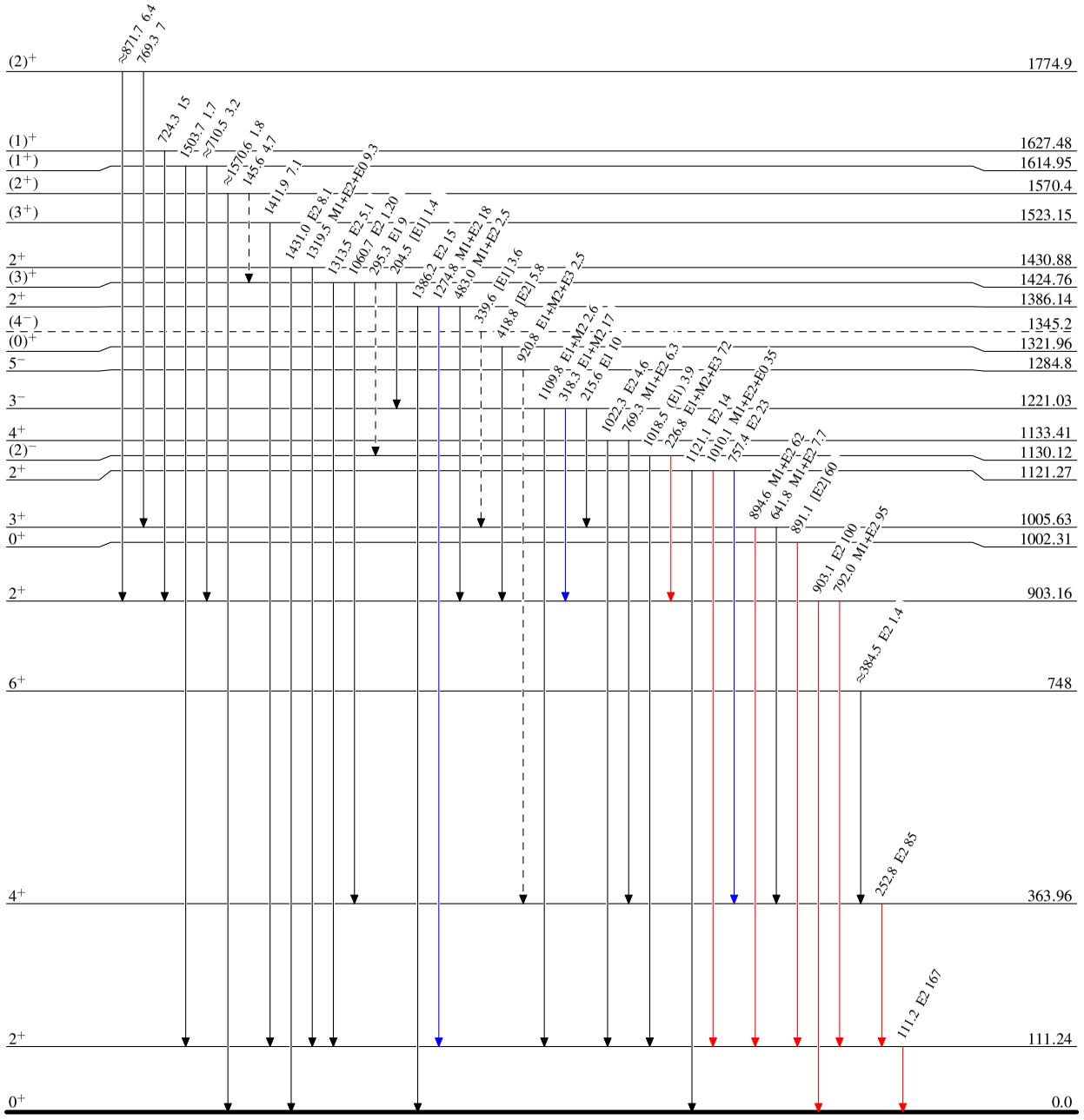
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{184}_{74}W_{110}$