^{189}Os(n,γ) E=8.96 eV 1979Ca02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169,1 (2020)	15-Oct-2020

1979Ca02 (also 1975Ma46,1975Ma31): E=10.3 eV neutrons were produced from the Brookhaven National Laboratory High Flux Beam Reactor (HFBR). Target was 1.0 g 87.3% enriched ^{189}Os. γ rays were detected with a 35-cm^3 Ge(Li) detector. Measured Eγ, Iγ. Deduced levels.

^{190}Os Levels

E(level)‡	J$^\pi$†
0.0	0^+
186.718 *2*	2^+
547.853 *7*	4^+
557.978 *5*	2^+
756.035 *14*	3^+
911.78 *5*	0^+
955.365 *15*	4^+
1050.5 *3*	6^+
1114.73 *4*	2^+
1163.21 *3*	4^+
1203.8 *1*	5^+
1382.9 *2*	0^+
1387.02 *3*	3^-
1435.78 *7*	2^+
1446.2 *2*	$(5)^+$
1545.35 *13*	0^+
1569.0 *2*	$(3)^+$
1570.3?	
1584.30 *14*	4^-
1616.00 *13*	$(2)^+$
1675.74 *10*	$(2)^+$
1680.6 *3*	(1)
1681.6 *3*	5^-
1689.2 *2*	(2^+)
1732.9 *2*	0^+
1813.4? *5*	
1823.8 *2*	$(1,2)^+$
1859.2 *2*	(2^+)
1872.9 *5*	$(5)^-$
1885.1? *5*	
1901.9? *3*	
1903.5 *3*	$(3^+,4^-)$
1910.5 *2*	$(2)^+$
1918.3? *4*	(1,2)
1941.7 *3*	(2^+)
1957.2?	
1970.7 *3*	$(1^+,2)$
1992.3? *3*	
1995.0 *2*	$(2)^+$
2010.2 *11*	$1^{(+)}$
2025.5? *7*	
2042.4? *16*	
2047.3 *11*	(1,2)
2071.4 *11*	$(1^+,2)$
2111.4? *11*	
2118.4? *5*	

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

^{190}Os Levels (continued)

E(level)‡	Jπ†	Comments
2125.0? *4*		
2135.9? *8*		
2153.7 *11*	(1,2+)	
2175.4? *20*		
2192.5 *16*		
2198.4 *11*	(1,2)	
2211.2? *16*		
2223.6 *11*		
2263.1 *11*	(1,2+)	
2290.1 *11*	(1,2)	
2306.0 *16*		
2313.9 *16*		
2347.3? *11*		
2382.6 *11*		
2467.4 *11*	(1,2)	
2476.6 *11*	(1+,2+)	
S(n)+0.00896	2−	E(level): S(n)+E(n), where S(n)=7792.34 *19* (2017Wa10), E(n)=8.96 eV *2* (2018MuZZ). Jπ: s-wave neutron capture in ^{189}Os (g.s. $J^\pi=3/2^-$) and γ-ray intensity ratios (1976St14,1975Na02), same J^π in 2018MuZZ.

† From the Adopted Levels.
‡ From least-squares fit to Eγ values.

γ(^{190}Os)

Iγ normalization: Σ(I(γ+ce) to g.s.)=100, assuming that the unplaced intensity of 215 units (relative) deexcites mainly the excited states. Conversion coefficients were taken into account.

Eγ†	Iγ‡k	Ei(level)	J_i^π	Ef	J_f^π
182.0 *2*	5.3d *6*	1569.0	(3)+	1387.02	3−
186.718 *2*	362 *29*	186.718	2+	0.0	0+
197.7mf *2*	8.0m@e *11*	756.035	3+	557.978	2+
197.7mf *2*	0.7m *2*	955.365	4+	756.035	3+
197.7m *2*	2.0m *3*	1584.30	4−	1387.02	3−
203.1 *1*	0.92 *9*	1114.73	2+	911.78	0+
208.1m *1*	1.5mcg *1*	756.035	3+	547.853	4+
208.1m *1*	0.6mc *1*	1163.21	4+	955.365	4+
223.811 *7*	7.9c *6*	1387.02	3−	1163.21	4+
282.9 *2*	1.5 *1*	1446.2	(5)+	1163.21	4+
288.6 *4*	0.58 *7*	1872.9	(5)−	1584.30	4−
x312.0 *3*	2.9@ *2*				
321.2 *2*	4.7 *3*	1435.78	2+	1114.73	2+
353.86 *7*	2.7 *5*	911.78	0+	557.978	2+
358.69 *4*	6.4 *7*	1114.73	2+	756.035	3+
361.136 *6*	106 *9*	547.853	4+	186.718	2+
371.260 *5*	100	557.978	2+	186.718	2+
380.1 *3*	1.5 *1*	1584.30	4−	1203.8	5+
397.388 *17*	21.3 *15*	955.365	4+	557.978	2+
407.176 *25*	13.9 *13*	1163.21	4+	756.035	3+
407.543 *25*	14.4 *20*	955.365	4+	547.853	4+
x416.1 *3*	0.42 *7*				

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

γ(^{190}Os) (continued)

E_γ [†]	I_γ [‡k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
420.8 *4*	0.94 *9*	1584.30	4^-	1163.21	4^+	
[x]424.0 *5*	0.32 *6*					
431.6 *1*	6.8 *5*	1387.02	3^-	955.365	4^+	
[x]441.7 *4*	0.40 *8*					
447.8 *1*	5.5 *4*	1203.8	5^+	756.035	3^+	
[x]477.0 *4*	0.40[#] *8*					
481.0 *9*	1.1 *1*	1435.78	2^+	955.365	4^+	
490.7 *3*	2.2[#] *2*	1446.2	$(5)^+$	955.365	4^+	
502.6 *3*	2.2 *2*	1050.5	6^+	547.853	4^+	
518.4 *3*	2.5 *4*	1681.6	5^-	1163.21	4^+	
524.0 *2*	2.1 *2*	1435.78	2^+	911.78	0^+	
[x]547.8 *3*	2.1 *2*					
557.972 *14*	150 *12*	557.978	2^+	0.0	0^+	
569.310 *14*	132 *11*	756.035	3^+	186.718	2^+	
574.6[n] *5*	1.6 *2*	1689.2	(2^+)	1114.73	2^+	
605.26 *7*	24.2 *17*	1163.21	4^+	557.978	2^+	
[x]614.8 *4*	0.76[&] *14*					
630.9 *2*	10.8 *8*	1387.02	3^-	756.035	3^+	
[x]638.0 *3*	1.3 *1*					
655.8 *3*	2.4 *2*	1203.8	5^+	547.853	4^+	
679.75 *9*	4.0 *3*	1435.78	2^+	756.035	3^+	
691.0[n] *4*	1.3[#] *2*	1446.2	$(5)^+$	756.035	3^+	
[x]708.6 *5*	1.2[&] *2*					
725.07 *8*	10.8 *8*	911.78	0^+	186.718	2^+	
[x]731.4 *9*	0.33 *19*					
[x]734.0 *10*	0.36 *19*					
740.3 *3*	2.0 *2*	1903.5	$(3^+,4^-)$	1163.21	4^+	
[x]755.9 *6*	1.5[#] *2*					
768.68 *10*	8.1 *6*	955.365	4^+	186.718	2^+	
812.7 *4*	1.0 *1*	1569.0	$(3)^+$	756.035	3^+	
[x]818.3 *3*	1.0 *1*					
[x]823.1 *6*	0.43 *9*					
828.89 *11*	10.3 *7*	1387.02	3^-	557.978	2^+	
[x]831.9 *6*	0.99 *11*					
839.0 *3*	2.7 *2*	1387.02	3^-	547.853	4^+	
859.9 *4*	1.2 *2*	1616.00	$(2)^+$	756.035	3^+	
[x]863.8 *5*	0.31 *12*					
877.73 *12*	5.2 *4*	1435.78	2^+	557.978	2^+	
887.9 *3*	<3.6	1435.78	2^+	547.853	4^+	Additional information 1.
[x]888.4 *3*	<3.6[h]					
919.64 *14*	2.4 *2*	1675.74	$(2)^+$	756.035	3^+	
927.92 *12*	16.4 *12*	1114.73	2^+	186.718	2^+	
932.9 *4*	0.9 *1*	1689.2	(2^+)	756.035	3^+	
[x]939.3 *8*	0.40 *12*					
948.9[n] *7*	2.7[&i] *3*	1903.5	$(3^+,4^-)$	955.365	4^+	
955.1[bn] *5*	1.6 *2*	1910.5	$(2)^+$	955.365	4^+	
976.6[n] *4*	0.69[c] *16*	1163.21	4^+	186.718	2^+	
987.33 *13*	2.1 *2*	1545.35	0^+	557.978	2^+	
1011.0 *2*	4.7 *4*	1569.0	$(3)^+$	557.978	2^+	
[x]1018.6 *4*	1.0 *2*					
1021.0 *4*	1.2 *2*	1569.0	$(3)^+$	547.853	4^+	
[x]1025.1 *5*	0.62 *13*					
1036.0 *3*	2.1 *2*	1584.30	4^-	547.853	4^+	

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ ‡k	E_i(level)	J_i^π	E_f	J_f^π	Comments
1057.8 3	3.1 2	1616.00	(2)$^+$	557.978	2$^+$	
1068.0ln 3	1.9l 2	1616.00	(2)$^+$	547.853	4$^+$	
1068.0ln 3	1.9lc 2	1823.8	(1,2)$^+$	756.035	3$^+$	
x1085.2 5	1.5 2					
x1088.5 5	1.3 2					
1103.1 3	3.5 3	1859.2	(2$^+$)	756.035	3$^+$	
1114.7 2	8.8 7	1114.73	2$^+$	0.0	0$^+$	
1117.7 2	5.4 4	1675.74	(2)$^+$	557.978	2$^+$	
1131.2 4	2.0 2	1689.2	(2$^+$)	557.978	2$^+$	
1141.8 4	1.3 2	1689.2	(2$^+$)	547.853	4$^+$	
1147.3 4	1.5 2	1903.5	(3$^+$,4$^-$)	756.035	3$^+$	
x1150.4 4	1.4 2					
1154.4 2	9.4 7	1910.5	(2)$^+$	756.035	3$^+$	
x1170.1 6	0.9 2					
1174.6 3	4.9 4	1732.9	0$^+$	557.978	2$^+$	
1195.8 2	4.8 4	1382.9	0$^+$	186.718	2$^+$	
1200.0 5	1.7a 3	1387.02	3$^-$	186.718	2$^+$	
x1203.9 4	0.9 2					
1214.7 4	1.6 2	1970.7	(1$^+$,2)	756.035	3$^+$	
x1219.5 5	1.1 2					
x1228.4 5	1.4 2					
1236.3bn 3	2.3 3	1992.3?		756.035	3$^+$	
1249.2 3	8.0 6	1435.78	2$^+$	186.718	2$^+$	
1254.7bn 5	5.6& 5	1813.4?		557.978	2$^+$	
1265.7 2	7.7 6	1823.8	(1,2)$^+$	557.978	2$^+$	
1301.0 3	4.0 4	1859.2	(2$^+$)	557.978	2$^+$	
1311.5 3	4.1& 4	1859.2	(2$^+$)	547.853	4$^+$	
1327.1bn 5	1.9 2	1885.1?		557.978	2$^+$	
x1342.4 4	1.8 2					
x1350.4 9	5.4 5					
1353.0bn 9	1.1 2	1910.5	(2)$^+$	557.978	2$^+$	
1360.3 9	3.2& 3	1545.35	0$^+$	186.718	2$^+$	
1368.9bn 9	1.0 3	2125.0?		756.035	3$^+$	
x1377.7 3	5.0 4					
1383.6ljn 3	7.0l 6	1382.9	0$^+$	0.0	0$^+$	
1383.6lbn 3	7.0l 6	1570.3?		186.718	2$^+$	
1383.6ln 3	7.0l 6	1941.7	(2$^+$)	557.978	2$^+$	
1387.4 6	2.2c 3	1387.02	3$^-$	0.0	0$^+$	Mult.: (E3) from the Adopted Gammas.
1396.9bn 6	2.1& 3	1941.7	(2$^+$)	547.853	4$^+$	
1412.6 4	2.3& 3	1970.7	(1$^+$,2)	557.978	2$^+$	
1429.4 2	6.5 5	1616.00	(2)$^+$	186.718	2$^+$	
1437.0 2	5.4 4	1995.0	(2)$^+$	557.978	2$^+$	
x1452.7 6	1.2 3					
x1462.7 5	3.8#& 4					
1467.5bn 9	3.1 4	2025.5?		557.978	2$^+$	
x1482.4 2	1.9 2					
1489.2 2	5.9 4	1675.74	(2)$^+$	186.718	2$^+$	
x1493.2 4	2.2 2					
1502.1 4	2.2 3	1689.2	(2$^+$)	186.718	2$^+$	
1512.0bn 3	4.1 4	2071.4	(1$^+$,2)	557.978	2$^+$	
x1536.0 6	1.2 3					

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ ‡k	E_i(level)	J_i^π	E_f	J_f^π
x1540.5 6	1.2 2				
1546.3 2	7.7 6	1732.9	0^+	186.718	2^+
x1557.6 5	1.5 3				
1561.0bn 5	1.4 3	2118.4?		557.978	2^+
1567.0bn 4	2.5 3	2125.0?		557.978	2^+
x1571.5 4	2.4 3				
x1595.2 3	2.1 3				
x1600.9 5	2.4 3				
1616.1 3	8.0 6	1616.00	$(2)^+$	0.0	0^+
1626.7bn 5	2.3 3	1813.4?		186.718	2^+
1637.2 6	1.8 3	1823.8	$(1,2)^+$	186.718	2^+
x1640.5 6	4.0 4				
x1665.8 5	0.7 2				
1672.5 3	3.6 5	1859.2	(2^+)	186.718	2^+
1680.6 3	7.7 7	1680.6	(1)	0.0	0^+
x1694.8 4	1.5 3				
x1700.0 5	1.2 2				
1715.2bn 3	3.8 5	1901.9?		186.718	2^+
x1723.9 6	1.4 3				
1731.6n 4	1.3 3	1918.3?	(1,2)	186.718	2^+
x1746.8 5	2.0& 3				
x1754.9 6	2.1& 3				
x1765.9 7	0.9 2				
1770.5bn 6	2.3 3	1957.2?		186.718	2^+
x1797.1 6	2.7& 4				
x1822.1 6	1.6 2				
1838.8bn 7	4.8& 5	2025.5?		186.718	2^+
x1847.5 5	1.6 3				
x1859.9 5	1.5 3				
1883.9bn 5	6.1 6	2071.4	$(1^+,2)$	186.718	2^+
x1918.3 6	1.4 4				
1931.7bn 5	2.9 4	2118.4?		186.718	2^+
1942.5 7	4.1& 4	1941.7	(2^+)	0.0	0^+
1949.2bn 8	2.6 3	2135.9?		186.718	2^+
x1964.9 6	4.2 5				
x1971.9 6	1.6& 3				
x1995.0 6	0.9 3				
x2005.3 5	1.1 3				
x2010.0 5	2.1 3				
x2023.3 4	2.9 4				
x2031.0 6	2.1 4				
x2051.9 6	2.1 3				
x2075.0 5	7.6& 7				
x2085.1 5	1.9 3				
x2111.1 6	3.6 4				
x2118.9 6	2.7 4				
x2143.6 5	3.3 4				
x2183.4 5	4.0& 6				
x2192.1 4	6.9 6				
x2211.9 9	2.8 3				
x2228.9 8	1.7 5				
x2241.9 5	1.0 4				

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ ‡ k	E_i(level)	J_i^π	E_f	J_f^π
x2261.5 5	1.9 3				
x2267.8 9	1.0 4				
x2282.0 6	2.5 4				
x2288.3 6	2.3 3				
x2297.1 7	2.0 3				
x2304.5 6	1.9 3				
x2316.0 6	2.3 4				
x2370.8 8	2.6 3				
x2393.0 9	1.8 4				
x2405.5 6	3.7 5				
x2417.4 7	3.0 4				
x2476.3 7	3.3 4				
5315.5 10	5.8 9	S(n)+0.00896	2⁻	2476.6	(1⁺,2⁺)
5324.7 10	3.3 8	S(n)+0.00896	2⁻	2467.4	(1,2)
5409.5 10	5.8 6	S(n)+0.00896	2⁻	2382.6	
5444.8[n] 10	<0.5	S(n)+0.00896	2⁻	2347.3?	
5478.2 15	4.6 6	S(n)+0.00896	2⁻	2313.9	
5486.1 15	4.4 6	S(n)+0.00896	2⁻	2306.0	
5502.0 10	1.8 4	S(n)+0.00896	2⁻	2290.1	(1,2)
5529.0 10	5.7 8	S(n)+0.00896	2⁻	2263.1	(1,2⁺)
5568.5 15	4.7 6	S(n)+0.00896	2⁻	2223.6	
5580.9[n] 15	<0.5	S(n)+0.00896	2⁻	2211.2?	
5593.7 10	9.7 10	S(n)+0.00896	2⁻	2198.4	(1,2)
5599.6 15	4.2 7	S(n)+0.00896	2⁻	2192.5	
5616.7[n] 20	<0.5	S(n)+0.00896	2⁻	2175.4?	
5638.4 10	1.5 5	S(n)+0.00896	2⁻	2153.7	(1,2⁺)
5680.9[n] 10	<0.5	S(n)+0.00896	2⁻	2111.4?	
5720.7 10	4.7 8	S(n)+0.00896	2⁻	2071.4	(1⁺,2)
5744.8 10	2.8 4	S(n)+0.00896	2⁻	2047.3	(1,2)
5749.7[n] 15	<1.2	S(n)+0.00896	2⁻	2042.4?	
5781.9 10	1.0 3	S(n)+0.00896	2⁻	2010.2	1⁽⁺⁾
5797.2 10	1.4 3	S(n)+0.00896	2⁻	1995.0	(2)⁺
5821.4[n] 10	<0.5	S(n)+0.00896	2⁻	1970.7	(1⁺,2)
5850.2 10	8.3 11	S(n)+0.00896	2⁻	1941.7	(2⁺)
5873.8[n] 10	<1.0	S(n)+0.00896	2⁻	1918.3?	(1,2)
5881.2 10	11.3 9	S(n)+0.00896	2⁻	1910.5	(2)⁺
5932.2 10	6.1 5	S(n)+0.00896	2⁻	1859.2	(2⁺)
5968.8 15	3.7 4	S(n)+0.00896	2⁻	1823.8	(1,2)⁺
6058.5[n] 10	<0.6	S(n)+0.00896	2⁻	1732.9	0⁺
6112.3[n] 15	<0.6	S(n)+0.00896	2⁻	1680.6	(1)
6222.7 15	2.7 6	S(n)+0.00896	2⁻	1570.3?	
6246.5[n] 10	<0.6	S(n)+0.00896	2⁻	1545.35	0⁺
6356.6 10	13.3 10	S(n)+0.00896	2⁻	1435.78	2⁺
6408.7[n] 10	<0.6	S(n)+0.00896	2⁻	1382.9	0⁺
6677.4 10	3.7 4	S(n)+0.00896	2⁻	1114.73	2⁺
7035.6[n] 15	<0.6	S(n)+0.00896	2⁻	756.035	3⁺
7234.3 10	12.5 9	S(n)+0.00896	2⁻	557.978	2⁺
7605.9 10	1.2 2	S(n)+0.00896	2⁻	186.718	2⁺
7792.8[n] 10	<0.6	S(n)+0.00896	2⁻	0.0	0⁺

† Weighted averaged values from E(n)=th and resonance data of different E(n) in 1979Ca02. Uncertainties on primary γ rays are not given in 1979Ca02 and assigned by the evaluators from a general statement by 1979Ca02 that relative uncertainty varies from

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^{189}Os(n,γ) E=8.96 eV 1979Ca02 (continued)

$\gamma(^{190}Os)$ (continued)

0.5 to 1.5 keV.
‡ From 1979Ca02.
# Contains an impurity contribution.
@ May contain a small impurity contribution.
& Broad peak.
a Corrected for contribution from impurity peaks.
b Tentative placement (evaluator) based on results from (n,n′γ); unplaced in 1979Ca02.
c Intensity disagrees with results from other experiments, see ^{189}Os(n,γ) E=th.
d Misprinted as 53 in 1979Ca02.
e Total Iγ=10.7 *11*.
f 199.3 from level energy difference.
g Total Iγ=1.5 *1*.
h Iγ(887.9γ+888.4γ)=3.6 *3*.
i High by a factor of ≈4, as compared to branching in ^{190}Ir ε.
j Placement not supported by results from (n,n′γ). Instead, it is placed with a 1570 level. This placement to 0^+ g.s. is also unlikely because of $J^\pi(1383)=0^+$ from L(p,t)=0.
k For intensity per 100 neutron captures, multiply by 0.142 *10*.
l Multiply placed with undivided intensity.
m Multiply placed with intensity suitably divided.
n Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{189}Os(n,γ) E=8.96 eV 1979Ca02

Level Scheme

Intensities: Iγ per 100 n-captures

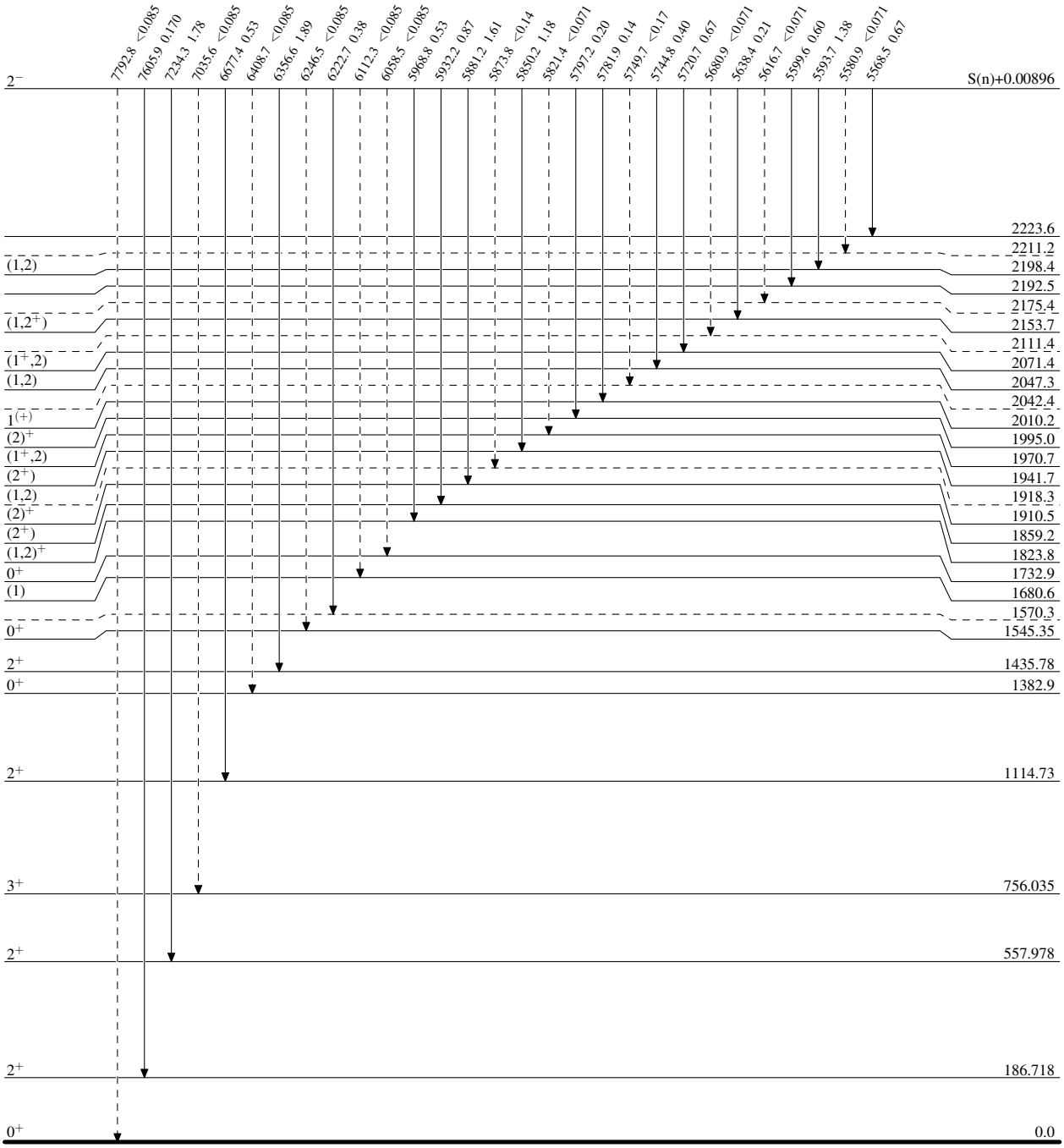
Legend

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

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

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

γ Decay (Uncertain)



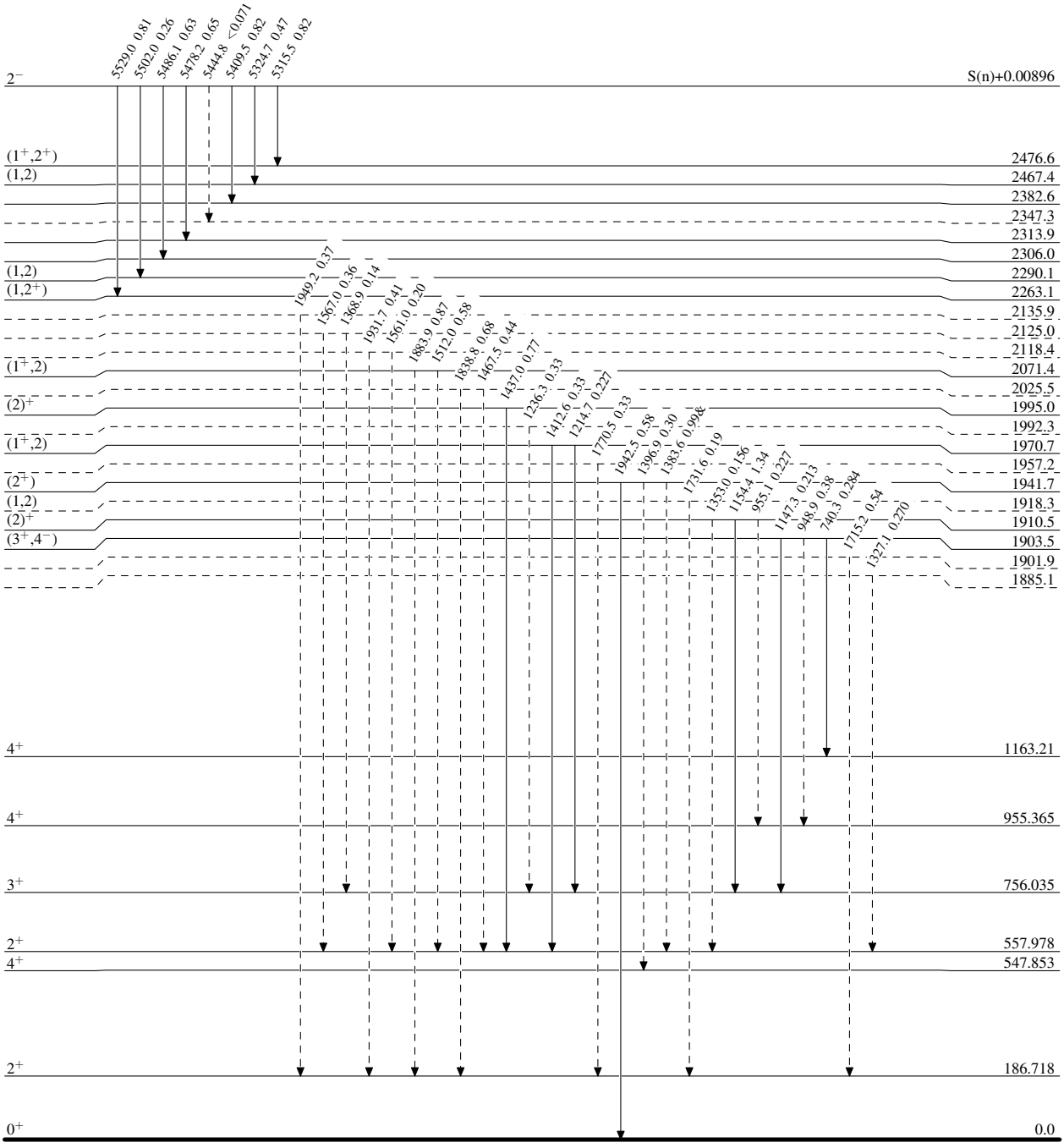
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=8.96 eV 1979Ca02

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given

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)



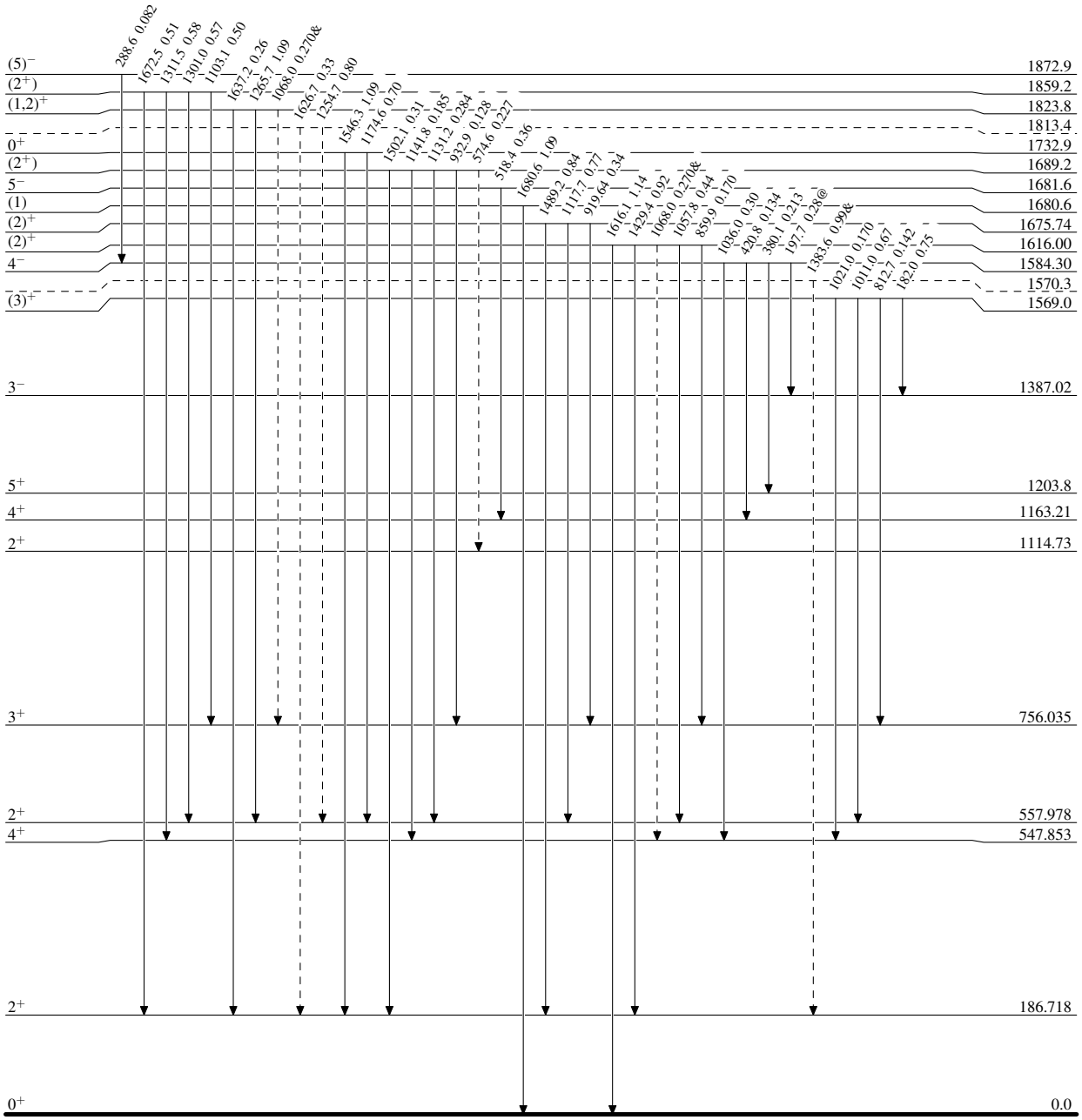
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=8.96 eV 1979Ca02

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



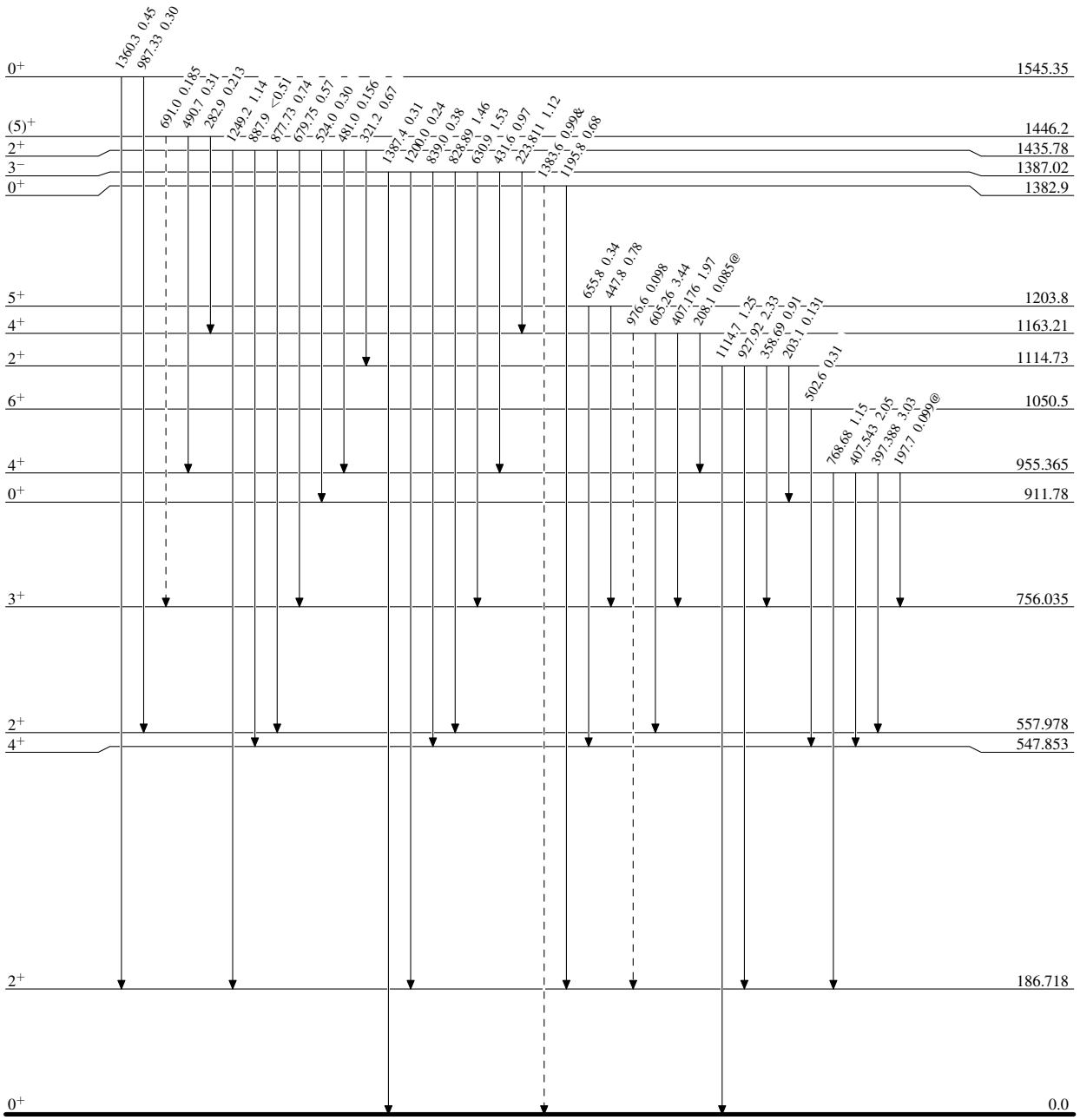
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=8.96 eV 1979Ca02

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



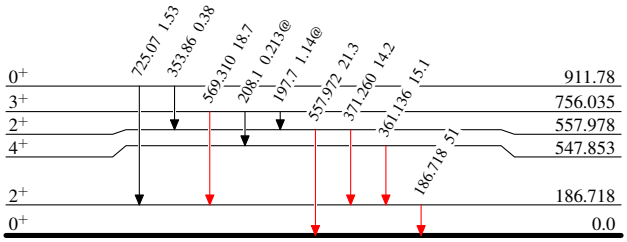
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=8.96 eV 1979Ca02

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{190}_{76}Os_{114}$