Adopted Levels, Gammas

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

Q(β^-)=−3801 *21*; S(n)=8412 *15*; S(p)=6567.8 *5*; Q(α)=2515.0 *10* 2012Wa38
S(2n)=15372 *15*; S(2p)=11778.8 *3* (2012Wa38).
Q(2ε)=143.20 *27* from Penning Trap measurement (2012Dr01).
Other reactions:
2002Pf01: Be(^{208}Pb,Xγ), E=1 GeV/nucleon. Measured $T_{1/2}$ of 3265, 14$^-$ isomer.
1994Ji02: Atomic-beam laser spectroscopy, measured isotope shift relative to ^{182}W.
1980KoZK: ^{180}W(^{86}Kr,^{86}Kr′), measured yrast band energies up to 10$^+$ level.
1977Dr03: ^{181}Ta(d,3n), E=24 MeV. Measured delayed γ′s from 8$^-$ isomer.
1976Ha46: ^{182}W(^{12}C,^{14}C), E=70 MeV. Measured $\sigma(\theta)$ to 0$^+$ and 2$^+$ (103 keV) levels.
α: Additional information 1.

^{180}W Levels

Cross Reference (XREF) Flags

A	^{180}Ta β^- decay	E	^{176}Yb(^{9}Be,5nγ)	I	^{181}Ta(p,2nγ)
B	^{180}Re ε decay	F	Hf(α,xnγ)	J	^{182}W(p,t)
C	^{180}W IT decay (5.47 ms)	G	^{180}W(γ,γ'): Mossbauer	K	^{186}W(n,7nγ)
D	^{136}Xe(^{48}Ca,4nγ)	H	^{180}W(d,d′)		

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
0.0@	0$^+$	1.8×10^{18} y *2*	ABCDEFGHIJK	%α=100 $T_{1/2}$: from 2004Co26. Others: 1.0×10^{18} y *+7−3* (2005Zd04) which supersedes the values from 2003Da05, 2003Bi13, 2002Bi16, and 1995Ge17, ≥2.7×10^{17} y (2003Ce01), >1.1×10^{15} y (1960Be13), >9×10^{14} y (1961Ma05). $T_{1/2}$: 2ε decay not observed. $T_{1/2}(2\varepsilon 0\nu)\geq 1.3\times 10^{18}$ y, $T_{1/2}(2\varepsilon 2\nu)\geq 6.6\times 10^{17}$ y (2011Be39,2009Be27) which supersedes the values from 2003Da09 and 2003Da24.
103.561@ *16*	2$^+$	1.28 ns *5*	ABCDEFGHIJK	μ=0.509 *34* Jπ: E2 103.6γ to 0$^+$. μ: from ^{180}W(γ,γ'):Mossbauer. Recalculated for consistency with standard (1973Zi03,1989Ra17). $T_{1/2}$: from ^{180}Ta β^- decay.
337.559@ *24*	4$^+$		BCDEF HIJK	Jπ: E2 234.0γ to 2$^+$.
688.46@ *3*	6$^+$		CDEF HIJK	Jπ: E2 350.9γ to 4$^+$.
1006.381& *19*	2$^-$	7.4 ns *4*	B EF I	Jπ: E1+M2 903γ to 2$^+$, 669γ to 4$^+$, 1006γ to 0$^+$. $T_{1/2}$: from $\gamma\gamma$(t) in ^{180}Re ε decay. Other: ≈ 5.5 ns from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ).
1082.374& *20*	3$^-$		B EF HIJ	Jπ: 76.0γ to 2$^-$, 744.8γ to 4$^+$; band assignment.
1117.31a *3*	2$^+$		B HIJ	Jπ: 1014γ to 2$^+$, 1117γ to 0$^+$, L(p,t)=(2).
1138.47@ *3*	8$^+$		CDEF I K	Jπ: E2 450γ to 6$^+$; band assignment.
1184.893& *20*	4$^-$		B EF IJ	Jπ: 102.5γ to 3$^-$, E2 178.5γ to 2$^-$, 847.4γ to 4$^+$; band assignment.
1232.67a *3*	3$^+$		B IJ	Jπ: 895.3γ to 4$^+$, 1129.1γ to 2$^+$; band assignment.
1307.575& *23*	5$^-$		EF hI	XREF: h(1319). Jπ: M1+E2 123γ to 4$^-$, E2 225.2γ to 3$^-$; band assignment.
1322.09 *19*	(2$^+$)		hIJ	XREF: h(1319). Jπ: 984γ to 4$^+$, 1218.8 γ to 2$^+$, 1322γ to 0$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{180}W Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
1360.51[a] 4	4^+		IJ	Jπ: (E2) 1257γ to 2^+, 1023γ to 4^+; band assignment.
1380.8 3	0^+		J	Jπ: L(p,t)=0.
1461.82[&] 3	6^-		EF I	Jπ: E2 277γ to 4^-, 154γ to 5^-; band assignment.
1472.1 4	(0^+)		J	Jπ: L(p,t)=(0).
1513.6 4	0^+		J	Jπ: L(p,t)=0.
1529.05[d] 4	8^-	5.47 ms 9	CDEF I	Jπ: E1 390.6γ to 8^+, γ(θ) in Hf(α,xnγ). $T_{1/2}$: weighted average of 5.24 ms *19* from Hf(α,xnγ) and 5.53 ms *10* from ^{181}Ta(p,2nγ). configuration=(ν7/2[514])(ν9/2[624]).
1535.63[a] 6	5^+		I	Jπ: 847γ to 6^+, 1198γ to 4^+, band assignment.
1568.17 11			I	
1587.27 5	2^+		B J	Jπ: L(p,t)=2.
1624.23[&] 3	7^-		EF I	Jπ: E2 317γ to 5^-, 162γ to 6^-; band assignment.
1632.92 5	$(1^-,2)$		B h j	XREF: h(1637)j(1635). Jπ: 550.5γ to 3^-, log *ft*=6.7 in ^{180}Re ε decay from $(1)^-$ parent.
1634.67 4	$(3,4^+)$		hIj	XREF: h(1637)j(1635). Jπ: 450γ to 4^-, 517γ to 2^+, 1297γ to 4^+.
1639.80[b] 3	(5^-)	19.2 ns 3	EF I	Jπ: 179γ to 6^-, 279γ to 4^+, 455γ to 4^-, 951γ to 6^+. $T_{1/2}$: from ^{181}Ta(p,2nγ). Other: 24 ns *7* from Hf(α,xnγ). configuration=(ν1/2[521])(ν9/2[624]).
1664.18[@] 4	10^+		DEF I K	Jπ: E2 526γ to 8^+; band assignment.
1689.4 5	0^+		h J	XREF: h(1692). Jπ: L(p,t)=0.
1693.60 15			hI	XREF: h(1692).
1702.98[a] 8	6^+		I	Jπ: 1014γ to 6^+, 1365.5γ to 4^+; band assignment.
1725.59[d] 5	9^-		DEF hIj	XREF: h(1737)j(1740). Jπ: 196.5γ to 8^-; band assignment.
1729.85 7	$(4^+,5,6^+)$		hIj	XREF: h(1737)j(1740). Jπ: 1041γ to 6^+, 1392γ to 4^+.
1764.42[b] 3	(6^-)		EF I	Jπ: 125γ to (5^-); band member.
1768.4 5	0^+		J	Jπ: L(p,t)=0.
1784.96 7	$(4^+,5^+)$		I	Jπ: 552γ to 3^+, 1096γ to 6^+.
1814.88 12	$(2^+,3)$		B H	Jπ: 809γ to 2^-, 1477γ to 4^+, 1711γ to 2^+. Log *ft*=7.5 in ^{180}Re ε decay from $(1)^-$ parent favors $J^\pi=2^+$.
1830.85[&] 4	8^-		EF hI	XREF: h(1824). Jπ: E2 369γ to 6^-, 207γ to 7^-; band assignment.
1831.70 3	2^-		B h	XREF: h(1824). Jπ: log *ft*=5.0 in ^{180}Re ε decay from $(1)^-$ parent, 599γ to 3^+.
1851.15 6			I	
1855.20 16			I	
1911.58[b] 4	(7^-)		EF IJ	Jπ: D+Q 147γ to (6^-), 272γ to (5^-); band assignment.
1918.13 19	$(4^+,5,6^+)$		I	Jπ: 1230γ to 6^+, 1581γ to 4^+.
1926.44 16	$(6^+,7,8^+)$		I	Jπ: 788γ to 8^+, 1238γ to 6^+.
1932.20[a] 11	7^+		I	Jπ: 794γ to 8^+, 12434γ to 6^+; band assignment.
1932.3 6	(0^+)		J	Jπ: L(p,t)=(0).
1945.07[d] 6	10^-		DEF IJ	Jπ: E2 416γ to 8^-, M1 219.5γ to 9^-; band assignment.
1954.53 15			I	
2024.57[&] 8	9^-		EF I	Jπ: E2 400γ to 7^-; band assignment.
2036.7 6	0^+		J	Jπ: L(p,t)=0.
2059.35 12			IJ	
2082.55[b] 6	(8^-)		EF IJ	XREF: J(2095). Jπ: E2 318γ to (6^-), M1+E2 171γ to (7^-); band assignment.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{180}W Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
2117.52 *12*			I	
2127.39 *9*			I	
2133.09[c] *9*	(8$^+$)		E I	J$^{\pi}$: 995γ to 8$^+$; band head of Fermi-aligned i$^2_{13/2}$ band.
2164 *10*			J	
2176.80 *5*			B	
2181.6 *6*	0$^+$		J	J$^{\pi}$: L(p,t)=0.
2187.00[d] *11*	11$^-$		DEF I	J$^{\pi}$: E2 461γ to 9$^-$, M1 242γ to 10$^-$; band assignment.
2203 *10*			J	
2212 *6*			H J	E(level): from (d,d′). Other: 2212 *10* from (p,t).
2227.85 *9*			B	
2235.19[@] *11*	12$^+$		DEF I K	J$^{\pi}$: E2 571γ to 10$^+$; band assignment.
2256.65? *6*			B j	XREF: j(2265).
2273.70[b] *7*	(9$^-$)		EF Ij	XREF: j(2265). J$^{\pi}$: E2 362γ to (7$^-$), D 191.5γ to (8$^-$); band assignment.
2274.0[c] *5*	(9$^+$)		E	J$^{\pi}$: 141γ to (8$^+$); band assignment.
2284.00[&] *15*	10$^-$		EF I	J$^{\pi}$: E2 453γ to 8$^-$; band assignment.
2293 *10*			J	
2326.8 *7*	0$^+$		J	
2348 *6*			H J	E(level): from (d,d′). Other: 2356 *10* in (p,t).
2400 *10*			J	
2415.77 *4*	2$^-$		B	J$^{\pi}$: log *ft*=5.7 in ^{180}Re ε decay from (1)$^-$ parent, 1183γ to 3$^+$.
2423.9[c] *4*	(10$^+$)		E	J$^{\pi}$: 150γ to (9$^+$), 1285γ to 8$^+$; band assignment.
2435.18 *3*	2$^-$		B	J$^{\pi}$: log *ft*=5.8 in ^{180}Re ε decay from (1)$^-$ parent, 1203γ to 3$^+$.
2451.61[d] *13*	12$^-$		DEF I	J$^{\pi}$: E2 507γ to 10$^-$; band assignment.
2494.5[b] *7*	(10$^-$)		E	J$^{\pi}$: 221γ to (9$^-$), 412γ to (8$^-$); band assignment.
2501.17[&] *13*	11$^-$		EF I	J$^{\pi}$: E2 477γ to 9$^-$; band assignment.
2522.58 *7*			B	
2531.51 *9*			B	
2546.87 *9*			B	
2589.1[c] *5*	(11$^+$)		E	J$^{\pi}$: E2 315γ to (9$^+$); band assignment.
2722.9[b] *10*	(11$^-$)		E	J$^{\pi}$: 449γ to (9$^-$); band assignment.
2736.8[d] *4*	13$^-$		DEF	J$^{\pi}$: E2 549γ to 11$^-$, M1 285γ to 12$^-$; band assignment.
2763.6[c] *5*	(12$^+$)		E	J$^{\pi}$: E2 340γ to (10$^+$), 175γ to (11$^+$); band assignment.
2813.4[&] *10*	12$^-$		EF	J$^{\pi}$: E2 529γ to 10$^-$; band assignment.
2822.9[@] *7*	14$^+$		DEF	J$^{\pi}$: E2 588γ to 12$^+$; band assignment.
2884.12 *5*	2$^-$		B	J$^{\pi}$: log *ft*=5.6 in ^{180}Re ε decay from (1)$^-$ parent, 1651.5γ to 3$^+$.
2910.02? *9*			B	
2966.2[c] *6*	(13$^+$)		E	J$^{\pi}$: E2 377γ to (11$^+$), 202γ to (12$^+$); band assignment.
3000.5[b] *12*	(12$^-$)		E	J$^{\pi}$: 506γ to (10$^-$); band assignment.
3042.7[d] *4*	14$^-$		DEF	J$^{\pi}$: E2 591γ to 12$^-$, M1 306γ to 13$^-$; band assignment.
3047.5[&] *10*	13$^-$		EF	J$^{\pi}$: E2 546γ to 11$^-$; band assignment.
3176.3[c] *6*	(14$^+$)		E	J$^{\pi}$: E2 413γ to (12$^+$); band assignment.
3248.4[b] *14*	(13$^-$)		E	J$^{\pi}$: 526γ to (11$^-$); band assignment.
3264.9 *3*	14$^-$	2.3 μs *2*	DEF	J$^{\pi}$: (M1) 222γ to 14$^-$, 813γ to 12$^-$. T$_{1/2}$: from 2.3 μs *2* in Be(^{208}Pb,X) (2002Pf01) and 2.3 μs *2* from Hf(α,xnγ). configuration=(ν7/2[514]ν9/2[624](π5/2[402]π7/2[404]).
3356.1 *8*			E	
3368.3[d] *7*	15$^-$		E	J$^{\pi}$: E2 632γ to 13$^-$; band assignment.
3389.8 *7*	(15$^+$)	8.6 ns *6*	DEF	J$^{\pi}$: (E1) 125γ to 14$^-$. T$_{1/2}$: other: ≈3.5 ns from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ). configuration=(ν7/2[514]ν9/2[624])(π5/2[402]π9/2[514]).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{180}W Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
3411.2[&] *14*	(14⁻)		EF	Jπ: 598γ to 12⁻; band assignment.
3412.7[@] *10*	16⁺		DEF	Jπ: E2 590γ to 14⁺, band assignment.
3421.8[c] *8*	(15⁺)		E	Jπ: E2 455γ to (13⁺), (M1+E2) 246γ to (14⁺); band assignment.
3515.2 *9*			D	
3529.1 *7*			E	
3547.9[g] *12*	(16⁺)	20.3 ns *6*	DEF	Jπ: (M1) 158γ to (15⁺). $T_{1/2}$: other: ≈4.2 ns from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ). configuration=(ν7/2[514]ν9/2[624])(π7/2[404]π9/2[514]).
3581.6 *8*			E	
3605.8 *9*			E	
3656.7[&] *14*	15⁻		E	Jπ: E2 609γ to 13⁻; band assignment.
3695.5[c] *8*	(16⁺)		E	Jπ: E2 519γ to (14⁺); band assignment.
3697.8 *7*			E	
3713.0[d] *8*	16⁻		E	Jπ: E2 671γ to 14⁻; band assignment.
3745.0 *9*			DE	
3831.5 *9*			D	
3845.4[b] *17*	(15⁻)		E	Jπ: 597γ to (13⁻); band assignment.
3888.2[g] *15*	(17⁺)		EF	Jπ: 340γ to (16⁺); band assignment.
3898.0[e] *8*	(16⁻)		E	Jπ: 250γ from (17⁻); band assignment.
3967.2[c] *10*	(17⁺)		E	Jπ: E2 545γ to (15⁺); band assignment.
4002.0 *12*			DE	
4017.4[@] *13*	(18⁺)		DEF	Jπ: (E2) 604.5γ to 16⁺; band assignment.
4066.2[&] *17*	(16⁻)		E	Jπ: 655γ to (14⁻); band assignment.
4074.9[d] *12*	(17⁻)		E	Jπ: 707γ to 15⁻; band assignment.
4147.8[e] *6*	(17⁻)		DE	Jπ: 435γ to 16⁻, 780γ to 15⁻.
4248.9[g] *15*	(18⁺)		EF	Jπ: 361γ to (17⁺), 701γ to (16⁺); band assignment.
4269.9 *11*			DE	
4320.4[&] *17*	(17⁻)		E	Jπ: 664γ to 15⁻; band assignment.
4339.4[c] *11*	(18⁺)		E	Jπ: E2 644γ to (16⁺); band assignment.
4416.7[e] *9*	(18⁻)		E	Jπ: 519γ to (16⁻); band assignment.
4455.9[d] *13*	(18⁻)		E	Jπ: 743γ to 16⁻; band assignment.
4525.7 *18*			E	
4554.2 *12*			DE	
4606.6[c] *14*	(19⁺)		E	Jπ: E2 639γ to (17⁺); band assignment.
4628.8[g] *16*	(19⁺)		EF	Jπ: 380γ to (18⁺), 741γ to (17⁺); band assignment.
4673.1[@] *14*	(20⁺)		DE	Jπ: E2 655.5γ to (18⁺); band assignment.
4711.4[h] *9*	(19⁻)		DE	Jπ: 295γ to (18⁻), 564γ to 17⁻.
4761.2[&] *20*	(18⁻)		E	Jπ: 695γ to (16⁻); band assignment.
4845.9?[d] *16*	(19⁻)		E	Jπ: 771γ to (17⁻); band assignment.
4852.9[h] *11*	(20⁻)		DE	Jπ: 142γ to (19⁻); band assignment.
4857.3 *12*			DE	
5024.8[g] *16*	(20⁺)		E	Jπ: 396γ to (19⁺), (E2) 776γ to (18⁺); band assignment.
5027.4?[&] *20*	(19⁻)		E	Jπ: 707γ to (17⁻); band assignment.
5029.7?[e] *13*	(20⁻)		E	Jπ: 613γ to (18⁻); band assignment.
5095.3[c] *15*	(20⁺)		E	Jπ: E2 756γ to (18⁺); band assignment.
5128.7[h] *12*	(21⁻)		DE	Jπ: 276γ to (20⁻); band assignment.
5178.5 *12*			DE	
5339.8[c] *17*	(21⁺)		E	Jπ: E2 733γ to (19⁺).
5402.2[@] *14*	(22⁺)		DE	Jπ: 729γ to (20⁺); band assignment.
5434.8[g] *17*	(21⁺)		E	Jπ: 410γ to (20⁺), 806γ to (19⁺); band assignment.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{180}W Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
5454.2[h] *12*	(22⁻)		DE	Jπ: 326γ to (21⁻), 601γ to (20⁻); band assignment.
5518.8 *13*			DE	
5745.4?[&] *22*	(21⁻)		E	Jπ: 718γ to (19⁻); band assignment.
5815.8[h] *12*	(23⁻)		DE	Jπ: 362γ to (22⁻), 687γ to (21⁻); band assignment.
5859.3[g] *17*	(22⁺)		E	Jπ: 424γ to (21⁺), 835γ to (20⁺); band assignment.
5877.5 *12*	(22⁻)		DE	Jπ: 359γ to (21⁻), 699γ to (20⁻); band assignment.
5975.4 *12*	(23⁻)	<0.7 ns	DE	Jπ: 521γ to (22⁻), 847γ to (21⁻). $T_{1/2}$: from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ).
6115.2 *12*	(23⁻)	≈1.4 ns	DE	Jπ: 661γ to (22⁻), 986γ to (21⁻). $T_{1/2}$: from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ).
6162.8?[c] *20*	(23⁺)		E	Jπ: 823γ to (21⁺); band assignment.
6207.9[h] *13*	(24⁻)		E	Jπ: 392γ to (23⁻), 735.5γ to (22⁻); band assignment.
6211.9[@] *14*	(24⁺)		DE	Jπ: 809.5γ to (22⁺); band assignment.
6292.6?[g] *18*	(23⁺)		E	Jπ: 433γ to (22⁺), 858γ to (21⁺); band assignment.
6304.2[f] *13*	(24⁺)	<0.7 ns	DE	Jπ: 189γ to (23⁻). $T_{1/2}$: from centroid-shift analysis in ^{176}Yb(^{9}Be,5nγ).
6626.6[h] *14*	(25⁻)		E	Jπ: 418.5γ to (24⁻), 811γ to (23⁻); band assignment.
6734.1[f] *15*	(25⁺)		DE	Jπ: 430γ to (24⁺); band assignment.
7070.2[h] *15*	(26⁻)		E	Jπ: 444γ to (25⁻), 862γ to (24⁻); band assignment.
7101.4[@] *17*	(26⁺)		E	Jπ: 889.5γ to (24⁺); band assignment.
7177.4[f] *15*	(26⁺)		DE	Jπ: 443γ to (25⁺), 873γ to (24⁺); band assignment.
7634.1[f] *16*	(27⁺)		D	Jπ: 456γ to (26⁺), 900γ to (25⁺); band assignment.
8067.4?[@] *20*	(28⁺)		E	Jπ: 966γ to (26⁺); band assignment.

[†] From a least-squares fit to Eγ, by evaluator, for levels connected by γ-rays. The remaining level energies are from the indicated dataset.
[‡] Assignments are based mainly on band structures and on γ-ray multipolarities and decay patterns. Additional arguments are included in the comments.
[#] From beam-γ(t) in Hf(α,xnγ), except where noted.
[@] Band(A): g.s. band.
[&] Band(B): $K^{\pi}=2^{-}$ octupole rotational band.
[a] Band(C): $K^{\pi}=2^{+}$ γ vibrational band.
[b] Band(D): $K^{\pi}=(5^{-})$ rotational band.
[c] Band(E): $K^{\pi}=(8^{+})$ band. Interpreted as a Fermi-aligned $i^{2}_{13/2}$, t-band.
[d] Band(F): $K^{\pi}=8^{-}$ rotational band.
[e] Band(G): $K^{\pi}=16^{-}$ band.
[f] Band(H): $K=(24^{+})$ band.
[g] Band(I): $K^{\pi}=(16^{+})$ band.
[h] Band(J): $K^{\pi}=(19^{-})$ band.

Adopted Levels, Gammas (continued)

γ(^{180}W)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ	α	Comments
103.561	2+	103.568 *18*	100	0.0	0+	E2		3.40	α(K)=0.827 *12*; α(L)=1.95 *3*; α(M)=0.492 *7*; α(N)=0.1159 *17*; α(O)=0.01587 *23* α(P)=6.54×10^{-5} *10* B(E2)(W.u.)=140 *6* Mult.: from ce ratios in ^{180}Re ε decay.
337.559	4+	233.99 *3*	100	103.561	2+	E2		0.184	α(K)=0.1106 *16*; α(L)=0.0558 *8*; α(M)=0.01379 *20*; α(N)=0.00327 *5*; α(O)=0.000466 *7* α(P)=9.03×10^{-6} *13* Mult.: from ce(K)/ce(L) in Hf(α,xnγ) and ^{181}Ta(p,2nγ).
688.46	6+	350.898 *7*	100	337.559	4+	E2		0.0538	α(K)=0.0380 *6*; α(L)=0.01212 *17*; α(M)=0.00293 *5*; α(N)=0.000697 *10*; α(O)=0.0001028 *15* α(P)=3.34×10^{-6} *5* Mult.: from ce(K)/ce(L) in Hf(α,xnγ) and ^{181}Ta(p,2nγ).
1006.381	2−	668.84 *10*	0.45 *3*	337.559	4+	[M2]		0.0736	α(K)=0.0599 *9*; α(L)=0.01053 *15*; α(M)=0.00243 *4*; α(N)=0.000588 *9*; α(O)=9.55×10^{-5} *14* α(P)=6.62×10^{-6} *10* B(M2)(W.u.)=0.0044 *4* I_γ: from ^{180}Re ε decay. Other: 1.14 from ^{181}Ta(p,2nγ).
		902.814 *13*	100 *3*	103.561	2+	E1+M2	−0.31 *5*	0.0048 *8*	α(K)=0.0039 *7*; α(L)=0.00062 *12*; α(M)=0.00014 *3*; α(N)=3.4×10^{-5} *7*; α(O)=5.5×10^{-6} *10* α(P)=3.9×10^{-7} *7* B(E1)(W.u.)=3.5×10^{-8} *3*; B(M2)(W.u.)=0.019 *6* Mult.,δ: from γγ(θ) and ce data in ^{180}Re ε decay. δ: Other: −0.16 *7* from ^{181}Ta(p,2nγ).
		1006.34 *6*	0.547 *21*	0.0	0+	[M2]		0.0236	α(K)=0.0195 *3*; α(L)=0.00321 *5*; α(M)=0.000736 *11*; α(N)=0.0001776 *25*; α(O)=2.89×10^{-5} *4* α(P)=2.05×10^{-6} *3* B(M2)(W.u.)=0.00069 *5* I_γ: from ^{180}Re ε decay. Other: 0.91 from ^{181}Ta(p,2nγ).
1082.374	3−	75.987 *10*	68 *3*	1006.381	2−				I_γ: from ^{180}Re ε decay. Other: 57 from ^{181}Ta(p,2nγ).
		744.79 *3*	100 *7*	337.559	4+				
1117.31	2+	1013.71 *8*	100 *4*	103.561	2+				
		1117.27 *4*	84 *3*	0.0	0+				
1138.47	8+	450.018 *20*	100	688.46	6+	E2		0.0274	α(K)=0.0206 *3*; α(L)=0.00527 *8*; α(M)=0.001257 *18*; α(N)=0.000300 *5*; α(O)=4.52×10^{-5} *7* α(P)=1.86×10^{-6} *3* Mult.: from α(K)exp and ce(K)/ce(L) in Hf(α,xnγ) and ^{181}Ta(p,2nγ).
1184.893	4−	102.513 *10*	22	1082.374	3−				
		178.516 *10*	100 *10*	1006.381	2−	E2[#]		0.454	α(K)=0.229 *4*; α(L)=0.1712 *24*; α(M)=0.0427 *6*; α(N)=0.01010 *15*;

$^{180}_{74}W_{106}$-6

Adopted Levels, Gammas (continued)

γ(^{180}W) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(O)=0.001415 *20* α(P)=1.771×10^{-5} *25*
1184.893	4$^-$	847.35 *4*	39 *13*	337.559	4$^+$			I_γ: from ^{180}Re ε decay. Other: 25 from ^{181}Ta(p,2nγ).
		1081.52 *12*	7.0	103.561	2$^+$			
1232.67	3$^+$	895.26 *10*	16	337.559	4$^+$			
		1129.12 *4*	100	103.561	2$^+$			
1307.575	5$^-$	122.688 *20*	24.4 *17*	1184.893	4$^-$	M1+E2	2.2 *5*	α(K)=1.4 *8*; α(L)=0.6 *3*; α(M)=0.15 *8*; α(N)=0.036 *17*; α(O)=0.0052 *21*; α(P)=0.00013 *9* I_γ: from Hf(α,xnγ). Other: 25 *3* from ^{176}Yb(^{9}Be,5nγ), 9.3 from ^{181}Ta(p,2nγ). Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ=no from level scheme.
		225.189 *20*	100 *6*	1082.374	3$^-$	E2[#]	0.208	α(K)=0.1226 *18*; α(L)=0.0651 *10*; α(M)=0.01612 *23*; α(N)=0.00382 *6*; α(O)=0.000543 *8* α(P)=9.94×10^{-6} *14*
		619.24 *22*	4.0	688.46	6$^+$			
		969.83 *18*	6.0	337.559	4$^+$			
1322.09	(2$^+$)	984.2 *3*	60	337.559	4$^+$			
		1218.8 *3*	100	103.561	2$^+$			
		1322.2 *4*	60	0.0	0$^+$			
1360.51	4$^+$	1022.92 *6*	100	337.559	4$^+$			
		1257.16 *9*	59	103.561	2$^+$	(E2)[@]	0.00289	α(K)=0.00239 *4*; α(L)=0.000378 *6*; α(M)=8.61×10^{-5} *12*; α(N)=2.07×10^{-5} *3*; α(O)=3.33×10^{-6} *5* α(P)=2.21×10^{-7} *3*
1461.82	6$^-$	154.23 *4*	2.3 *8*	1307.575	5$^-$			I_γ: from ^{176}Yb(^{9}Be,5nγ). Other: 4.5 from ^{181}Ta(p,2nγ).
		276.941 *20*	100 *8*	1184.893	4$^-$	E2	0.1083	α(K)=0.0704 *10*; α(L)=0.0289 *4*; α(M)=0.00708 *10*; α(N)=0.001679 *24*; α(O)=0.000242 *4* α(P)=5.95×10^{-6} *9*
1529.05	8$^-$	67		1461.82	6$^-$			E_γ: observed only in ^{176}Yb(^{9}Be,5nγ).
		390.581 *15*	100	1138.47	8$^+$	E1	0.01230	α(K)=0.01030 *15*; α(L)=0.001554 *22*; α(M)=0.000351 *5*; α(N)=8.40×10^{-5} *12* α(O)=1.341×10^{-5} *19*; α(P)=8.66×10^{-7} *13* B(E1)(W.u.)<6.43×10^{-13} *11* Mult.: from α(K)exp in Hf(α,xnγ) and ^{181}Ta(p,2nγ).
1535.63	5$^+$	847.0	12.0	688.46	6$^+$			
		1198.07 *6*	100	337.559	4$^+$			
1568.17		879.6[b] *3*	50	688.46	6$^+$			
		1230.62 *11*	100	337.559	4$^+$			
1587.27	2$^+$	580.8 *1*	100 *17*	1006.381	2$^-$			
		1483.69 *6*	92 *8*	103.561	2$^+$			
		1587.2 *3*	16 *3*	0.0	0$^+$			
1624.23	7$^-$	162.43 *5*	2.9	1461.82	6$^-$			
		316.63 *3*	100	1307.575	5$^-$	E2	0.0724	α(K)=0.0495 *7*; α(L)=0.01751 *25*; α(M)=0.00426 *6*; α(N)=0.001012 *15*; α(O)=0.0001479 *21* α(P)=4.28×10^{-6} *6*

$^{180}_{74}W_{106}$-7

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
1632.92	(1⁻,2)	550.52 *6*	100 *8*	1082.374	3⁻			
		626.7 *2*	35 *13*	1006.381	2⁻			
		1529.30 *11*	47 *3*	103.561	2⁺			
1634.67	(3,4⁺)	401.84 *12*	69	1232.67	3⁺			
		450.0 *5*	27	1184.893	4⁻			
		517.37 *4*	100	1117.31	2⁺			
		552.0 *3*	15	1082.374	3⁻			
		1297.4 *3*	19	337.559	4⁺			
1639.80	(5⁻)	179.1	8.3	1461.82	6⁻			
		279.31 *4*	33	1360.51	4⁺			
		332.24 *3*	100 *8*	1307.575	5⁻			
		454.88 *3*	112 *9*	1184.893	4⁻			I_γ: weighted average of 115 *8* from Hf(α,xnγ) and 86 *23* from ^{176}Yb(^{9}Be,5nγ). Other: 73 from ^{181}Ta(p,2nγ).
		951.25 *12*	10	688.46	6⁺			
1664.18	10⁺	525.71 *3*	100	1138.47	8⁺	E2	0.0185	α(K)=0.01429 *20*; α(L)=0.00327 *5*; α(M)=0.000773 *11*; α(N)=0.000185 *3*; α(O)=2.82×10^{-5} *4* α(P)=1.309×10^{-6} *19*
1693.60		1356.04 *15*	100	337.559	4⁺			
1702.98	6⁺	1014.49 *10*	100	688.46	6⁺			
		1365.46 *13*	47	337.559	4⁺			
1725.59	9⁻	196.54 *3*	100	1529.05	8⁻	M1+E2	0.51 *19*	α(K)=0.38 *21*; α(L)=0.103 *12*; α(M)=0.025 *4*; α(N)=0.0059 *9*; α(O)=0.00088 *7* α(P)=3.6×10^{-5} *23* Mult.: D+Q from $\gamma(\theta)$ in ^{176}Yb(^{9}Be,5nγ), $\Delta\pi$= no from assumed band structure.
1729.85	(4⁺,5,6⁺)	1041.40 *7*	100	688.46	6⁺			
		1392.22 *16*	42	337.559	4⁺			
1764.42	(6⁻)	124.63 *2*	100	1639.80	(5⁻)			
1784.96	(4⁺,5⁺)	424.50 *8*	100	1360.51	4⁺			
		552.4 *2*	50	1232.67	3⁺			
		1096.3 *2*	38	688.46	6⁺			
		1447.2 *2*	88	337.559	4⁺			
1814.88	(2⁺,3)	808.9 *3*	100 *19*	1006.381	2⁻			
		1477.3 *3*	44 *16*	337.559	4⁺			
		1711.3 *2*	81 *13*	103.561	2⁺			
1830.85	8⁻	206.7 *7*	1.9 *9*	1624.23	7⁻			I_γ: from ^{176}Yb(^{9}Be,5nγ). Other: 3.1 from ^{181}Ta(p,2nγ).
		369.02 *3*	100 *6*	1461.82	6⁻	E2	0.0467	α(K)=0.0334 *5*; α(L)=0.01017 *15*; α(M)=0.00245 *4*; α(N)=0.000584 *9*; α(O)=8.64×10^{-5} *13* α(P)=2.96×10^{-6} *5*
1831.70	2⁻	599.0 *2*	1.50 *19*	1232.67	3⁺			
		714.43 *7*	2.82 *19*	1117.31	2⁺			
		749.34 *5*	11.3 *4*	1082.374	3⁻			
		825.36 *5*	100 *3*	1006.381	2⁻	M1	0.01564	α(K)=0.01308 *19*; α(L)=0.00198 *3*; α(M)=0.000449 *7*; α(N)=0.0001080 *16*

$^{180}_{74}W_{106}$-8

Adopted Levels, Gammas (continued)

γ(^{180}W) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(O)=1.768×10^{-5} *25*; α(P)=1.282×10^{-6} *18* Mult.: from α(K)exp in ^{180}Re ε decay.
1831.70	2$^-$	1727.8 *1*	0.57 *7*	103.561	2$^+$			
1851.15		211.35 *5*	100	1639.80	(5$^-$)			
1855.20		1166.74 *16*	100	688.46	6$^+$			
1911.58	(7$^-$)	147.16 *2*	100 *8*	1764.42	(6$^-$)	M1+E2	1.2 *4*	α(K)=0.8 *5*; α(L)=0.30 *10*; α(M)=0.07 *3*; α(N)=0.017 *6*; α(O)=0.0026 *7*; α(P)=8.E−5 *6* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ= no from assumed band structure.
		271.75 *5*	98 *6*	1639.80	(5$^-$)			
1918.13	(4$^+$,5,6$^+$)	1229.6 *2*	100	688.46	6$^+$			
		1581.2 *6*	60	337.559	4$^+$			
1926.44	(6$^+$,7,8$^+$)	788.0 *3*	14	1138.47	8$^+$			
		1237.96 *18*	100	688.46	6$^+$			
1932.20	7$^+$	794	13	1138.47	8$^+$			
		1243.73 *11*	100	688.46	6$^+$			
1945.07	10$^-$	219.49 *4*	102 *8*	1725.59	9$^-$	M1	0.515	α(K)=0.428 *6*; α(L)=0.0674 *10*; α(M)=0.01533 *22*; α(N)=0.00369 *6*; α(O)=0.000603 *9* α(P)=4.30×10^{-5} *6* I$_\gamma$: weighted average of 89 *5* from Hf(α,xnγ) and 107 *3* from ^{176}Yb(^{9}Be,5nγ). Others: 100 *20* in ^{136}Xe(^{48}Ca,4nγ) and 220 in ^{181}Ta(p,2nγ). Mult.: D from γ(θ) in Hf(α,xnγ), Δπ=no from level scheme.
		415.94 *10*	100 *5*	1529.05	8$^-$	E2	0.0337	α(K)=0.0249 *4*; α(L)=0.00680 *10*; α(M)=0.001629 *23*; α(N)=0.000388 *6*; α(O)=5.81×10^{-5} *9* α(P)=2.23×10^{-6} *4*
1954.53		319.74[b] *17*	100	1634.67	(3,4$^+$)			
		1266.2 *3*	63	688.46	6$^+$			
		1617.6 *5*	25	337.559	4$^+$			
2024.57	9$^-$	194.0	1.3 *7*	1830.85	8$^-$			
		400.26 *8*	100 *4*	1624.23	7$^-$	E2	0.0374	α(K)=0.0273 *4*; α(L)=0.00772 *11*; α(M)=0.00185 *3*; α(N)=0.000441 *7*; α(O)=6.58×10^{-5} *10* α(P)=2.44×10^{-6} *4*
		886.6 *2*	16	1138.47	8$^+$			
2059.35		329.5 *1*	100	1729.85	(4$^+$,5,6$^+$)			
2082.55	(8$^-$)	170.95 *5*	23 *5*	1911.58	(7$^-$)	M1+E2	0.8 *3*	α(K)=0.6 *3*; α(L)=0.17 *4*; α(M)=0.041 *11*; α(N)=0.0098 *24*; α(O)=0.00146 *25*; α(P)=5.E−5 *4* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ= no from assumed band structure. I$_\gamma$: from ^{176}Yb(^{9}Be,5nγ). Others: 145 *10* from Hg(α,xnγ) and 63 from ^{181}Ta(p,2nγ).
		318.24 *11*	100 *24*	1764.42	(6$^-$)	E2	0.0714	α(K)=0.0489 *7*; α(L)=0.01719 *25*; α(M)=0.00418 *6*; α(N)=0.000993

$^{180}_{74}W_{106}$-9

Adopted Levels, Gammas (continued)

γ(^{180}W) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								14; α(O)=0.0001452 *21* α(P)=4.23×10^{-6} *6* I_γ: from Hg(α,xnγ). Other: 160 from ^{181}Ta(p,2nγ).
2117.52		979.05 *12*	100	1138.47	8$^+$			
2127.39		988.92 *8*	100	1138.47	8$^+$			
2133.09	(8$^+$)	603.4[b]		1529.05	8$^-$			
		994.62 *8*		1138.47	8$^+$			
2176.80		1059.42 *6*	100 *5*	1117.31	2$^+$			
		2073.5 *2*	20 *3*	103.561	2$^+$			
		2176.9 *1*	28 *3*	0.0	0$^+$			
2187.00	11$^-$	241.91 *14*	74 *9*	1945.07	10$^-$	M1	0.394	α(K)=0.328 *5*; α(L)=0.0515 *8*; α(M)=0.01171 *17*; α(N)=0.00282 *4*; α(O)=0.000460 *7* α(P)=3.28×10^{-5} *5* I_γ: weighted average of 79.7 *24* from ^{176}Yb(^{9}Be,5nγ) and 60 *4* from Hf(α,xnγ). Other: 170 from ^{181}Ta(p,2nγ). Mult.: D from γ(θ) in Hf(α,xnγ), Δπ=no from level scheme.
		461.43 *13*	100 *6*	1725.59	9$^-$	E2	0.0257	α(K)=0.0194 *3*; α(L)=0.00487 *7*; α(M)=0.001160 *17*; α(N)=0.000276 *4*; α(O)=4.18×10^{-5} *6* α(P)=1.757×10^{-6} *25*
2227.85		995.14 *9*	100 *10*	1232.67	3$^+$			
		1110.7 *2*	78 *9*	1117.31	2$^+$			
		1145.4 *4*	14 *8*	1082.374	3$^-$			
2235.19	12$^+$	571.0 *1*	100	1664.18	10$^+$	E2	0.01520	α(K)=0.01186 *17*; α(L)=0.00257 *4*; α(M)=0.000605 *9*; α(N)=0.0001445 *21*; α(O)=2.22×10^{-5} *4* α(P)=1.091×10^{-6} *16*
2256.65?		1250.22[a] *6*	<65[a]	1006.381	2$^-$			
		2153.24 *11*	100 *6*	103.561	2$^+$			
2273.70	(9$^-$)	191.5 *3*	37 *11*	2082.55	(8$^-$)	M1	0.752	α(K)=0.625 *10*; α(L)=0.0986 *15*; α(M)=0.0225 *4*; α(N)=0.00541 *8*; α(O)=0.000882 *13* α(P)=6.29×10^{-5} *10* Mult.: D from γ(θ) in Hf(α,xnγ), Δπ=no from level scheme. I_γ: from ^{176}Yb(^{9}Be,5nγ). Others: 25 from ^{181}Ta(p,2nγ), 104 *14* from Hf(α,xnγ).
		362.10 *6*	100 *22*	1911.58	(7$^-$)	E2	0.0493	α(K)=0.0351 *5*; α(L)=0.01086 *16*; α(M)=0.00262 *4*; α(N)=0.000624 *9*; α(O)=9.22×10^{-5} *13* α(P)=3.10×10^{-6} *5*
2274.0	(9$^+$)	141.2	100 *8*	2133.09	(8$^+$)	(M1+E2)	1.4 *4*	α(K)=0.9 *6*; α(L)=0.35 *13*; α(M)=0.09 *4*; α(N)=0.021 *8*; α(O)=0.0030 *10*; α(P)=9.E−5 *6* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ=no from level scheme.
		548.7	16 *8*	1725.59	9$^-$			
2284.00	10$^-$	453.15 *14*	100	1830.85	8$^-$	E2	0.0269	α(K)=0.0202 *3*; α(L)=0.00515 *8*; α(M)=0.001229 *18*; α(N)=0.000293 *5*;

$^{180}_{74}W_{106}$-10

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(O)=4.42×10^{-5} *7* α(P)=1.83×10^{-6} *3*
2415.77	2$^-$	782.6 *2*	5.8 *19*	1632.92	(1$^-$,2)			
		828.5[b] *2*	8 *4*	1587.27	2$^+$			
		1183.11 *7*	24.0 *19*	1232.67	3$^+$			
		1298.44 *5*	74.0 *19*	1117.31	2$^+$			
		1333.4 *2*	11.6 *12*	1082.374	3$^-$			
		1409.40 *5*	100 *4*	1006.381	2$^-$			
		2312.1 *2*	3.9 *8*	103.561	2$^+$			
2423.9	(10$^+$)	150.0	47 *6*	2274.0	(9$^+$)	(M1+E2)	1.2 *4*	α(K)=0.8 *5*; α(L)=0.28 *9*; α(M)=0.068 *24*; α(N)=0.016 *6*; α(O)=0.0024 *7*; α(P)=8.E−5 *5* Mult.: D+Q from $\gamma(\theta)$ in ^{176}Yb(^{9}Be,5nγ), $\Delta\pi$=no from level scheme.
		698.2	23 *3*	1725.59	9$^-$			
		759.7	100 *6*	1664.18	10$^+$			
		1285.2	70 *12*	1138.47	8$^+$			
2435.18	2$^-$	847.8[a] *1*	<13[a]	1587.27	2$^+$			
		1202.6 *1*	28.7 *23*	1232.67	3$^+$			
		1250.22[a] *6*	<23[a]	1184.893	4$^-$			
		1317.85 *6*	63 *3*	1117.31	2$^+$			
		1352.80 *5*	100 *7*	1082.374	3$^-$			
		1428.8 *1*	13 *3*	1006.381	2$^-$			
		2331.87 *11*	30.3 *16*	103.561	2$^+$			
2451.61	12$^-$	264.7 *6*	46 *3*	2187.00	11$^-$		0.22 *10*	I_γ: from Hf(α,xnγ). Other: ≤110 from ^{181}Ta(p,2nγ).
		506.56 *12*	100 *5*	1945.07	10$^-$	E2	0.0203	α(K)=0.01556 *22*; α(L)=0.00365 *6*; α(M)=0.000866 *13*; α(N)=0.000207 *3*; α(O)=3.15×10^{-5} *5* α(P)=1.422×10^{-6} *20*
2494.5	(10$^-$)	221.0	11 *4*	2273.70	(9$^-$)			
		411.8	100 *21*	2082.55	(8$^-$)			
2501.17	11$^-$	476.6 *1*	100	2024.57	9$^-$	E2[#]	0.0237	α(K)=0.0179 *3*; α(L)=0.00440 *7*; α(M)=0.001047 *15*; α(N)=0.000250 *4*; α(O)=3.78×10^{-5} *6* α(P)=1.632×10^{-6} *23*
2522.58		935.2 *2*	52 *13*	1587.27	2$^+$			
		1290.0 *1*	62 *9*	1232.67	3$^+$			
		1405.2 *1*	100 *10*	1117.31	2$^+$			
		1516.0 *5*	75 *14*	1006.381	2$^-$			
2531.51		699.7[b] *2*	100 *30*	1831.70	2$^-$			
		1449.2 *2*	18 *6*	1082.374	3$^-$			
		1525.14 *11*	84 *5*	1006.381	2$^-$			
2546.87		1314.2 *1*	36 *9*	1232.67	3$^+$			
		1429.5 *2*	100 *18*	1117.31	2$^+$			
2589.1	(11$^+$)	165.1	100 *5*	2423.9	(10$^+$)	(M1+E2)	0.9 *3*	α(K)=0.6 *4*; α(L)=0.19 *5*; α(M)=0.047 *13*; α(N)=0.011 *3*; α(O)=0.0017 *4*;

$^{180}_{74}W_{106}$-11

Adopted Levels, Gammas (continued)

γ(^{180}W) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(P)=6.E−5 *4* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ=no from level scheme.
2589.1	(11$^+$)	315.4	15 *5*	2274.0	(9$^+$)	E2[#]	0.0733	α(K)=0.0500 *7*; α(L)=0.01776 *25*; α(M)=0.00432 *6*; α(N)=0.001027 *15*; α(O)=0.0001500 *21* α(P)=4.32×10^{-6} *6*
		643.5	12 *5*	1945.07	10$^-$			
2722.9	(11$^-$)	449.2	100	2273.70	(9$^-$)			
2736.8	13$^-$	285.3	17 *3*	2451.61	12$^-$	M1	0.251	α(K)=0.209 *3*; α(L)=0.0327 *5*; α(M)=0.00743 *11*; α(N)=0.00179 *3*; α(O)=0.000292 *4* α(P)=2.09×10^{-5} *3* Mult.: D from γ(θ) in Hf(α,xnγ), Δπ=no from level scheme.
		549.1	100 *2*	2187.00	11$^-$	E2	0.01669	α(K)=0.01295 *19*; α(L)=0.00288 *4*; α(M)=0.000679 *10*; α(N)=0.0001621 *23* α(O)=2.49×10^{-5} *4*; α(P)=1.189×10^{-6} *17*
2763.6	(12$^+$)	174.5	9.0 *17*	2589.1	(11$^+$)	M1+E2	0.73 *25*	α(K)=0.5 *3*; α(L)=0.16 *3*; α(M)=0.038 *9*; α(N)=0.0091 *21*; α(O)=0.00135 *21*; α(P)=5.E−5 *4* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ=no from level scheme.
		339.6	17 *3*	2423.9	(10$^+$)	E2[#]	0.0591	α(K)=0.0413 *6*; α(L)=0.01360 *19*; α(M)=0.00330 *5*; α(N)=0.000784 *11*; α(O)=0.0001152 *17* α(P)=3.61×10^{-6} *5*
		528.3	100 *7*	2235.19	12$^+$			
		1099.6	40 *10*	1664.18	10$^+$	(E2)[#]	0.00373	α(K)=0.00308 *5*; α(L)=0.000504 *7*; α(M)=0.0001152 *17*; α(N)=2.76×10^{-5} *4*; α(O)=4.43×10^{-6} *7* α(P)=2.86×10^{-7} *4*
2813.4	12$^-$	529.4	100	2284.00	10$^-$	E2	0.0182	α(K)=0.01406 *20*; α(L)=0.00320 *5*; α(M)=0.000757 *11*; α(N)=0.000181 *3*; α(O)=2.76×10^{-5} *4* α(P)=1.289×10^{-6} *18*
2822.9	14$^+$	587.6	100	2235.19	12$^+$	E2	0.01421	α(K)=0.01113 *16*; α(L)=0.00237 *4*; α(M)=0.000557 *8*; α(N)=0.0001331 *19*; α(O)=2.05×10^{-5} *3* α(P)=1.025×10^{-6} *15*
2884.12	2$^-$	1069.4 *2*	15 *3*	1814.88	(2$^+$,3)			
		1651.45 *11*	31.6 *22*	1232.67	3$^+$			
		1766.74 *11*	41 *4*	1117.31	2$^+$			
		1801.75 *11*	65 *4*	1082.374	3$^-$			
		1877.70 *10*	100 *4*	1006.381	2$^-$			
		2780.6 *2*	6.2 *9*	103.561	2$^+$			
2910.02?		1678.0 *3*	72 *19*	1232.67	3$^+$			
		1792.3 *3*	59 *16*	1117.31	2$^+$			
		1903.6 *1*	100 *13*	1006.381	2$^-$			
2966.2	(13$^+$)	202.4	27 *4*	2763.6	(12$^+$)	(M1+E2)	0.47 *18*	α(K)=0.35 *19*; α(L)=0.093 *9*; α(M)=0.022 *3*; α(N)=0.0053 *7*; α(O)=0.00080 *5*; α(P)=3.3×10^{-5} *21* Mult.: D+Q from γ(θ) in ^{176}Yb(^{9}Be,5nγ), Δπ=no from level scheme.
		376.9	100 *5*	2589.1	(11$^+$)	E2[#]	0.0441	α(K)=0.0317 *5*; α(L)=0.00946 *14*; α(M)=0.00228 *4*; α(N)=0.000542 *8*;

$^{180}_{74}W_{106}$-12

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(O)=8.05×10^{-5} *12* α(P)=2.82×10^{-6} *4*
3000.5	(12$^-$)	506.0	100	2494.5	(10$^-$)			
3042.7	14$^-$	306.1	18.7 *16*	2736.8	13$^-$	M1	0.208	α(K)=0.1727 *25*; α(L)=0.0270 *4*; α(M)=0.00613 *9*; α(N)=0.001477 *21*; α(O)=0.000241 *4* α(P)=1.725×10^{-5} *25* Mult.: D from $\gamma(\theta)$ in Hf(α,xnγ), $\Delta\pi$=no from level scheme.
		591.2	100 *5*	2451.61	12$^-$	E2	0.01401	α(K)=0.01098 *16*; α(L)=0.00233 *4*; α(M)=0.000547 *8*; α(N)=0.0001308 *19*; α(O)=2.02×10^{-5} *3* α(P)=1.012×10^{-6} *15*
3047.5	13$^-$	546.3	100	2501.17	11$^-$	E2	0.01690	α(K)=0.01310 *19*; α(L)=0.00292 *4*; α(M)=0.000689 *10*; α(N)=0.0001645 *23* α(O)=2.52×10^{-5} *4*; α(P)=1.202×10^{-6} *17*
3176.3	(14$^+$)	353.3[b]		2822.9	14$^+$			
		413.0	40 *6*	2763.6	(12$^+$)	E2[#]	0.0344	α(K)=0.0253 *4*; α(L)=0.00696 *10*; α(M)=0.001668 *24*; α(N)=0.000397 *6*; α(O)=5.94×10^{-5} *9* α(P)=2.27×10^{-6} *4*
		940.9	100 *5*	2235.19	12$^+$	E2[#]	0.00510	α(K)=0.00417 *6*; α(L)=0.000715 *10*; α(M)=0.0001643 *23*; α(N)=3.94×10^{-5} *6*; α(O)=6.27×10^{-6} *9* α(P)=3.87×10^{-7} *6*
3248.4	(13$^-$)	525.5	100	2722.9	(11$^-$)			
3264.9	14$^-$	222.3 *3*	82 *4*	3042.7	14$^-$	(M1)	0.497	α(K)=0.413 *6*; α(L)=0.0651 *10*; α(M)=0.01480 *22*; α(N)=0.00357 *6*; α(O)=0.000582 *9* α(P)=4.15×10^{-5} *6* B(M1)(W.u.)=2.31×10^{-7} *25* Mult.: from α(exp) in Hf(α,xnγ).
		298.4		2966.2	(13$^+$)	[E1]	0.0232	α(K)=0.0193 *3*; α(L)=0.00298 *5*; α(M)=0.000674 *10*; α(N)=0.0001610 *23*; α(O)=2.55×10^{-5} *4* α(P)=1.588×10^{-6} *23*
		528.0 *3*	100 *6*	2736.8	13$^-$			
		813.4 *3*	87 *4*	2451.61	12$^-$	[E2]	0.00689	α(K)=0.00558 *8*; α(L)=0.001010 *15*; α(M)=0.000234 *4*; α(N)=5.60×10^{-5} *8*; α(O)=8.83×10^{-6} *13* α(P)=5.19×10^{-7} *8* B(E2)(W.u.)=3.2×10^{-6} *4*
3356.1		91.3	100	3264.9	14$^-$	D+Q[#]		
3368.3	15$^-$	325.6	100.0 *23*	3042.7	14$^-$			
		631.7	26.0 *17*	2736.8	13$^-$	E2[#]	0.01201	α(K)=0.00949 *14*; α(L)=0.00194 *3*; α(M)=0.000454 *7*; α(N)=0.0001085 *16* α(O)=1.683×10^{-5} *24*; α(P)=8.77×10^{-7} *13*
3389.8	(15$^+$)	125.0	100	3264.9	14$^-$	(E1)	0.210	α(K)=0.1728 *25*; α(L)=0.0291 *4*; α(M)=0.00663 *10*; α(N)=0.001571 *22*; α(O)=0.000240 *4* α(P)=1.271×10^{-5} *18*

$^{180}_{74}W_{106}$-13

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								B(E1)(W.u.)=1.04×10^{-5} *8* Mult.: from α(exp) in Hf(α,xnγ).
3411.2	(14$^-$)	597.8	100	2813.4	12$^-$			
3412.7	16$^+$	589.6	100	2822.9	14$^+$	E2	0.01410	α(K)=0.01104 *16*; α(L)=0.00235 *4*; α(M)=0.000552 *8*; α(N)=0.0001318 *19*; α(O)=2.03×10^{-5} *3* α(P)=1.018×10^{-6} *15*
3421.8	(15$^+$)	245.7	6 *3*	3176.3	(14$^+$)	(M1+E2)	0.27 *11*	α(K)=0.21 *11*; α(L)=0.0476 *18*; α(M)=0.01127 *17*; α(N)=0.00269 *4*; α(O)=0.00041 *3* α(P)=2.0×10^{-5} *12* Mult.: D+Q from $\gamma(\theta)$ in ^{176}Yb(^{9}Be,5nγ), $\Delta\pi$=no from level scheme.
		455.4	100 *11*	2966.2	(13$^+$)	E2[#]	0.0266	α(K)=0.0200 *3*; α(L)=0.00507 *8*; α(M)=0.001210 *17*; α(N)=0.000288 *4*; α(O)=4.35×10^{-5} *6* α(P)=1.81×10^{-6} *3*
3515.2		250	100	3264.9	14$^-$			
3529.1		173.2		3356.1		D+Q		
		264		3264.9	14$^-$			
3547.9	(16$^+$)	158.1	100	3389.8	(15$^+$)	(M1)	1.288	α(K)=1.069 *15*; α(L)=0.1693 *24*; α(M)=0.0385 *6*; α(N)=0.00928 *13*; α(O)=0.001514 *22* α(P)=0.0001078 *15* B(M1)(W.u.)=0.000120 *5*
3581.6		316.7[&]	100	3264.9	14$^-$			
3605.8		216.0	100	3389.8	(15$^+$)			
3656.7	15$^-$	609.2	100	3047.5	13$^-$	E2[#]	0.01306	α(K)=0.01028 *15*; α(L)=0.00214 *3*; α(M)=0.000503 *7*; α(N)=0.0001201 *17*; α(O)=1.86×10^{-5} *3* α(P)=9.48×10^{-7} *14*
3695.5	(16$^+$)	519.0	100 *20*	3176.3	(14$^+$)	E2[#]	0.0191	α(K)=0.01472 *21*; α(L)=0.00340 *5*; α(M)=0.000804 *12*; α(N)=0.000192 *3*; α(O)=2.93×10^{-5} *4* α(P)=1.347×10^{-6} *19*
		872.8	97 *20*	2822.9	14$^+$			
3697.8		168.6	21 *4*	3529.1				
		308.0	12 *5*	3389.8	(15$^+$)			
		433.0	100 *20*	3264.9	14$^-$			
3713.0	16$^-$	670.5	100	3042.7	14$^-$	E2[#]	0.01050	α(K)=0.00835 *12*; α(L)=0.001652 *24*; α(M)=0.000386 *6*; α(N)=9.22×10^{-5} *13* α(O)=1.436×10^{-5} *21*; α(P)=7.73×10^{-7} *11*
3745.0		139.1	34 *3*	3605.8				
		355.3	100 *8*	3389.8	(15$^+$)			
3831.5		316[&]	100	3515.2				
3845.4	(15$^-$)	597.0	100	3248.4	(13$^-$)			
3888.2	(17$^+$)	340.4	100	3547.9	(16$^+$)	M1+E2		Mult.: D+Q from $\gamma(\theta)$ in Hf(α,xnγ), $\Delta\pi$=no from level scheme.
3898.0	(16$^-$)	316.7[&]	100	3581.6				
3967.2	(17$^+$)	271.7[b]		3695.5	(16$^+$)	(M1+E2)	0.20 *9*	α(K)=0.16 *9*; α(L)=0.034 *4*; α(M)=0.0081 *5*; α(N)=0.00193 *13*; α(O)=0.00030 *4*

$^{180}_{74}W_{106}$-14

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(P)=1.5×10^{-5} *9* Mult.: (D+Q) from $\gamma(\theta)$ in ^{176}Yb(^{9}Be,5nγ), $\Delta\pi$=no from level scheme.
3967.2	(17$^+$)	545.4		3421.8	(15$^+$)	(E2)[#]	0.01696	α(K)=0.01315 *19*; α(L)=0.00293 *5*; α(M)=0.000692 *10*; α(N)=0.0001653 *24* α(O)=2.53×10^{-5} *4*; α(P)=1.207×10^{-6} *17*
4002.0		257.1	100	3745.0				
4017.4	(18$^+$)	604.5	100	3412.7	16$^+$	(E2)[#]	0.01330	α(K)=0.01045 *15*; α(L)=0.00219 *3*; α(M)=0.000514 *8*; α(N)=0.0001228 *18*; α(O)=1.90×10^{-5} *3* α(P)=9.64×10^{-7} *14*
4066.2	(16$^-$)	655.0	100	3411.2	(14$^-$)			
4074.9	(17$^-$)	706.6	100	3368.3	15$^-$			
4147.8	(17$^-$)	249.9	41 *25*	3898.0	(16$^-$)			
		316		3831.5				
		435		3713.0	16$^-$			
		450.0	100 *10*	3697.8				
		542[b]		3605.8				
		565.9	29 *9*	3581.6				
		779.7	7.4 *8*	3368.3	15$^-$			
4248.9	(18$^+$)	360.9	100 *6*	3888.2	(17$^+$)	M1+E2		Mult.: D+Q from $\gamma(\theta)$ in Hf(α,xnγ), $\Delta\pi$=no from level scheme.
		700.9	19 *5*	3547.9	(16$^+$)			
4269.9		267.7	100 *13*	4002.0				
		524.9	40 *6*	3745.0				
4320.4	(17$^-$)	663.7	100	3656.7	15$^-$			
4339.4	(18$^+$)	643.9		3695.5	(16$^+$)	E2[#]	0.01150	α(K)=0.00911 *13*; α(L)=0.00184 *3*; α(M)=0.000431 *6*; α(N)=0.0001030 *15* α(O)=1.599×10^{-5} *23*; α(P)=8.42×10^{-7} *12*
		926.8[b]		3412.7	16$^+$			
4416.7	(18$^-$)	518.9	100 *21*	3898.0	(16$^-$)			
		703.6	41 *5*	3713.0	16$^-$			
4455.9	(18$^-$)	742.9	100	3713.0	16$^-$			
4525.7		276.8	100	4248.9	(18$^+$)			
4554.2		284.3	100 *30*	4269.9				
		552.5	13 *4*	4002.0				
4606.6	(19$^+$)	639.4	100	3967.2	(17$^+$)	E2[#]	0.01169	α(K)=0.00925 *13*; α(L)=0.00188 *3*; α(M)=0.000439 *7*; α(N)=0.0001050 *15* α(O)=1.629×10^{-5} *23*; α(P)=8.55×10^{-7} *12*
4628.8	(19$^+$)	379.8	100 *10*	4248.9	(18$^+$)			
		740.5	73 *7*	3888.2	(17$^+$)			
4673.1	(20$^+$)	655.5	100	4017.4	(18$^+$)	E2[#]	0.01104	α(K)=0.00877 *13*; α(L)=0.001755 *25*; α(M)=0.000410 *6*; α(N)=9.81×10^{-5} *14* α(O)=1.525×10^{-5} *22*; α(P)=8.11×10^{-7} *12*
4711.4	(19$^-$)	294.8	19 *3*	4416.7	(18$^-$)			
		563.6	100 *9*	4147.8	(17$^-$)			
4761.2	(18$^-$)	695.0	100	4066.2	(16$^-$)			
4845.9?	(19$^-$)	771.0[b]	100	4074.9	(17$^-$)			

$^{180}_{74}W_{106}$-15

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α	Comments
4852.9	(20$^-$)	141.6	100	4711.4	(19$^-$)			
4857.3		303.2	100 *17*	4554.2				
		587.3	30 *12*	4269.9				
5024.8	(20$^+$)	396.3	100 *10*	4628.8	(19$^+$)			
		776.0	78 *17*	4248.9	(18$^+$)	(E2)[#]	0.00762	α(K)=0.00615 *9*; α(L)=0.001135 *16*; α(M)=0.000263 *4*; α(N)=6.30×10^{-5} *9*; α(O)=9.90×10^{-6} *14* α(P)=5.71×10^{-7} *8*
5027.4?	(19$^-$)	707.0[b]	100	4320.4	(17$^-$)			
5029.7?	(20$^-$)	613[b]	100	4416.7	(18$^-$)			
5095.3	(20$^+$)	755.9	100	4339.4	(18$^+$)	E2[#]	0.00806	α(K)=0.00649 *9*; α(L)=0.001212 *17*; α(M)=0.000281 *4*; α(N)=6.73×10^{-5} *10* α(O)=1.057×10^{-5} *15*; α(P)=6.02×10^{-7} *9*
5128.7	(21$^-$)	276.0	100	4852.9	(20$^-$)			
5178.5		321.3	100 *17*	4857.3				
		624.3	30 *13*	4554.2				
5339.8	(21$^+$)	733.2	100	4606.6	(19$^+$)	E2[#]	0.00861	α(K)=0.00692 *10*; α(L)=0.001309 *19*; α(M)=0.000304 *5*; α(N)=7.28×10^{-5} *11* α(O)=1.141×10^{-5} *16*; α(P)=6.41×10^{-7} *9*
5402.2	(22$^+$)	728.9	100	4673.1	(20$^+$)			
5434.8	(21$^+$)	409.9	100 *13*	5024.8	(20$^+$)			
		805.6	87 *24*	4628.8	(19$^+$)			
5454.2	(22$^-$)	325.5	100 *9*	5128.7	(21$^-$)			
		601.4	21 *4*	4852.9	(20$^-$)			
5518.8		340.5	100 *8*	5178.5				
		661.4	7.8 *25*	4857.3				
5745.4?	(21$^-$)	718[b]	100	5027.4?	(19$^-$)			
5815.8	(23$^-$)	361.5	100 *10*	5454.2	(22$^-$)			
		687.0	37 *5*	5128.7	(21$^-$)			
5859.3	(22$^+$)	423.9		5434.8	(21$^+$)			
		835[b]		5024.8	(20$^+$)			
5877.5	(22$^-$)	358.8	100 *17*	5518.8				
		699.1	72 *11*	5178.5				
5975.4	(23$^-$)	159.7		5815.8	(23$^-$)			
		521[b]		5454.2	(22$^-$)			E_γ: observed only in ^{136}Xe(^{48}Ca,4nγ).
		846.8		5128.7	(21$^-$)			
6115.2	(23$^-$)	237.7		5877.5	(22$^-$)			
		299.1		5815.8	(23$^-$)			
		661.2		5454.2	(22$^-$)			
		986.4		5128.7	(21$^-$)			
6162.8?	(23$^+$)	823.0[b]	100	5339.8	(21$^+$)			
6207.9	(24$^-$)	392.0		5815.8	(23$^-$)			
		753.5		5454.2	(22$^-$)			
6211.9	(24$^+$)	809.5	100	5402.2	(22$^+$)			

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
6292.6?	(23^+)	433[b]		5859.3	(22^+)	7070.2	(26^-)	443.6		6626.6	(25^-)
		858[b]		5434.8	(21^+)			862.3		6207.9	(24^-)
6304.2	(24^+)	(92)		6211.9	(24^+)	7101.4	(26^+)	889.5	100	6211.9	(24^+)
		189.1		6115.2	(23^-)	7177.4	(26^+)	443.0		6734.1	(25^+)
		328.9		5975.4	(23^-)			873.1		6304.2	(24^+)
6626.6	(25^-)	418.5		6207.9	(24^-)	7634.1	(27^+)	456.3		7177.4	(26^+)
		811.1		5815.8	(23^-)			900.4		6734.1	(25^+)
6734.1	(25^+)	430.0	100	6304.2	(24^+)	8067.4?	(28^+)	966[b]	100	7101.4	(26^+)

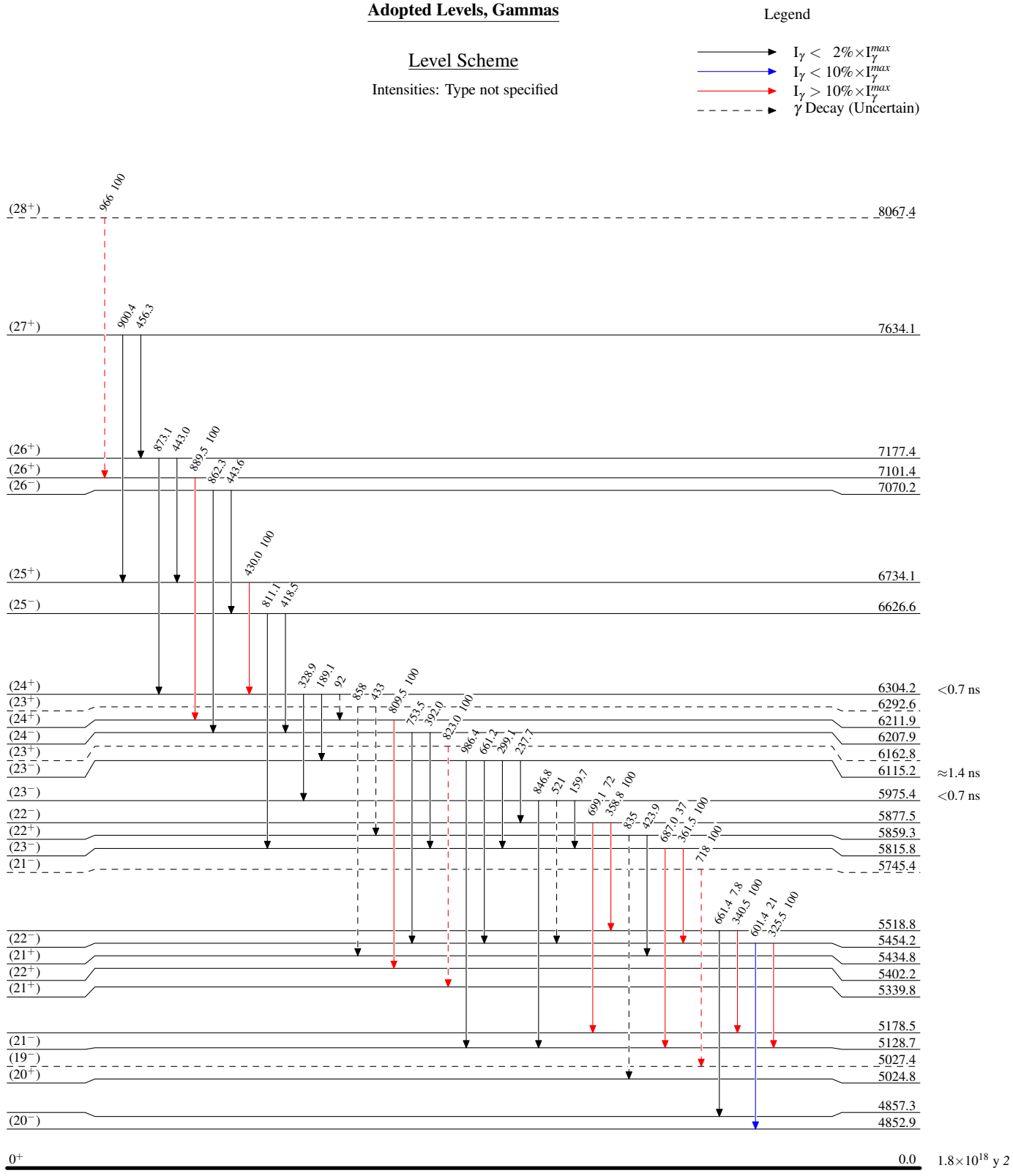
† Weighted average of all available data, except where noted.
‡ From $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in Hf(α,xnγ), except where noted.
# From $\gamma(\theta)$ in ^{176}Yb(^{9}Be,5nγ). Stretched Q transitions are assumed to be E2 in character.
@ From p$\gamma(\theta)$ in ^{181}Ta(p,2nγ). Stretched Q transitions are assumed to be E2 in character.
& Multiply placed.
[a] Multiply placed with undivided intensity.
[b] Placement of transition in the level scheme is uncertain.

$^{180}_{74}W_{106}$-17

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

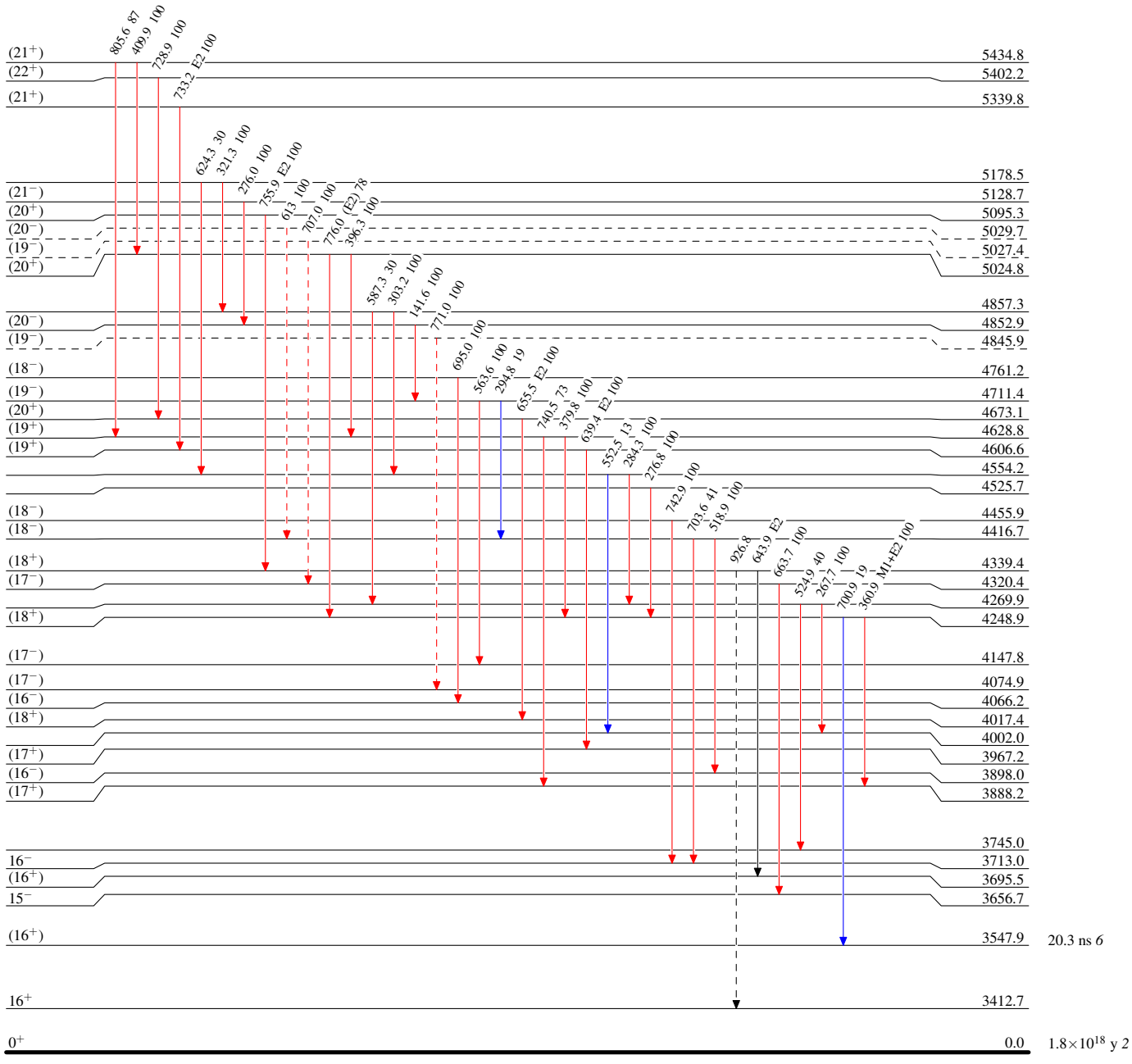


$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

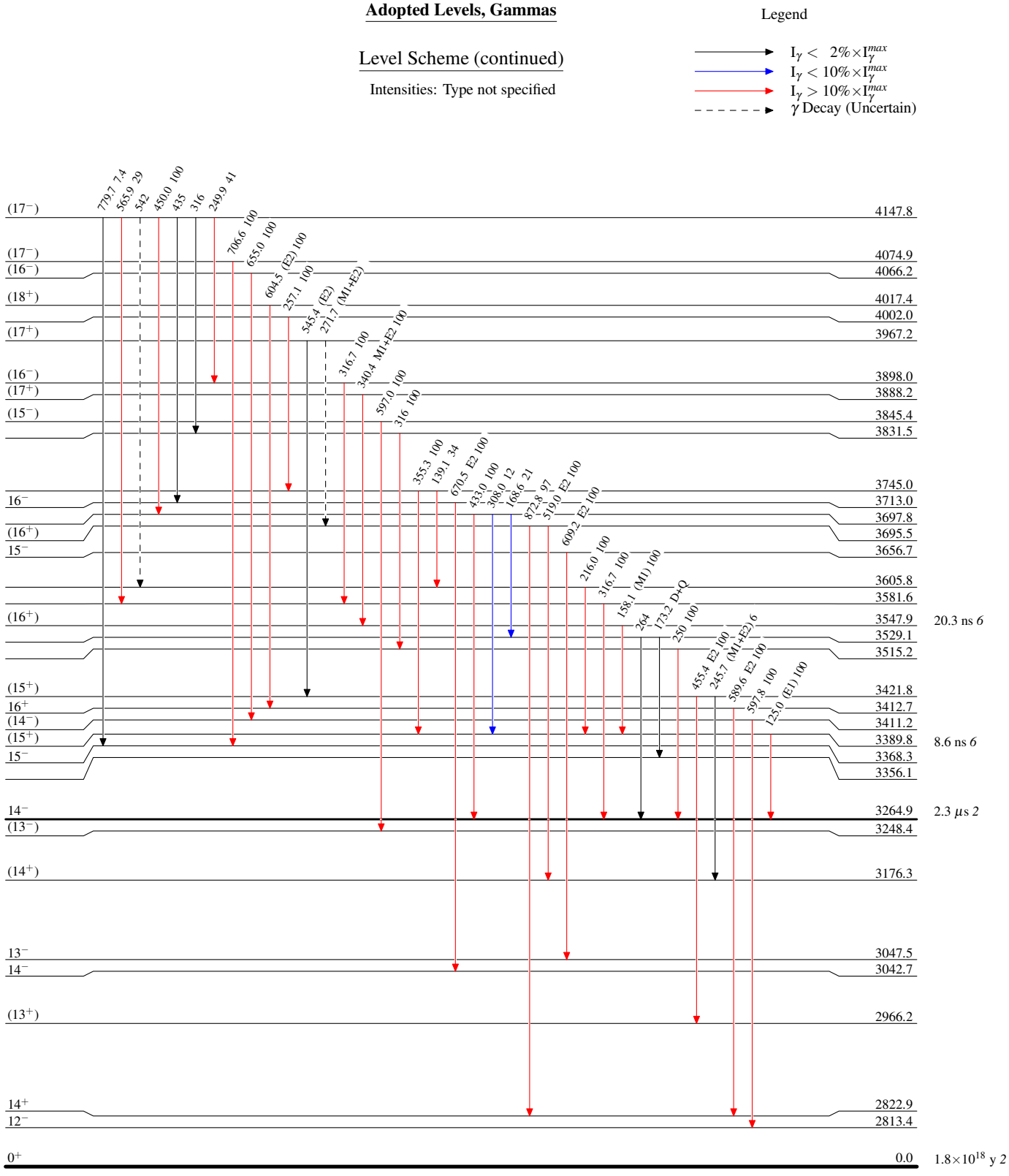


$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

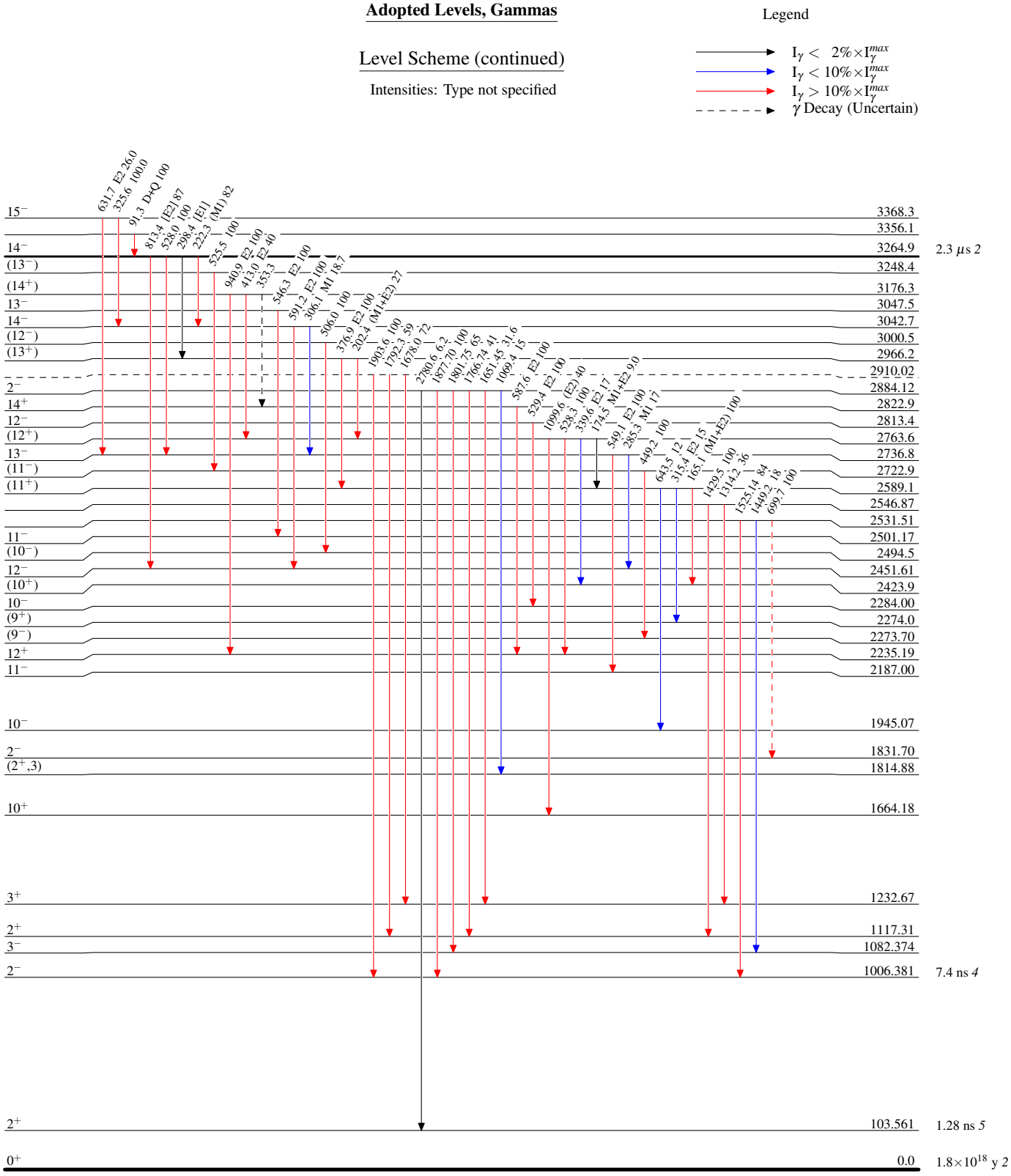


$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

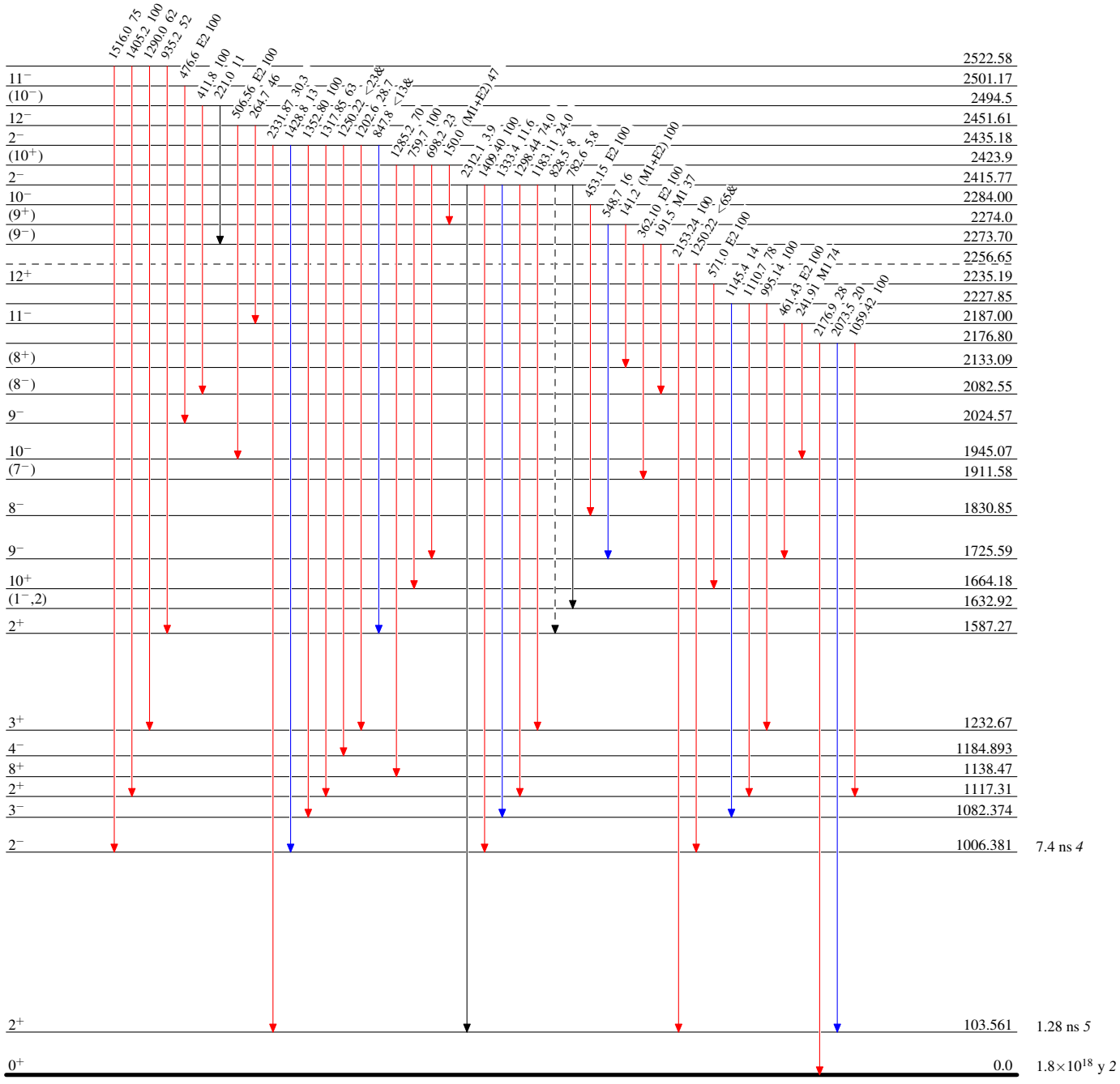


$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given



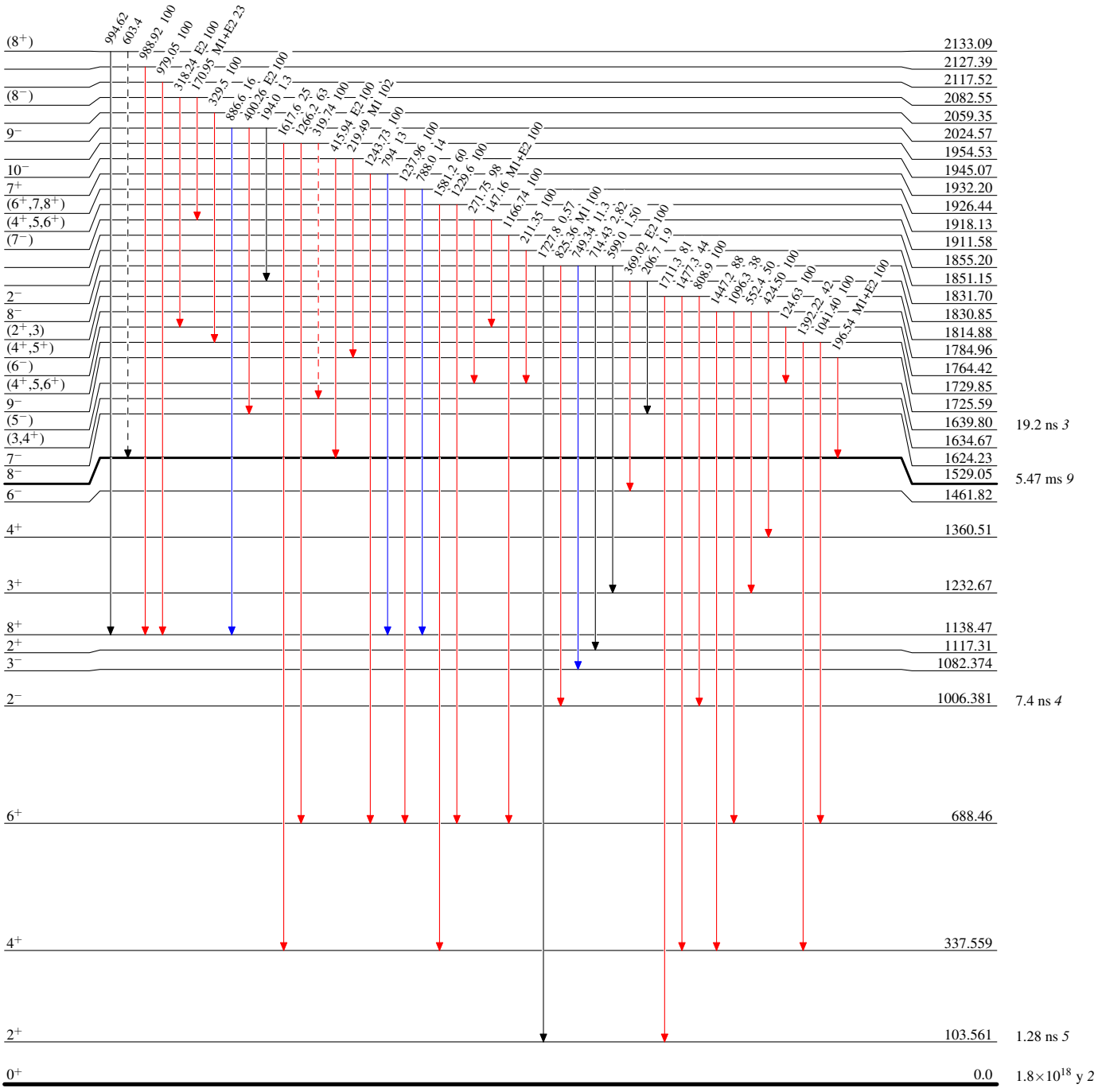
$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& 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)

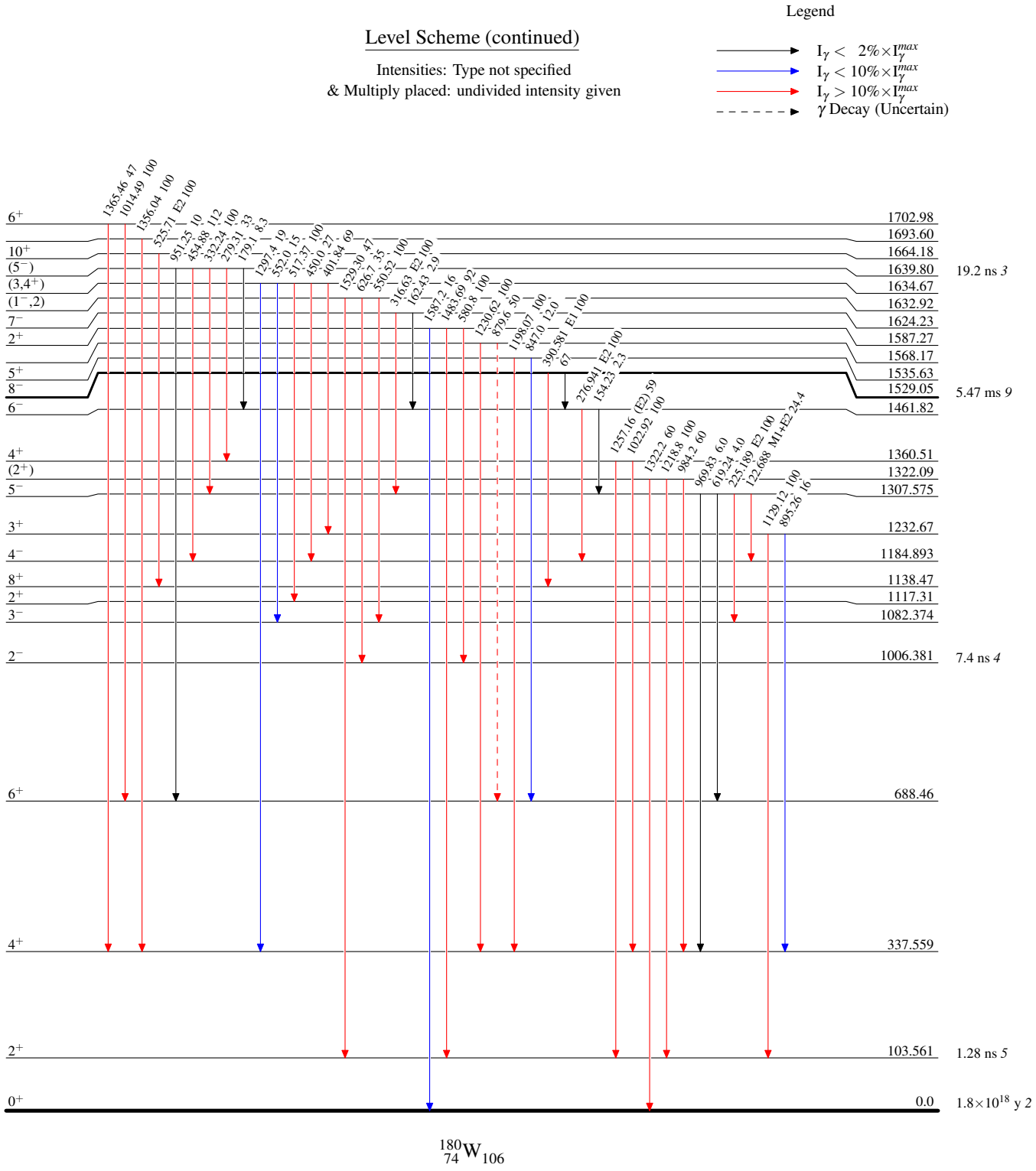


$^{180}_{74}W_{106}$

Adopted Levels, Gammas

Level Scheme (continued)

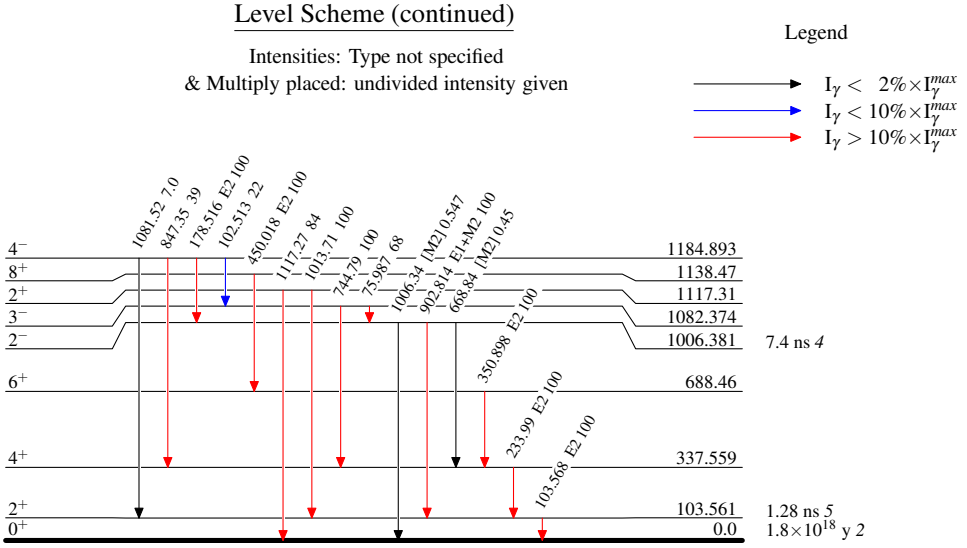
Intensities: Type not specified
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

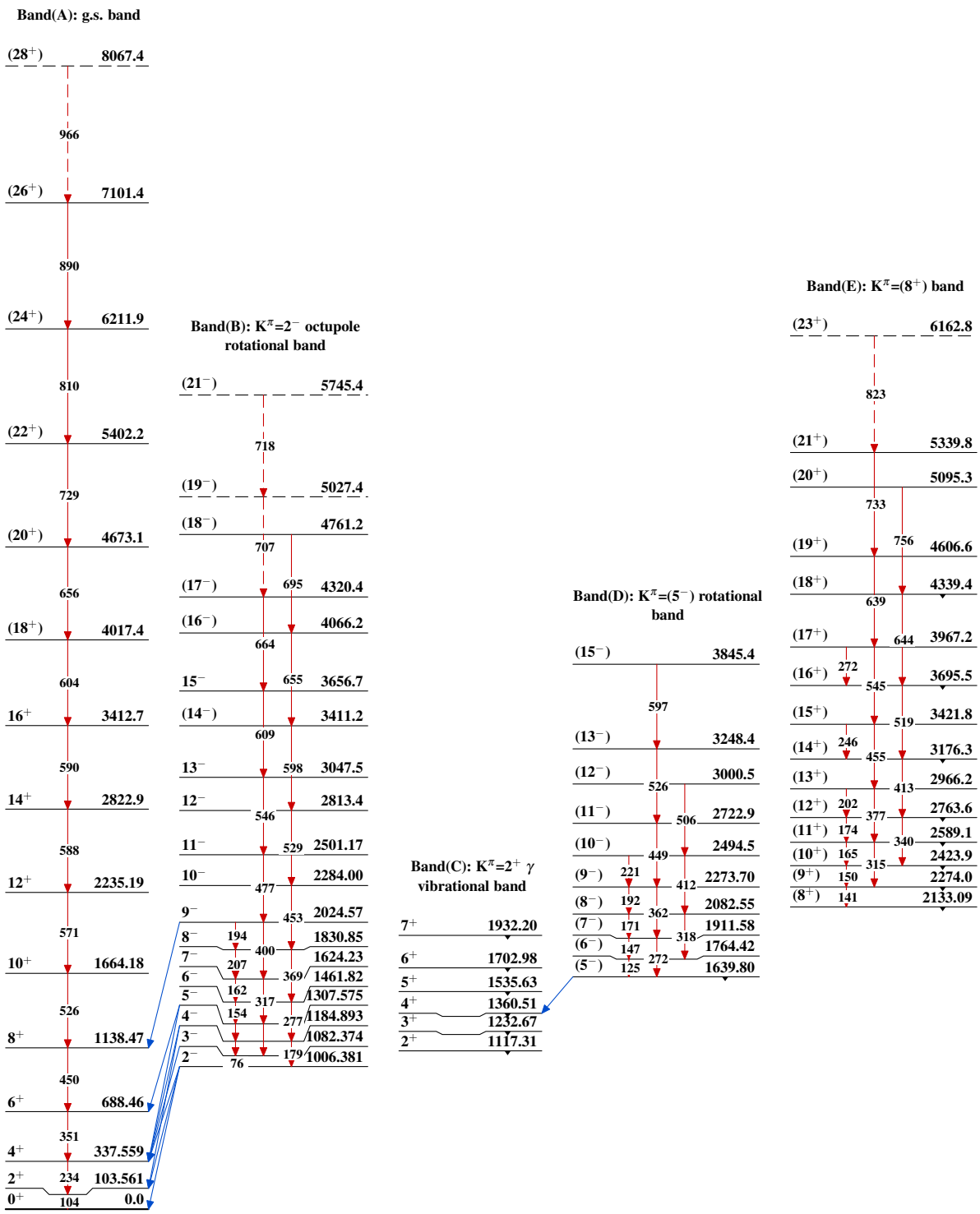
Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

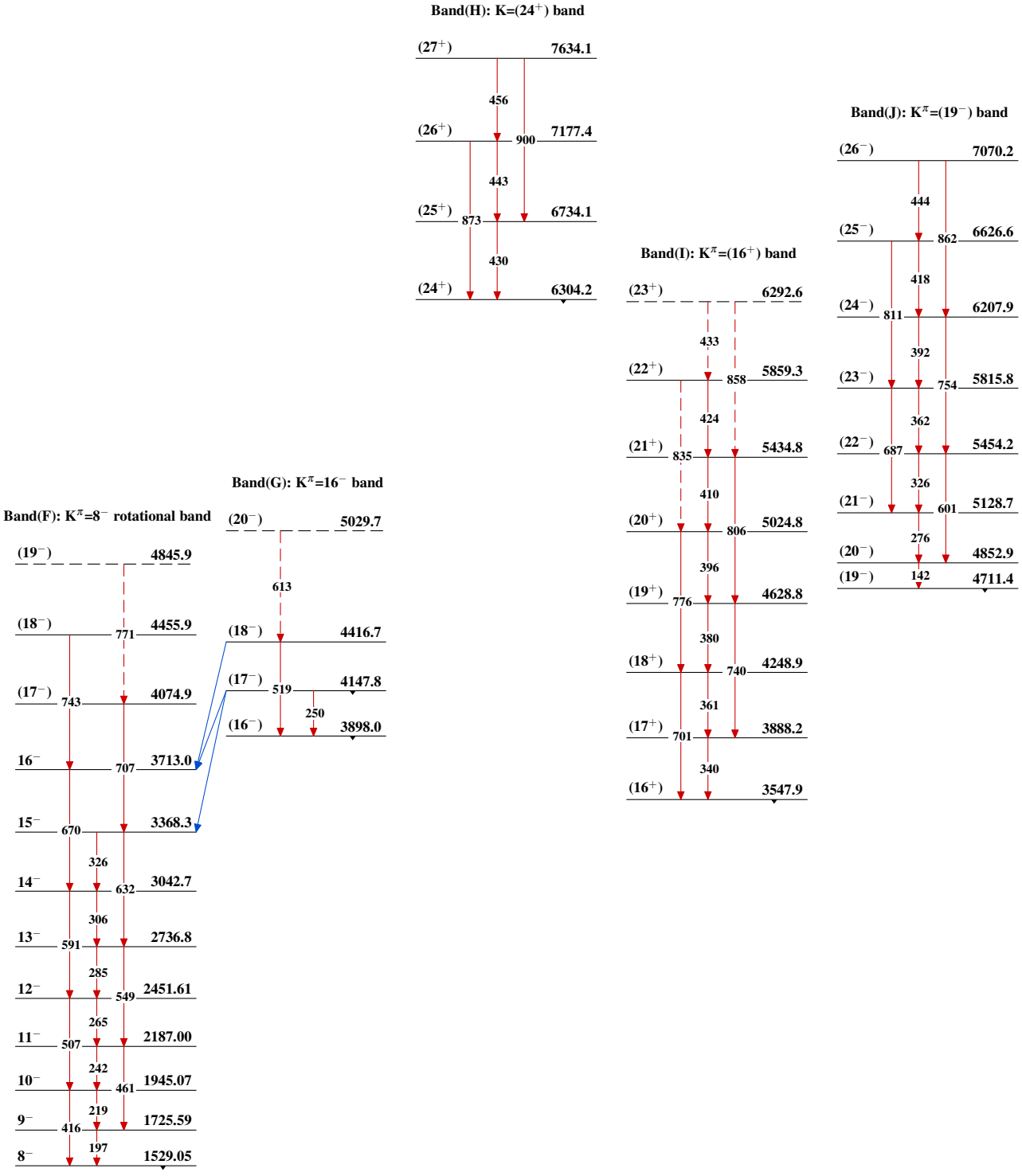


$^{180}_{74}W_{106}$

Adopted Levels, Gammas



Adopted Levels, Gammas (continued)



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