^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Achterberg, O. A. Capurro, G. V. Marti	NDS 110, 1473 (2009)	31-May-2008

^{178}Hf: S(n)=7625.96 keV *18* (2003Au03).

1986Ha22: Target: 86.5% enriched ^{177}Hf (J^{π}=7/2$^-$). Measured Eγ, Iγ, conversion electron energies and intensities. Detector: bent crystal spectrometer, Ge(Li) anti-Compton spectrometer, mag spect. Thermal neutron separation energy, S(n)=7626.34 *30*, determined from the energies of the most intense primary γ rays. Known bands confirmed and extended, and new ones established. Additional information 1.

1987Bo52: Target: ^{177}Hf (J^{π}=7/2$^-$). Measured Eγ, total Iγ for γ-ray cascades. Measured $\gamma\gamma$ coin for γ rays with fixed energy sum feeding the g.s. (0$^+$), 93 (2$^+$), 307 (4$^+$), 632 (6$^+$), 1175 (2$^+$), 1260 (2$^-$), 1269 (3$^+$), and 1277 (2$^+$) levels. Detectors: Ge(Li).

Other: 1969Pr14.

^{178}Hf Levels

See 1989Bo50 for possible additional levels at 6048, 6080, 6340, 6660, 6713, 6733, and 6817 keV.

E(level)[†]	J$^{\pi}$	T$_{1/2}$	Comments
0.0	0$^+$		
93.1800[@] *10*	2$^+$		
306.621[@] *3*	4$^+$		
632.180[@] *5*	6$^+$		
1058.559[@] *6*	8$^+$		
1147.426[&] *6*	8$^-$	4.0 s *2*	T$_{1/2}$: From Adopted Levels.
1174.633[a] *4*	2$^+$		
1199.386[b] *11*	0$^+$		
1260.251[c] *4*	2$^-$		
1268.540[a] *4*	3$^+$		
1276.695[b] *5*	2$^+$		
1310.071[d] *4*	1$^-$		
1322.467[c] *4*	3$^-$		
1362.554[d] *4*	2$^-$		
1384.465[a] *4*	4$^+$		
1409.443[c] *4*	4$^-$		
1433.626[d] *4*	(3)$^-$		
1434.253[e] *21*	0$^+$		
1443.938[f] *10*	0$^+$		
1450.366[b] *5*	4$^+$	1.0 ps *9*	T$_{1/2}$: Half-life range of 0.13 to 1.91 ps from lifetime measurements in 1999Ap02.
1496.468[e] *17*	2$^+$		
1512.595[c] *4*	(5)$^-$		
1513.611[f] *9*	2$^+$		
1513.834[g] *4*	4$^+$		
1533.156[a] *5*	5$^+$		
1538.793[d] *4*	4$^-$		
1554.001[h] *4*	6$^+$	77.5 ns *7*	T$_{1/2}$: From Adopted Levels.
1561.543[i] *5*	2$^+$		
1566.671[j] *4*	2$^-$		
1635.607[e] *5*	4$^+$		
1636.731[k] *4*	5$^-$		

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^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

^{178}Hf Levels (continued)

E(level)†	Jπ	$T_{1/2}$	Comments
1639.761[j] 4	3−		
1640.455[g] 4	5+		
1648.841[c] 5	(6)−		
1651.462[d] 4	(5)−		
1691.086[a] 11	6+		
1731.068[b] 4	6+		
1747.105[j] 4	4−		
1758.147[l] 4	3+		
1772.22[m] 8	0+		
1781.268[k] 4	(6)−		
1788.602[g] 4	6+		
1803.392[n] 4	3−		
1808.278[o] 5	(2)+		
1818.290[m] 7	2+	0.50 ps 23	$T_{1/2}$: Half-life range of 0.36 to 0.82 ps from lifetime measurements in 1999Ap02.
1857.154[p] 5	(2)−		
1862.210[o] 5	3+		Note that while 1986Ha22 list this level as the $J^\pi=3^+$ member of the 1808-keV based $K^\pi=2^+$ band, rather strong arguments in 1993Sh15 indicate that it is actually the bandhead of a new $K^\pi=3^+$ band. See also Adopted Levels.
1863.715[j] 4	(5)−		
1869.843[l] 4	4+		
1891.307 8	2+		
1913.620[n] 4	4−		
1917.440[p] 4	3−		
1942.010 5	1+,2+,3+		
1942.8? 10			
1947.954[k] 5	(7)−		
1953.135[o] 5	4+		
1953.686[g] 5	(7)+		
1956.426[m] 5	4+		
1986.453 4	1+,2+,3+		
1997.469 8	3+		
2007.569 4	4+,3+		
2013.555 5	3+,4+,5+		
2021.184 5	1+,2+,3+		
2027.48?[#] 20	0+		
2027.568[p] 5	4−		
2050.492 10	3+		
2068.038[o] 5	5+		
2099.877 6	3+,4+		
2118.6[#] 5			
2155.6[#] 6			
2272.5[#] 5			
2365.4[#] 6	(2+)		
2474.8[#] 6			
2552.7[#] 6			
2557.8[#] 6			
2631.4[#] 6			
2737.5[#] 6			
2865.8[#] 6			
2898.7[#] 6			

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^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

^{178}Hf Levels (continued)

E(level)[†]	Comments
2957.7[#] *6*	
3100.5[#] *6*	
3112.8[#] *6*	
3909.5[#] *6*	
4210.5[#] *6*	
4325.1[#] *6*	
4377.9[#] *6*	
4593.1[#] *6*	
4781.8[#] *6*	
4873.6[#] *6*	
4914.7[#] *6*	
5010.0[#] *6*	
5282.9[#] *6*	
5388.6[#] *5*	
7626.30[‡] *4*	This is the neutron separation energy determined in 1986Ha22 based on an average of their measured primary γ ray energies and the known energies of the respective final levels.

[†] From a least-squares fit of primary and secondary γ rays of 1986Ha22, unless otherwise specified.
[‡] Neutron-capture state. J^π: 3^-,4^- for s-wave neutron capture.
[#] Observed by 1987Bo52 only.
[@] Band(A): $K^\pi=0^+$ g.s. rotational band.
[&] Band(B): $K^\pi=8^-$ 4.0 s isomeric band based on the 1147-keV level.
[a] Band(C): $K^\pi=2^+$ γ-vibrational band based on the 1174-keV level.
[b] Band(D): $K^\pi=0^+$ band based on the 1199-keV level.
[c] Band(E): $K^\pi=2^-$ band based on the 1260-keV level.
[d] Band(F): $K^\pi=1^-$ band based on the 1310-keV level.
[e] Band(G): $K^\pi=0^+$ band based on the 1434-keV level.
[f] Band(H): $K^\pi=0^+$ band based on the 1444-keV level.
[g] Band(I): $K^\pi=4^+$ band based on the 1514-keV level.
[h] Band(J): $K^\pi=6^+$ 77.5 ns isomeric band based on the 1554-keV level.
[i] Band(K): $K^\pi=(2^+)$ band based on the 1561-keV level.
[j] Band(L): $K^\pi=2^-$ band based on the 1566-keV level.
[k] Band(M): $K^\pi=5^-$ band based on the 1636-keV level.
[l] Band(N): $K^\pi=3^+$ band based on the 1758-keV level.
[m] Band(O): $K^\pi=0^+$ band based on the 1772-keV level.
[n] Band(P): $K^\pi=3^-$ band based on the 1803-keV level.
[o] Band(Q): $K^\pi=2^+$ band based on the 1808-keV level.
[p] Band(R): $K^\pi=2^-$ band based on the 1857-keV level.

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf)

Unless otherwise specified, Eγ and Iγ are from 1986Ha22: 1. Bent crystal spectrometer, for secondary γ rays (Eγ≤1965 keV). 2. Ge(Li) anti-Compton spectrometer, for primary γ rays (Eγ≥5526 keV). 3. Conversion electron data measured with a magnetic spectrometer, for E0 transitions.

E_γ [&]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [#]	α [j]	Comments
48.877 *2*	0.012 *3*	1857.154	(2)$^-$	1808.278	(2)$^+$				
x49.069 *2*	0.031 *12*					(M1)		5.35	
52.482 *1*	0.061 *10*	1362.554	2$^-$	1310.071	1$^-$	M1+E2			
x52.774 *2*	0.129 *6*					M1+E2	0.23 *+8−13*	6.8 *21*	
53.025 *6*	0.020 *8*	2050.492	3$^+$	1997.469	3$^+$	E2+M1	1.1 *6*	31 *17*	Mult.: α(M2)(exp)=2.6 *11*; theory: α(M2)(M1)=0.0689, α(M2)(E2)=4.63.
x53.427 *5*	0.038 *14*								
x53.659 *1*	0.035 *11*								
53.931 *1*	0.050 *6*	1862.210	3$^+$	1808.278	(2)$^+$	(E2)		48.8	
57.534 *1*	0.048 *5*	1788.602	6$^+$	1731.068	6$^+$	M1		3.35	
62.215 *12*	0.031 *6*	1496.468	2$^+$	1434.253	0$^+$	(E2)		24.4	
x63.634 *1*	0.230 *14*								
x63.685 *10*	0.296 *15*					(M1+E2)		12 *10*	
69.670 *5*	0.022 *10*	1513.611	2$^+$	1443.938	0$^+$				
73.087 *2*	0.153 *8*	1639.761	3$^-$	1566.671	2$^-$	(M1+E2)		11.3 *14*	
x81.552 *5*	0.013 *4*					M1+E2		7.6 *5*	
82.731 *2*	0.82 *3*	1636.731	5$^-$	1554.001	6$^+$	E1		0.586	
85.621 *11*	0.87 *6*	1260.251	2$^-$	1174.633	2$^+$	E1		0.536	
88.867 *1*	0.81 *3*	1147.426	8$^-$	1058.559	8$^+$	E1		0.487	B(E1)(W.u.)=5.1×10^{-14} *3*
93.180 *1*	45 *3*	93.1800	2$^+$	0.0	0$^+$	E2		4.66	
97.937 *3*	0.176 *4*	1636.731	5$^-$	1538.793	4$^-$	(M1)		4.25	
100.973 *2*	0.050 *2*	1639.761	3$^-$	1538.793	4$^-$	(M1)		3.89	
102.307 *2*	0.021 *2*	1362.554	2$^-$	1260.251	2$^-$				
x102.608 *3*	0.049 *3*								
103.152 *2*	0.025 *2*	1512.595	(5)$^-$	1409.443	4$^-$				
105.164 *6*	0.376 *4*	1538.793	4$^-$	1433.626	(3)$^-$	(M1)		3.47	
x106.412 *3*	0.027 *5*					M1+E2	0.69 *+49−43*	3.16 *16*	
107.331[k] *15*	0.488[k] *10*	1640.455	5$^+$	1533.156	5$^+$				
107.331[k] *15*	0.488[k] *10*	1747.105	4$^-$	1639.761	3$^-$				
110.229 *1*	0.040 *2*	1913.620	4$^-$	1803.392	3$^-$				
111.160 *2*	0.026 *3*	1433.626	(3)$^-$	1322.467	3$^-$	(M1)		2.96	
111.697 *1*	0.352 *4*	1869.843	4$^+$	1758.147	3$^+$	M1+E2	0.58 *24*	2.76 *10*	
112.669 *3*	0.134 *5*	1651.462	(5)$^-$	1538.793	4$^-$	M1		2.84	
114.049 *2*	0.021 *3*	1917.440	3$^-$	1803.392	3$^-$	E2		2.13	
114.900 *4*	0.019 *3*	2068.038	5$^+$	1953.135	4$^+$	M1		2.69	
x115.677 *5*	0.029 *2*					E2		2.01	

From ENSDF

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
116.610[k] *1*	0.282[k] *6*	1863.715	(5)$^-$	1747.105	4$^-$				
116.610[k] *1*	0.282[k] *6*	1986.453	1$^+$,2$^+$,3$^+$	1869.843	4$^+$				
122.897 *1*	1.46 *4*	1636.731	5$^-$	1513.834	4$^+$	E1		0.209	
123.565 *4*	0.026 *2*	1433.626	(3)$^-$	1310.071	1$^-$				
124.130 *3*	0.069 *2*	1636.731	5$^-$	1512.595	(5)$^-$	M1		2.16	
[x]124.583 *3*	0.031 *2*					E2		1.526	
126.625 *11*	0.964 *19*	1640.455	5$^+$	1513.834	4$^+$	M1+E2	0.65 *8*	1.86 *4*	
[x]128.127 *19*	0.091 *3*								
129.365[k] *3*	0.171[k] *5*	1513.834	4$^+$	1384.465	4$^+$				
129.365[k] *3*	0.171[k] *5*	1538.793	4$^-$	1409.443	4$^-$				
[x]129.807 *3*	0.024 *3*								
133.043 *2*	0.374 *15*	1566.671	2$^-$	1433.626	(3)$^-$	M1+E2	1.1 *+3−2*	1.46 *7*	
[x]134.168 *2*	0.024 *1*					E2		1.161	
136.26 *4*	0.060 *2*	1648.841	(6)$^-$	1512.595	(5)$^-$	E2		1.097	
137.730 *2*	0.234 *7*	2007.569	4$^+$,3$^+$	1869.843	4$^+$	M1+E2	1.0 *1*	1.33 *4*	
[x]137.887 *9*	0.011 *2*								
138.601 *6*	0.019 *6*	1942.010	1$^+$,2$^+$,3$^+$	1803.392	3$^-$				
138.869 *3*	0.024 *2*	1651.462	(5)$^-$	1512.595	(5)$^-$				
[x]139.510 *4*	0.033 *3*					M1		1.548	
140.806 *5*	0.064 *4*	1781.268	(6)$^-$	1640.455	5$^+$				
140.906 *3*	0.74 *3*	1409.443	4$^-$	1268.540	3$^+$	E1		0.1463	
144.542 *2*	1.30 *3*	1781.268	(6)$^-$	1636.731	5$^-$	E2		0.886	
147.836 *2*	0.690 *21*	1322.467	3$^-$	1174.633	2$^+$				
148.148[k] *3*	0.185[k] *9*	1788.602	6$^+$	1640.455	5$^+$				
148.148[k] *3*	0.185[k] *9*	1956.426	4$^+$	1808.278	(2)$^+$				
149.193 *3*	0.482 *14*	1409.443	4$^-$	1260.251	2$^-$	(E2)		0.791	Mult.: E2+(20% *13*) M1 from conversion electron data, but decay scheme requires E2.
[x]150.519 *6*	0.014 *2*								
151.343[k] *2*	0.294[k] *9*	2013.555	3$^+$,4$^+$,5$^+$	1862.210	3$^+$				
151.343[k] *2*	0.294[k] *9*	2021.184	1$^+$,2$^+$,3$^+$	1869.843	4$^+$				
154.346 *9*	0.013 *3*	1538.793	4$^-$	1384.465	4$^+$				
[x]154.937 *3*	0.017 *2*								
155.470 *4*	0.022 *2*	1913.620	4$^-$	1758.147	3$^+$				
156.920 *4*	0.014 *2*	1433.626	(3)$^-$	1276.695	2$^+$				
157.920 *11*	0.113 *2*	1691.086	6$^+$	1533.156	5$^+$				
159.289 *3*	0.030 *1*	1917.440	3$^-$	1758.147	3$^+$				
[x]160.204 *4*	0.019 *2*								
[x]161.981 *2*	0.166 *7*					E2		0.592	
165.083 *3*	0.024 *2*	1953.686	(7)$^+$	1788.602	6$^+$				
[x]165.251 *2*	0.022 *1*					M1+E2	1.2 *+15−6*	0.72 *14*	
166.694 *3*	0.066 *3*	1947.954	(7)$^-$	1781.268	(6)$^-$	(E2)		0.535	
169.537 *2*	0.172 *7*	1554.001	6$^+$	1384.465	4$^+$	E2		0.505	B(E2)(W.u.)=0.0375 *20*

From ENSDF

$^{178}_{72}Hf_{106}$-5

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

$\gamma(^{178}Hf)$ (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]170.257 *4*	0.018 *2*					M1		0.883	
[x]171.012 *5*	0.051 *4*								
173.374 *3*	0.192 *6*	1433.626	$(3)^-$	1260.251	2^-	M1+E2	1.8 *2*	0.555 *19*	
173.673 *2*	0.045 *4*	1450.366	4^+	1276.695	2^+				
176.239 *2*	0.238 *10*	1538.793	4^-	1362.554	2^-	(E2)		0.441	Mult.: E2+(25% *14*) M1 from conversion electron data, but decay scheme requires E2.
179.181 *4*	0.022 *2*	1997.469	3^+	1818.290	2^+	M1		0.765	
180.435 *3*	0.098 *4*	1747.105	4^-	1566.671	2^-	(E2)		0.407	Mult.: E2 or E1 from conversion electron data, but decay scheme requires $\Delta\pi$=+.
[x]183.638 *4*	0.013 *2*					M1		0.714	
185.276 *10*	0.028 *2*	1635.607	4^+	1450.366	4^+	M1+E2	1.1 *+8−4*	0.52 *8*	
[x]187.634 *2*	0.325 *13*					E2		0.356	
187.919 *3*	0.023 *2*	1362.554	2^-	1174.633	2^+				
[x]189.569 *2*	0.032 *2*								
190.13[k] *3*	0.391[k] *16*	1512.595	$(5)^-$	1322.467	3^-				
190.13[k] *3*	0.391[k] *16*	1640.455	5^+	1450.366	4^+				
[x]194.55 *4*	0.027 *2*								
[x]195.136 *5*	0.023 *1*								
[x]197.499 *4*	0.012 *1*					E0+M1+E2		0.44 *15*	
[x]201.076 *3*	0.024 *1*					M1		0.555	
203.107 *3*	0.327 *13*	1636.731	5^-	1433.626	$(3)^-$	(E2)		0.273	Mult.: M1+E2 from conversion electron data, but decay scheme requires E2.
[x]203.832 *3*	0.75 *3*					M1		0.534	
204.121 *3*	0.464 *19*	1566.671	2^-	1362.554	2^-	M1		0.532	
206.141 *3*	0.175 *7*	1639.761	3^-	1433.626	$(3)^-$	E2		0.260	
208.318 *3*	0.047 *2*	1747.105	4^-	1538.793	4^-				
209.828 *3*	0.038 *2*	1384.465	4^+	1174.633	2^+				
213.442 *3*	100	306.621	4^+	93.1800	2^+	E2		0.232	
216.329 *3*	0.56 *3*	1538.793	4^-	1322.467	3^-	M1+E2	0.64 *24*	0.39 *4*	
[x]216.661 *6*	0.071 *4*								
[x]217.036 *5*	0.053 *20*								
217.834 *3*	0.191 *8*	1651.462	$(5)^-$	1433.626	$(3)^-$	(E2)		0.217	Mult.: E2+(33% *32*) M1 from conversion electron data, but decay scheme requires E2.
218.964 *3*	0.148 *6*	2007.569	$4^+,3^+$	1788.602	6^+				
221.752 *9*	0.008 *2*	1862.210	3^+	1640.455	5^+				
223.955 *3*	0.116 *7*	1863.715	$(5)^-$	1639.761	3^-				
[x]224.338 *3*	0.034 *2*					M1		0.410	
227.286 *3*	0.73 *7*	1636.731	5^-	1409.443	4^-	E2(+M1)		0.29 *11*	
229.391 *3*	0.603 *24*	1869.843	4^+	1640.455	5^+	M1(+E2)		0.28 *11*	
230.321 *3*	0.203 *10*	1639.761	3^-	1409.443	4^-	E2(+M1)		0.28 *10*	
231.018 *10*	0.013 *2*	1640.455	5^+	1409.443	4^-				
234.595 *9*	0.38 *5*	1788.602	6^+	1554.001	6^+	M1+E2	1.7 *+6−3*	0.220 *20*	
[x]235.418 *5*	0.018 *1*								

From ENSDF

$^{178}_{72}Hf_{106}$-6

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]
[x]238.779 *3*	0.054 *9*					M1		0.345
239.397 *3*	0.61 *4*	1648.841	(6)$^-$	1409.443	4$^-$	E2		0.1595
242.019 *3*	0.347 *17*	1651.462	(5)$^-$	1409.443	4$^-$	M1+E2	0.44 *13*	0.304 *16*
242.483 *6*	0.028 *2*	1781.268	(6)$^-$	1538.793	4$^-$			
[x]242.711 *20*	0.068 *3*					M1		0.330
244.311 *3*	1.95 *12*	1758.147	3$^+$	1513.834	4$^+$	M1+E2	0.35 *11*	0.305 *13*
245.298 *3*	1.95 *12*	1513.834	4$^+$	1268.540	3$^+$	E2		0.1476
[x]246.906 *3*	0.085 *5*					M1+E2	1.3 *+5−3*	0.208 *24*
[x]247.607 *3*	0.066 *4*					M1+E2	0.47 *+19−22*	0.282 *22*
249.418 *3*	0.324 *13*	2007.569	4$^+$,3$^+$	1758.147	3$^+$	E2+M1		0.22 *9*
[x]250.453 *10*	0.015 *1*					M1		0.303
[x]252.894 *5*	0.045 *2*					M1+E2	0.5 *3*	0.26 *3*
[x]253.653 *3*	0.032 *2*					M1		0.293
256.001 *16*	0.93 *3*	1640.455	5$^+$	1384.465	4$^+$			
256.602 *18*	1.44 *6*	1566.671	2$^-$	1310.071	1$^-$	M1+E2	0.58 *17*	0.244 *18*
[x]259.026 *6*	0.049 *1*							
[x]260.058 *3*	0.226 *7*					E1		0.0304
264.613 *4*	0.082 *6*	1533.156	5$^+$	1268.540	3$^+$			
[x]264.877 *15*	0.030 *3*							
[x]267.397 *8*	0.039 *2*							
268.667 *4*	0.056 *3*	1781.268	(6)$^-$	1512.595	(5)$^-$			
[x]270.273 *4*	0.102 *6*					E2(+M1)	>0.56	0.16 *6*
[x]270.583 *4*	0.193 *12*					E1		0.0275
[x]271.379 *6*	0.016 *1*							
273.161 *4*	1.03 *5*	1913.620	4$^-$	1640.455	5$^+$	E1		0.0269
274.761 *4*	0.20 *5*	1788.602	6$^+$	1513.834	4$^+$	E2		0.1035
[x]276.976 *4*	0.79 *5*					E2,E1		
277.209 *4*	1.16 *7*	1639.761	3$^-$	1362.554	2$^-$	M1+E2	0.7 *2*	0.187 *17*
277.689 *4*	0.083 *6*	1917.440	3$^-$	1639.761	3$^-$	M1+E2	1.3 *+6−3*	0.148 *20*
[x]278.585 *4*	0.063 *4*							
279.439 *4*	0.136 *8*	2068.038	5$^+$	1788.602	6$^+$	M1+E2	1.06 *17*	0.158 *12*
280.710[k] *22*	0.46[k] *3*	1731.068	6$^+$	1450.366	4$^+$			
280.710[k] *22*	0.46[k] *3*	1917.440	3$^-$	1636.731	5$^-$			
[x]283.416 *4*	0.037 *3*							
[x]288.390 *4*	0.034 *2*							
289.556 *4*	2.67 *13*	1803.392	3$^-$	1513.834	4$^+$	E1		0.0233
290.58[k] *5*	0.020[k] *3*	1857.154	(2)$^-$	1566.671	2$^-$			
290.58[k] *5*	0.020[k] *3*	1942.010	1$^+$,2$^+$,3$^+$	1651.462	(5)$^-$			
292.993 *4*	0.017 *1*	1561.543	2$^+$	1268.540	3$^+$			
296.481 *4*	0.032 *4*	2099.877	3$^+$,4$^+$	1803.392	3$^-$			
[x]296.772 *4*	0.251 *18*					M1+E2	0.50 *16*	0.169 *12*
[x]297.567 *4*	0.025 *2*					M1(+E0)		
[x]298.072 *13*	0.013 *2*					E0+M1+E2		0.13 *6*

From ENSDF

$^{178}_{72}Hf_{106}$-7

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]
299.104 *6*	0.036 *2*	1947.954	(7)$^-$	1648.841	(6)$^-$			
300.625 *22*	0.019 *2*	1862.210	3$^+$	1561.543	2$^+$			
301.553 *6*	0.019 *3*	1942.010	1$^+$,2$^+$,3$^+$	1640.455	5$^+$			
x302.965 *4*	0.052 *3*							
306.409[k] *4*	0.41[k] *3*	1566.671	2$^-$	1260.251	2$^-$			
306.409[k] *4*	0.41[k] *3*	1942.010	1$^+$,2$^+$,3$^+$	1635.607	4$^+$			
306.68 *3*	0.039 *5*	1691.086	6$^+$	1384.465	4$^+$			
x308.402 *4*	0.060 *3*							
311.212 *4*	0.163 *10*	1947.954	(7)$^-$	1636.731	5$^-$	E2		0.0710
311.76 *3*	0.033 *3*	1808.278	(2)$^+$	1496.468	2$^+$			
312.680 *4*	0.157 *9*	1953.135	4$^+$	1640.455	5$^+$	M1+E2	0.39 *+16−21*	0.153 *10*
313.474 *4*	0.60 *3*	1747.105	4$^-$	1433.626	(3)$^-$	M1+E2	0.61 *17*	0.139 *11*
x315.920 *5*	0.029 *3*							
x317.328 *7*	0.38 *3*					M1		0.1596
x318.620 *4*	0.126 *6*							
320.818 *4*	0.028 *3*	1956.426	4$^+$	1635.607	4$^+$			
x321.282 *4*	0.028 *3*							
324.919 *4*	0.27 *3*	1863.715	(5)$^-$	1538.793	4$^-$	M1		0.1498
325.562 *4*	22.7 *14*	632.180	6$^+$	306.621	4$^+$	E2		0.0622
x327.734 *12*	0.022 *2*							
x328.646 *4*	0.160 *11*					M1+E2	2.5 *+9−5*	0.072 *6*
329.789 *18*	0.041 *3*	1891.307	2$^+$	1561.543	2$^+$			
330.99 *3*	0.018 *5*	1869.843	4$^+$	1538.793	4$^-$			
x331.614 *4*	0.194 *10*					M1+E2	0.7 *3*	0.115 *16*
x333.161 *9*	0.017 *2*					M1(+E0)		
336.667 *13*	0.033 *17*	1869.843	4$^+$	1533.156	5$^+$			
337.657 *5*	0.306 *24*	1747.105	4$^-$	1409.443	4$^-$	M1		0.1352
339.198 *5*	4.78 *19*	1513.834	4$^+$	1174.633	2$^+$	E2		0.0552
x342.167 *5*	0.098 *10*					M1+E2	1.8 *+8−4*	0.072 *9*
x343.275 *11*	0.030 *3*					M1		0.1293
348.372 *5*	2.09 *6*	1862.210	3$^+$	1513.834	4$^+$	M1		0.1243
x349.682 *7*	0.025 *2*							
351.118 *5*	0.194 *8*	1863.715	(5)$^-$	1512.595	(5)$^-$	M1+E2	0.64 *14*	0.101 *7*
x354.679 *5*	0.131 *9*					M1		0.1185
x356.090 *12*	0.042 *2*					M1		0.1173
x356.951 *5*	1.41 *4*					M1		0.1165
x358.077 *11*	0.057 *2*					E0+M1+E2		0.08 *4*
x362.82 *4*	0.026 *4*					M1+E2	0.7 *6*	0.090 *22*
x363.251 *11*	0.154 *5*					E1		0.01353
x364.384 *5*	0.055 *6*							
367.079 *6*	0.022 *4*	1635.607	4$^+$	1268.540	3$^+$			
x368.541 *5*	0.037 *2*					E2,E1		
x369.602 *10*	0.026 *2*							

From ENSDF

$^{178}_{72}Hf_{106}$-8

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ [&]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [#]	α [j]	Comments
371.212 *5*	0.041 *2*	1639.761	3^-	1268.540	3^+				
371.932 [k] *23*	0.066 [k] *3*	1640.455	5^+	1268.540	3^+				
371.932 [k] *23*	0.066 [k] *3*	2007.569	$4^+,3^+$	1635.607	4^+				
[x]374.241 *5*	0.032 *1*					M1		0.1028	
[x]375.008 *5*	0.090 *5*					M1		0.1022	
376.109 *5*	0.052 *3*	2027.568	4^-	1651.462	$(5)^-$	M1		0.1014	
[x]376.858 *5*	0.040 *2*								
377.960 *5*	0.026 *2*	2013.555	$3^+,4^+,5^+$	1635.607	4^+	M1		0.1001	
379.505 *5*	0.456 *18*	1639.761	3^-	1260.251	2^-	M1+E2	0.92 *17*	0.072 *6*	
[x]383.257 *5*	0.97 *4*					M1+E2	0.37 *10*	0.090 *4*	
[x]384.180 *9*	0.029 *1*					M1		0.0959	
[x]384.758 *15*	0.036 *2*					M1		0.0955	
[x]386.38 *4*	0.025 *3*								
386.938 *21*	0.020 *6*	1561.543	2^+	1174.633	2^+				
387.811 *5*	0.058 *5*	2027.568	4^-	1639.761	3^-	M1		0.0935	
[x]391.070 *9*	0.041 *2*					M1+E2	0.5 *4*	0.081 *14*	
393.954 [k] *6*	0.029 [k] *2*	1803.392	3^-	1409.443	4^-				
393.954 [k] *6*	0.029 [k] *2*	1947.954	$(7)^-$	1554.001	6^+				
[x]395.594 *5*	0.173 *9*					M1		0.0887	
[x]396.388 *8*	0.023 *4*								
[x]397.450 *5*	0.105 *7*								
[x]398.928 *24*	0.045 *3*								
399.787 *5*	0.683 *20*	1913.620	4^-	1513.834	4^+	E1		0.01083	
401.035 *6*	0.047 *3*	1913.620	4^-	1512.595	$(5)^-$				
403.605 *6*	0.560 *17*	1917.440	3^-	1513.834	4^+	E1		0.01060	
406.579 *6*	0.095 *4*	1554.001	6^+	1147.426	8^-	(M2)		0.282	B(M2)(W.u.)=0.0269 *15*
[x]408.191 *6*	0.357 *14*					M1		0.0817	
[x]411.932 *6*	0.069 *3*					M1+E2	0.9 *3*	0.058 *9*	
[x]413.400 *8*	0.079 *6*					E2		0.0318	
[x]416.894 *9*	0.049 *3*					M1+E2	0.69 *55*	0.062 *14*	
[x]417.160 *8*	0.020 *3*								
[x]417.911 *10*	0.027 *1*					M1		0.0768	
[x]420.137 *7*	0.097 *3*					M1+E2	0.75 *20*	0.059 *6*	
[x]421.113 *7*	0.163 *8*					M1		0.0753	
[x]424.044 *6*	0.131 *5*					M1+E2	0.53 *14*	0.064 *5*	
424.635 *6*	0.59 *4*	1747.105	4^-	1322.467	3^-	M1+E2	0.40 *+16−20*	0.068 *5*	
424.921 *17*	0.060 *5*	1986.453	$1^+,2^+,3^+$	1561.543	2^+				
426.383 *6*	1.64 *12*	1058.559	8^+	632.180	6^+	E2		0.0292	
427.590 *6*	0.277 *22*	2068.038	5^+	1640.455	5^+	M1		0.0723	
[x]429.474 *24*	0.021 *3*								
[x]430.919 *6*	0.041 *4*					M1+E2	1.3 *+6−4*	0.044 *8*	
[x]434.635 *6*	0.043 *3*								
435.684 *6*	0.522 *16*	1758.147	3^+	1322.467	3^-	E1		0.00891	

From ENSDF

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]
436.214 *6*	0.139 *6*	1869.843	4^+	1433.626	$(3)^-$			
[x]438.309 *6*	0.118 *6*					M1		0.0678
439.296 *18*	0.140 *6*	1953.135	4^+	1513.834	4^+	M1		0.0674
440.840 *10*	0.016 *2*	1803.392	3^-	1362.554	2^-			
442.809 *8*	0.022 *1*	1956.426	4^+	1513.611	2^+			
[x]444.780 *6*	0.029 *3*					M1+E2	0.67 *+39−36*	0.053 *9*
[x]445.998 *14*	0.023 *2*					M1+E2	0.72 *+61−51*	0.051 *12*
[x]447.388 *9*	0.029 *1*					M1		0.0642
[x]449.538 *8*	0.045 *2*					M1		0.0634
[x]450.103 *6*	0.127 *5*					M1		0.0632
[x]451.219 *11*	0.040 *1*							
[x]452.732 *8*	0.046 *2*					M1		0.0623
454.265 *6*	0.437 *17*	1863.715	$(5)^-$	1409.443	4^-	M1+E2	0.35 *+11−15*	0.058 *3*
[x]454.781 *8*	0.093 *7*					E2		0.0247
455.76 *4*	0.005 *2*	1818.290	2^+	1362.554	2^-			
[x]456.540 *14*	0.020 *1*					E0+M1+E2		0.043 *19*
[x]458.963 *10*	0.058 *4*							
459.625 *6*	0.131 *4*	2021.184	$1^+,2^+,3^+$	1561.543	2^+	M1+E2	1.0 *+27−8*	0.042 *17*
[x]460.383 *6*	0.227 *9*					E2		0.0239
[x]462.031 *6*	0.054 *3*					M1+E2	1.6 *+27−6*	0.034 *9*
[x]466.374 *7*	0.083 *7*					M1+E2	1.2 *+5−3*	0.037 *6*
[x]468.829 *12*	0.057 *2*							
[x]473.184 *7*	0.69 *3*					M1		0.0555
[x]473.88 *4*	0.021 *3*							
[x]476.345 *7*	0.119 *4*					M1+E2	0.37 *10*	0.0506 *21*
477.712 *13*	0.020 *2*	1862.210	3^+	1384.465	4^+			
[x]478.315 *7*	0.070 *10*					M1(+E2)	0.7 *+10−7*	0.043 *14*
[x]478.566 *7*	0.184 *7*					E2(+M1)	>0.8	0.031 *10*
[x]480.975 *7*	0.256 *8*					M1+E2	1.5 *+19−6*	0.031 *8*
[x]482.281 *14*	0.056 *7*					E2		0.0212
[x]483.203 *7*	0.138 *8*					M1+E2	0.59 *17*	0.044 *4*
[x]486.768 *7*	0.099 *8*					E1,E2		
[x]487.884 *10*	0.034 *2*					E2,E1		
488.768 *7*	0.146 *4*	2027.568	4^-	1538.793	4^-	M1		0.0510
489.611 *10*	0.059 *4*	1758.147	3^+	1268.540	3^+	M1		0.0508
494.580 *8*	0.356 *7*	1857.154	$(2)^-$	1362.554	2^-	M1+E2	1.9 *+11−5*	0.026 *4*
[x]495.681 *8*	0.088 *7*					M1+E2	1.3 *+6−4*	0.031 *6*
[x]496.361 *7*	0.273 *19*					M1+E2	0.55 *14*	0.042 *3*
497.888 *7*	3.76 *4*	1758.147	3^+	1260.251	2^-	E1		0.00663
502.728 *22*	0.041 *3*	1953.135	4^+	1450.366	4^+	M1+E2	1.1 *+11−5*	0.032 *8*
504.157 *7*	0.235 *14*	1913.620	4^-	1409.443	4^-	M1+E2	0.78 *+44−35*	0.036 *7*
506.090 *14*	0.260 *18*	1956.426	4^+	1450.366	4^+	E2		0.0188
[x]507.431 *7*	0.241 *17*					M1		0.0463
[x]508.118 *7*	0.133 *9*							

From ENSDF

$^{178}_{72}Hf_{106}$-10

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]512.75 *3*	0.115 *5*					E0+M1+E2		0.032 *14*	
[x]513.084 *8*	0.162 *18*					M1		0.0450	
515.015 *18*	0.128 *15*	2027.568	4^-	1512.595	$(5)^-$	M1+E2	1.6 *+6−4*	0.025 *4*	
[x]520.421 *7*	0.172 *14*					M1		0.0433	
[x]520.751 *9*	0.201 *8*					M1+E2	0.77 *20*	0.034 *4*	
[x]522.502 *7*	0.830 *8*					M1		0.0429	
531.71 *6*	0.029 *3*	1808.278	$(2)^+$	1276.695	2^+	E2(+M1)	>0.6	0.026 *9*	
[x]532.482 *7*	0.080 *5*					M1+E2	1.2 *+5−3*	0.027 *4*	
[x]533.835 *8*	0.086 *7*					M1		0.0406	
534.699 *8*	0.200 *14*	1857.154	$(2)^-$	1322.467	3^-	M1+E2	1.1 *+3−2*	0.027 *3*	
[x]535.160 *8*	0.391 *16*					M1+E2	0.80 *17*	0.031 *3*	
536.100 *8*	0.067 *3*	1986.453	$1^+,2^+,3^+$	1450.366	4^+	M1		0.0401	
539.66 *3*	0.032 *2*	1808.278	$(2)^+$	1268.540	3^+				
541.593 *8*	0.097 *6*	1818.290	2^+	1276.695	2^+	M1+E2	1.0 *2*	0.027 *3*	B(M1)(W.u.)<0.013; B(E2)(W.u.)>2.6 Eγ=541.4 (1987Bo52).
543.136 *23*	0.286 *9*	1803.392	3^-	1260.251	2^-	M1+E2	3.6 *11*	0.0174 *16*	
[x]545.419 *8*	0.204 *8*								
547.378 *8*	1.37 *3*	1869.843	4^+	1322.467	3^-	E1		0.00540	
[x]550.027 *8*	0.130 *4*					M1		0.0376	
554.187 *8*	0.077 *5*	2068.038	5^+	1513.834	4^+				
[x]556.651 *12*	0.036 *2*								
557.593 *22*	0.027 *2*	1942.010	$1^+,2^+,3^+$	1384.465	4^+				
[x]559.075 *8*	0.147 *3*					M1+E2	1.3 *+6−3*	0.023 *4*	
[x]561.088 *12*	0.022 *2*								
[x]561.957 *12*	0.047 *3*					M1		0.0355	
[x]564.168 *12*	0.034 *4*					M1		0.0352	
[x]565.313 *8*	0.027 *3*					M1		0.0350	
[x]568.348 *8*	0.090 *4*								
[x]572.518 *8*	0.271 *11*					M1		0.0339	
[x]579.230 *18*	0.027 *2*								
583.511 *8*	0.155 *19*	1758.147	3^+	1174.633	2^+	(E2)		0.01326	Mult.: E2 or E1 from conversion electron data, but decay scheme requires E2.
585.534 *8*	0.061 *5*	1862.210	3^+	1276.695	2^+	M1		0.0320	
[x]587.283 *8*	0.125 *9*					M1+E2	3.2 *+68−10*	0.0147 *16*	
[x]588.642 *8*	0.220 *13*					M1+E2	1.2 *+27−6*	0.021 *7*	
[x]590.561 *8*	0.147 *9*					M1+E2	0.96 *18*	0.0225 *19*	
591.148 *13*	0.079 *5*	1913.620	4^-	1322.467	3^-				
593.917 *15*	0.087 *4*	2027.568	4^-	1433.626	$(3)^-$	M1+E2	0.65 *33*	0.025 *4*	
594.942 *9*	0.207 *4*	1917.440	3^-	1322.467	3^-	M1+E2	1.6 *2*	0.0177 *11*	
596.886 *8*	1.06 *3*	1857.154	$(2)^-$	1260.251	2^-	M1		0.0305	
[x]598.154 *8*	0.809 *24*					M1+E2	1.5 *2*	0.0180 *12*	
601.31 *3*	0.039 *7*	1869.843	4^+	1268.540	3^+				Eγ=603.3 (1987Bo52).
[x]604.248 *14*	0.086 *5*								
[x]605.04 *3*	0.058 *4*								

From ENSDF

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ [&]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [#]	α [j]
[x]606.358 *9*	0.106 *5*					E2,E1		
[x]607.402 *9*	0.974 *19*					M1		0.0291
[x]610.506 *9*	0.438 *13*					M1		0.0287
612.989 *12*	0.095 *10*	1997.469	3^+	1384.465	4^+	E2		0.01180
614.58 *3*	0.095 *11*	1891.307	2^+	1276.695	2^+			
[x]615.174 *11*	0.101 *3*					M1+E2	0.59 *17*	0.0239 *19*
618.129 *9*	0.642 *19*	2027.568	4^-	1409.443	4^-	M1		0.0278
618.95 *3*	0.020 *6*	1818.290	2^+	1199.386	0^+			
622.82 *3*	0.135 *4*	1891.307	2^+	1268.540	3^+	E2+M1	2.5 *+15−6*	0.0136 *13*
[x]624.31 *3*	0.046 *2*							
[x]626.96 *3*	0.099 *4*					M1		0.0269
[x]627.286 *18*	0.059 *5*							
[x]627.924 *12*	0.050 *8*					M1		0.0268
628.765 *9*	0.583 *12*	1803.392	3^-	1174.633	2^+	E1		0.00404
[x]629.352 *11*	0.086 *12*							
630.64 *5*	0.028 *8*	1953.135	4^+	1322.467	3^-			
631.062 *10*	0.075 *3*	1891.307	2^+	1260.251	2^-			
[x]632.847 *9*	0.172 *10*							
[x]633.444 *11*	0.338 *10*					M1+E2	0.42 *12*	0.0239 *12*
[x]636.491 *9*	0.092 *5*					M1+E2	0.47 *22*	0.0231 *22*
[x]638.830 *9*	0.071 *4*							
[x]640.82 *3*	0.045 *2*							
643.076 *9*	0.144 *6*	2027.568	4^-	1384.465	4^+			
645.081 *9*	0.57 *3*	1913.620	4^-	1268.540	3^+	E1		0.00383
[x]646.240 *9*	0.392 *12*					M1		0.0249
648.885 *9*	0.45 *6*	1917.440	3^-	1268.540	3^+	E1		0.00379
649.42 *4*	0.099 *10*	2099.877	$3^+,4^+$	1450.366	4^+	M1+E2	1.4 *+9−4*	0.015 *3*
[x]653.311 *9*	0.312 *25*					E1,E2		
657.177 *9*	0.326 *10*	1917.440	3^-	1260.251	2^-	E2		0.01005
[x]659.107 *9*	0.271 *11*					M1		0.0236
[x]661.346 *9*	0.259 *10*					M1(+E2)	<1.4	0.019 *5*
[x]664.191 *10*	0.271 *14*					E1		0.00361
665.322 *19*	0.103 *5*	1942.010	$1^+,2^+,3^+$	1276.695	2^+	E2		0.00977
[x]668.805 *12*	0.092 *5*					M1+E2	1.5 *+14−5*	0.014 *3*
[x]669.625 *10*	0.297 *12*					M1+E2	0.45 *15*	0.0205 *13*
[x]671.463 *10*	0.064 *6*							
672.46 *4*	0.017 *2*	1731.068	6^+	1058.559	8^+			
[x]674.177 *10*	0.212 *8*					M1		0.0223
682.512 *10*	0.555 *17*	1857.154	$(2)^-$	1174.633	2^+	E1		0.00342
687.602 *10*	0.226 *11*	1862.210	3^+	1174.633	2^+	M1		0.0212
691.902 *13*	0.064 *9*	1891.307	2^+	1199.386	0^+			
[x]695.202 *10*	0.148 *6*					E1,E2		
[x]697.480 *10*	0.130 *7*					M1+E2	1.4 *+6−3*	0.0127 *17*
[x]698.182 *11*	0.145 *7*					M1+E2	1.1 *+4−3*	0.0140 *19*

From ENSDF

$^{178}_{72}Hf_{106}$-12

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]701.88 *3*	0.083 *6*					M1+E2	0.55 *+35−45*	0.017 *3*	
705.106 *10*	0.38 *5*	2027.568	4^-	1322.467	3^-	M1+E2	1.3 *+14−5*	0.013 *3*	
[x]705.762 *11*	0.157 *11*					E2		0.00856	
[x]711.49 *3*	0.030 *3*					M1(+E2)	<1.6	0.015 *4*	
715.47 *3*	0.079 *3*	2099.877	$3^+,4^+$	1384.465	4^+	(E2)		0.00830	Mult.: E2 or E1 from conversion electron data, but decay scheme requires E2.
716.650 *15*	0.566 *23*	1891.307	2^+	1174.633	2^+	M1+E2	1.36 *+37−26*	0.0121 *12*	
[x]720.91 *3*	0.11 *3*								
[x]724.25 *3*	0.076 *21*					M1		0.0186	
[x]726.168 *10*	0.117 *2*								
[x]730.822 *10*	0.64 *3*					E1		0.00298	
[x]731.898 *24*	0.063 *6*					E2		0.00789	
[x]735.202 *22*	0.09 *4*								
[x]736.626 *16*	0.297 *18*					M1+E2	0.89 *16*	0.0134 *10*	
738.982 *20*	0.277 *6*	2007.569	$4^+,3^+$	1268.540	3^+	M1+E2	1.6 *+3−2*	0.0105 *7*	
744.55 *3*	0.382 *23*	2021.184	$1^+,2^+,3^+$	1276.695	2^+	M1+E2	2.1 *+12−5*	0.0094 *10*	
744.964 *24*	0.44 *6*	2013.555	$3^+,4^+,5^+$	1268.540	3^+				
[x]745.825 *23*	0.088 *4*								
[x]748.383 *17*	0.041 *2*								
[x]748.734 *22*	0.056 *8*					E2		0.00751	
[x]751.367 *14*	0.244 *17*					E2		0.00745	
[x]752.522 *11*	0.59 *4*					M1		0.01691	
[x]755.923 *23*	0.052 *4*					E0+M1+E2		0.012 *5*	
[x]759.114 *14*	0.440 *22*					E2,E1			
[x]761.531 *14*	0.257 *13*					E1		0.00275	
[x]762.29 *3*	0.41 *5*					E2		0.00722	
[x]762.786 *14*	0.100 *14*					E2		0.00721	
[x]767.52 *4*	0.051 *6*					M1		0.01609	
[x]768.278 *15*	0.087 *6*					E2		0.00710	
773.75 *4*	0.048 *4*	2050.492	3^+	1276.695	2^+	M1		0.01576	
[x]775.63 *5*	0.075 *3*					M1		0.01567	
777.438 *11*	0.416 *21*	2099.877	$3^+,4^+$	1322.467	3^-	E1		0.00264	
[x]779.36 *3*	0.032 *7*					M1(+E0)			Mult.: M1(+E0) or E2+E0.
[x]781.674 *18*	0.172 *10*					M1		0.01537	
[x]788.17 *5*	0.044 *4*					M1		0.01505	
[x]791.05 *4*	0.050 *4*					M1(+E2)	<2.1	0.012 *4*	
[x]794.392 *16*	0.158 *9*								
[x]800.810 *24*	0.079 *6*								
[x]804.253 *12*	0.19 *4*					E1,E2			
[x]806.96 *3*	0.054 *7*								
[x]809.346 *12*	0.174 *9*					M1+E2	0.75 *31*	0.0113 *16*	
[x]811.59 *5*	0.088 *7*								
818.190 *13*	0.376 *19*	1450.366	4^+	632.180	6^+	E2		0.00620	B(E2)(W.u.)=1.8 *16*
[x]818.94 *5*	0.083 *11*					M1+E2	1.1 *+14−5*	0.0096 *24*	

From ENSDF

$^{178}_{72}Hf_{106}$-13

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]819.99 *4*	0.047 *5*								
[x]820.517 *20*	0.082 *5*								
[x]821.683 *24*	0.165 *12*					M1+E2	1.3 *+7−4*	0.0089 *14*	
[x]823.071 *12*	0.079 *4*					M1		0.01350	
[x]824.64 *9*	0.032 *6*								
[x]825.29 *5*	0.052 *4*								
[x]828.63 *3*	0.045 *7*					M1(+E2)	<5.1	0.010 *4*	
[x]831.20 *3*	0.175 *11*					M1+E2	1.4 *+8−4*	0.0084 *12*	
[x]833.077 *12*	0.104 *9*					M1+E2	0.72 *+39−33*	0.0107 *15*	
[x]837.034 *16*	0.086 *8*					M1		0.01294	
[x]838.116 *22*	0.116 *9*								
[x]839.404 *20*	0.101 *6*					M1		0.01285	
[x]841.44 *4*	0.105 *8*								
841.6[i]		2118.6		1276.695	2+				
[x]843.572 *12*	0.533 *21*					M1		0.01269	
846.50 *3*	0.31 *3*	2021.184	1+,2+,3+	1174.633	2+	M1+E2	2.1 *+16−6*	0.0070 *9*	
[x]850.646 *12*	0.147 *7*					M1		0.01243	
850.7[f]		2027.48?	0+	1174.633	2+				
[x]851.751 *15*	0.282 *17*					M1+E2	0.4 *2*	0.0115 *9*	
[x]854.86 *3*	0.041 *6*								
[x]858.34 *3*	0.387 *19*					M1+E2	0.44 *20*	0.0111 *9*	
[x]860.508 *20*	0.259 *13*					M1+E2	0.7 *2*	0.0099 *9*	
[x]861.745 *15*	0.099 *8*					M1+E2	0.85 *+68−45*	0.0093 *19*	
[x]864.358 *23*	0.310 *16*								
[x]865.841 *12*	0.101 *7*					M1		0.01189	
867.990 *16*	0.165 *10*	1174.633	2+	306.621	4+	(E2)		0.00547	Mult.: E2 or E1 from conversion electron data, but decay scheme requires E2. Eγ=871.0 (1987Bo52).
[x]870.104 *14*	0.179 *9*					M1+E2	1.1 *3*	0.0083 *10*	
[x]873.413 *20*	0.130 *14*								
[x]877.284 *14*	0.158 *8*					M1+E2	0.62 *35*	0.0098 *13*	
881.664 *18*	0.47 *5*	1513.834	4+	632.180	6+				Eγ=880.8 (1987Bo52).
[x]886.79 *6*	0.112 *16*					M1+E2	0.7 *5*	0.0092 *18*	
[x]891.463 *20*	0.087 *10*					M1		0.01106	
895.148 *21*	0.106 *7*	1953.686	(7)+	1058.559	8+	M1		0.01095	
[x]898.201 *13*	0.098 *8*					E0(+M1+E2)		0.008 *3*	
900.986 *13*	0.77 *5*	1533.156	5+	632.180	6+	E2		0.00506	Eγ=900.6 (1987Bo52).
[x]903.21 *5*	0.163 *13*					M1		0.01071	
[x]904.67 *3*	0.163 *11*					M1		0.01066	
[x]907.426 *14*	0.092 *4*					E1,E2			
[x]911.36 *3*	0.100 *5*								
[x]912.456 *20*	0.124 *9*					E0(+M1+E2)		0.008 *3*	
[x]916.47 *5*	0.062 *6*					E2(+M1)	>0.75	0.0066 *18*	
[x]919.860 *17*	0.151 *14*					E1,E2			

From ENSDF

$^{178}_{72}Hf_{106}$-14

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
921.827 *13*	2.39 *12*	1554.001	6^+	632.180	6^+	E2		0.00483	B(E2)(W.u.)=0.000110 *7*
[x]925.05 *3*	0.049 *10*					M1		0.01009	
[x]930.376 *14*	0.273 *11*					M1(+E0)			Mult.: M1(+E0) or E2+E0.
[x]933.10 *5*	0.030 *4*								
[x]936.07 *4*	0.136 *7*					M1+E2	0.55 *32*	0.0086 *11*	
[x]939.029 *14*	0.425 *17*					M1+E2	1.8 *4*	0.0058 *6*	
[x]943.29 *4*	0.042 *4*								
[x]945.710 *22*	0.178 *5*					M1		0.00955	
[x]950.907 *21*	0.132 *9*					M1+E2	0.98 *+58−37*	0.0070 *11*	
[x]952.62 *6*	0.083 *6*					M1		0.00938	
[x]956.83 *3*	0.115 *10*					M1		0.00928	
961.915 *14*	2.51 *10*	1268.540	3^+	306.621	4^+	E2		0.00442	Eγ=959.0 (1987Bo52).
[x]965.044 *14*	0.130 *17*					E2(+M1)	>1.1	0.0055 *11*	
[x]966.40 *3*	0.095 *7*					E2(+M1)	>0.8	0.0058 *15*	
[x]968.811 *19*	0.205 *12*					M1+E2	1.3 *+5−3*	0.0061 *7*	
970.105 *14*	1.00 *3*	1276.695	2^+	306.621	4^+	(E2)		0.00435	Mult.: E2+(11% *6*) M1 from conversion electron data, but decay scheme requires E2.
[x]975.92 *3*	0.100 *4*					E2		0.00430	
[x]978.044 *20*	0.116 *6*					M1+E2	1.3 *+10−5*	0.0060 *11*	
[x]979.96 *4*	0.112 *4*					E2		0.00426	
[x]984.58 *3*	0.51 *3*					M1		0.00864	
[x]985.93 *5*	0.324 *19*					M1+E2	0.51 *24*	0.0077 *7*	
[x]998.20 *3*	0.123 *6*					M1		0.00835	
[x]1000.29 *4*	0.058 *10*								
1004.13 *24*	0.43 *3*	1636.731	5^-	632.180	6^+	E1		1.62×10^{-3}	I_γ: may contain contribution from ^{179}Hf.
[x]1006.92 *5*	0.142 *9*					E2,E1			
1008.255 *15*	0.941 *19*	1640.455	5^+	632.180	6^+	E2		0.00402	
[x]1014.28 *7*	0.160 *14*					M1		0.00803	
1015.79 *5*	0.45 *7*	1322.467	3^-	306.621	4^+	E1		1.59×10^{-3}	Eγ=1018.4 (1987Bo52).
1016.605 *23*	1.02 *5*	1648.841	$(6)^-$	632.180	6^+	E1		1.59×10^{-3}	
[x]1019.20 *3*	0.063 *6*								
[x]1024.350 *15*	0.246 *10*					M1		0.00784	
[x]1026.91 *3*	0.075 *3*								
[x]1031.012 *15*	0.344 *17*					E2,E1			
[x]1039.66 *3*	0.091 *4*					M1		0.00755	
[x]1046.43 *4*	0.190 *11*					M1+E2	1.6 *+41−7*	0.0048 *10*	
[x]1047.19 *7*	0.101 *8*					M1		0.00742	
[x]1048.044 *16*	0.139 *24*								
[x]1052.24 *4*	0.051 *4*								
1059.03 *9*	0.664 *20*	1691.086	6^+	632.180	6^+	M1+E2	2.6 *+14−6*	0.0041 *3*	
[x]1062.97 *5*	0.123 *15*					E2		0.00362	
[x]1074.419 *24*	0.155 *5*					E2		0.00354	
1077.819 *16*	6.20 *6*	1384.465	4^+	306.621	4^+	E2		0.00352	Eγ=1077.1 (1987Bo52).
1081.448 *16*	8.40 *8*	1174.633	2^+	93.1800	2^+	E2		0.00349	Eγ=1081.5 (1987Bo52).

From ENSDF

$^{178}_{72}Hf_{106}$-15

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]1086.57 *10*	0.055 *4*					M1		0.00678	
[x]1091.836 *20*	0.134 *5*								
[x]1093.94 *5*	0.083 *10*					M1		0.00666	
[x]1095.918 *21*	0.096 *11*					M1(+E0)			Mult.: M1(+E0) or E2+E0.
1098.4[f]		2272.5		1174.633	2^+				
1098.79 *7*	0.125 *6*	1731.068	6^+	632.180	6^+	M1		0.00659	
1102.832 *16*	8.07 *8*	1409.443	4^-	306.621	4^+	E1		1.37×10^{-3}	
1106.201 *18*	0.451 *14*	1199.386	0^+	93.1800	2^+	E2		0.00334	
[x]1107.924 *23*	0.217 *4*					M1+E2	0.8 *3*	0.0052 *6*	
[x]1114.05 *3*	0.156 *5*					M1		0.00637	
[x]1123.207 *18*	0.227 *14*					M1		0.00625	
1126.995 *16*	0.476 *14*	1433.626	$(3)^-$	306.621	4^+				
1143.762 *17*	4.76 *5*	1450.366	4^+	306.621	4^+	E0+M1+E2		0.0046 *15*	
[x]1149.38 *3*	0.175 *7*								
1156.33 *6*	0.811 *16*	1788.602	6^+	632.180	6^+	M1+E2	0.9 *+11−5*	0.0046 *10*	
[x]1158.13 *3*	0.174 *5*					E1,E2			
1167.060 *17*	11.24 *11*	1260.251	2^-	93.1800	2^+	E1		1.25×10^{-3}	
1174.668 *23*	11.2 *10*	1174.633	2^+	0.0	0^+	(E2)		0.00297	Mult.: E2 or E1 from conversion electron data but, decay scheme requires E2. Eγ=1173.5 (1987Bo52).
1175.31 *5*	13.1 *14*	1268.540	3^+	93.1800	2^+	E2		0.00297	Eγ=1175.7 (1987Bo52).
1183.535 *17*	3.59 *4*	1276.695	2^+	93.1800	2^+	E0+M1+E2		0.0042 *13*	
[x]1188.96 *16*	0.130 *5*								
[x]1197.63 *7*	0.180 *11*								
1199.28 *5*		1199.386	0^+	0.0	0^+	E0			
[x]1202.15 *6*	0.348 *21*					M1		0.00529	
1205.957 *18*	4.24 *17*	1512.595	$(5)^-$	306.621	4^+	E1		1.19×10^{-3}	
1207.204 *18*	10.0 *4*	1513.834	4^+	306.621	4^+	M1+E2	2.1 *+13−5*	0.0033 *3*	Eγ=1207.2 (1987Bo52).
1216.856 *18*	0.709 *21*	1310.071	1^-	93.1800	2^+	E1		1.17×10^{-3}	
1226.53 *3*	4.01 *8*	1533.156	5^+	306.621	4^+	M1+E2	2.2 *+10−5*	0.00313 *21*	Eγ=1227.6 (1987Bo52).
1229.30 *9*	11.80 *12*	1322.467	3^-	93.1800	2^+	E1		1.16×10^{-3}	Eγ=1230.2 (1987Bo52).
1232.156 *18*	3.68 *7*	1538.793	4^-	306.621	4^+	E1		1.16×10^{-3}	
1247.391 *18*	1.23 *3*	1554.001	6^+	306.621	4^+	(E2)		0.00265	B(E2)(W.u.)=1.25×10^{-5} *5* Mult.: E2+(11% *6*) M1 from conversion electron data, but decay scheme requires E2.
1254.921 *19*	1.50 *5*	1561.543	2^+	306.621	4^+	E2		0.00262	Eγ=1254.4 (1987Bo52).
1269.351 *19*	5.66 *17*	1362.554	2^-	93.1800	2^+	E1		1.11×10^{-3}	
1276.682 *19*	0.66 *3*	1276.695	2^+	0.0	0^+	E2		0.00254	
1283.3[h]		2552.7		1268.540	3^+				
[x]1285.28 *5*	0.128 *18*								
[x]1287.707 *24*	0.278 *17*					M1		0.00449	
1291.274 *19*	2.82 *6*	1384.465	4^+	93.1800	2^+	E2		0.00249	Eγ=1292.6 (1987Bo52).
[x]1297.15 *3*	0.260 *13*					M1		0.00441	

From ENSDF

$^{178}_{72}Hf_{106}$-16

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
1310.059 *19*	3.89 *8*	1310.071	1^-	0.0	0^+	E1		1.08×10^{-3}	
1315.78 *7*	0.126 *11*	1947.954	$(7)^-$	632.180	6^+				
1321.54 *3*	0.338 *17*	1953.686	$(7)^+$	632.180	6^+				
1324.16 *7*	0.230 *18*	1956.426	4^+	632.180	6^+	E2		0.00238	
1329.98 *7*	5.31 *21*	1636.731	5^-	306.621	4^+	E1		1.06×10^{-3}	Eγ=1329.6 (1987Bo52).
1333.796 *20*	4.57 *14*	1640.455	5^+	306.621	4^+	M1+E2	2.7 *+9−5*	0.00256 *10*	
1340.460 *21*	6.46 *19*	1433.626	$(3)^-$	93.1800	2^+	E1		1.05×10^{-3}	
1344.86 *7*	1.63 *5*	1651.462	$(5)^-$	306.621	4^+	(E1)		1.05×10^{-3}	Mult.: E2 or E1 from conversion electron data, but decay scheme requires E2.
1350.70 *3*	0.196 *6*	1443.938	0^+	93.1800	2^+	E2		0.00229	
1357.12 *6*	0.304 *9*	1450.366	4^+	93.1800	2^+	E2		0.00227	B(E2)(W.u.)=0.11 *11*
[x]1375.63 *9*	0.127 *10*					M1,E2		0.0030 *9*	
1384.46 *3*	0.393 *16*	1691.086	6^+	306.621	4^+	E2		0.00220	
1403.260 *21*	1.71 *5*	1496.468	2^+	93.1800	2^+	E0+M1+E2		0.0029 *8*	Eγ=1402.6 (1987Bo52).
1420.653 *21*	5.18 *16*	1513.834	4^+	93.1800	2^+	E2		0.00210	Eγ=1421.1 (1987Bo52).
1434.25 *18*		1434.253	0^+	0.0	0^+	E0			
1440.56 *5*	0.293 *23*	1747.105	4^-	306.621	4^+				
1443.80 *5*		1443.938	0^+	0.0	0^+	E0			
1468.406 *22*	0.452 *23*	1561.543	2^+	93.1800	2^+	E0+M1+E2		0.0027 *7*	Eγ=1469.8 (1987Bo52).
1473.462 *22*	0.93 *5*	1566.671	2^-	93.1800	2^+	E1		9.95×10^{-4}	
[x]1477.18 *7*	0.078 *6*								
1482.03 *4*	0.19 *1*	1788.602	6^+	306.621	4^+	E2		0.00196	
[x]1491.73 *4*	0.121 *11*								
1496.45 *9*	1.45 *9*	1496.468	2^+	0.0	0^+	E2		0.00193	Eγ=1497.1 (1987Bo52).
1501.1[d]		1808.278	$(2)^+$	306.621	4^+				
[x]1502.09 *6*	0.31 *3*					M1+E2	0.75 *+81−65*	0.0027 *5*	
1511.74 *5*	0.59 *5*	1818.290	2^+	306.621	4^+	E2		0.00190	B(E2)(W.u.)=0.7 *4* Eγ=1512.5 (1987Bo52).
1513.72 *7*	0.165 *10*	1513.611	2^+	0.0	0^+	E2		0.00190	
[x]1518.18 *14*	0.103 *18*					M1		0.00310	
[x]1519.05 *4*	0.087 *10*								
[x]1522.05 *11*	0.214 *13*					M1		0.00308	
[x]1534.86 *12*	0.141 *16*					E2,E1			
1542.436 *23*	1.84 *7*	1635.607	4^+	93.1800	2^+	E2		0.00185	Eγ=1542.6 (1987Bo52).
[x]1556.63 *4*	0.47 *3*					M1+E2	0.6 *3*	0.00265 *21*	
1561.63 *5*	0.408 *24*	1561.543	2^+	0.0	0^+	E2		0.00181	Eγ=1562.8 (1987Bo52).
1562.1[d]		1869.843	4^+	306.621	4^+				
[x]1563.83 *7*	0.318 *22*					M1		0.00291	
[x]1565.88 *13*	0.14 *9*					M1,E2		0.0024 *6*	
[x]1574.39 *8*	0.165 *21*					M1(+E0)			Mult.: M1(+E0) or E2+E0.
[x]1589.73 *14*	0.133 *17*								
[x]1599.71 *5*	0.185 *13*					M1(+E2)	<3.4	0.0023 *5*	
1607.17 *10*	0.102 *15*	1913.620	4^-	306.621	4^+				

From ENSDF

$^{178}_{72}Hf_{106}$-17

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_γ[&]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[j]	Comments
[x]1610.85 *4*	0.149 *9*					E2(+M1)	>0.27	0.0022 *5*	
[x]1612.91 *13*	0.14 *3*								
[x]1616.03 *11*	0.094 *12*					M1		0.00273	
[x]1621.81 *10*	0.126 *23*								
[x]1628.40 *7*	0.168 *15*					M1		0.00269	
1634.7[d]		1942.010	1+,2+,3+	306.621	4+				
[x]1639.82 *5*	0.368 *18*					M1+E2+(E0)		0.0022 *5*	
1646.46 *3*	0.82 *5*	1953.135	4+	306.621	4+	E0+M1+E2		0.0022 *5*	
1649.76 *3*	1.24 *7*	1956.426	4+	306.621	4+	E0+M1+E2		0.0021 *5*	
[x]1682.93 *7*	0.351 *25*					M1+E2	0.64 *52*	0.0023 *3*	
1690.89 *4*	0.56 *8*	1997.469	3+	306.621	4+	M1		0.00250	Eγ=1690.2 (1987Bo52).
1705.7[d]		2013.555	3+,4+,5+	306.621	4+				
1715.06 *4*	0.41 *5*	1808.278	(2)+	93.1800	2+	M1(+E2)	<1.7	0.0021 *4*	Eγ=1714.5 (1987Bo52).
1725.13 *4*	1.44 *13*	1818.290	2+	93.1800	2+	E0+M1+E2		0.0020 *5*	B(M1)(W.u.)<0.0063 Eγ=1724.9 (1987Bo52).
1743.80 *7*	0.69 *6*	2050.492	3+	306.621	4+	M1		0.00236	Eγ=1744.8 (1987Bo52).
1772.21 *8*		1772.22	0+	0.0	0+	E0			
1776.59 *4*	0.41 *8*	1869.843	4+	93.1800	2+	E2		1.53×10^{-3}	Eγ=1774.8 (1987Bo52).
1793.27 *4*	0.32 *6*	2099.877	3+,4+	306.621	4+	E2		1.52×10^{-3}	
1798.14 *4*	0.46 *5*	1891.307	2+	93.1800	2+	M1		0.00224	
[x]1802.80 *7*	0.62 *4*					E0+M1+E2		0.0019 *4*	
1844.4[e]		2474.8		632.180	6+				
1848.80 *7*	1.18 *11*	1942.010	1+,2+,3+	93.1800	2+	M1		0.00214	Eγ=1849.1 (1987Bo52).
1849.7[d]		2155.6		306.621	4+				
[x]1866.23 *7*	0.63 *3*					E0+M1+E2		0.0018 *4*	
[x]1876.43 *7*	0.238 *17*					E0+M1+E2		0.0018 *4*	
[x]1885.27 *5*	0.08 *3*					M1		0.00208	
1893.17 *7*	0.78 *5*	1986.453	1+,2+,3+	93.1800	2+	E0+M1+E2		0.0018 *4*	
[x]1895.66 *6*	0.91 *5*					M1		0.00206	
[x]1904.93 *5*	1.29 *12*								
1905.3[c]		1997.469	3+	93.1800	2+				
[x]1917.99 *9*	0.48 *10*					M1		0.00203	
1920.46 *15*	0.85 *8*	2013.555	3+,4+,5+	93.1800	2+	M1		0.00202	Eγ=1922.3 (1987Bo52).
1927.98 *8*	0.68 *6*	2021.184	1+,2+,3+	93.1800	2+	M1		0.00201	
1933.1[c]		2027.48?	0+	93.1800	2+				
1942.8[b]		1942.8?		0.0	0+				
1957.28 *4*	1.01 *9*	2050.492	3+	93.1800	2+	M1		0.00197	Eγ=1957.0 (1987Bo52).
1965.4[d]		2272.5		306.621	4+				
[x]1965.41 *7*	0.58 *6*					M1+E2	1.2 *+32−7*	0.00162 *23*	
2027.0[c]		2118.6		93.1800	2+				
2058.2[d]		2365.4	(2+)	306.621	4+				
2061.8[c]		2155.6		93.1800	2+				

From ENSDF

$^{178}_{72}Hf_{106}$-18

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (continued)

E_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
2117.3[b]	2118.6		0.0	0^+	3739.1[f]		4914.7		1174.633	2^+
2179.5[c]	2272.5		93.1800	2^+	3904.2[d]		4210.5		306.621	4^+
2237.8[a]	7626.30		5388.6		4071.7[d]		4377.9		306.621	4^+
2251.1[d]	2557.8		306.621	4^+	4117.0[c]		4210.5		93.1800	2^+
2273.0[c]	2365.4	(2^+)	93.1800	2^+	4119.3[h]		5388.6		1268.540	3^+
2325.8[d]	2631.4		306.621	4^+	4232.1[c]		4325.1		93.1800	2^+
2343.5[a]	7626.30		5282.9		4513.6[a]		7626.30		3112.8	
2379.9[c]	2474.8		93.1800	2^+	4525.9[a]		7626.30		3100.5	
2429.9[d]	2737.5		306.621	4^+	4567.0[d]		4873.6		306.621	4^+
2464.8[c]	2557.8		93.1800	2^+	4592.2[b]		4593.1		0.0	0^+
2537.2[c]	2631.4		93.1800	2^+	4609.0[d]		4914.7		306.621	4^+
2553.7[b]	2552.7		0.0	0^+	4652.7[e]		5282.9		632.180	6^+
2560.6[d]	2865.8		306.621	4^+	4668.7[a]		7626.30		2957.7	
2591.8[d]	2898.7		306.621	4^+	4687.0[c]		4781.8		93.1800	2^+
2616.4[a]	7626.30		5010.0		4702.1[d]		5010.0		306.621	4^+
2645.4[c]	2737.5		93.1800	2^+	4727.7[a]		7626.30		2898.7	
2711.7[a]	7626.30		4914.7		4760.5[a]		7626.30		2865.8	
2736.5[f]	3909.5		1174.633	2^+	4780.4[c]		4873.6		93.1800	2^+
2752.8[a]	7626.30		4873.6		4888.8[a]		7626.30		2737.5	
2771.3[c]	2865.8		93.1800	2^+	4918.2[c]		5010.0		93.1800	2^+
2794.3[d]	3100.5		306.621	4^+	4974.3[d]		5282.9		306.621	4^+
2805.9[c]	2898.7		93.1800	2^+	4995.0[a]		7626.30		2631.4	
2806.0[d]	3112.8		306.621	4^+	5068.6[a]		7626.30		2557.8	
2844.5[a]	7626.30		4781.8		5073.7[a]		7626.30		2552.7	
2865.1[c]	2957.7		93.1800	2^+	5083.3[d]		5388.6		306.621	4^+
2957.1[b]	2957.7		0.0	0^+	5151.6[a]		7626.30		2474.8	
3007.0[c]	3100.5		93.1800	2^+	5260.9[a]		7626.30		2365.4	(2^+)
3019.8[c]	3112.8		93.1800	2^+	5294.8[c]		5388.6		93.1800	2^+
3033.2[a]	7626.30		4593.1		5353.8[a]		7626.30		2272.5	
3064.7[g]	4325.1		1260.251	2^-	5470.8[a]		7626.30		2155.6	
3109.0[h]	4377.9		1268.540	3^+	5507.7[a]		7626.30		2118.6	
3248.4[a]	7626.30		4377.9		5526.2 *3*	13 *1*	7626.30		2099.877	$3^+,4^+$
3301.2[a]	7626.30		4325.1		5557.7 *4*	2.1 *3*	7626.30		2068.038	5^+
3317.3[i]	4593.1		1276.695	2^+	5575.6 *2*	93 *5*	7626.30		2050.492	3^+
3415.9[a]	7626.30		4210.5		5598.6 *2*	6 *1*	7626.30		2027.48?	0^+
3514.9[h]	4781.8		1268.540	3^+	5605.2 *2*	25 *1*	7626.30		2021.184	$1^+,2^+,3^+$
3601.2[d]	3909.5		306.621	4^+	5612.3 *2*	48 *3*	7626.30		2013.555	$3^+,4^+,5^+$
3716.9[a]	7626.30		3909.5		5628.4 *2*	36 *2*	7626.30		1997.469	3^+

From ENSDF

$^{178}_{72}Hf_{106}$-19

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

γ(^{178}Hf) (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
5639.5 *2*	38 *2*	7626.30		1986.453	$1^+,2^+,3^+$	6064.7 *2*	39 *2*	7626.30		1561.543	2^+
5669.6 *2*	32 *2*	7626.30		1956.426	4^+	6087.5 *4*	2.7 *3*	7626.30		1538.793	4^-
5683.9 *2*	26 *1*	7626.30		1942.010	$1^+,2^+,3^+$	6093.1 *2*	28 *2*	7626.30		1533.156	5^+
5712.4 *2*	38 *2*	7626.30		1913.620	4^-	6112.4 *2*	266 *14*	7626.30		1513.611	2^+
5734.8 *3*	6 *1*	7626.30		1891.307	2^+	6130.2 *3*	11 *1*	7626.30		1496.468	2^+
5756.3 *2*	27 *2*	7626.30		1869.843	4^+	6175.9 *2*	16 *1*	7626.30		1450.366	4^+
5763.7 *2*	64 *3*	7626.30		1862.210	3^+	6192.8 *2*	9 *1*	7626.30		1433.626	$(3)^-$
5807.8 *2*	112 *6*	7626.30		1818.290	2^+	6216.8 *2*	23 *1*	7626.30		1409.443	4^-
5817.9 *5*	1.9 *2*	7626.30		1808.278	$(2)^+$	6241.9 *2*	23 *1*	7626.30		1384.465	4^+
5822.7 *3*	10 *1*	7626.30		1803.392	3^-	6303.9 *2*	37 *2*	7626.30		1322.467	3^-
5868.0 *2*	16 *1*	7626.30		1758.147	3^+	6349.7 *2*	20 *1*	7626.30		1276.695	2^+
5879.0 *4*	2.5 *2*	7626.30		1747.105	4^-	6357.9 *2*	100 *5*	7626.30		1268.540	3^+
5974.6 *4*	1.5 *2*	7626.30		1651.462	$(5)^-$	6366.4 *3*	10 *1*	7626.30		1260.251	2^-
5986.5 *4*	6 *1*	7626.30		1639.761	3^-	6451.8 *2*	31 *2*	7626.30		1174.633	2^+
5990.5 *2*	37 *2*	7626.30		1635.607	4^+	7319.9 *2*	15 *1*	7626.30		306.621	4^+
6059.6 *4*	4.0 *3*	7626.30		1566.671	2^-	7533.2 *2*	9 *1*	7626.30		93.1800	2^+

† Uncertainties of γ-ray intensities are statistical only. They include neither systematic values nor components due to background corrections, which may contribute an additional 5% (1986Ha22).

‡ From γ-ray and conversion electron data. Iγ and Ice scales were normalized using several strong K-electron lines from transitions with known multipolarities in ^{178}Hf (1986Ha22).

From γ-ray and conversion electron data.

@ Iγ of primary γ rays (Eγ≥5526 keV) are relative to 100 for 6357.9γ (1986Ha22).

& Eγ of primary γ rays are from 1986Ha22, unless otherwise specified.

a From 1987Bo52.

b From γγ coin with energy sum=7626.3 keV; final-level energy=0 keV (1987Bo52).

c From γγ coin with energy sum=7533.2 keV; final-level energy=93 keV (1987Bo52).

d From γγ coin with energy sum=7319.7 keV; final-level energy=307 keV (1987Bo52).

e From γγ coin with energy sum=6994.3 keV; final-level energy=632 keV (1987Bo52).

f From γγ coin with energy sum=6451.7 keV; final-level energy=1175 keV (1987Bo52).

g From γγ coin with energy sum=6366.1 keV; final-level energy=1260 keV (1987Bo52).

h From γγ coin with energy sum=6357.1 keV; final-level energy=1269 keV (1987Bo52).

i From γγ coin with energy sum=6349.6 keV; final-level energy=1277 keV (1987Bo52).

j 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.

k Multiply placed with undivided intensity.

x γ ray not placed in level scheme.

From ENSDF

$^{178}_{72}Hf_{106}$-20

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme

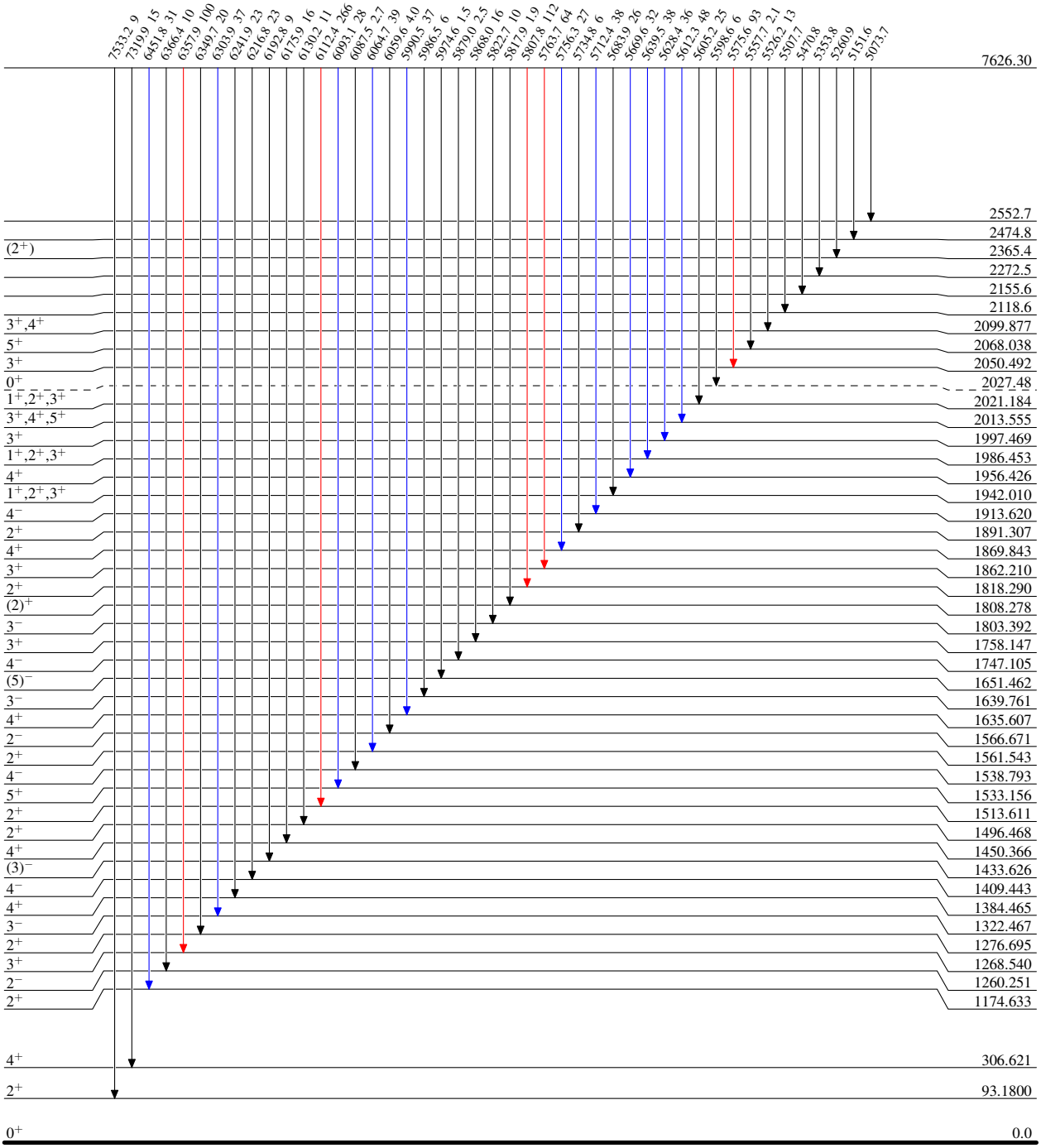
Intensities: Relative I_γ

Legend

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

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

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

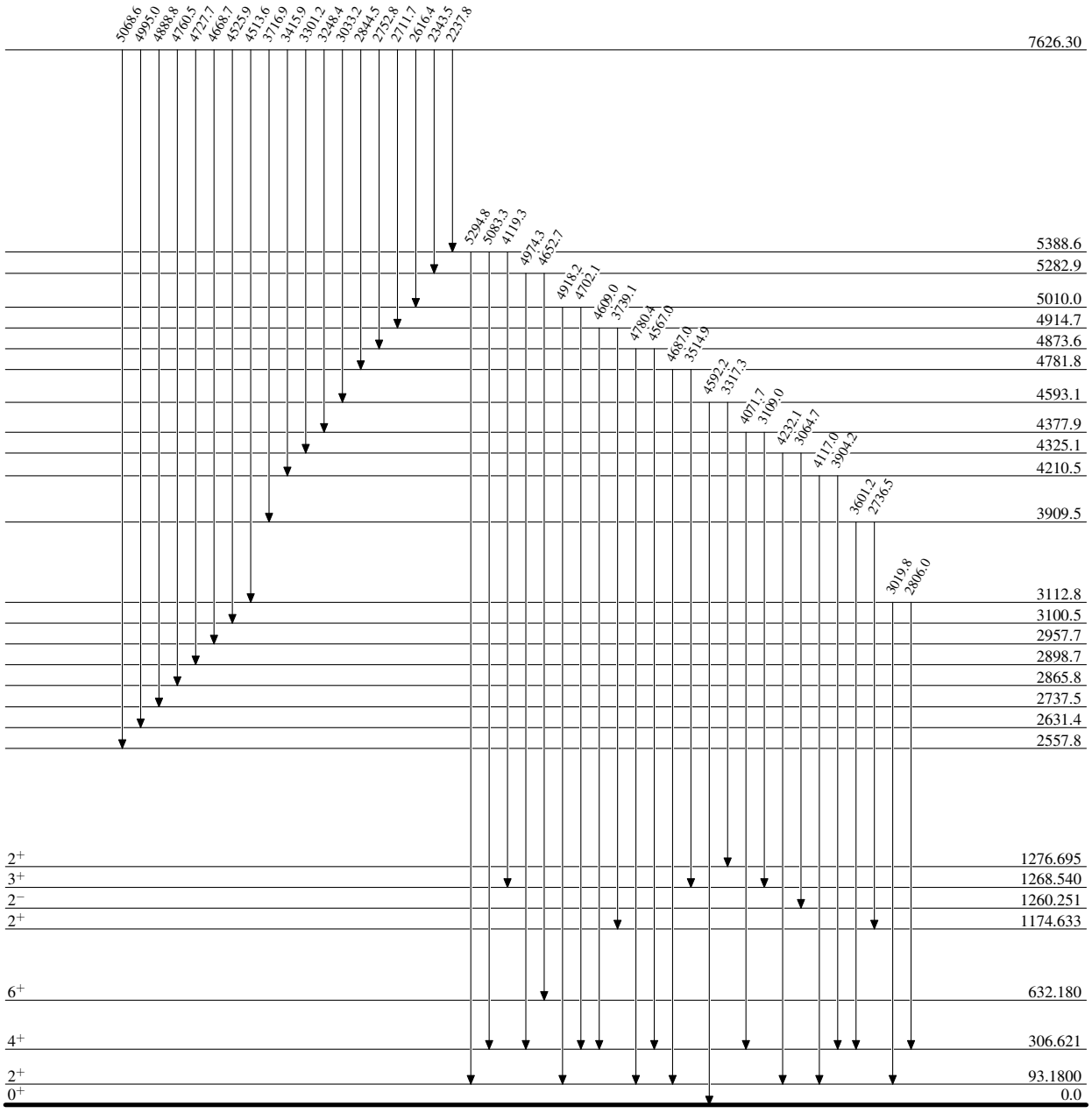


$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ



$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

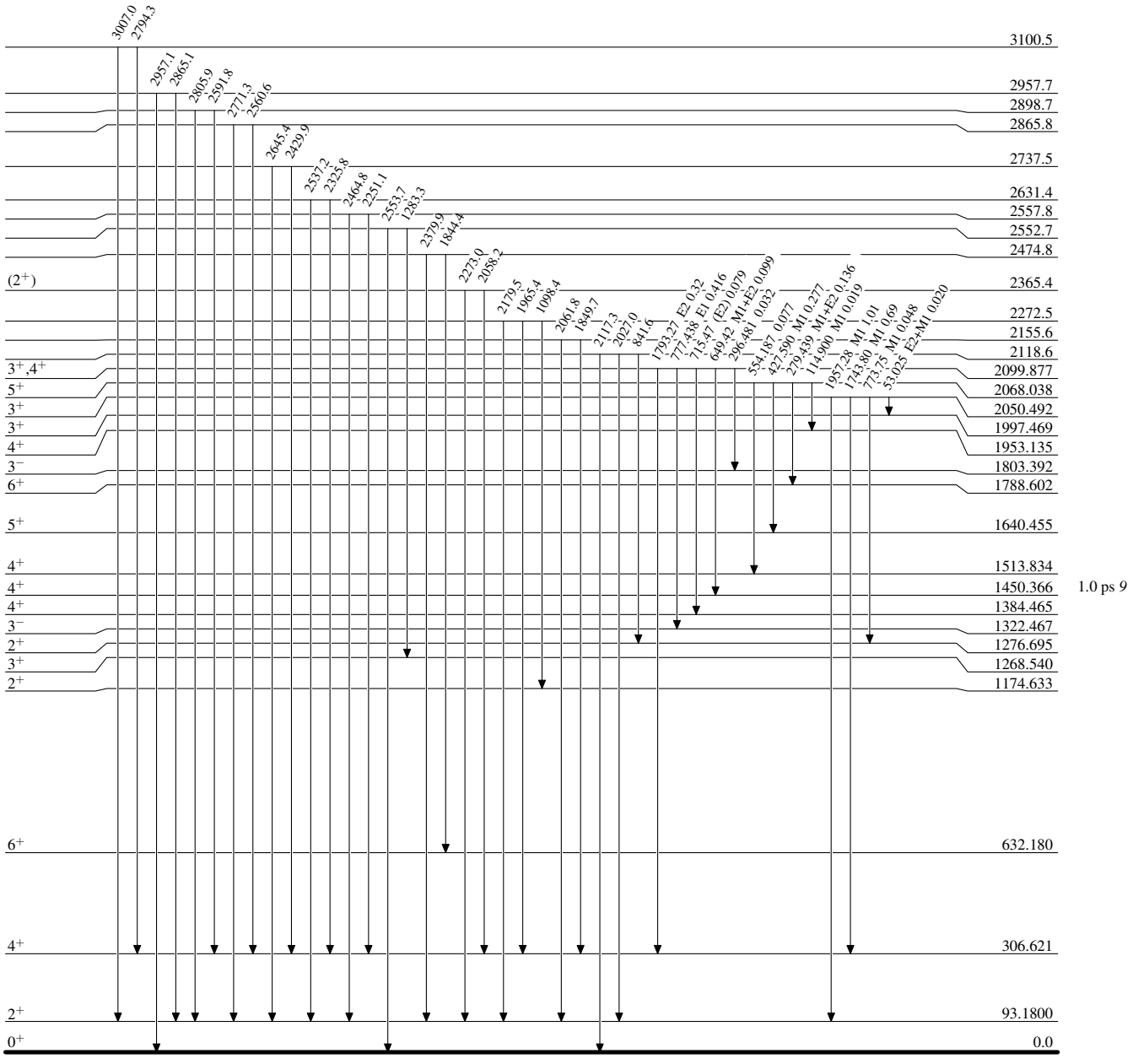
Intensities: Relative I_γ

Legend

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

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

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



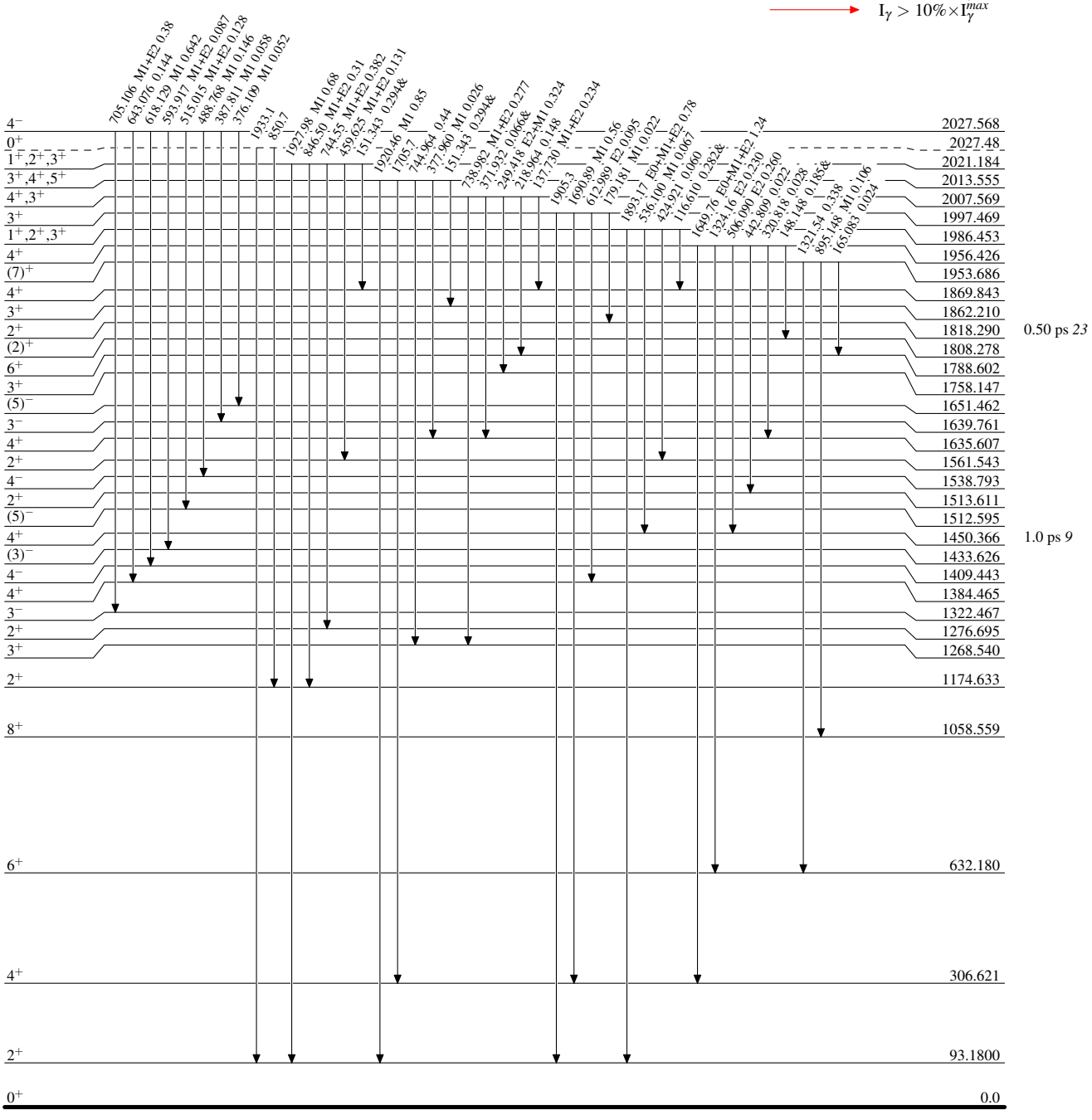
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



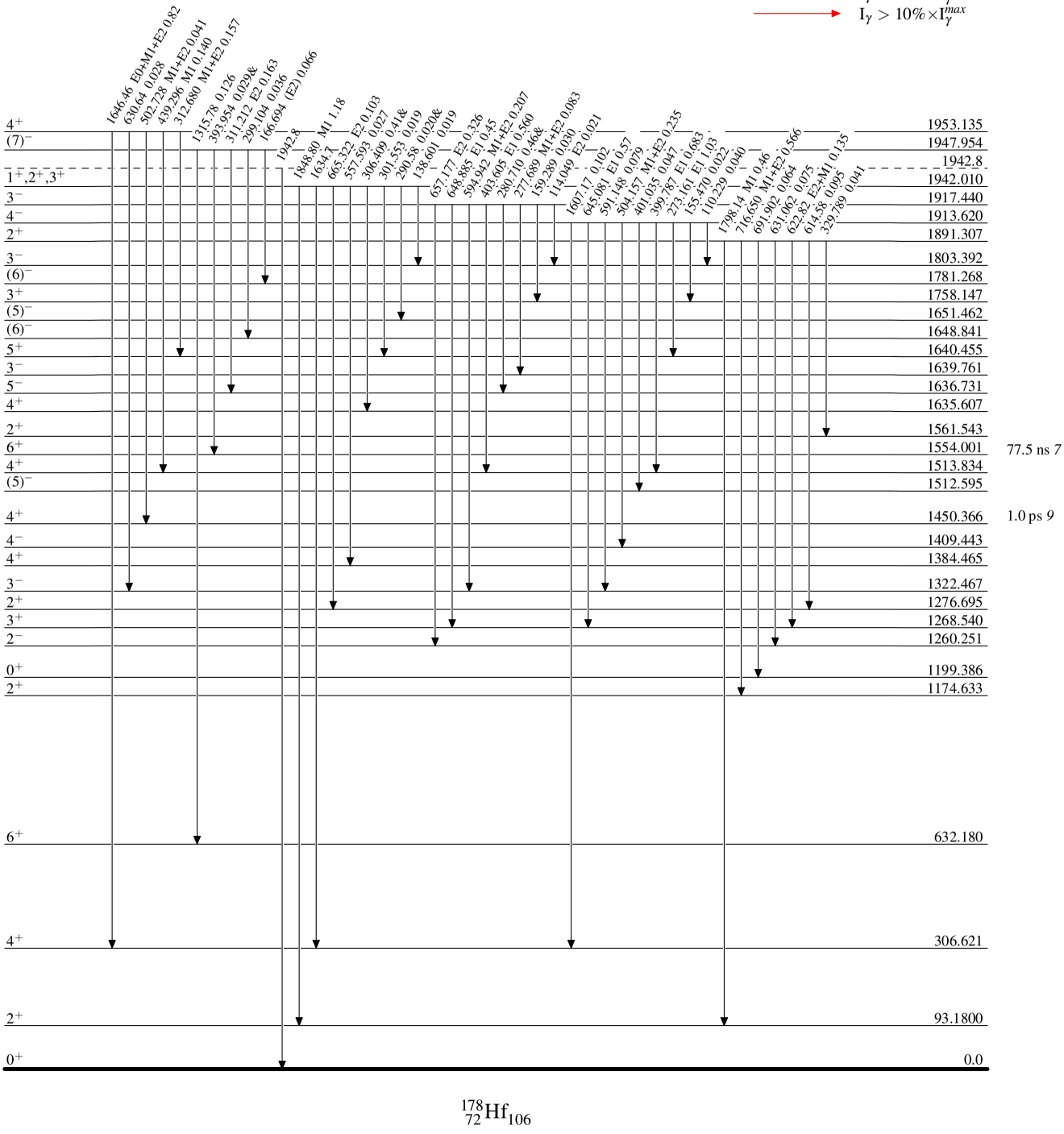
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



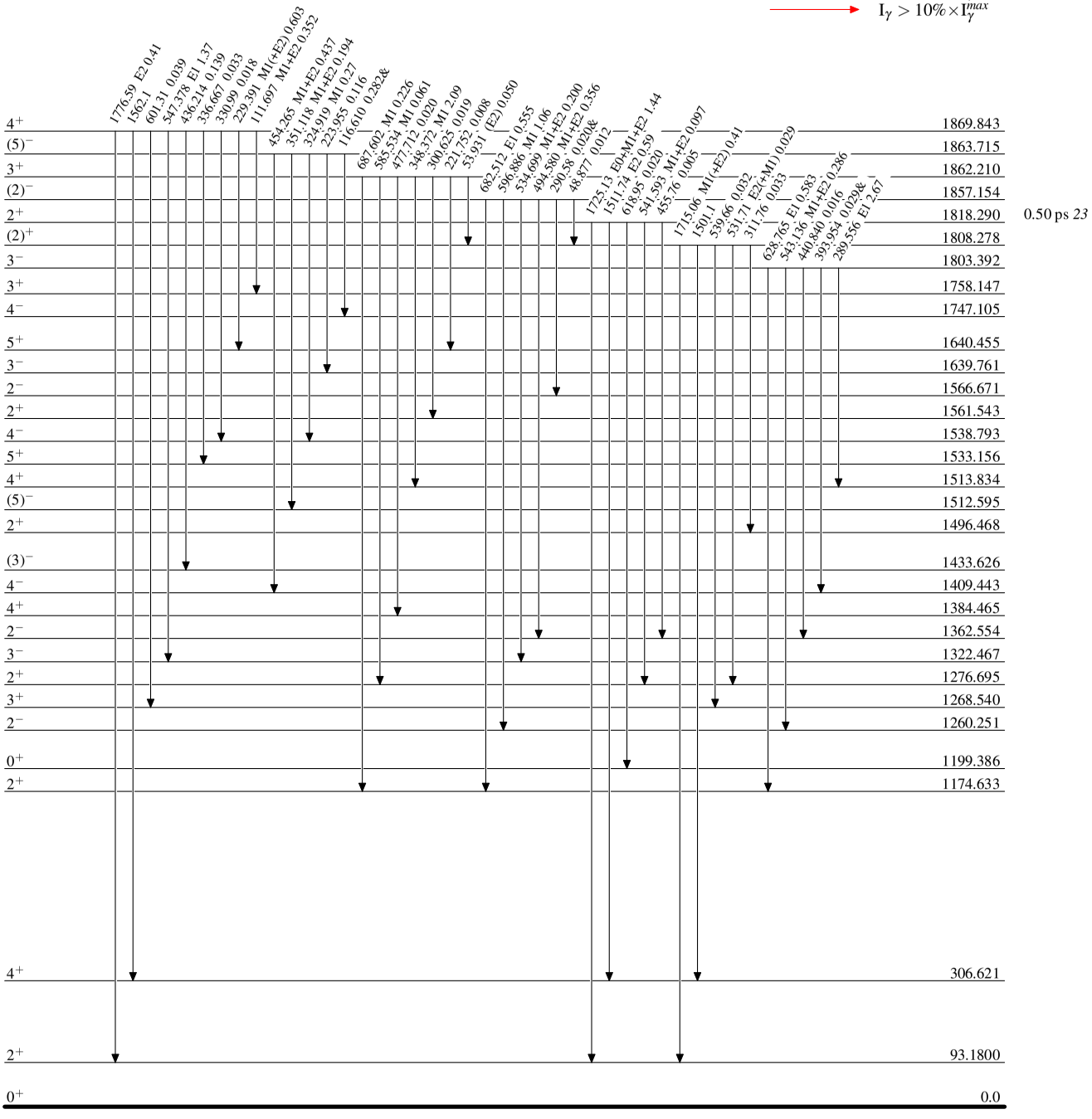
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



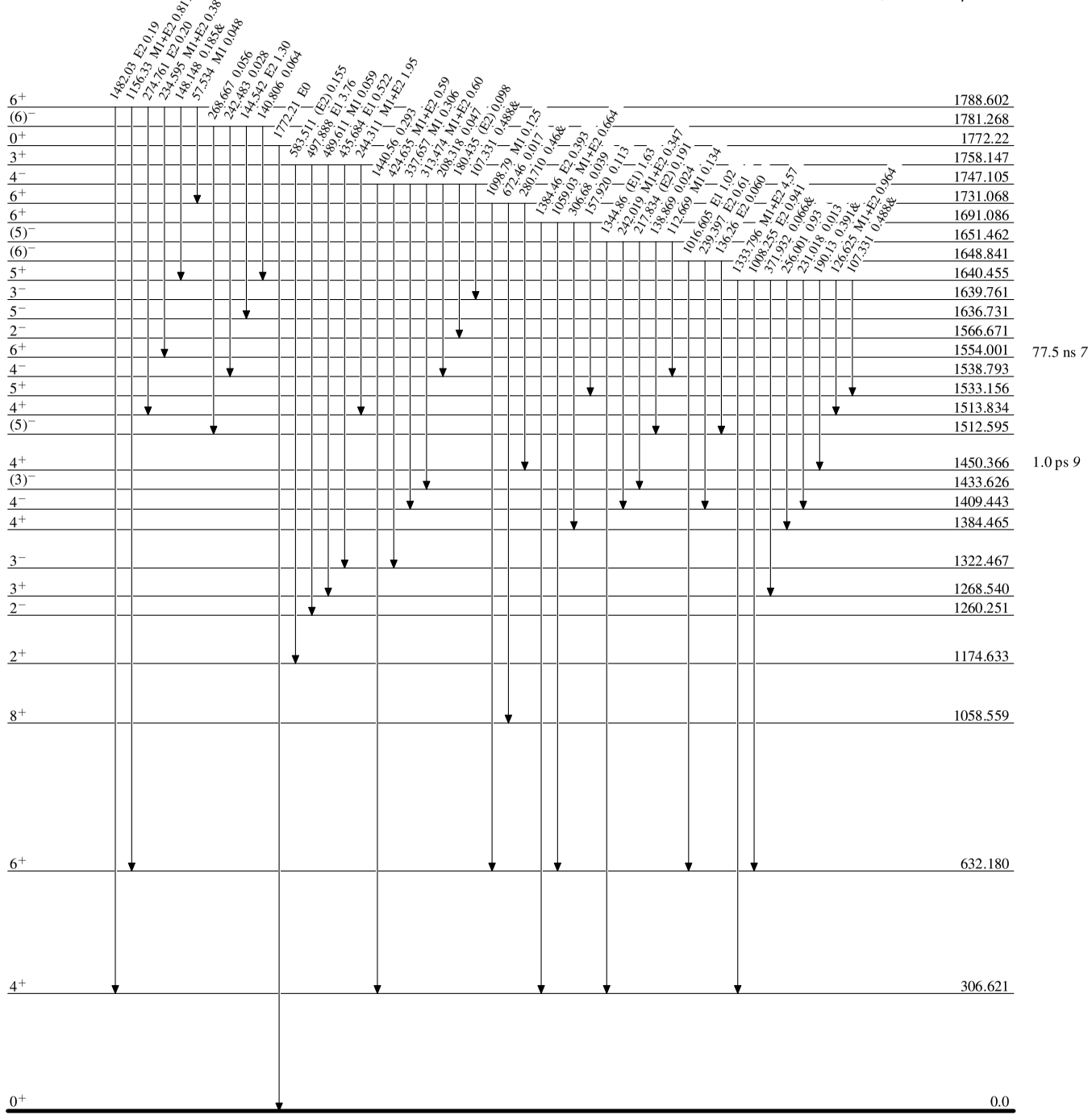
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



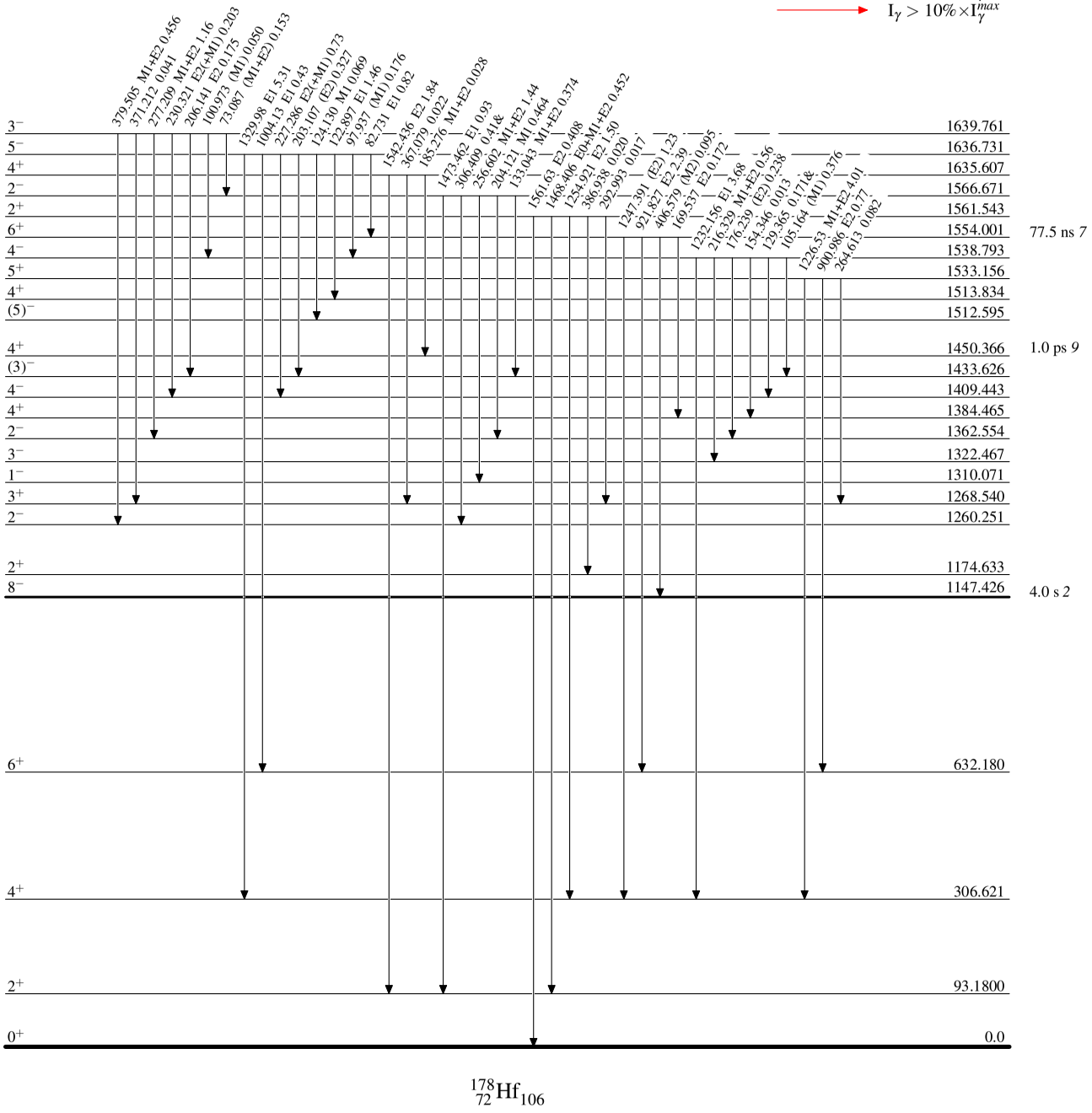
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



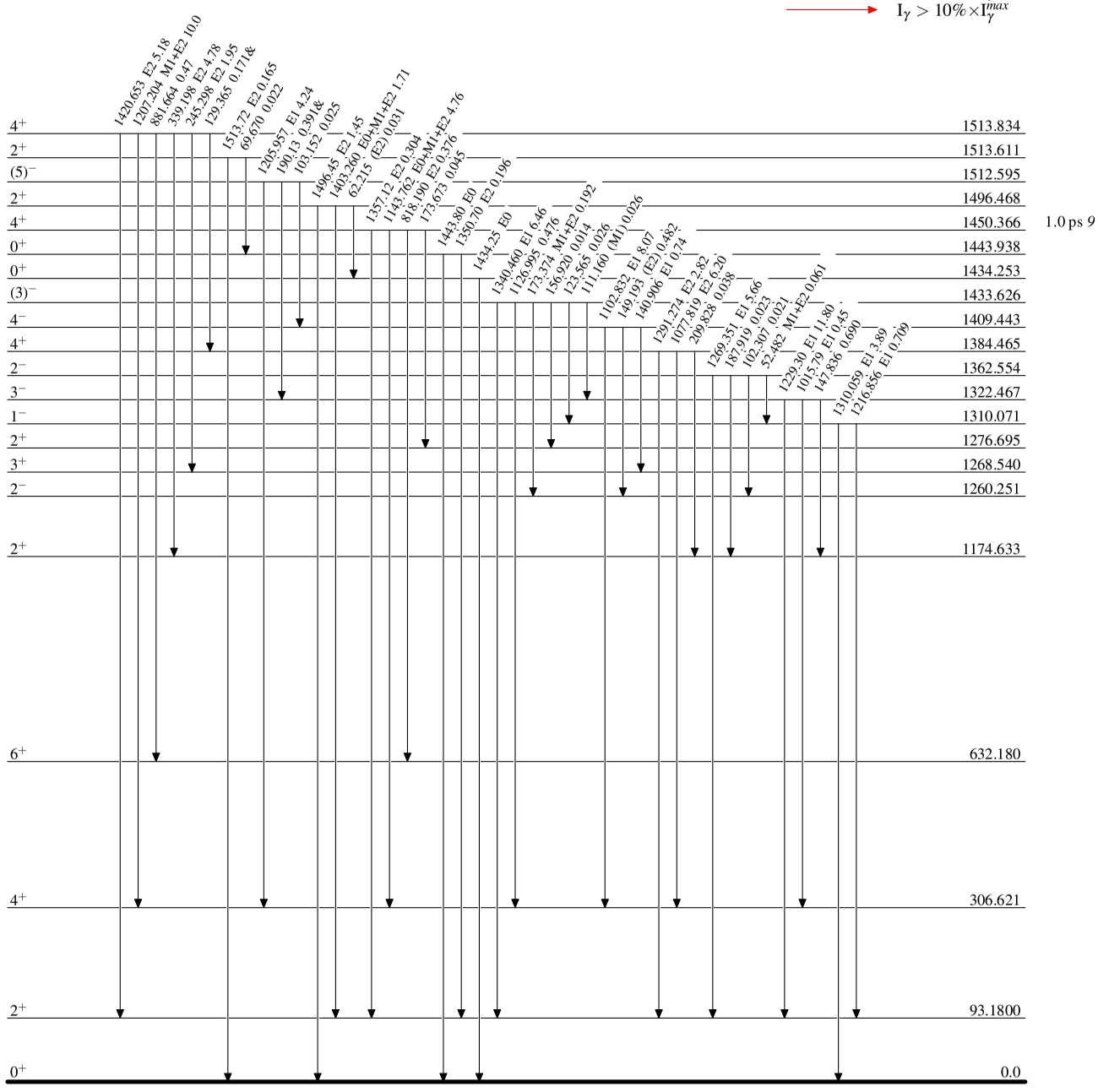
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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

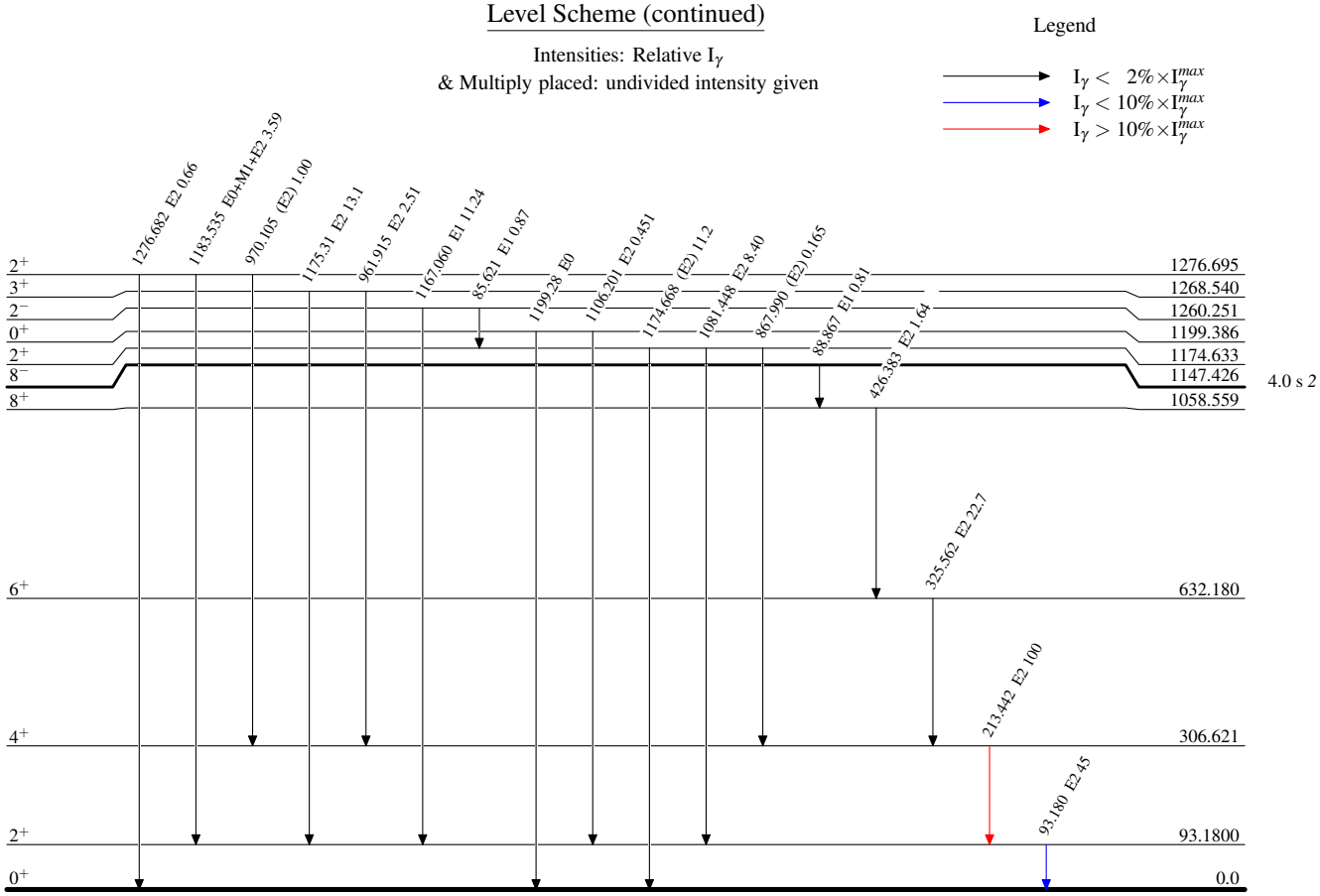


$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52

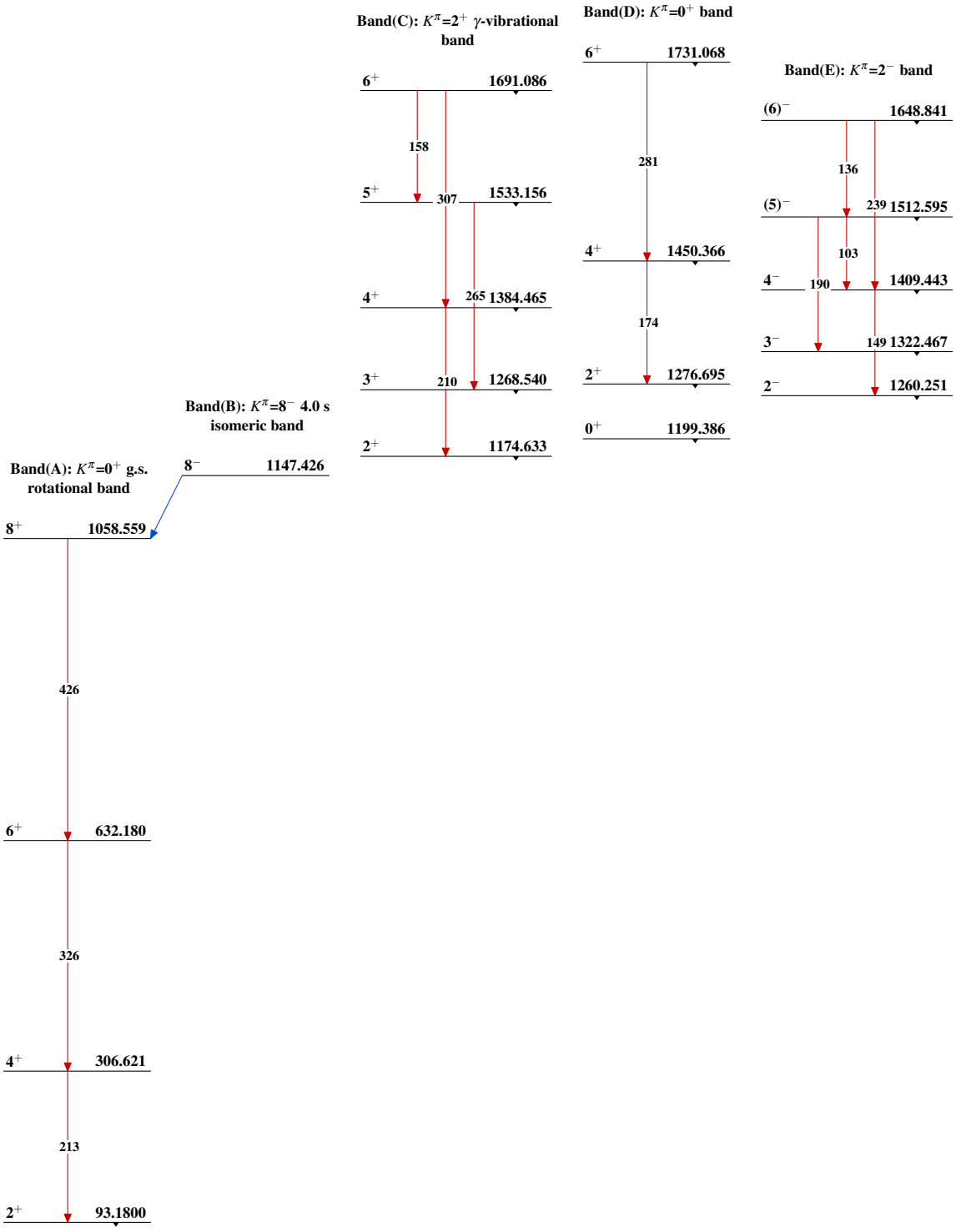
Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



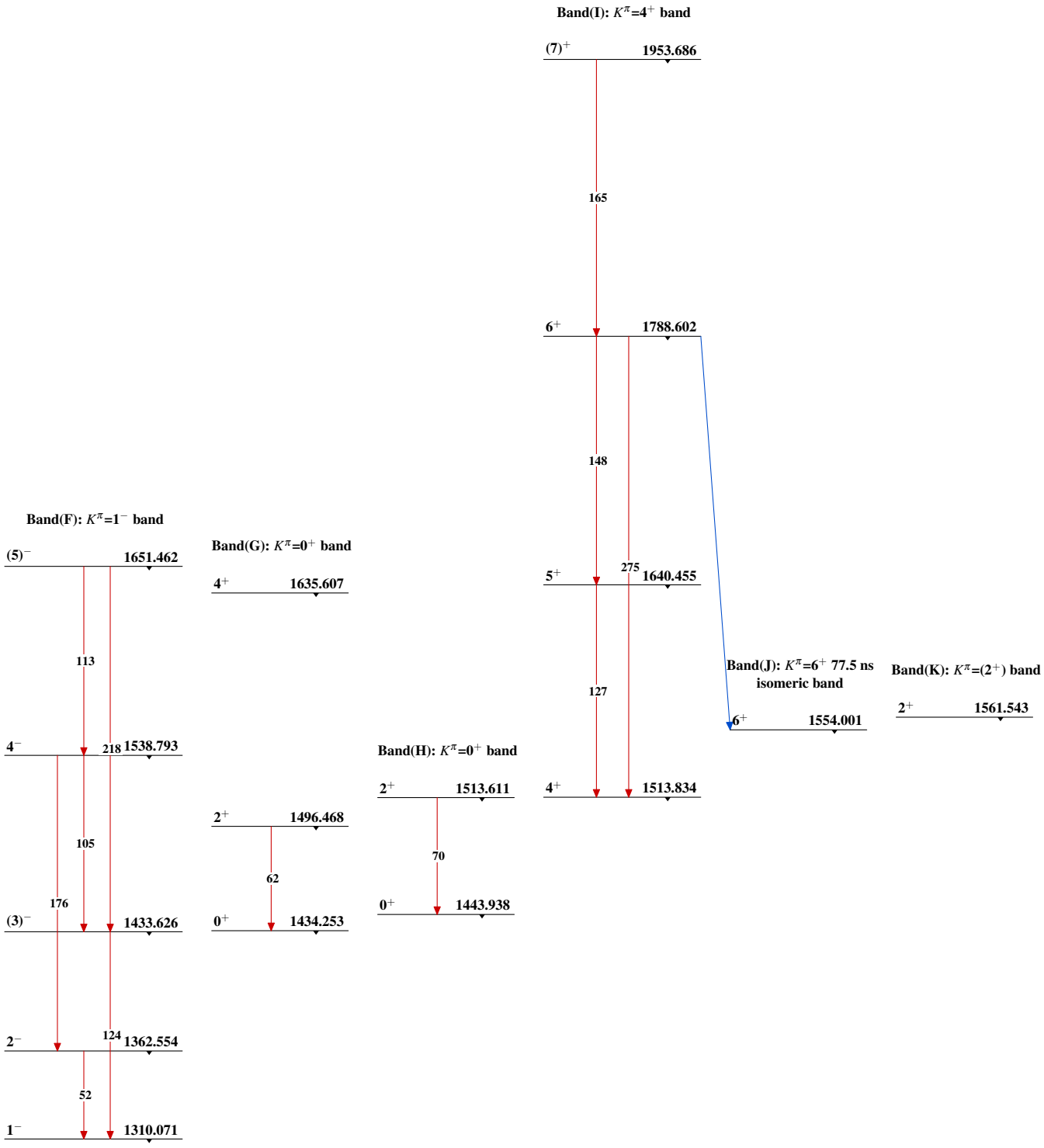
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52



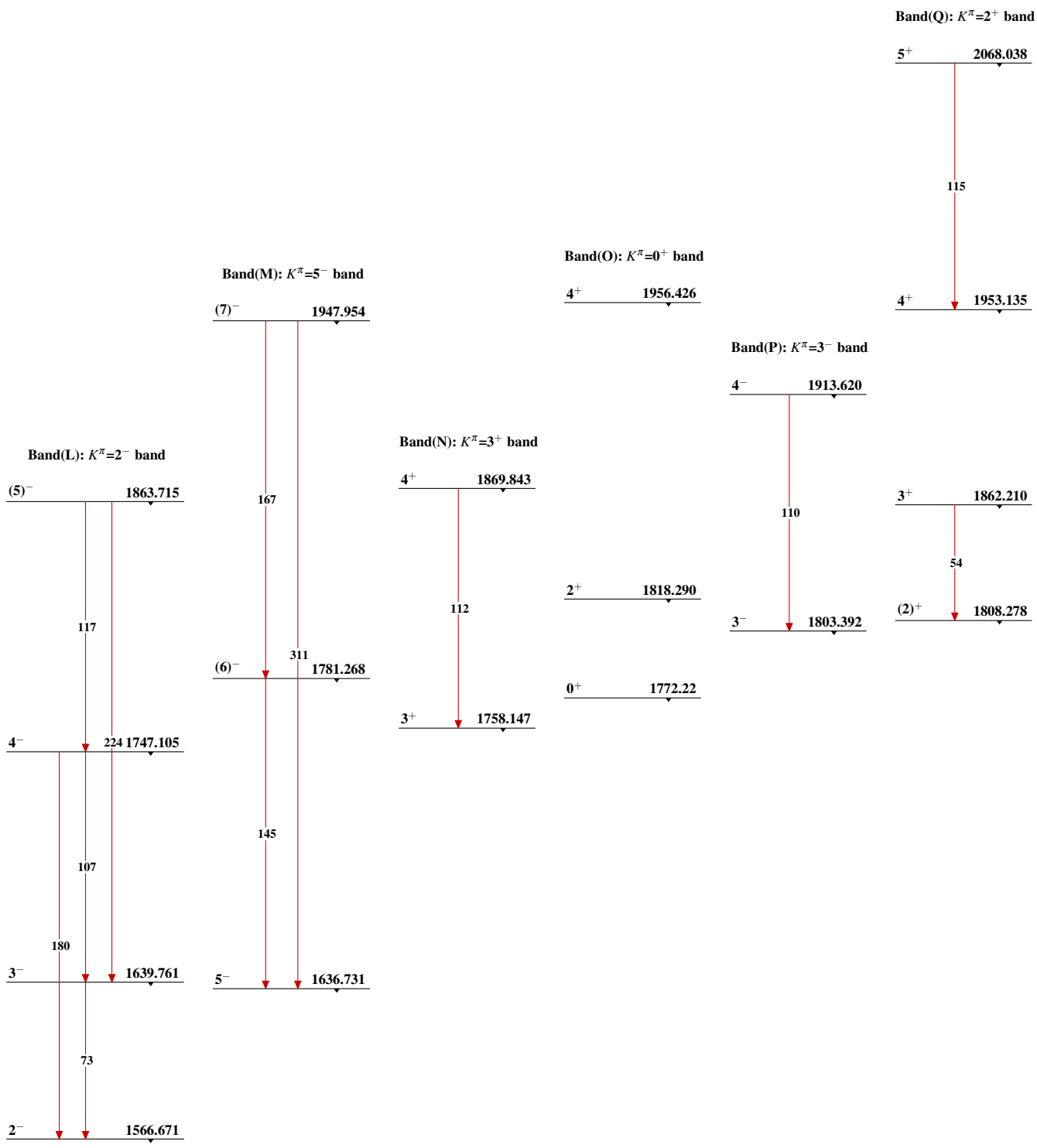
$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)



$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)



$^{178}_{72}Hf_{106}$

^{177}Hf(n,γ) E=thermal 1986Ha22,1987Bo52 (continued)

Band(R): $K^{\pi}=2^{-}$ band

4^{-} 2027.568

3^{-} 1917.440

$(2)^{-}$ 1857.154

$^{178}_{72}Hf_{106}$