^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 1103 (2008)	1-Mar-2008

Others: 1988Pe08 (E(α)=40 MeV; Dumond curved crystal spectrometer); 1982El02 (Eα=41 MeV).

1995Ma07: ^{165}Ho(α,3nγ), Eα=32.6 to 47.9 MeV; iron-free double orange β spectrometer with NE102 plastic scintillator (FWHM=1.4 At 125 keV), curved-crystal spectrometer (reflection orders n=1, 2, 3, 5 recorded, energy resolution≈50 eV At 100 keV for n=2), two Ge detectors (one planar and one 65 cm^3 coaxial). Measured Eγ, $\gamma\gamma$ coin (15 ns FWHM), Iγ, $\gamma(\theta)$, I(ce) (prompt and delayed), ce-ce coin.

1992Dr03: Eα=32.6, 38.1, 43.1, 47.9 MeV; two intrinsic HPGE detectors and a curved-crystal spectrometer; measured Eγ, Iγ, $\gamma\gamma$ coin (15 ns FWHM), $\gamma(\theta)$ (15° −90°), γ(t).

^{166}Tm Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$	Comments
0.0[&]	2$^+$		J$^{\pi}$: from Adopted Levels.
0.0+y			E(level): from Adopted Levels, y=x+453.5.
0.0+z[o]			E(level): from Adopted Levels, z=x+281.
0.0+u[p]			E(level): from figure 9b of 1995Ma07, u>171.56+x.
0.0+v			E(level): from Adopted Levels, v=0.0.
33.620[a] *12*	3$^+$		
74.903[&] *11*	4$^+$		
74.920 *2*			
77.624+z *9*			
82.298+v *8*	1$^+$		Configuration=(π 7/2[523])-(ν 5/2[523]).
85.973+y[l] *20*	(4$^-$)		
101.5+z[n] *10*			
109.338 *4*			not adopted. In Adopted Levels, Gammas, the 34.4γ deexcites the 109.3+x isomer directly, As proposed In the (^{11}B,5nγ) study by 2002Ca46.
109.338+x[#]	6$^-$	340 ms *25*	T$_{1/2}$: from Adopted Levels. E(level): see comment on 109.338 level.
120.294+z[o]	5		E(level): 86.918+x In 1995Ma07 because order of 87γ and 120γ there was the reverse of what is shown here.
131.736[d] *12*	4$^-$		
149.2083+x *17*	5$^-$,6$^-$,7$^-$		level not adopted; In Adopted Levels, Gammas, the order of the 39.9γ deexciting it here and the 62.231γ feeding it is reversed, resulting In E(level)=171.6+x.
152.100[a] *12*	5$^+$		
171.5647+x *19*	7$^+$		1995Ma07 propose configuration=(π 7/2[404])+(ν 7/2[633]).
184.07+y[m] *6*	(5$^-$)		
194.032+u[p]			
207.212+z[o] *7*			
207.536[e] *12*	5$^-$		
211.4407+x[j] *17*	6$^+$		
226.569[&] *11*	6$^+$		
231.0523+x[f] *25*	6$^-$	>80 ns	T$_{1/2}$: 80 ns<T$_{1/2}$<1 μs (1992Dr03) from two-parameter Eγ-t measurements. note, however, that adopted value is 36 ns *2*.
256.997+x[@] *7*	7$^-$		
287.585+x[g] *4*	7$^-$		
288.124[d] *12*	6$^-$		
298.125+x[k] *6*	7$^+$		
302.36+y[l] *6*	(6$^-$)		
334.250+x[i] *5*	(5$^-$)		
341.836[a] *12*	7$^+$		

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

^{166}Tm Levels (continued)

E(level)[†]	J$^{\pi}$[‡]
353.017+z[n] 8	
367.484+x[f] 6	8$^-$
368.208+z[o] 14	
409.088+u[p] 23	
415.45+x 20	
417.448+x[j] 5	8$^+$
423.644[b] 22	6$^+$
423.678[e] 12	7$^-$
424.178+x[#] 9	8$^-$
433.57+y[m] 6	(7$^-$)
460.244[&] 12	8$^+$
469.140+x[g] 7	9$^-$
474.890+x[h] 13	(6$^-$)
496.855+z[o] 15	
507.792[c] 14	7$^+$
524.616[d] 12	8$^-$
563.386+x[k] 6	9$^+$
591.72+y[l] 6	(8$^-$)
592.556+x[f] 9	10$^-$
605.300[a] 12	9$^+$
609.621+x[@] 12	9$^-$
633.206+x[i] 19	(7$^-$)
634.371[b] 14	8$^+$
642.59+u[p] 6	
684.337+z[n] 15	
700.755+z[o] 18	
733.228+x[j] 7	10$^+$
733.680[e] 15	9$^-$
736.302[c] 14	9$^+$
737.614+x[g] 11	11$^-$
760.33+y[m] 6	(9$^-$)
772.725[&] 16	10$^+$
808.715+x[h] 20	(8$^-$)
850.022[d] 13	10$^-$
875.08+z[o] 6	
904.430+x[f] 12	12$^-$
915.964[b] 14	10$^+$
922.170+x[k] 9	11$^+$
946.232[a] 15	11$^+$
962.98+y[l] 6	(10$^-$)
1000.738+x[i] 22	(9$^-$)
1042.994[c] 15	11$^+$
1092.228+x[g] 13	13$^-$
1097.65+z[n] 4	
1130.469[e] 16	11$^-$
1132.348+x[j] 9	12$^+$
1157.129[&] 22	12$^+$
1171.64+y[m] 6	(11$^-$)

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

^{166}Tm Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
1208.7+x[h] *10*	(10$^-$)	
1268.615[d] *25*	12$^-$	
1279.678[b] *20*	12$^+$	
1299.527+x[f] *14*	14$^-$	
1313.51+z[o] *6*		E(level): not adopted; In Adopted Levels, Gammas, a 455.6γ deexcites this band member.
1350.36+x[k] *4*		
1368.11[a] *5*	13$^+$	
1419.75+y[l] *7*	(12$^-$)	
1433.80[c] *3*	13$^+$	
1528.157+x[g] *17*	15$^-$	
1576.64+z[n] *12*		E(level): not adopted. See comment on 478.99γ.
1599.63+x[j] *6*	14$^+$	
1610.03[&] *3*	14$^+$	
1612.07[e] *16*	13$^-$	E(level): not adopted; the 481.6γ deexciting level here is placed elsewhere In Adopted Levels, Gammas.
1669.39+y[m] *7*	(13$^-$)	
1722.63[b] *8*	14$^+$	
1770.17+x[f] *4*	16$^-$	
1774.59[d] *14*	14$^-$	
1836.50+x[k] *6*	15$^+$	
1865.88[a] *6*	15$^+$	
1908.46[c] *5*	15$^+$	
2038.33+x[g] *13*	17$^-$	
2110.1+x[j] *4*	16$^+$	E(level): not adopted. In Adopted Levels, Gammas, a 532.3γ feeds the 1600+x level, not the 510.5 multiply-placed γ suggested In 1995Ma07.
2120.5[&] *4*	16$^+$	
2307.61+x[f] *11*	18$^-$	
2381.17+x[k] *9*	17$^+$	
2450.9[a] *10*	17$^+$	E(level): not adopted. In Adopted Levels, Gammas, a 557.4γ feeds the 1866 level, not the 585.0γ suggested In 1995Ma07.
2463.72[c] *10*	17$^+$	
2614.09+x[g] *19*	19$^-$	
2725.7?[&] *11*	18$^+$	E(level): not adopted. In Adopted Levels, Gammas, a 569.7γ feeds the 2121 level, not the 605.2γ suggested In 1995Ma07.
2906.4+x[f] *8*	20$^-$	

[†] From least-squares fit to Eγ.

[‡] Authors′ values based on deduced band structure and transition multipolarities.

[#] Band(A): K$^{\pi}$=6$^-$, α=0 (π 7/2[404])+(ν 5/2[523]) band. 1995Ma07 assigned only the bandhead but a number of unplaced transitions associated with this band were placed by the evaluator In accord with Adopted Levels, Gammas.

[@] Band(a): K$^{\pi}$=6$^-$, α=1 (π 7/2[404])+(ν 5/2[523]) band. See comment on signature partner of this band.

[&] Band(B): K$^{\pi}$=2$^+$, α=0 (π 1/2[411])-(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here.

[a] Band(b): K$^{\pi}$=2$^+$, α=1 (π 1/2[411])-(ν 5/2[642]) band. See comment on signature partner of this band.

[b] Band(C): K$^{\pi}$=3$^+$, α=0 (π 1/2[411])+(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here and π is opposite. The configuration proposed In 1995Ma07 also differs from the adopted K$^{\pi}$=3$^-$ configuration=(π 1/2[541])+(ν 5/2[642]).

[c] Band(c): K$^{\pi}$=3$^+$, α=1 (π 1/2[411])+(ν 5/2[642]) band. See comment on signature partner of this band.

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

^{166}Tm Levels (continued)

[d] Band(D): K$^{\pi}$=3^{-}, α=0 (π 1/2[411])+(ν 5/2[523]) band. Note that adopted J values are one unit higher than shown here and π is opposite. The configuration proposed In 1995Ma07 also differs from the adopted K$^{\pi}$=3^{+} configuration=(π 1/2[541])+(ν 5/2[523]).
[e] Band(d): K$^{\pi}$=3^{-}, α=1 (π 1/2[411])+(ν 5/2[523]) band. See comment on signature partner of this band.
[f] Band(E): K$^{\pi}$=6^{-}, α=0 (π 7/2[523])+(ν 5/2[642]) band.
[g] Band(e): K$^{\pi}$=6^{-}, α=1 (π 7/2[523])+(ν 5/2[642]) band.
[h] Band(F): K$^{\pi}$=5^{-}, α=0 (π 7/2[404])+(ν 3/2[521]) band. Note that adopted J values are two units higher than shown here and π is opposite. The configuration proposed In 1995Ma07 also differs from the adopted K$^{\pi}$=6^{+} configuration=(π 7/2[523])+(ν 5/2[523]).
[i] Band(f): K$^{\pi}$=5^{-}, α=1 (π 7/2[404])+(ν 3/2[521]) band. See comment on signature partner of this band.
[j] Band(G): K$^{\pi}$=6^{+}, α=0 (π 7/2[404])+(ν 5/2[642]) band. Note that adopted J values are one unit higher than shown here.
[k] Band(g): K$^{\pi}$=6^{+}, α=1 (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner of this band.
[l] Band(H): K$^{\pi}$=4^{-}, α=0 (π 7/2[404])+(ν 1/2[521]) band. Note that adopted J values are three units higher than shown here. The configuration proposed In 1995Ma07 also differs. From the adopted K$^{\pi}$=1^{-} configuration=(π 7/2[523])-(ν 5/2[642]).
[m] Band(h): K$^{\pi}$=4^{-}, α=1 (π 7/2[404])+(ν 1/2[521]) band. See comment on signature partner of this band.
[n] Band(I): Band #1.
[o] Band(J): Band #2.
[p] Band(K): possible band fragment.

γ(^{166}Tm)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
(v)		0.0+v		0.0	2^{+}		
(x)		109.338+x	6^{-}	109.338			E_γ: x<25 keV (1995Ma07). however, see comment on 109.338 level.
34.418[@] *1*	130 *50*	109.338		74.920			
39.867 *2*	26 *6*	149.2083+x	5^{-},6^{-},7^{-}	109.338+x	6^{-}		placed from 211+x level In Adopted Levels, Gammas.
53.71		341.836	7^{+}	288.124	6^{-}		
56.532 *2*	29 *5*	287.585+x	7^{-}	231.0523+x	6^{-}		
57[d]		131.736	4^{-}	74.903	4^{+}		
[x]57.5							
59.488[@] *2*	50 *3*	231.0523+x	6^{-}	171.5647+x	7^{+}	E1	Mult.: α(L)exp<0.5 (1995Ma07).
62.225 *2*	62 *15*	171.5647+x	7^{+}	109.338+x	6^{-}	E1	Mult.: α(L)exp=0.18 *2*, α(M+...)exp<0.1 (1995Ma07).
62.231 *2*	67 *17*	211.4407+x	6^{+}	149.2083+x	5^{-},6^{-},7^{-}	E1	Mult.: from α(L)exp<0.3 (1995Ma07).
74.45 *3*	3.94 *25*	226.569	6^{+}	152.100	5^{+}		
74.903[&] *11*	11.0[&] *21*	74.903	4^{+}	0.0	2^{+}	E2	Mult.: α(L)exp=5.6 *15* (1995Ma07).
74.920[@&] *3*	23.5[&] *25*	74.920		0.0	2^{+}	E2	Mult.: α(L)exp=5.7 *4*, α(N+...)exp=0.45 *6* (1995Ma07). transition has both prompt and delayed components.
75.793 *4*	8.32 *24*	207.536	5^{-}	131.736	4^{-}		
77.195 *2*	13.4 *3*	152.100	5^{+}	74.903	4^{+}	D+Q	Mult.: A_2=−0.41 *3*.
79.888 *9*	11.2 *4*	367.484+x	8^{-}	287.585+x	7^{-}		
80.584 *4*	7.5 *15*	288.124	6^{-}	207.536	5^{-}		L/M+=4.07 *12* for 80.6γ+80.7γ (1995Ma07).
80.682 *3*	4.6 *9*	605.300	9^{+}	524.616	8^{-}		Mult.: L/M+=4.07 *12* for 80.6γ+80.7γ (1995Ma07).
82.298 *8*	4.50 *20*	82.298+v	1^{+}	0.0+v			
85.973 *20*	4.74 *19*	85.973+y	(4^{-})	0.0+y			

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ[#]	Comments
86.696 *9*	20.5 *4*	298.125+x	7+	211.4407+x	6+	M1+E2	+0.32 *2*	Mult.: α(L)exp=0.44 *20*, α(M+...)exp=0.24 *10*, A_2=+0.20 *2* (1995Ma07).
86.918 *4*	5.65 *30*	207.212+z		120.294+z	5			the evaluator has reversed the order of the 86.9γ and 120.29γ In order to achieve consistency with Adopted Levels, Gammas.
96.23 *4*	1.29 *15*	946.232	11+	850.022	10−			
98.10[b] *5*	7.0[b] *10*	184.07+y	(5−)	85.973+y	(4−)			
98.10[bd] *5*	7.0[b] *10*	131.736	4−	33.620	3+			
98.10[b] *5*	7.0[b] *10*	207.536	5−	109.338				
100.939 *3*	4.18 *19*	524.616	8−	423.678	7−			
101.657 *3*	27.4 *5*	469.140+x	9−	367.484+x	8−	M1+E2	+0.20 *1*	Mult.: A_2=+0.09 *1* (1995Ma07).
101.929 *5*	1.77 *3*	736.302	9+	634.371	8+			
102.102 *2*	16.4 *3*	211.4407+x	6+	109.338+x	6−	D		Mult.: A_2=−0.25 *8* (1995Ma07).
115.269 *2*	16.6 *7*	341.836	7+	226.569	6+			
116.3[d]		850.022	10−	733.680	9−			
118.284 *4*	7.6 *8*	302.36+y	(6−)	184.07+y	(5−)			
118.4[d]		460.244	8+	341.836	7+			
118.480 *4*	24.3 *23*	152.100	5+	33.620	3+	E2		Mult.: α(L)exp=0.91 *23*; α(M+...)exp=0.22 *6* (1995Ma07).
119.324 *3*	24.8 *4*	417.448+x	8+	298.125+x	7+	M1+E2	+0.44 *1*	Mult.: A_2=+0.37 *3*, A_4=+0.07 *4* (1995Ma07).
120.294 *5*	5.54 *16*	120.294+z	5	0.0+z				the evaluator has reversed the order of the 86.9γ and 120.29γ In order to achieve consistency with Adopted Levels, Gammas.
121.710[@] *5*	16.9 *3*	231.0523+x	6−	109.338+x	6−	M1		Mult.: K/L=6.7 *15*; L/M+=4.1 *8*; α(L)exp=0.28 *9* (1995Ma07).
122.809 *4*	6.83 *16*	334.250+x	(5−)	211.4407+x	6+			placed here As a γ linking to a different band; however, In Adopted Levels, Gammas, this is an intraband transition.
123.416 *6*	34.8 *5*	592.556+x	10−	469.140+x	9−	M1+E2	+0.22 *1*	Mult.: A_2=+0.08 *3* (1995Ma07).
126.577 *4*	2.79 *23*	634.371	8+	507.792	7+			
127.030 *4*	2.5 *3*	1042.994	11+	915.964	10+			
128.645 *7*	3.05 *18*	496.855+z		368.208+z				
129.588 *6*	1.76 *5*	207.212+z		77.624+z				
131.215 *4*	6.5 *4*	433.57+y	(7−)	302.36+y	(6−)			
132.636 *4*	7.36 *21*	207.536	5−	74.903	4+			
135.554 *3*	11.8 *3*	423.678	7−	288.124	6−	D+Q		Mult.: A_2=−0.642 *22* (1995Ma07).
136.022 *3*	12.05 *25*	288.124	6−	152.100	5+	D+Q		Mult.: A_2=−0.36 *6* (1995Ma07).
136.445 *9*	1.02 *22*	367.484+x	8−	231.0523+x	6−			
140.641 *12*	7.4 *7*	474.890+x	(6−)	334.250+x	(5−)			
145.061[c] *3*	30[c] *6*	737.614+x	11−	592.556+x	10−			
145.061[c] *3*	10[c] *3*	605.300	9+	460.244	8+			
145.805 *4*	6.6 *7*	353.017+z		207.212+z				
145.939 *3*	15.4 *7*	563.386+x	9+	417.448+x	8+	M1+E2	+0.47 *2*	Mult.: α(K)exp=0.43 *20* (1995Ma07); A_2=+0.41 *3*, A_4=+0.09 *4* (1992Dr03). A_4=+0.09 *40* In 1995Ma07 is presumably a misprint.
147.656 *7*	10.6 *3*	256.997+x	7−	109.338+x	6−	D+Q		Mult.: A_2=+0.47 *7*, A_4=+0.08 *9* (1995Ma07). placement from 1996Dr07.

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult. ‡	δ #	Comments
151.666 *1*	100.0 *8*	226.569	6+	74.903	4+	E2		Mult.: A_2=+0.316 *18*, A_4=−0.036 *25* (1995Ma07).
154.18 *4*	2.63 *25*	1433.80	13+	1279.678	12+			
156.409 *7*	5.00 *4*	288.124	6−	131.736	4−			Mult.: A_2=+0.70 *21* (1995Ma07).
158.148 *14*	8.8 *9*	591.72+y	(8−)	433.57+y	(7−)	D+Q		Mult.: A_2=−0.16 *5*, A_4=+0.10 *7* (1995Ma07).
158.329 *15*	6.2 *9*	633.206+x	(7−)	474.890+x	(6−)	D+Q		Mult.: A_2=+0.14 *8*, A_4=−0.18 *11* (1995Ma07).
160.998 *15*	6.8 *3*	368.208+z		207.212+z				
166.819 *7*	24.3 *7*	904.430+x	12−	737.614+x	11−	M1+E2	+0.25 *1*	Mult.: A_2=+0.14 *2*, A_4=+0.13 *2* (1995Ma07).
167.180 *5*	7.4 *3*	424.178+x	8−	256.997+x	7−	(D+Q)		Mult.: A_2=+0.29 *5*, A_4=−0.10 *6* (1995Ma07). placement from 1996Dr07.
167.4		772.725	10+	605.300	9+			
168.609 *5*	7.39 *23*	760.33+y	(9−)	591.72+y	(8−)	D+Q		Mult.: A_2=−0.139 *22*, A_4=+0.04 *3* (1995Ma07).
169.841 *5*	7.0 *4*	733.228+x	10+	563.386+x	9+	M1+E2	+0.66 *19*	Mult.: A_2=+0.62 *15*, A_4=+0.18 *17* (1995Ma07).
173.46 *8*	2.3 *3*	946.232	11+	772.725	10+			
175.514 *9*	4.8 *3*	808.715+x	(8−)	633.206+x	(7−)			
179.664 *7*	3.35 *26*	915.964	10+	736.302	9+			
181.552 *9*	4.5 *5*	469.140+x	9−	287.585+x	7−	E2		Mult.: A_2=+0.27 *11*, A_4=+0.04 *15* (1995Ma07).
182.775 *8*	2.58 *10*	524.616	8−	341.836	7+	D+Q		A_2=−0.47 *3* (1995Ma07).
184.4 *2*		415.45+x		231.0523+x	6−	E2		Mult.: α(K)exp=0.21 *8* (1995Ma07).
185.441 *9*	5.8 *4*	609.621+x	9−	424.178+x	8−			Mult.: A_2=+0.36 *16* (1995Ma07). placement from 1996Dr07.
187.482 *6*	4.4 *8*	684.337+z		496.855+z				
187.796 *5*	18.6 *7*	1092.228+x	13−	904.430+x	12−	M1+E2	+0.44 *4*	Mult.: A_2=+0.32 *8* (1995Ma07).
188.925 *8*	6.3 *4*	922.170+x	11+	733.228+x	10+	M1+E2	+0.63 *14*	Mult.: A_2=+0.58 *16*, A_4=+0.30 *21* (1995Ma07).
189.733 *3*	54.4 *6*	341.836	7+	152.100	5+	E2		Mult.: A_2=+0.314 *14*, A_4=−0.046 *19* (1995Ma07).
192.023 *11*	4.0 *5*	1000.738+x	(9−)	808.715+x	(8−)			
192.8 *2*	2.0 *5*	1042.994	11+	850.022	10−			
194.032 *7*	5.0 *3*	194.032+u		0.0+u		D+Q		Mult.: A_2=−0.67 *13*, A_4=+0.23 *18* (1995Ma07).
202.649 *8*	10.5 *3*	962.98+y	(10−)	760.33+y	(9−)			
203.894 *12*	2.4 *3*	700.755+z		496.855+z				
206.004 *5*	17.5 *4*	417.448+x	8+	211.4407+x	6+	E2		Mult.: A_2=+0.22 *2*, A_4=−0.01 *2* (1995Ma07).
207.20 *4*	4.5 *8*	207.212+z		0.0+z				
207.295 *5*	14.4 *11*	1299.527+x	14−	1092.228+x	13−	D+Q	+0.17 *1*	Mult.: A_2=+0.07 *2*, A_4=+0.174 *3* (1995Ma07).
208.0		1208.7+x	(10−)	1000.738+x	(9−)			
208.659 *15*	5.8 *3*	1171.64+y	(11−)	962.98+y	(10−)			
209.081 *13*	7.2 *6*	733.680	9−	524.616	8−	D+Q		Mult.: A_2=−0.46 *8* (1995Ma07).
210.177 *3*	4.4 *4*	1132.348+x	12+	922.170+x	11+			
210.7[d]		634.371	8+	423.644	6+			
210.893 *25*	9.1 *3*	1157.129	12+	946.232	11+			
211.671 *26*	5.36 *25*	736.302	9+	524.616	8−			
215.056 *21*	3.68 *12*	409.088+u		194.032+u				
216.139 *12*	12.3 *3*	423.678	7−	207.536	5−	E2		Mult.: A_2=+0.33 *6*, A_4=−0.10 *10* (1995Ma07).
218	1.8 *4*	1350.36+x		1132.348+x	12+			

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
[x]219.41 *4*	3.9 *4*						
225.056 *17*	10.2 *4*	592.556+x	10$^-$	367.484+x	8$^-$	E2	Mult.: A_2=+0.31 *4*, A_4=−0.04 *6* (1995Ma07).
228.533 *15*	12.0 *10*	736.302	9$^+$	507.792	7$^+$		
228.622 *10*	13.0 *10*	1528.157+x	15$^-$	1299.527+x	14$^-$	(D+Q)	Mult.: A_2=+0.23 *2*, A_4=−0.01 *3* (1992Dr03).
233.675 *5*	95.4 *15*	460.244	8$^+$	226.569	6$^+$	E2	Mult.: A_2=+0.326 *13*, A_4=−0.054 *18* (1995Ma07).
236.484 *10*	19.4 *8*	524.616	8$^-$	288.124	6$^-$		
236.688 *15*	4.58 *21*	1279.678	12$^+$	1042.994	11$^+$		
242.05 *4*	7.5 *3*	1770.17+x	16$^-$	1528.157+x	15$^-$		
244.718 *7*	13.2 *8*	850.022	10$^-$	605.300	9$^+$	E1+M2	Mult.: α(K)exp<0.065 (1995Ma07); A_2=−0.73 *3* (1995Ma07).
248.08 *3*	6.0 *10*	1419.75+y	(12$^-$)	1171.64+y	(11$^-$)	D+Q	Mult.: A_2=+0.08 *4*, A_4=−0.03 *5* (1995Ma07).
249.52[c] *7*	3.0[c] *10*	433.57+y	(7$^-$)	184.07+y	(5$^-$)		
249.52[c] *7*	1.0[c] *5*	1599.63+x	14$^+$	1350.36+x			
249.52[c] *7*	2.5[c] *10*	1669.39+y	(13$^-$)	1419.75+y	(12$^-$)		
251.5[d]		353.017+z		101.5+z			
263.466 *6*	57.5 *6*	605.300	9$^+$	341.836	7$^+$	E2	Mult.: A_2=+0.326 *12*, A_4=−0.054 *16* (1995Ma07).
265.263 *11*	35.6 *3*	563.386+x	9$^+$	298.125+x	7$^+$	E2	Mult.: A_2=+0.34 *2*, A_4=−0.06 *2* (1995Ma07).
268.479 *10*	15.4 *10*	737.614+x	11$^-$	469.140+x	9$^-$	E2	Mult.: A_2=+0.28 *2*, A_4=−0.04 *3* (1995Ma07).
268.5 *5*	4.0 *10*	2038.33+x	17$^-$	1770.17+x	16$^-$		
269.32 *9*	1.8 *4*	2307.61+x	18$^-$	2038.33+x	17$^-$		
270.30 *4*	6.3 *5*	1042.994	11$^+$	772.725	10$^+$		
271.543 *19*	4.1 *5*	423.644	6$^+$	152.100	5$^+$		
276.058 *13*	16.8 *3*	736.302	9$^+$	460.244	8$^+$	D	Mult.: A_2=−0.24 *3*.
276.6		1433.80	13$^+$	1157.129	12$^+$		
280.446 *8*	6.2 *10*	1130.469	11$^-$	850.022	10$^-$		
281.228 *16*	22.0 *20*	507.792	7$^+$	226.569	6$^+$	D+Q	Mult.: A_2=−0.19 *6* (1995Ma07).
281.597 *13*	8.5 *10*	915.964	10$^+$	634.371	8$^+$	E2	Mult.: A_2=+0.32 *15*, A_4=−0.08 *20* (1995Ma07).
288.9		1722.63	14$^+$	1433.80	13$^+$		
289.36 *7*	6.0 *6*	591.72+y	(8$^-$)	302.36+y	(6$^-$)		
289.61 *5*	5.5 *6*	496.855+z		207.212+z			
292.534 *14*	17.9 *4*	634.371	8$^+$	341.836	7$^+$	D+Q	Mult.: A_2=−0.109 *26* (1995Ma07).
[x]294.379 *22*	10.4 *4*						A_2=+0.28 *7*, A_4=+0.14 *9* (1995Ma07).
298.89 *9*	4.0 *12*	633.206+x	(7$^-$)	334.250+x	(5$^-$)	(E2)	Mult.: A_2=+0.27 *4*, A_4=+0.08 *6* (1995Ma07).
306.5 *5*	<0.7	2614.09+x	19$^-$	2307.61+x	18$^-$		
306.685 *9*	20.6 *4*	1042.994	11$^+$	736.302	9$^+$	E2	Mult.: A_2=+0.31 *4*, A_4=−0.06 *5* (1995Ma07).
309.977 *16*	14.3 *4*	733.680	9$^-$	423.678	7$^-$	E2	Mult.: A_2=+0.353 *16*, A_4=−0.11 *3* (1995Ma07).
310.662 *19*	11.9 *7*	915.964	10$^+$	605.300	9$^+$	D	Mult.: A_2=−0.25 *5* (1995Ma07).
311.855 *19*	21.0 *6*	904.430+x	12$^-$	592.556+x	10$^-$	E2	Mult.: A_2=+0.20 *7*, A_4=−0.06 *8* (1995Ma07).
312.484 *12*	50.9 *9*	772.725	10$^+$	460.244	8$^+$	E2	Mult.: A_2=+0.363 *19*, A_4=−0.063 *26* (1995Ma07).
314.87 *4*		424.178+x	8$^-$	109.338+x	6$^-$		E_γ: from (α,3nγ) experiment of 1995Ma07, but data reported only In conjunction with data from a different reaction In 1996Dr07. Placement from 1996Dr07.
315.735 *17*	33.5 *12*	733.228+x	10$^+$	417.448+x	8$^+$	E2	Mult.: A_2=+0.32 *2*, A_4=0.00 *3* (1995Ma07).
322.27 *7*	3.4 *4*	1268.615	12$^-$	946.232	11$^+$	D+Q	Mult.: A_2=−0.73 *16* (1995Ma07).
325.423 *12*	22.5 *3*	850.022	10$^-$	524.616	8$^-$	E2	Mult.: A_2=+0.325 *27*, A_4=−0.06 *4* (1995Ma07).
326.89 *8*	5.4 *9*	760.33+y	(9$^-$)	433.57+y	(7$^-$)	E2	Mult.: A_2=+0.16 *7*, A_4=−0.12 *10* (1995Ma07).
331.323 *21*	11.7 *5*	684.337+z		353.017+z		E2	Mult.: A_2=+0.33 *4*, A_4=−0.03 *5* (1995Ma07).
332.58 *3*	11.4 *4*	700.755+z		368.208+z		E2	Mult.: A_2=+0.290 *16*, A_4=−0.113 *21* (1995Ma07).
333.5		1279.678	12$^+$	946.232	11$^+$		
333.78 *3*	6.4 *7*	808.715+x	(8$^-$)	474.890+x	(6$^-$)		

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
340.928 *10*	43.0 *4*	946.232	11^+	605.300	9^+	E2	Mult.: A_2=+0.314 *25*, A_4=−0.07 *3* (1995Ma07).
352.66 *4*		609.621+x	9^-	256.997+x	7^-		E_γ: from (α,3nγ) experiment of 1995Ma07 but data reported only In conjunction with data from a different experiment In 1996Dr07. Placement from 1996Dr07.
354.5		1722.63	14^+	1368.11	13^+		
354.61 *6*	21.9 *16*	1092.228+x	13^-	737.614+x	11^-	E2	Mult.: A_2=+0.32 *2*, A_4=−0.07 *2* (1995Ma07).
358.80 *1*	34.5 *8*	922.170+x	11^+	563.386+x	9^+	E2	Mult.: A_2=+0.324 *21*, A_4=−0.07 *3* (1995Ma07).
363.76 *5*	9.5 *4*	1279.678	12^+	915.964	10^+	E2	Mult.: A_2=+0.21 *3*, A_4=−0.09 *5* (1995Ma07).
367.52 *5*	6.4 *3*	1000.738+x	(9^-)	633.206+x	(7^-)	E2	Mult.: A_2=+0.47 *8*, A_4=−0.24 *9* (1995Ma07).
371.2		962.98+y	(10^-)	591.72+y	(8^-)		
378.22 *5*	9.8 *3*	875.08+z		496.855+z		E2	Mult.: A_2=+0.297 *24*, A_4=−0.12 *3* (1995Ma07).
384.406 *21*	27.7 *4*	1157.129	12^+	772.725	10^+	E2	Mult.: A_2=+0.287 *18*, A_4=−0.032 *24* (1995Ma07).
390.77 *3*	18.2 *5*	1433.80	13^+	1042.994	11^+	E2	Mult.: A_2=+0.352 *26*, A_4=−0.08 *4* (1995Ma07).
395.12 *2*	20.9 *7*	1299.527+x	14^-	904.430+x	12^-	E2	Mult.: A_2=+0.28 *2*, A_4=−0.07 *2* (1995Ma07).
396.79 *4*	12.0 *10*	1130.469	11^-	733.680	9^-	E2	Mult.: A_2=+0.27 *8*, A_4=−0.11 *10* (1995Ma07).
399.16 *2*	25.8 *9*	1132.348+x	12^+	733.228+x	10^+	E2	Mult.: A_2=+0.31 *2*, A_4=−0.06 *2* (1995Ma07).
404.14 *3*	4.3 *4*	1350.36+x					
411.21 *11*	2.6 *3*	1171.64+y	(11^-)	760.33+y	(9^-)	Q	Mult.: A_2=+0.37 *13*, A_4=+0.08 *13* (1995Ma07).
413.31 *3*	9.9 *8*	1097.65+z		684.337+z		E2	Mult.: A_2=+0.37 *3*, A_4=−0.04 *5* (1995Ma07).
418.603 *22*	15.5 *4*	1268.615	12^-	850.022	10^-	Q	Mult.: A_2=+0.347 *26*, A_4=−0.07 *4* (1995Ma07).
421.88 *4*	18.5 *21*	1368.11	13^+	946.232	11^+	Q	Mult.: A_2=+0.34 *4*, A_4=−0.19 *8* (1995Ma07).
428.19 *4*	21.1 *8*	1350.36+x		922.170+x	11^+	Q	Mult.: A_2=+0.37 *1*, A_4=−0.08 *2* (1995Ma07).
435.97 *2*	21.0 *10*	1528.157+x	15^-	1092.228+x	13^-	Q	Mult.: A_2=+0.23 *2*, A_4=−0.12 *3* (1995Ma07).
438.43 *3*	6.4 *6*	1313.51+z		875.08+z			placement not ADOPTED.
442.95 *7*	6.5 *10*	1722.63	14^+	1279.678	12^+	Q	Mult.: A_2=+0.40 *4*, A_4=−0.02 *6* (1995Ma07).
448.56 *6*	4.1 *4*	642.59+u		194.032+u			
452.904 *22*	13.5 *4*	1610.03	14^+	1157.129	12^+	Q	Mult.: A_2=+0.34 *6*, A_4=−0.19 *9* (1995Ma07).
456.91 *16*	1.5 *4*	1419.75+y	(12^-)	962.98+y	(10^-)		
467.28 *6*	13.2 *8*	1599.63+x	14^+	1132.348+x	12^+	Q	Mult.: A_2=+0.37 *5*, A_4=−0.04 *7* (1995Ma07).
470.60 *4*	10.7 *8*	1770.17+x	16^-	1299.527+x	14^-	Q	Mult.: A_2=+0.45 *19*, A_4=−0.2 *2* (1995Ma07).
474.66 *3*	11.0 *20*	1908.46	15^+	1433.80	13^+	Q	Mult.: A_2=+0.37 *12*, A_4=−0.10 *16* (1995Ma07).
478.99[a] *11*	8.6 *10*	1576.64+z		1097.65+z			
481.60 *16*	4.7 *6*	1612.07	13^-	1130.469	11^-		
[x]486.1							
486.14 *4*	15.8 *4*	1836.50+x	15^+	1350.36+x		Q	Mult.: A_2=+0.30 *6*, A_4=−0.03 *8* (1995Ma07).
497.77[c] *3*	1.0[c] *5*	1669.39+y	(13^-)	1171.64+y	(11^-)		
497.77[c] *3*	10.0[c] *15*	1865.88	15^+	1368.11	13^+		
505.97 *13*	6.9 *8*	1774.59	14^-	1268.615	12^-		
510.5 *3*	18 *4*	2038.33+x	17^-	1528.157+x	15^-		
510.5[c] *4*	7.5[c] *25*	2110.1+x	16^+	1599.63+x	14^+		placement not adopted; see comment on 2110+x level.
510.5[c] *4*	8.5[c] *15*	2120.5	16^+	1610.03	14^+		
537.38 *11*	3.8 *6*	2307.61+x	18^-	1770.17+x	16^-		
544.67 *6*	8.1 *4*	2381.17+x	17^+	1836.50+x	15^+	Q	Mult.: A_2=+0.34 *7*, A_4=−0.06 *9* (1992Dr03).
555.26 *9*	5.6 *6*	2463.72	17^+	1908.46	15^+		
575.76 *14*	4.1 *4*	2614.09+x	19^-	2038.33+x	17^-		
585.0		2450.9	17^+	1865.88	15^+		placement not adopted; see comment on 2451 level.
598.8 *8*	<0.5	2906.4+x	20^-	2307.61+x	18^-		
605.2[d]		2725.7?	18^+	2120.5	16^+		placement not adopted; see comment on 2726 level.

Continued on next page (footnotes at end of table)

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)

γ(^{166}Tm) (continued)

[†] From 1995Ma07; many of these data were already reported In 1992Dr03. Eγ data for the six transitions measured by 1988Pe08 using a curved-crystal spectrometer are In excellent agreement.

[‡] From ce data of 1995Ma07, when available; otherwise, from $\gamma(\theta)$ data. 1995Ma07 normalized photon and electron intensity scales using unspecified transitions of known multipolarity from other reaction channels or from ^{166}Tm decay. $\gamma(\theta)$ data combined with 15 ns FWHM for $\gamma\gamma$ coin have been used by the evaluator to rule out $\Delta\pi$=yes for a number of transitions, based on RUL.

[#] From authors′ analysis of $\gamma(\theta)$ (1992Dr03), except As noted.

[@] Delayed transition (1995Ma07).

[&] 1995Ma07 report a close doublet In their curved-crystal spectrometer data; Eγ=74.920 *3*, Iγ=23.5 *25* and Eγ=74.903 *11*, Iγ=11.021, the former being the isomeric transition.

[a] Placement not adopted. In Adopted Levels, Gammas, Eγ=478.3 *3* is placed In the signature partner of the band suggested here and an interband Eγ=479.1 *1* feeds the 875+Z level. however, No other evidence exists for excitation of the signature partner band In (α,3nγ) and the intraband 461.9γ expected to accompany the interband 479γ is absent In (α,3nγ).

[b] Multiply placed with undivided intensity.

[c] Multiply placed with intensity suitably divided.

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

[x] γ ray not placed in level scheme.

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

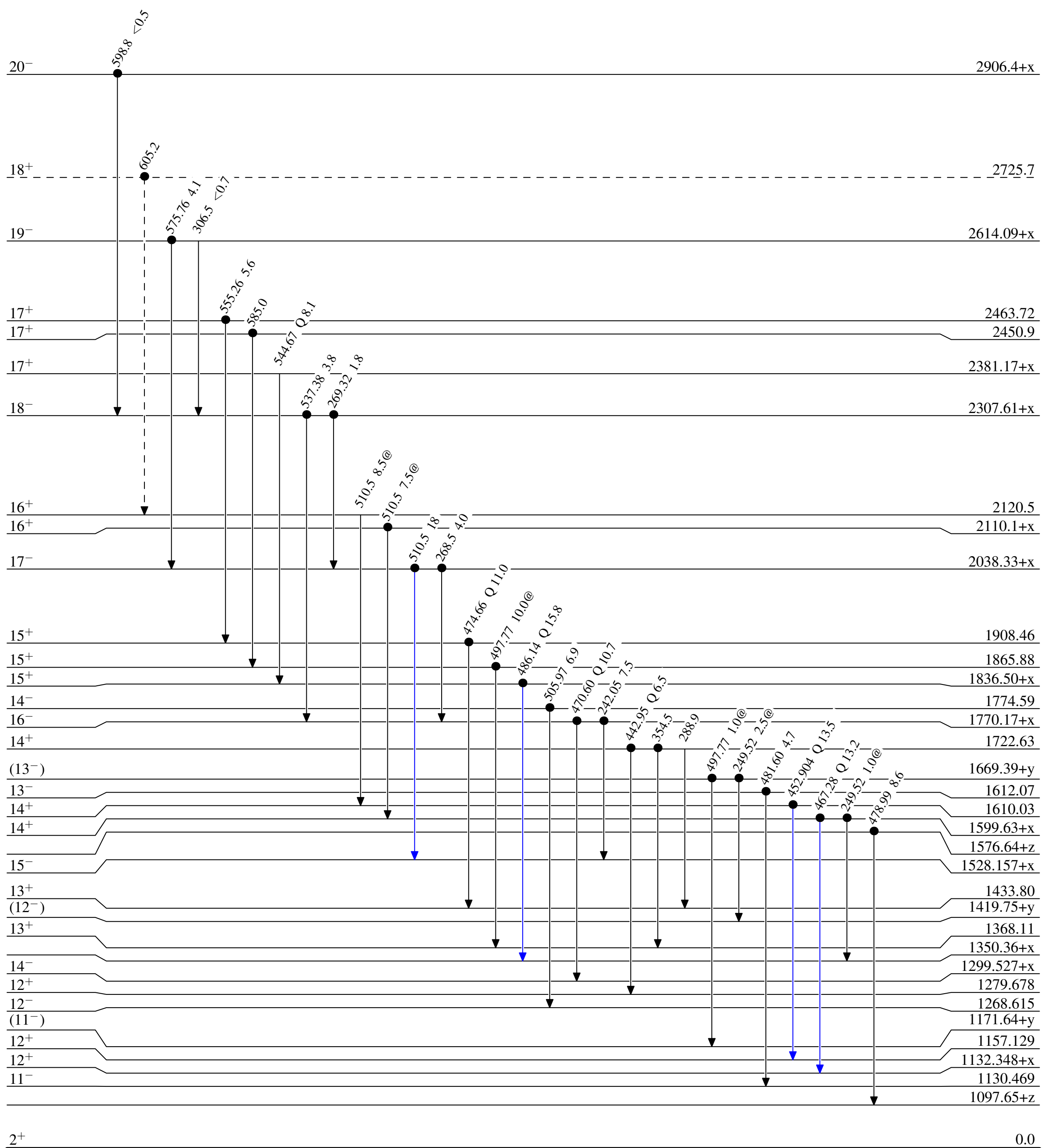
$I_\gamma < 2\% \times I_\gamma^{max}$

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

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

γ Decay (Uncertain)

Coincidence



$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

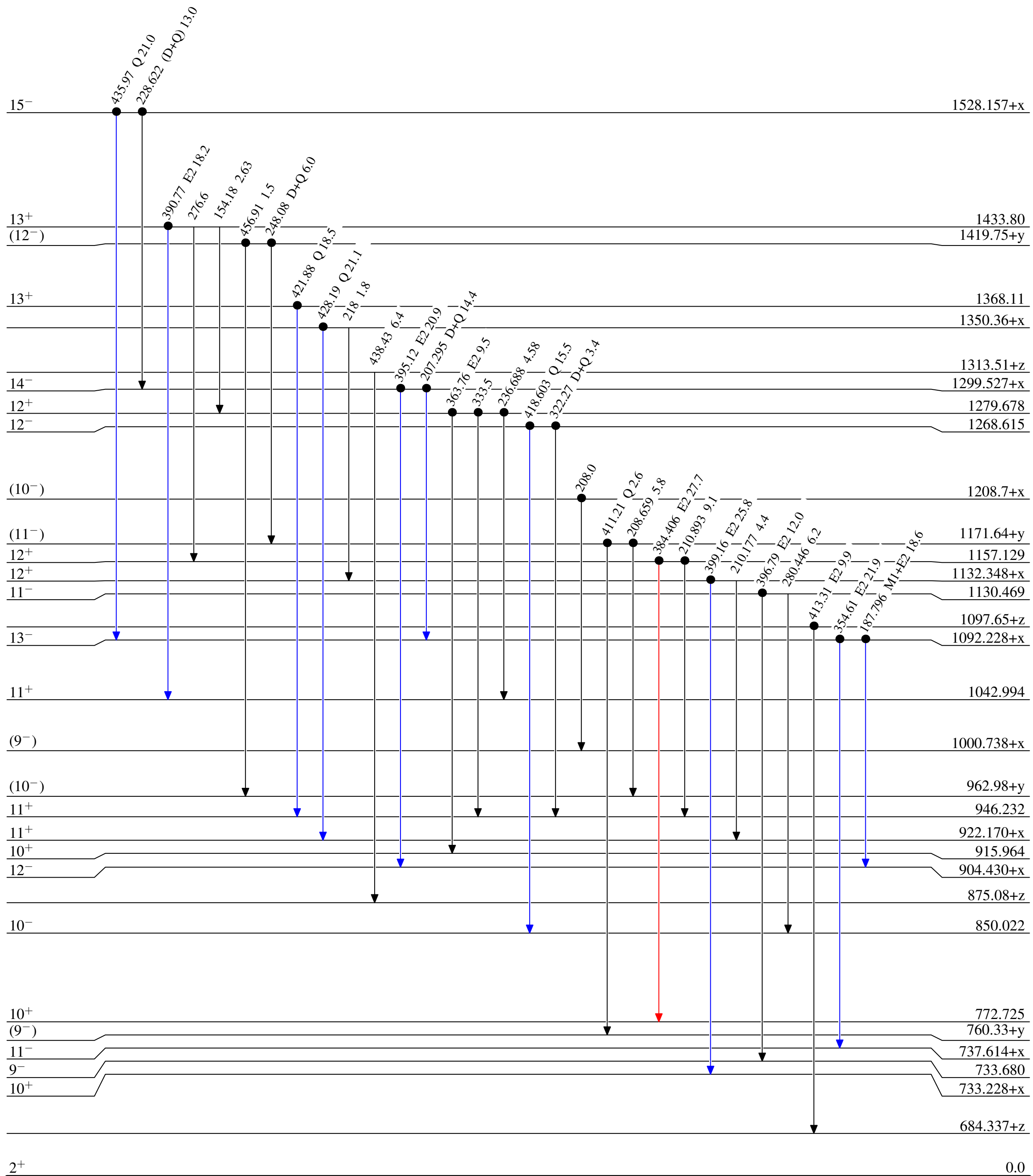
Legend

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

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

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

Coincidence



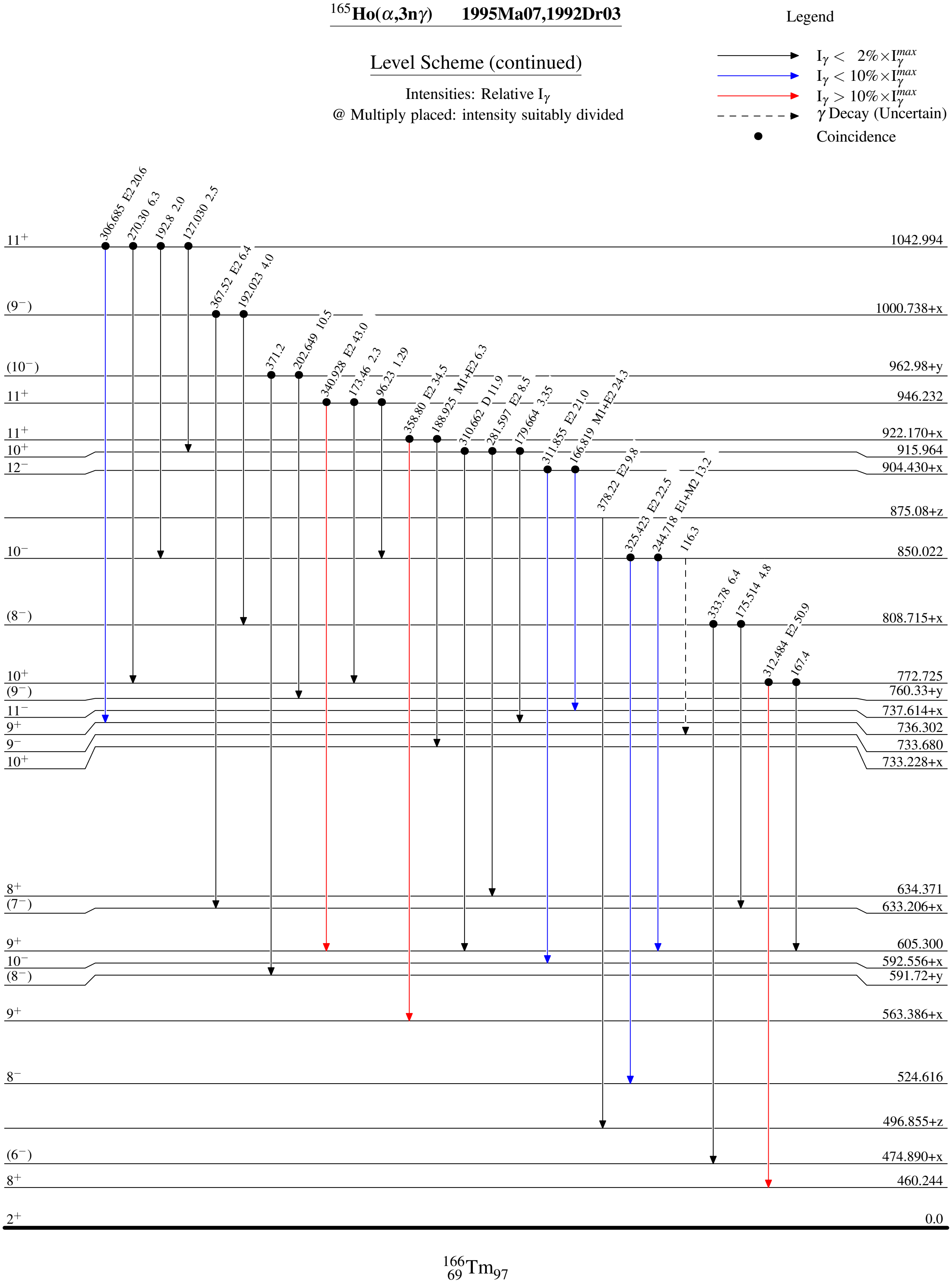
$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



^{165}Ho(α,3nγ) **1995Ma07,1992Dr03**

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

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

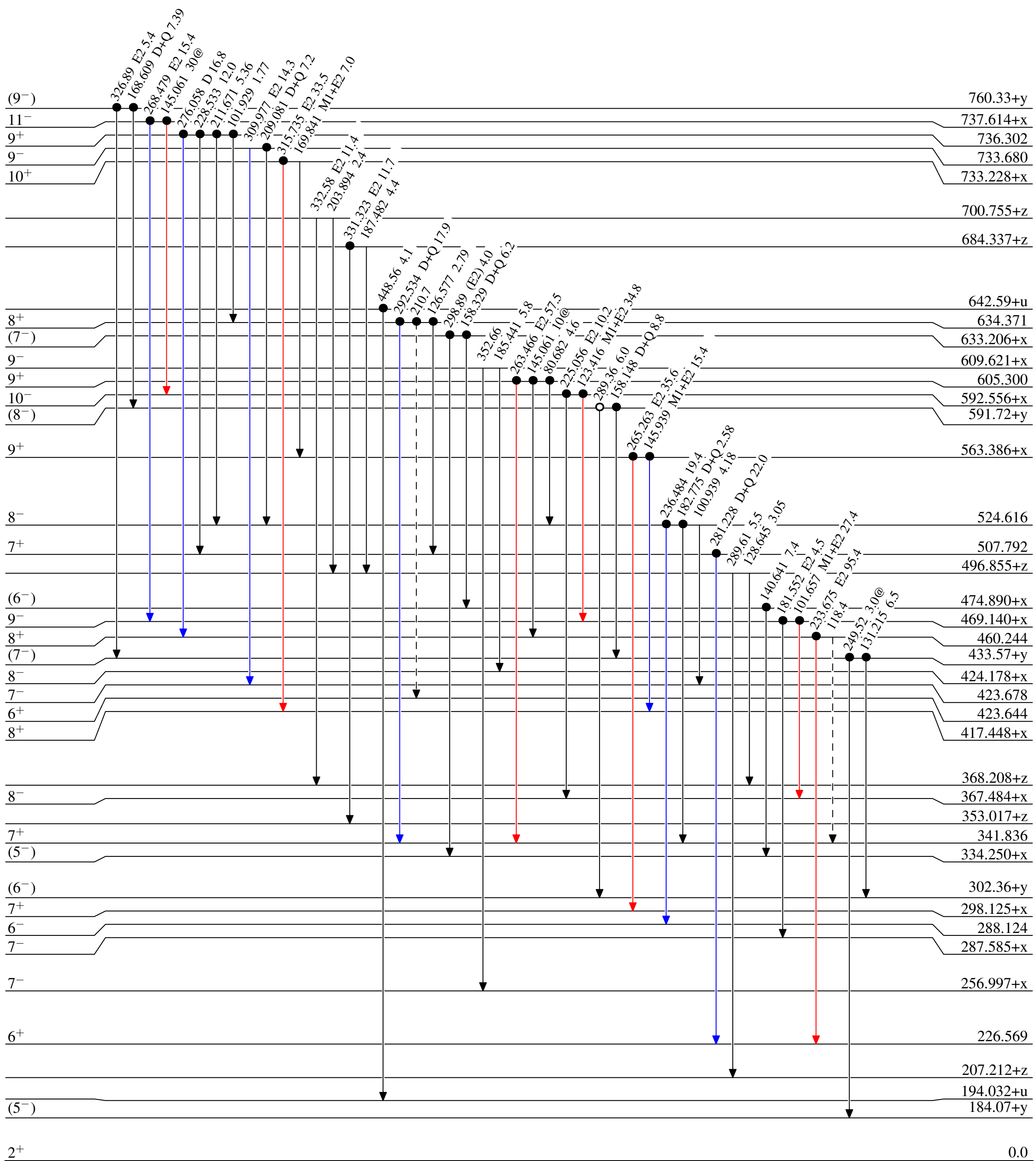
$I_\gamma < 10\% \times I_\gamma^{max}$

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

γ Decay (Uncertain)

Coincidence

Coincidence (Uncertain)



$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Level Scheme (continued)

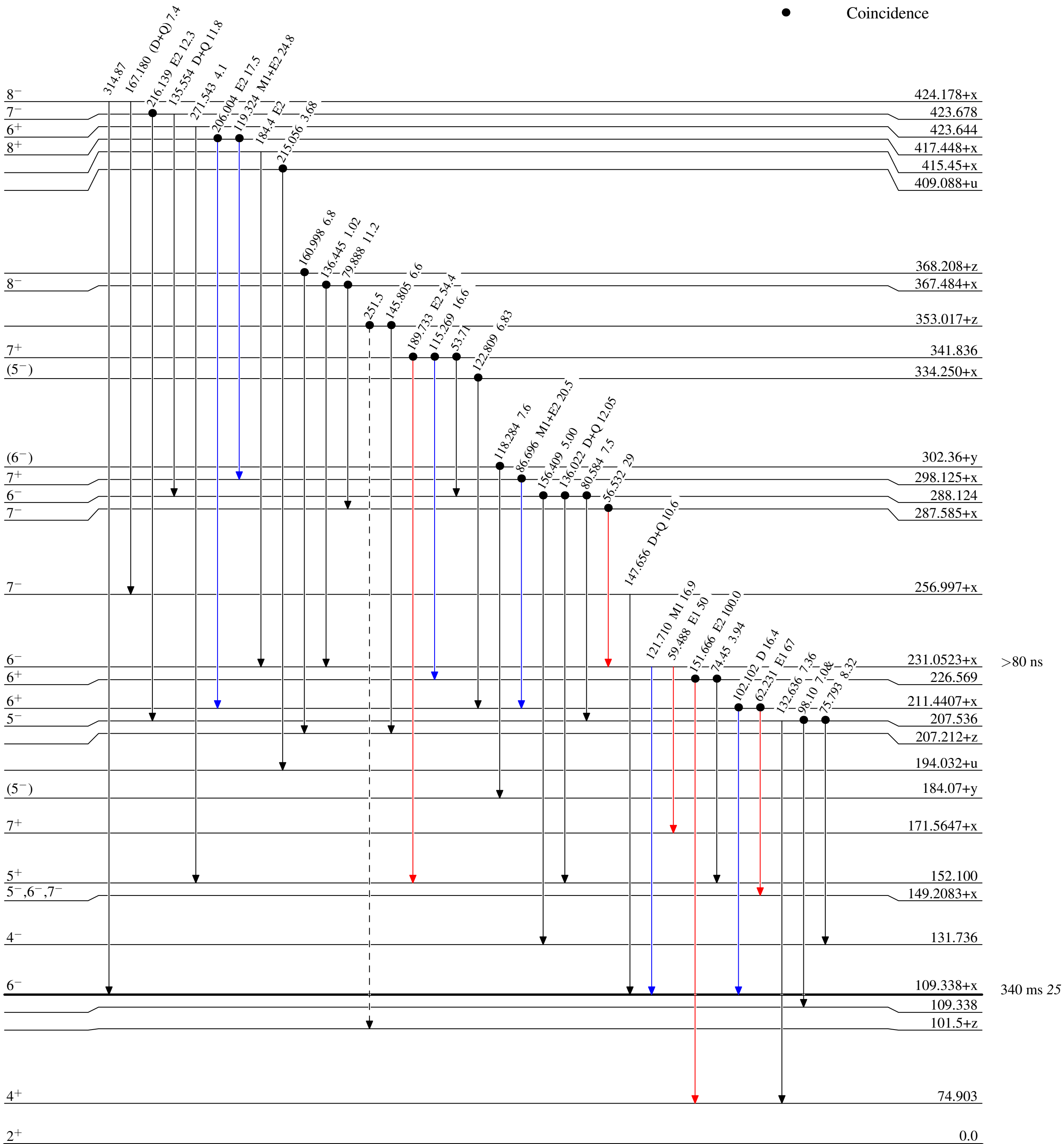
Intensities: Relative I_γ

& Multiply placed: undivided intensity given

@ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{166}_{69}Tm_{97}$

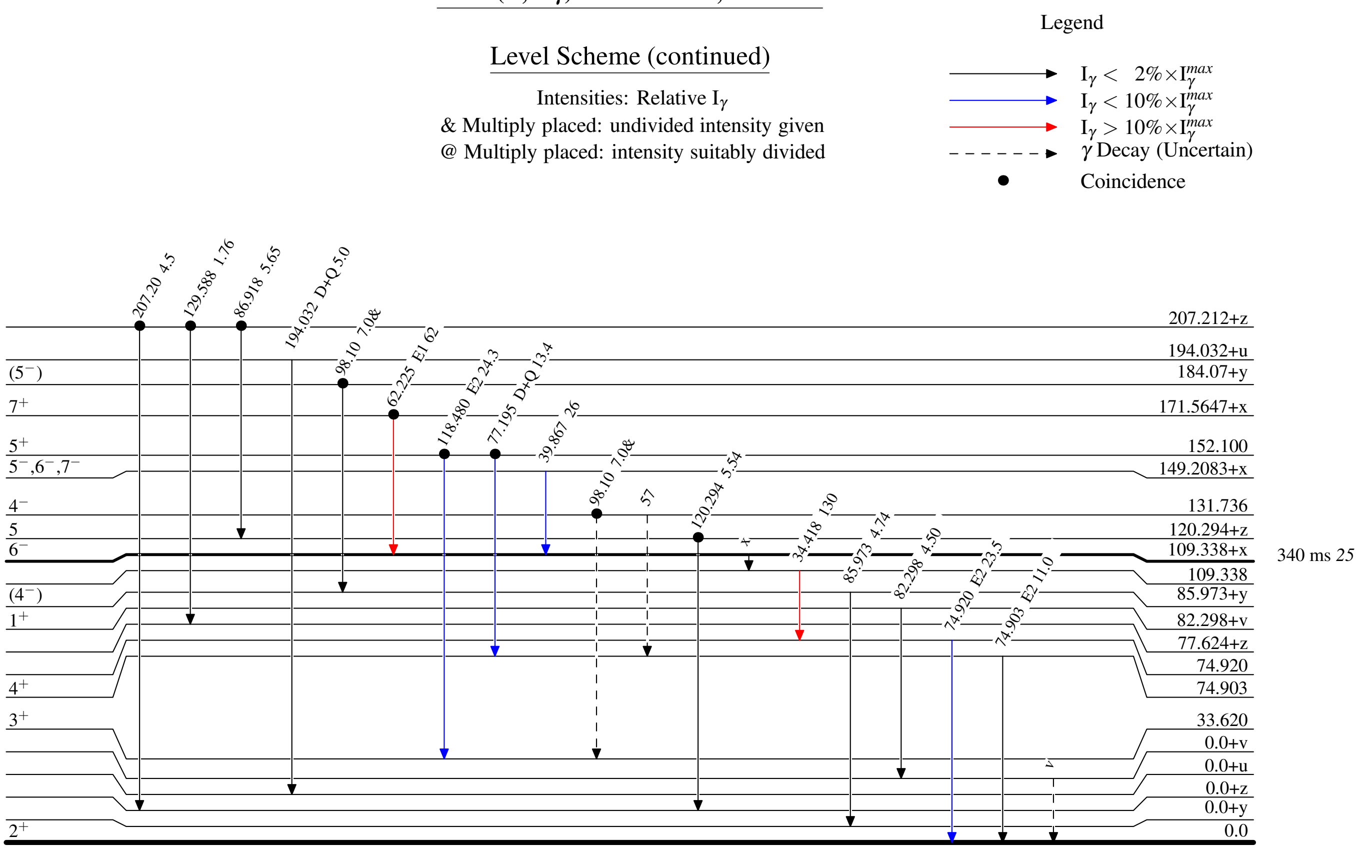
^{165}Ho(α,3nγ) 1995Ma07,1992Dr03

Level Scheme (continued)

Intensities: Relative I_γ

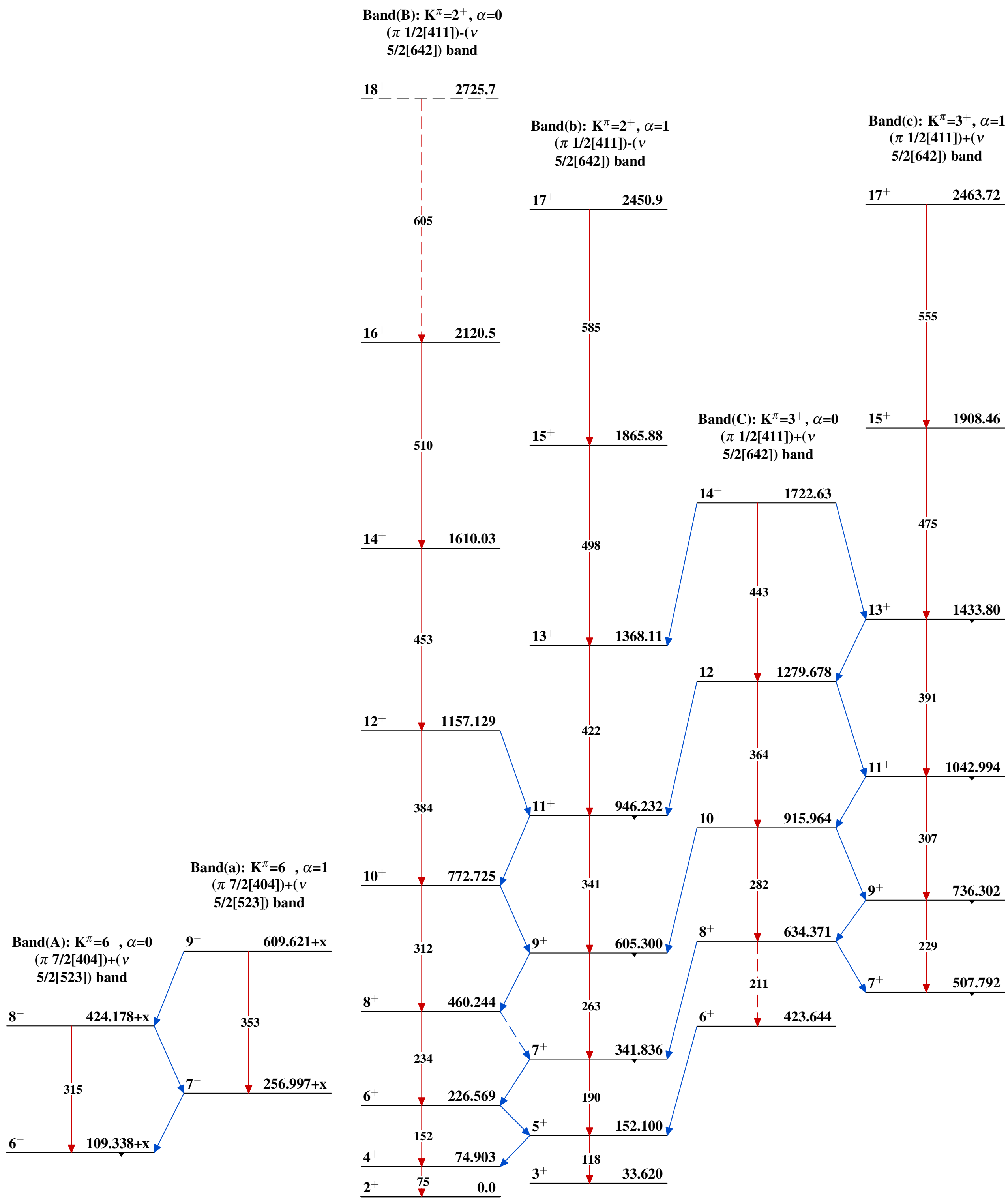
& Multiply placed: undivided intensity given

@ Multiply placed: intensity suitably divided



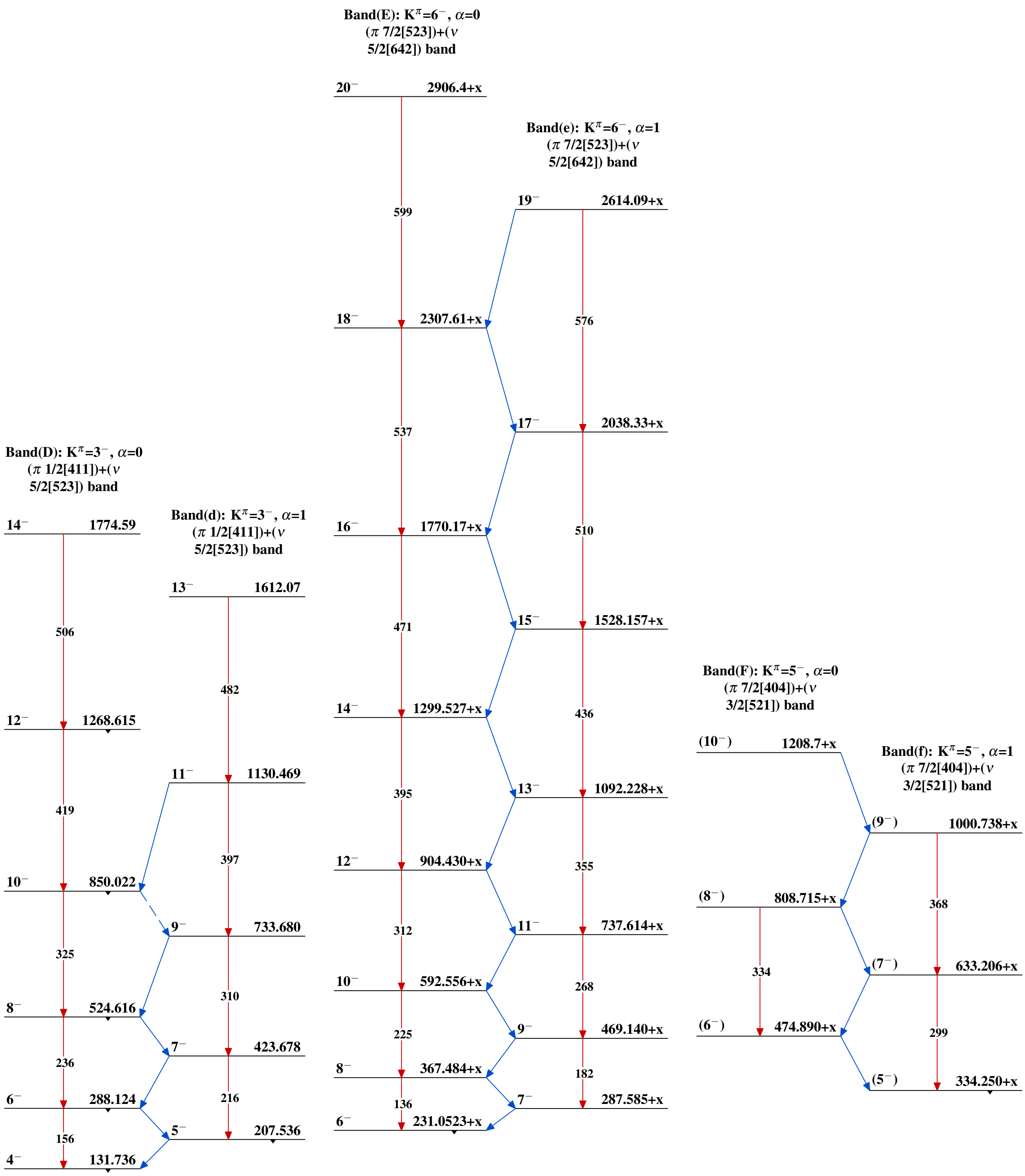
$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03



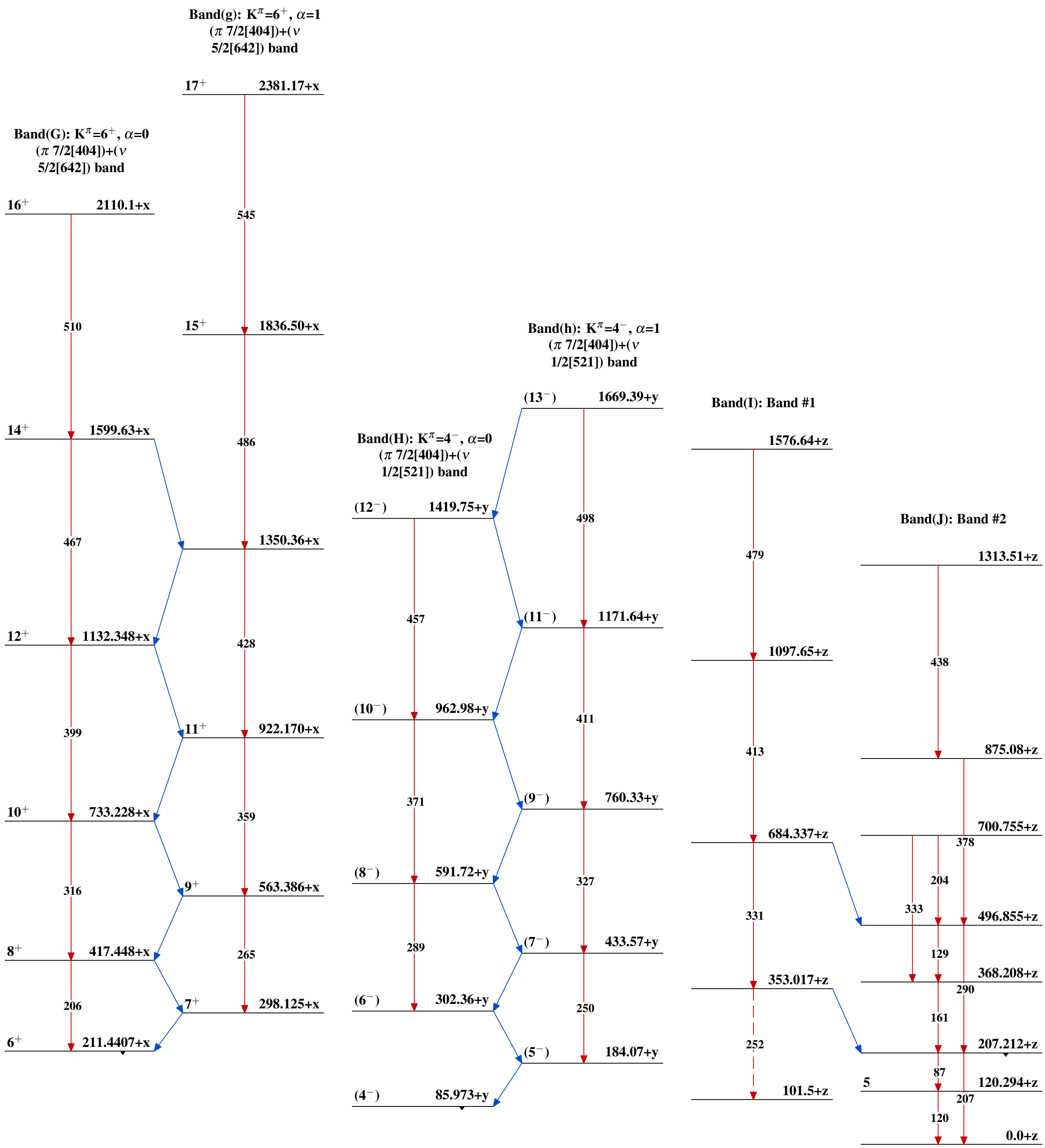
$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)



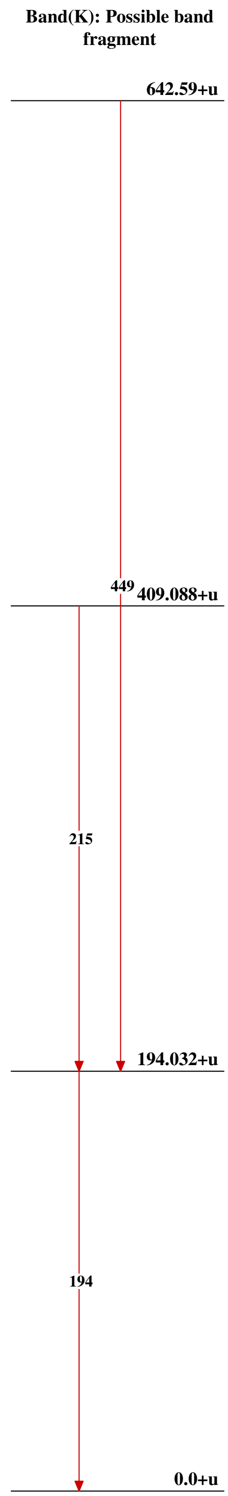
$^{166}_{69}Tm_{97}$

$^{165}Ho(\alpha,3n\gamma)$ 1995Ma07,1992Dr03 (continued)



$^{166}_{69}Tm_{97}$

^{165}Ho(α,3nγ) 1995Ma07,1992Dr03 (continued)



$^{166}_{69}Tm_{97}$