^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 107, 791 (2006)	15-Sep-2005

1998Ko09: Target: Isotopically 95% enriched ^{170}Er. Projectile:^{11}B, E=51-81 MeV beams, in steps of 3 MeV. Detector: CAESER array, consists of six Compton-suppressed HPGe detectors at θ=±48°, ±97°, ±145° with respect to the beam axis, and two small volume planer Ge detectors (LEPS) at ±45°. Measured: $\gamma\gamma$ coin, Iγ, $\gamma(\theta)$, deduced high spin levels, J, π.
1994Da11: Target: ^{170}Er Projectile: ^{11}B, E=55 MeV beams. Detector: CAESAR array. Measured: $\gamma\gamma$ coin, $\gamma\gamma$(t).

^{176}Ta Levels

E(level)†	J$^\pi$‡	$T_{1/2}$@	Comments
0+x	$(3,4)^-$		J$^\pi$: From (M1+E2) or stretched quadrupole character of the 196.3γ from the (5^-) state at 196.3+x keV.
0+y[b]	(4^+)		J$^\pi$: 39.9γ, 63.9γ, and 85.9γ of M1 with small E2 admixtures feeding this state from (5^+), (6^+), and (7^+) states. Band assignment.
0+w#[e]	7^+		J$^\pi$: 186.3γ E1 from the 8^- state at 186.3+W. The relative population of the band and its properties are in agreement with the assignment. Band assignment.
39.7+y[b] *7*	(5^+)		
75+w	(7^+)		
90.4+x[a] *8*	$(4,5)^+$	27 ns *8*	J$^\pi$: 90.4γ E1 to the $(3,4)^-$ state at 0+x keV. $T_{1/2}$: From a time difference spectrum constructed with gates on the 220.8γ or 239.3γ (as start) and the depopulating 90.4γ (as stop).
99.9+x&[&] *8*	(3^+)	38 ns *6*	J$^\pi$: 99.9γ E1 to the $(3,4)^-$ state at 0+x keV. $T_{1/2}$: From a time difference spectrum constructed with gates on the 249.3 keV γ-ray, (9^+) to (7^+), in-band transition and the depopulating 99.9 keV γ-ray.
100+z&[&]	(5^+)		
103.6+y[b] *7*	(6^+)		
152.0+w[e] *6*	8^+		
182.6+x[c] *8*	(4^-)	≤2 ns	
186.5+w#[d] *6*	8^-	1.5 ns *5*	$T_{1/2}$: From time difference spectra.
189.5+y[b] *8*	(7^+)		
196.3+x[c] *8*	(5^-)		
222.3+x[a] *11*	$(5,6)^+$		
241.9+x[c] *9*	(6^-)		J$^\pi$: In-band 45.6γ (M1+E2) to the (5^-) state.
249.5+w#[d] *8*	9^-		J$^\pi$: In-band 63.1γ M1+E2 to the 8^- state.
255.3+z&[&] *12*	(7^+)		J$^\pi$: 155.4γ E2 to the (5^+) state at 100+Z .
298.2+y[b] *9*	(8^+)		
305.1+x[c] *10*	(7^-)		J$^\pi$: In-band 62.9γ (M1+E2) to the (6^-) state. In-band 108.5γ E2 to the (5^-) state.
320.4+w[e] *6*	9^+		
378.9+x[a] *11*	$(6,7)^+$		
382.7+x[c] *10*	(8^-)		J$^\pi$: In-band 78.0γ (M1+E2) transition to the (7^-) state.
383.6+w#[d] *8*	10^-		
428.8+y[b] *9*	(9^+)		
486.1+x[c] *11*	(9^-)		
504.6+z&[&] *14*	(9^+)		
505.7+w[e] *8*	10^+		
553.9+w#[d] *8*	11^-		
558.1+x[a] *11*	$(7,8)^+$		
581.5+y[b] *9*	(10^+)		
601.4+x[c] *11*	(10^-)		
712.5+w[e] *9*	11^+		

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

^{176}Ta Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[@]	Comments
753.0+w[#d] *9*	12^-		
754.2+x[c] *12*	(11^-)		
754.9+y[b] *10*	(11^+)		
759.0+x[a] *12*	$(8,9)^+$		
845.9+z[&] *16*	(11^+)		
906.4+x[c] *12*	(12^-)		
949.1+y[b] *10*	(12^+)		
976.8+w[#d] *10*	13^-		
979.8+x[a] *12*	$(9,10)^+$		
1113.5+x[c] *12*	(13^-)		
1163.1+y[b] *10*	(13^+)		
1218.8+x[a] *13*	$(10,11)^+$		
1225+w[#d] *1*	14^-		
1273.7+z[&] *18*	(13^+)		
1299.7+x[c] *13*	(14^-)		
1371+w[#f] *1*	14^-	3.8 μs *4*	$T_{1/2}$: From 1978Bu16. Jπ: 393.6γ M1+E2 to the 13^- state at 976.8+W keV.
1382+w[g] *1*	$(11,12)^+$	2.0 ns *4*	$T_{1/2}$: Weighted average of 1.4 ns *5*, determined from the time-difference spectrum constructed with a gate on the 376.3 keV γ-ray and 169.9 keV γ-ray, and 2.7 ns *5*, determined from the time spectrum relative to the beam pulses with a gate on the 828.1 keV transition.
1397.4+y[b] *11*	(14^+)		
1432+w *1*	(13^+)	25 ns *8*	Jπ: 61.4γ E1 to the 14^- state at 1370+W keV level. $T_{1/2}$: From the time spectrum with respect to the beam pulses with a gate on the 61.4γ in the LEPS detector.
1476.7+x[a] *14*	$(11,12)^+$		
1495+w[#d] *1*	15^-		
1530+w[g] *1*	$(12,13)^+$		
1555+w[#f] *1*	15^-		
1563.4+x[c] *13*	(15^-)		
1649.8+y[b] *10*	(15^+)		
1666+w *1*	(14^-)	≤1 ns	Jπ: 233.9γ E1 to the (13^+) state at 1432+W keV level. $T_{1/2}$: From time difference spectrum with a gate on the 353.9 keV γ-ray (as start) and the 233.9 keV γ-ray (as stop).
1705+w[g] *1*	$(13,14)^+$		
1754.8+x[a] *14*	$(12,13)^+$		
1779.6+x[c] *13*	(16^-)		
1781.4+z[&] *20*	(15^+)		
1785+w[#d] *1*	16^-		
1812+w[#f] *1*	16^-		
1906+w[g] *1*	$(14,15)^+$		
1921.5+y[b] *11*	(16^+)		
1995+w *2*	(15^-)		
2094+w[d] *1*	17^-		
2098.7+x[#c] *14*	(17^-)		
2107+w[#f] *1*	17^-		
2210.3+y[b] *12*	(17^+)		
2343.0+x[c] *14*	(18^-)		
2349+w *2*	(16^-)		

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

^{176}Ta Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[@]	Comments
2362.6+z[&] *22*	(17$^+$)		
2418+w[#d] *1*	18$^-$		
2426+w[#f] *1*	18$^-$		
2517.4+y[b] *12*	(18$^+$)		
2713.2+x[c] *15*	(19$^-$)		
2760+w[#d] *1*	19$^-$		
2765+w[#f] *1*	19$^-$		
2771+w[#h] *1*	20$^-$	0.97 ms *7*	Jπ: 345.5γ E2 to the 18$^-$ state at 2425+W keV level. $T_{1/2}$: from 1994Da11. Jπ: From 345.1γ E2 transition.
2841.4+y[b] *13*	(19$^+$)		
2983.4+x[c] *15*	(20$^-$)		
3011.3+z[&] *23*	(19$^+$)		
3080+w[h] *1*	(21$^-$)		
3108+w[d] *1*	20$^-$		
3116+w[f] *1*	20$^-$		
3181.8+y[b] *13*	(20$^+$)		
3398.0+x[c] *17*	(21$^-$)		
3446+w[h] *1*	(22$^-$)		
3472+w[d] *1*	21$^-$		
3483+w[f] *1*	21$^-$		
3539.2+y[b] *15*	(21$^+$)		
3697.2+x[c] *17*	(22$^-$)		
3724.0+z[&] *24*	(21$^+$)		
3837+w[d] *1*	22$^-$		
3841+w[h] *1*	(23$^-$)		
3853+w[f] *1*	(22$^-$)		
3911.9+y[b] *16*	(22$^+$)		
4143.7+x[c] *19*	(23$^-$)		
4212+w[d] *1*	23$^-$		
4241+w[f] *1*	(23$^-$)		
4255+w[h] *1*	(24$^-$)		
4272.1+y[b] *17*	(23$^+$)		
4423+w *1*	(24)	≤0.5 ns	
4478.4+x[c] *19*	(24$^-$)		
4497+z[&] *3*	(23$^+$)		
4586+w[d] *1*	24$^-$		
4682+w[h] *1*	(25$^-$)		
4971+w[d] *1*	25$^-$		
5119+w[h] *1*	(26$^-$)		
5294+w[i] *1*	(27$^-$)	≤1 ns	Jπ: From 175.7γ M1 to the (26$^-$) state at 5117+W keV level.
5354+w[d] *1*	26$^-$		
5560+w[h] *1*	(27$^-$)		
5687+w[i] *2*	(28$^-$)		
5749+w[d] *2*	(27$^-$)		
6106+w[i] *2*	(29$^-$)		

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

^{176}Ta Levels (continued)

E(level)[†]	Jπ[‡]
6150+w[d] 2	(28$^-$)
6562+w[i] 2	(30$^-$)

† Deduced by evaluator from a least squares fit to the γ-ray energies. The level energies of bands 1, 2 and 4 are relative to the (3,4)$^-$ state at 0+X keV, band 3 relative to the (4$^+$) state at 0+Y , and all other level energies are relative to the 7$^+$ state at 0+W . Least squares fits were done separately for each group.
‡ From γ multipolarities, electron-conversion coefficients, angular distribution coefficients, and band assignment.
# Observed both in 1998Ko09 and 1994Da11.
@ From 1998Ko09, except otherwise specified.
& Band 1: K=1 configuration=π1/2[541]$\otimes\nu$1/2[521].
a Band 2: K=4 (assumed): configuration=π9/2[514]$\otimes\nu$1/2[521].
b Band 3: K=2 (assumed): configuration=π1/2[541]$\otimes\nu$5/2[512].
c Band 4: K=3 (assumed): configuration=π1/2[541]$\otimes\nu$7/2[633].
d Band 5: K=8 configuration=π9/2[514]$\otimes\nu$7/2[633].
e Band 6: K=7 configuration=π9/2[514]$\otimes\nu$5/2[512].
f Band 7: K=14 Possible configuration=π^3(5/2[402],7/2[404], 9/2[514])$\otimes\nu$(7/2[633]).
g Band 8: K=11 Possible configuration=π(7/2[404])$\otimes\nu^3$(1/2[521], 7/2[514],7/2[633]).
h Band 9: K=20 configuration=π^3(7/2[404],9/2[514],5/2[402])$\otimes\nu^3$(5/2[512],7/2[633], 7/2[514]).
i Band 10: K=27 Possible configuration=ν^2(5/2[642],9/2[624]) coupled to the $\pi^3\nu^3$(20$^-$) state of Band 9.

γ(^{176}Ta)

A_2 values from 1998Ko09. Deduced from angular distributions setting A_4=0.

E$_\gamma$[†]	I$_\gamma$[@]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[&]	I$_{(\gamma+ce)}$	Comments
6.9[‡] 6		2771+w	20$^-$	2765+w	19$^-$		0.64	
11.5[‡] 6		2771+w	20$^-$	2760+w	19$^-$		0.27	
34.4 8		186.5+w	8$^-$	152.0+w	8$^+$			
39.9 8	≤30	39.7+y	(5$^+$)	0+y	(4$^+$)			
45.6 2	30 5	241.9+x	(6$^-$)	196.3+x	(5$^-$)	(M1+E2)		
61.4 8	28 3	1432+w	(13$^+$)	1371+w	14$^-$	E1		Mult.: From α=0.50 18 based on intensity balance at 1432+W keV level.
62.9 8	51 7	305.1+x	(7$^-$)	241.9+x	(6$^-$)	(M1+E2)		
63.1[‡] 6	89 11	249.5+w	9$^-$	186.5+w	8$^-$	M1+E2		Mult.: from α(exp)=3.7 3 (1998Ko09); α(L)exp=4 1 and α(exp)=6.5 13 (1994Da11).
63.9 8	≤40	103.6+y	(6$^+$)	39.7+y	(5$^+$)			
78.0 8	19 6	382.7+x	(8$^-$)	305.1+x	(7$^-$)	(M1+E2)		
85.9 8	≈23	189.5+y	(7$^+$)	103.6+y	(6$^+$)			
90.4 8	25 4	90.4+x	(4,5)$^+$	0+x	(3,4)$^-$	E1		Mult.: From α(exp)<2.5.
99.9 8	≈30	99.9+x	(3$^+$)	0+x	(3,4)$^-$	E1		Mult.: From α(exp)=0.6 3.
103.3 8	38 5	486.1+x	(9$^-$)	382.7+x	(8$^-$)	M1+E2[a]		A_2=−0.60 11
103.4 8	≈8	103.6+y	(6$^+$)	0+w	7$^+$			Iγ(63.9):Iγ(103.4)=1.00:0.05(4) from λ value (Branching ratio in 1998Ko09).
108.5 8	6 2	305.1+x	(7$^-$)	196.3+x	(5$^-$)	(E2)		A_2=−0.62 16

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

$\gamma(^{176}Ta)$ (continued)

E_γ [†]	I_γ [@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
							Iγ(62.9):Iγ(108.5)=1.00:0.23(9) from λ value (Branching ratio in 1998Ko09).
108.7 *8*	≈32	298.2+y	(8^+)	189.5+y	(7^+)		
111.1 *8*	17 *2*	186.5+w	8^-	75+w	(7^+)		A_2=−0.18 *24*
115.3[#] *2*	38 *8*	601.4+x	(10^-)	486.1+x	(9^-)	M1+E2[a]	A_2=−0.54 *5*
130.3 *8*	55 *5*	428.8+y	(9^+)	298.2+y	(8^+)	M1+E2[a]	A_2=−0.33 *16*
131.9 *8*	14 *3*	222.3+x	$(5,6)^+$	90.4+x	$(4,5)^+$		
134.0[‡] *6*	127 *6*	383.6+w	10^-	249.5+w	9^-	M1[a]	A_2=−0.17 *12*
140.7 *8*	6 *2*	382.7+x	(8^-)	241.9+x	(6^-)		Iγ(78.0):Iγ(140.7)=1.00:0.54(20) from λ value (Branching ratio in 1998Ko09).
147.8 *8*	9 *3*	1530+w	$(12,13)^+$	1382+w	$(11,12)^+$		
149.8 *8*	≈8	189.5+y	(7^+)	39.7+y	(5^+)		Iγ(85.9):Iγ(149.8)=1.00:0.36(14) from λ value (Branching ratio in 1998Ko09).
151.9 *8*	≈85	152.0+w	8^+	0+w	7^+	M1+E2[a]	A_2=−0.32 *4*
151.9 *8*	≈40	906.4+x	(12^-)	754.2+x	(11^-)		
152.3 *8*	44 *5*	581.5+y	(10^+)	428.8+y	(9^+)		
152.4 *8*	51 *8*	754.2+x	(11^-)	601.4+x	(10^-)		
155.4 *8*	15 *3*	255.3+z	(7^+)	100+z	(5^+)	E2	Mult.: From α(exp)=0.91 *12*.
155.9 *8*	16 *2*	378.9+x	$(6,7)^+$	222.3+x	$(5,6)^+$		
168.4 *8*	≈73	320.4+w	9^+	152.0+w	8^+	M1+E2[a]	A_2=+0.1 *4*
170.0[‡] *6*	197 *28*	553.9+w	11^-	383.6+w	10^-	M1+E2[a]	A_2=−0.08 *12*
173.2 *8*	23 *4*	754.9+y	(11^+)	581.5+y	(10^+)		
175.0 *8*	14 *3*	1705+w	$(13,14)^+$	1530+w	$(12,13)^+$		
175.7 *8*	5 *1*	5294+w	(27^-)	5119+w	(26^-)	M1	Mult.: From α(exp)=1.2 *5*, based on the intensity flow through the band head at 5293+W keV level.
179.3 *8*	16 *4*	558.1+x	$(7,8)^+$	378.9+x	$(6,7)^+$		
181.4 *8*	4 *2*	486.1+x	(9^-)	305.1+x	(7^-)		Iγ(103.3):Iγ(181.4)=1.0:0.7(5) from λ value (Branching ratio in 1998Ko09).
182.6 *8*	≈37	182.6+x	(4^-)	0+x	$(3,4)^-$		
183.8[‡] *6*	78 *8*	1555+w	15^-	1371+w	14^-		
185.3 *8*	≈62	505.7+w	10^+	320.4+w	9^+		
186.3 *8*	30 *6*	1299.7+x	(14^-)	1113.5+x	(13^-)	M1+E2[a]	A_2=−0.28 *10*
186.6[‡] *6*	≈350	186.5+w	8^-	0+w	7^+	E1	Mult.: From α(exp)≤0.16.
194.1 *8*	29 *7*	949.1+y	(12^+)	754.9+y	(11^+)	M1[a]	A_2=−0.18 *15*
194.6 *8*	≈22	298.2+y	(8^+)	103.6+y	(6^+)		Iγ(108.7):Iγ(194.6)=1.00:0.68(11) from λ value (Branching ratio in 1998Ko09).
196.3 *8*	≈80	196.3+x	(5^-)	0+x	$(3,4)^-$	(M1+E2)	A_2=+0.23 *16* Mult.: M1/E2 or stretched quadrupole character.
197.0 *8*	3 *1*	383.6+w	10^-	186.5+w	8^-		Iγ(134.0):Iγ(197.0)=1.00:0.03(1) from λ value (Branching ratio in 1998Ko09).
198.9[‡] *6*	199 *26*	753.0+w	12^-	553.9+w	11^-	M1+E2[a]	A_2=−0.02 *12*
200.8 *8*	18 *3*	759.0+x	$(8,9)^+$	558.1+x	$(7,8)^+$		
200.9 *8*	16 *4*	1906+w	$(14,15)^+$	1705+w	$(13,14)^+$		
206.8 *8*	≈46	712.5+w	11^+	505.7+w	10^+		
206.9 *8*	32 *7*	1113.5+x	(13^-)	906.4+x	(12^-)		
213.8 *8*	14 *3*	1163.1+y	(13^+)	949.1+y	(12^+)	M1+E2[a]	A_2=−0.5 *3*
216.3 *8*	12 *3*	1779.6+x	(16^-)	1563.4+x	(15^-)		
218.8 *8*	32 *4*	601.4+x	(10^-)	382.7+x	(8^-)		Iγ(115.3):Iγ(218.8)=1.0:1.4(3) from λ value (Branching ratio in 1998Ko09).
220.8 *8*	16 *4*	979.8+x	$(9,10)^+$	759.0+x	$(8,9)^+$		
224.6[#] *2*	142 *23*	976.8+w	13^-	753.0+w	12^-	M1+E2[a]	A_2=+0.01 *14*
233.9 *8*	11 *2*	1666+w	(14^-)	1432+w	(13^+)	E1	A_2=−0.3 *3*

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

$\gamma(^{176}Ta)$ (continued)

E_γ †	I_γ @	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	Comments
							Mult.: From α=0.11 *12* based on the intensity balance at 1666+W keV level and assuming M1 multipolarity for the 328.2 keV transition.
234.1 *8*	12 *3*	1397.4+y	(14^+)	1163.1+y	(13^+)		
239.3 *8*	11 *3*	1218.8+x	$(10,11)^+$	979.8+x	$(9,10)^+$		
239.4 *8*	64 *5*	428.8+y	(9^+)	189.5+y	(7^+)		
244.5 *8*	10 *3*	2343.0+x	(18^-)	2098.7+x	(17^-)		
247.9‡ *6*	91 *13*	1225+w	14^-	976.8+w	13^-	M1+E2[a]	A_2=+0.11 *6*
249.3 *8*	28 *4*	504.6+z	(9^+)	255.3+z	(7^+)		
252.4 *8*	9 *3*	1649.8+y	(15^+)	1397.4+y	(14^+)		
257.7‡ *6*	86 *9*	1812+w	16^-	1555+w	15^-	M1+E2[a]	A_2=+0.13 *10*
257.8 *8*	12 *4*	1476.7+x	$(11,12)^+$	1218.8+x	$(10,11)^+$		
263.4 *8*	23 *6*	1563.4+x	(15^-)	1299.7+x	(14^-)		
268.3 *8*	55 *7*	754.2+x	(11^-)	486.1+x	(9^-)		Iγ(152.4):Iγ(268.3)=1.00:0.99(19) from λ value (Branching ratio in 1998Ko09).
269.5[b] *8*	≤10	2983.4+x	(20^-)	2713.2+x	(19^-)		
269.9‡ *6*	64 *8*	1495+w	15^-	1225+w	14^-		
271.7 *8*	7 *2*	1921.5+y	(16^+)	1649.8+y	(15^+)		
278.0[b] *8*	≤9	1754.8+x	$(12,13)^+$	1476.7+x	$(11,12)^+$		
283.3# *2*	58 *6*	581.5+y	(10^+)	298.2+y	(8^+)	E2[a]	A_2=+0.15 *21* Iγ(152.3):Iγ(283.3)=1.00:1.32(21) from λ value (Branching ratio in 1998Ko09).
288.7 *8*	8 *3*	2210.3+y	(17^+)	1921.5+y	(16^+)		
288.8 *8*	6 *2*	378.9+x	$(6,7)^+$	90.4+x	$(4,5)^+$		A_2=−0.10 *20* Iγ(155.9):Iγ(288.8)=1.00:0.35(8) from λ value (Branching ratio in 1998Ko09).
289.6‡ *6*	52 *9*	1785+w	16^-	1495+w	15^-		
294.1# *2*	67 *6*	2107+w	17^-	1812+w	16^-	M1+E2[a]	A_2=−0.05 *24*
304.6‡ *6*	32 *5*	553.9+w	11^-	249.5+w	9^-	E2[a]	A_2=+0.24 *10* Iγ(170.0):Iγ(304.6)=1.00:0.16(1) from λ value (Branching ratio in 1998Ko09).
305.0 *8*	78 *8*	906.4+x	(12^-)	601.4+x	(10^-)		Iγ(151.9):Iγ(305.0)=1:5(3) from λ value (Branching ratio in 1998Ko09).
307.3 *8*	4 *1*	2517.4+y	(18^+)	2210.3+y	(17^+)		
309.1 *8*	55 *6*	3080+w	(21^-)	2771+w	20^-	M1+E2[a]	A_2=−0.04 *8*
309.6‡ *6*	40 *8*	2094+w	17^-	1785+w	16^-		
319.5‡ *6*	10 *2*	2098.7+x	(17^-)	1779.6+x	(16^-)		
319.5‡ *8*	51 *5*	2426+w	18^-	2107+w	17^-	M1+E2[a]	A_2=−0.71 *24*
320.3 *8*	≈17	320.4+w	9^+	0+w	7^+		Iγ(168.4):Iγ(320.3)=1.00:0.23(4) from λ value (Branching ratio in 1998Ko09).
321.7 *8*	10 *2*	2107+w	17^-	1785+w	16^-		
323.2 *8*	8 *3*	1705+w	$(13,14)^+$	1382+w	$(11,12)^+$		Iγ(175.0):Iγ(323.2)=1.0:0.8(3) from λ value (Branching ratio in 1998Ko09).
323.4‡ *6*	27 *5*	2418+w	18^-	2094+w	17^-	M1+E2[a]	A_2=+0.09 *25*
324.4 *8*	≤2	2841.4+y	(19^+)	2517.4+y	(18^+)		
326.2 *8*	47 *4*	754.9+y	(11^+)	428.8+y	(9^+)	E2[a]	A_2=+0.25 *24* Iγ(173.2):Iγ(326.2)=1.0:2.0(3) from λ value (Branching ratio in 1998Ko09).
328.2 *8*	13 *3*	1995+w	(15^-)	1666+w	(14^-)	M1+E2[a]	A_2=−0.38 *27*
333.5 *8*	8 *2*	2760+w	19^-	2426+w	18^-		
335.5 *8*	6 *2*	558.1+x	$(7,8)^+$	222.3+x	$(5,6)^+$		Iγ(179.3):Iγ(335.5)=1.00:0.35(8) from λ value (Branching ratio in 1998Ko09).

Continued on next page (footnotes at end of table)

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

$\gamma(^{176}Ta)$ (continued)

E_γ †	I_γ @	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	$I_{(\gamma+ce)}$	Comments
338.6‡ *6*	41 *5*	2765+w	19^-	2426+w	18^-	M1+E2[a]		A_2=+0.1 *3*
340.4[b] *8*	≤2	3181.8+y	(20^+)	2841.4+y	(19^+)			
341.3 *8*	20 *3*	845.9+z	(11^+)	504.6+z	(9^+)			
342.3 *8*	20 *4*	2760+w	19^-	2418+w	18^-			
345.5‡ *6*		2771+w	20^-	2426+w	18^-	E2	0.09	Mult.: From α(K)exp=0.040 *1*.
346.9‡ *6*	9 *2*	2765+w	19^-	2418+w	18^-	(M1+E2)[a]		A_2=−0.4 *5*
348.8 *8*	15 *5*	3108+w	20^-	2760+w	19^-			
351.8 *8*	≈2	3116+w	20^-	2765+w	19^-			
353.7 *8*	≈33	505.7+w	10^+	152.0+w	8^+			Iγ(185.3):Iγ(353.7)=1.00: 0.54(14) from λ value (Branching ratio in 1998Ko09).
353.9 *8*	8 *2*	2349+w	(16^-)	1995+w	(15^-)			
359.4# *2*	68 *7*	1113.5+x	(13^-)	754.2+x	(11^-)	E2[a]		A_2=+0.94 *10* Iγ(206.9):Iγ(359.4)=1.0:2.2(4) from λ value (Branching ratio in 1998Ko09).
363.6 *8*	18 *7*	3472+w	21^-	3108+w	20^-	M1+E2[a]		A_2=+0.2 *3*
364.9 *8*	7 *4*	3837+w	22^-	3472+w	21^-			
366.2 *8*	61 *7*	3446+w	(22^-)	3080+w	(21^-)	M1+E2[a]		A_2=+0.07 *17*
367.3 *8*	3 *1*	3483+w	21^-	3116+w	20^-	M1+E2[a]		A_2=+0.16 *16*
367.7 *8*	61 *5*	949.1+y	(12^+)	581.5+y	(10^+)			Iγ(194.1):Iγ(367.7)=1.0:2.1(3) from λ value (Branching ratio in 1998Ko09).
369.5‡ *6*	65 *11*	753.0+w	12^-	383.6+w	10^-			Iγ(198.9):Iγ(369.5)=1.000: 0.337(15) from λ value (Branching ratio in 1998Ko09).
369.5[b] *8*	12 *3*	2713.2+x	(19^-)	2343.0+x	(18^-)			A_2=+0.08 *25*
369.5 *8*	3 *1*	3853+w	(22^-)	3483+w	21^-			
374.3 *8*	≤5	4212+w	23^-	3837+w	22^-			
374.5 *8*	≤3	4586+w	24^-	4212+w	23^-			
376.3 *8*	32 *6*	1906+w	$(14,15)^+$	1530+w	$(12,13)^+$			A_2=+0.18 *13* Iγ(200.9):Iγ(376.3)=1.0:1.7(5) from λ value (Branching ratio in 1998Ko09).
380.1 *8*	6 *2*	759.0+x	$(8,9)^+$	378.9+x	$(6,7)^+$	E2[a]		A_2=+0.3 *5* Iγ(200.8):Iγ(380.1)=1.00: 0.34(8) from λ value (Branching ratio in 1998Ko09).
387.8 *8*	≤2	4241+w	(23^-)	3853+w	(22^-)			
392.1 *8*	≈46	712.5+w	11^+	320.4+w	9^+			Iγ(206.8):Iγ(392.1)=1.00: 1.01(17) from λ value (Branching ratio in 1998Ko09).
393.2 *8*	4 *1*	5687+w	(28^-)	5294+w	(27^-)			A_2=+0.17 *8*
393.3 *8*	95 *9*	1299.7+x	(14^-)	906.4+x	(12^-)			Iγ(186.3):Iγ(393.3)=1.0:3.2(5) from λ value (Branching ratio in 1998Ko09).
393.6‡ *6*	58 *4*	1371+w	14^-	976.8+w	13^-	M1+E2		Mult.: From α(K)exp 0.064 *15*.
394.8 *8*	33 *4*	3841+w	(23^-)	3446+w	(22^-)			
408.2# *2*	49 *2*	1163.1+y	(13^+)	754.9+y	(11^+)			Iγ(213.8):Iγ(408.2)=1.0:3.5(4)

Continued on next page (footnotes at end of table)

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

$\gamma(^{176}Ta)$ (continued)

E_γ [†]	I_γ [@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
							from λ value (Branching ratio in 1998Ko09).
413.8 *8*	20 *4*	4255+w	(24^-)	3841+w	(23^-)		
418.0 *8*	2 *1*	6106+w	(29^-)	5687+w	(28^-)		
421.8 *8*	8 *2*	979.8+x	$(9,10)^+$	558.1+x	$(7,8)^+$		Iγ(220.8):Iγ(421.8)=1.00:0.53(13) from λ value (Branching ratio in 1998Ko09).
423.8[‡] *6*	75 *9*	976.8+w	13^-	553.9+w	11^-		A_2=+0.10 *13* Iγ(224.6):Iγ(423.8)=1.00:0.56(5) from λ value (Branching ratio in 1998Ko09).
427.2 *8*	13 *3*	4682+w	(25^-)	4255+w	(24^-)	M1+E2[a]	A_2=+0.12 *19*
427.8 *8*	16 *3*	1273.7+z	(13^+)	845.9+z	(11^+)		
436.3 *8*	13 *3*	5119+w	(26^-)	4682+w	(25^-)		
441.6 *8*	3 *1*	1812+w	16^-	1371+w	14^-		Iγ(257.7):Iγ(441.6)=1.000:0.032(3) from λ value (Branching ratio in 1998Ko09).
442.1 *8*	≤4	5560+w	(27^-)	5119+w	(26^-)		
448.4 *8*	56 *6*	1397.4+y	(14^+)	949.1+y	(12^+)		Iγ(234.1):Iγ(448.4)=1.0:4.6(7) from λ value (Branching ratio in 1998Ko09).
449.7 *8*	58 *9*	1563.4+x	(15^-)	1113.5+x	(13^-)	E2[a]	A_2=+0.42 *24* Iγ(263.4):Iγ(449.7)=1.0:3.1(6) from λ value (Branching ratio in 1998Ko09).
456.1[b] *8*	≤1	6562+w	(30^-)	6106+w	(29^-)		
459.6 *8*	5 *2*	1218.8+x	$(10,11)^+$	759.0+x	$(8,9)^+$		Iγ(239.3):Iγ(459.6)=1.00:0.44(13) from λ value (Branching ratio in 1998Ko09).
472.5[#] *2*	101 *17*	1225+w	14^-	753.0+w	12^-	E2[a]	A_2=+0.54 *15* Iγ(247.9):Iγ(472.5)=1.00:0.73(6) from λ value (Branching ratio in 1998Ko09).
479.9[#] *2*	70 *2*	1779.6+x	(16^-)	1299.7+x	(14^-)		A_2=+0.13 *9* Iγ(216.3):Iγ(479.9)=1.0:5.5(8) from λ value (Branching ratio in 1998Ko09).
486.7[#] *2*	34 *3*	1649.8+y	(15^+)	1163.1+y	(13^+)	E2[a]	A_2=+0.32 *21* Iγ(252.4):Iγ(486.7)=1.0:3.7(7) from λ value (Branching ratio in 1998Ko09).
496.9 *8*	12 *4*	1476.7+x	$(11,12)^+$	979.8+x	$(9,10)^+$		Iγ(257.8):Iγ(496.9)=1.00:1.02(23) from λ value (Branching ratio in 1998Ko09).
507.7 *8*	14 *3*	1781.4+z	(15^+)	1273.7+z	(13^+)		
517.7[#] *2*	82 *11*	1495+w	15^-	976.8+w	13^-	E2[a]	A_2=+0.22 *15* Iγ(269.9):Iγ(517.7)=1.00:1.10(8) from λ value (Branching ratio in 1998Ko09).
524.1[#] *2*	37 *3*	1921.5+y	(16^+)	1397.4+y	(14^+)	E2[a]	A_2=+0.22 *13* Iγ(271.7):Iγ(524.1)=1.0:5.3(12) from λ value (Branching ratio in 1998Ko09).
534.9 *8*	49 *6*	2098.7+x	(17^-)	1563.4+x	(15^-)	E2[a]	A_2=+0.27 *11* Iγ(319.5):Iγ(534.9)=1.0:4.9(12) from λ value (Branching ratio in 1998Ko09).
536.0[b] *8*	≤4	1754.8+x	$(12,13)^+$	1218.8+x	$(10,11)^+$		
552.0[‡] *6*	9 *2*	2107+w	17^-	1555+w	15^-		Iγ(294.1):Iγ(552.0)=1.00:0.11(1) from λ value (Branching ratio in 1998Ko09).
559.7[‡] *6*	74 *11*	1785+w	16^-	1225+w	14^-	E2[a]	A_2=+0.4 *3* Iγ(289.6):Iγ(559.7)=1.00:1.37(11) from λ value (Branching ratio in 1998Ko09).
560.5 *8*	24 *3*	2210.3+y	(17^+)	1649.8+y	(15^+)		Iγ(288.7):Iγ(560.5)=1.0:3.1(6) from λ value (Branching ratio in 1998Ko09).
563.3 *8*	58 *6*	2343.0+x	(18^-)	1779.6+x	(16^-)	E2[a]	A_2=+0.53 *16*

Continued on next page (footnotes at end of table)

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

γ(^{176}Ta) (continued)

E_γ [†]	I_γ [@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
							Iγ(244.5):Iγ(563.3)=1.0:6.1(20) from λ value (Branching ratio in 1998Ko09).
581.2 *8*	11 *2*	2362.6+z	(17$^+$)	1781.4+z	(15$^+$)	E2[a]	A_2=+0.2 *4*
596.1 *8*	28 *5*	2517.4+y	(18$^+$)	1921.5+y	(16$^+$)		Iγ(307.3):Iγ(596.1)=1.0:6.6(25) from λ value (Branching ratio in 1998Ko09).
598.7[#] *2*	52 *9*	2094+w	17$^-$	1495+w	15$^-$	E2[a]	A_2=+0.24 *17* Iγ(309.6):Iγ(598.7)=1.00:1.67(11) from λ value (Branching ratio in 1998Ko09).
611.1[b] *8*	≤1	2107+w	17$^-$	1495+w	15$^-$		
613.7[‡] *6*	16 *2*	2426+w	18$^-$	1812+w	16$^-$		Iγ(319.5):Iγ(613.7)=1.00:0.27(2) from λ value (Branching ratio in 1998Ko09).
614.5 *8*	25 *4*	2713.2+x	(19$^-$)	2098.7+x	(17$^-$)		
618.4[‡] *6*	208 *8*	1371+w	14$^-$	753.0+w	12$^-$	E2	Mult.: From α(K)exp 0.012 *2*.
630.7 *8*	13 *2*	2841.4+y	(19$^+$)	2210.3+y	(17$^+$)		Iγ(324.4):Iγ(630.7)=1:7(3) from λ value (Branching ratio in 1998Ko09).
632.8[‡] *6*	50 *9*	2418+w	18$^-$	1785+w	16$^-$		Iγ(323.4):Iγ(632.8)=1.00:1.92(18) from λ value (Branching ratio in 1998Ko09).
640.9 *8*	20 *4*	2426+w	18$^-$	1785+w	16$^-$		
641.0 *8*	43 *6*	2983.4+x	(20$^-$)	2343.0+x	(18$^-$)		
648.7 *8*	6 *2*	3011.3+z	(19$^+$)	2362.6+z	(17$^+$)		
652.5 *8*	4 *2*	2760+w	19$^-$	2107+w	17$^-$		
657.8[‡] *6*	20 *4*	2765+w	19$^-$	2107+w	17$^-$		Iγ(338.3):Iγ(657.6)=1.00:0.48(6) from λ value (Branching ratio in 1998Ko09).
664.4 *8*	18 *4*	3181.8+y	(20$^+$)	2517.4+y	(18$^+$)		A_2=+0.13 *16*
665.5[‡] *6*	29 *6*	2760+w	19$^-$	2094+w	17$^-$		Iγ(342.3):Iγ(665.2)=1.00:2.10(17) from λ value (Branching ratio in 1998Ko09).
670.5[‡] *6*	15 *3*	2765+w	19$^-$	2094+w	17$^-$		
674.7 *8*	≤3	3446+w	(22$^-$)	2771+w	20$^-$		Iγ(366.2):Iγ(674.7)=1.000:0.035(18) from λ value (Branching ratio in 1998Ko09).
684.8 *8*	17 *3*	3398.0+x	(21$^-$)	2713.2+x	(19$^-$)		
690.2 *8*	5 *1*	3116+w	20$^-$	2426+w	18$^-$		Iγ(351.8):Iγ(690.2)=1.0:1.1(3) from λ value (Branching ratio in 1998Ko09).
691.0 *8*	30 *6*	3108+w	20$^-$	2418+w	18$^-$		Iγ(348.8):Iγ(691.0)=1.0:1.8(3) from λ value (Branching ratio in 1998Ko09).
697.8 *8*	7 *2*	3539.2+y	(21$^+$)	2841.4+y	(19$^+$)		
712.7 *8*	15 *4*	3472+w	21$^-$	2760+w	19$^-$		Iγ(363.6):Iγ(712.7)=1.0:1.3(3) from λ value (Branching ratio in 1998Ko09).
712.7 *8*	≤6	3724.0+z	(21$^+$)	3011.3+z	(19$^+$)		
713.8 *8*	20 *5*	3697.2+x	(22$^-$)	2983.4+x	(20$^-$)		
719.0 *8*	4 *1*	3483+w	21$^-$	2765+w	19$^-$		
728.7 *8*	20 *5*	3837+w	22$^-$	3108+w	20$^-$		Iγ(364.9):Iγ(728.7)=1.0:2.0(5) from λ value (Branching ratio in 1998Ko09).
730.1 *8*	≤5	3911.9+y	(22$^+$)	3181.8+y	(20$^+$)		
732.9 *8*	≤2	4272.1+y	(23$^+$)	3539.2+y	(21$^+$)		
736.4 *8*	≤2	3853+w	(22$^-$)	3116+w	20$^-$		
739.7 *8*	11 *3*	4212+w	23$^-$	3472+w	21$^-$		Iγ(374.3):Iγ(739.7)=1.00:0.91(18) from λ value (Branching ratio in 1998Ko09).
745.7 *8*	13 *4*	4143.7+x	(23$^-$)	3398.0+x	(21$^-$)		
748.8 *8*	9 *3*	4586+w	24$^-$	3837+w	22$^-$		
757.2 *8*	≤2	4241+w	(23$^-$)	3483+w	21$^-$		
759.3 *8*	7 *3*	4971+w	25$^-$	4212+w	23$^-$		
761.1 *8*	4 *1*	3841+w	(23$^-$)	3080+w	(21$^-$)		Iγ(394.8):Iγ(761.1)=1.00:0.09(4) from λ value (Branching ratio in 1998Ko09).
767.7 *8*	8 *3*	5354+w	26$^-$	4586+w	24$^-$		

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^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11 (continued)

γ(^{176}Ta) (continued)

E_γ †	I_γ @	E_i(level)	J_i^π	E_f	J_f^π	Comments
773.2 *8*	≤2	4497+z	(23^+)	3724.0+z	(21^+)	
777.1 *8*	18 *4*	1530+w	$(12,13)^+$	753.0+w	12^-	A_2=−0.21 *12*
778.0[b] *8*	≤5	5749+w	(27^-)	4971+w	25^-	
781.2 *8*	11 *3*	4478.4+x	(24^-)	3697.2+x	(22^-)	
796.0[b] *8*	≤5	6150+w	(28^-)	5354+w	26^-	
809.5 *8*	3 *1*	4255+w	(24^-)	3446+w	(22^-)	Iγ(413.8):Iγ(809.5)=1.00:0.24(9) from λ value (Branching ratio in 1998Ko09).
811.2[b] *8*	≤1	6106+w	(29^-)	5294+w	(27^-)	Iγ(418.0):Iγ(811.2)=1.00:0.19(20) from λ value (Branching ratio in 1998Ko09).
828.1 *8*	16 *4*	1382+w	$(11,12)^+$	553.9+w	11^-	
841.0 *8*	6 *2*	4682+w	(25^-)	3841+w	(23^-)	Iγ(427.2):Iγ(841.0)=1.00:0.24(6) from λ value (Branching ratio in 1998Ko09).
863.4 *8*	6 *2*	5119+w	(26^-)	4255+w	(24^-)	Iγ(436.3):Iγ(863.4)=1.00:0.37(4) from λ value (Branching ratio in 1998Ko09).
877.5 *8*	2 *1*	5560+w	(27^-)	4682+w	(25^-)	Iγ(442.1):Iγ(877.5)=1.00:0.63(22) from λ value (Branching ratio in 1998Ko09).
976.8 *8*	4 *1*	4423+w	(24)	3446+w	(22^-)	

† From 1998Ko09, unless otherwise specified. The energies are accurate to within 0.1-0.2 keV for the strong, well resolved transitions. For other transitions the uncertainty may rise up to 0.8 keV. Evaluator assigned γ-ray uncertainty to 0.2 keV, if γ-ray is separated by 3 keV on both sides and intensity more than 30, otherwise 0.8 keV.

‡ Weighted average of 1998Ko09 (Eγ ΔE=0.8 keV) and 1994Da11 (assuming Eγ ΔE=1 keV).

Weighted average of 1998Ko09 (Eγ ΔE=0.2 keV) and 1994Da11 (assuming Eγ ΔE=1 keV).

@ From 1998Ko09. Approximate relative intensities obtained from singles and coincidence spectra.

& From α(exp) and γ-ray intensity balance in 1998Ko09, except otherwise noted.

a Assigned by evaluator based on A2 values and inband transitions.

b Placement of transition in the level scheme is uncertain.

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme

Intensities: Relative I_γ

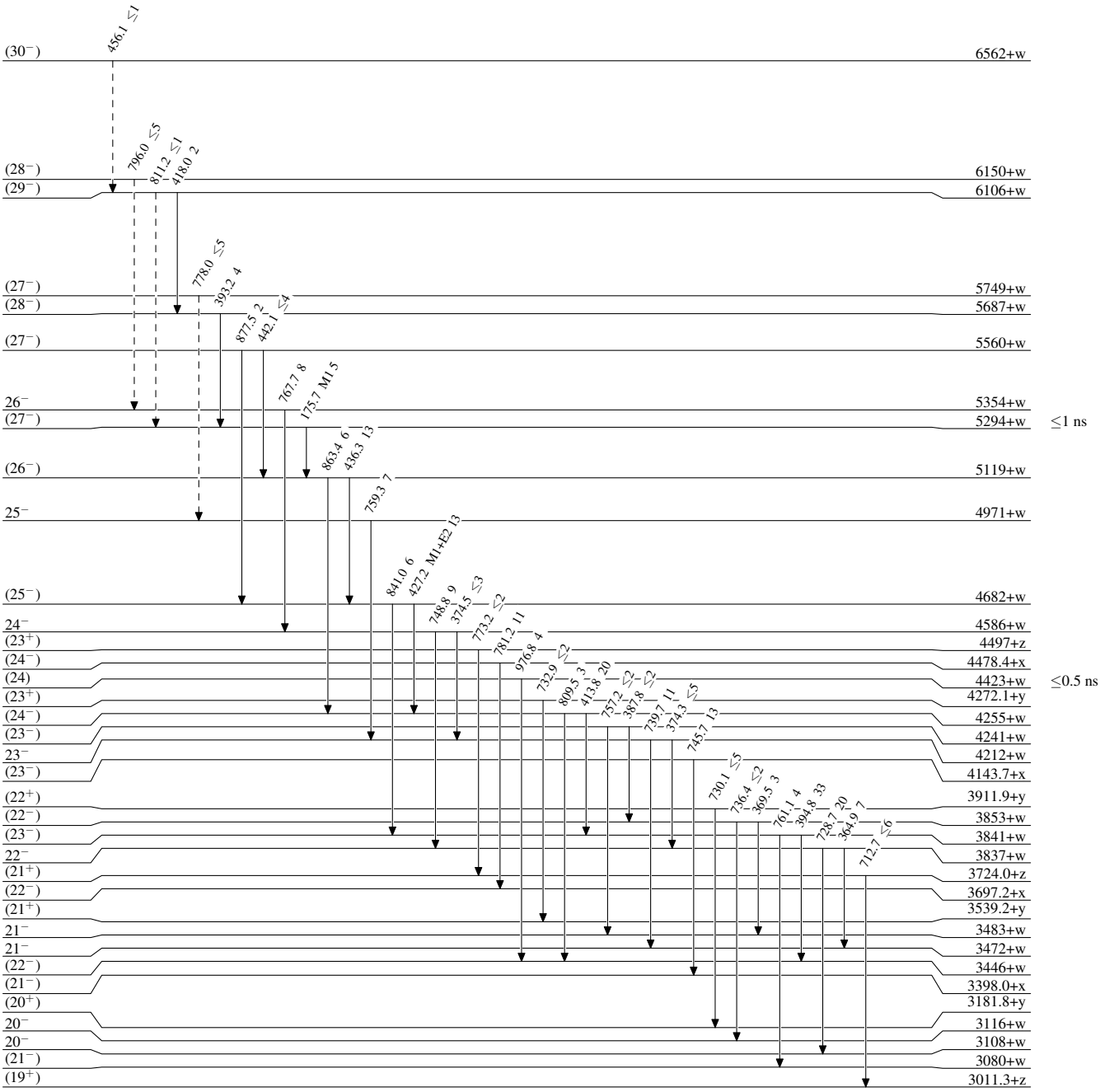
Legend

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

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

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

γ Decay (Uncertain)



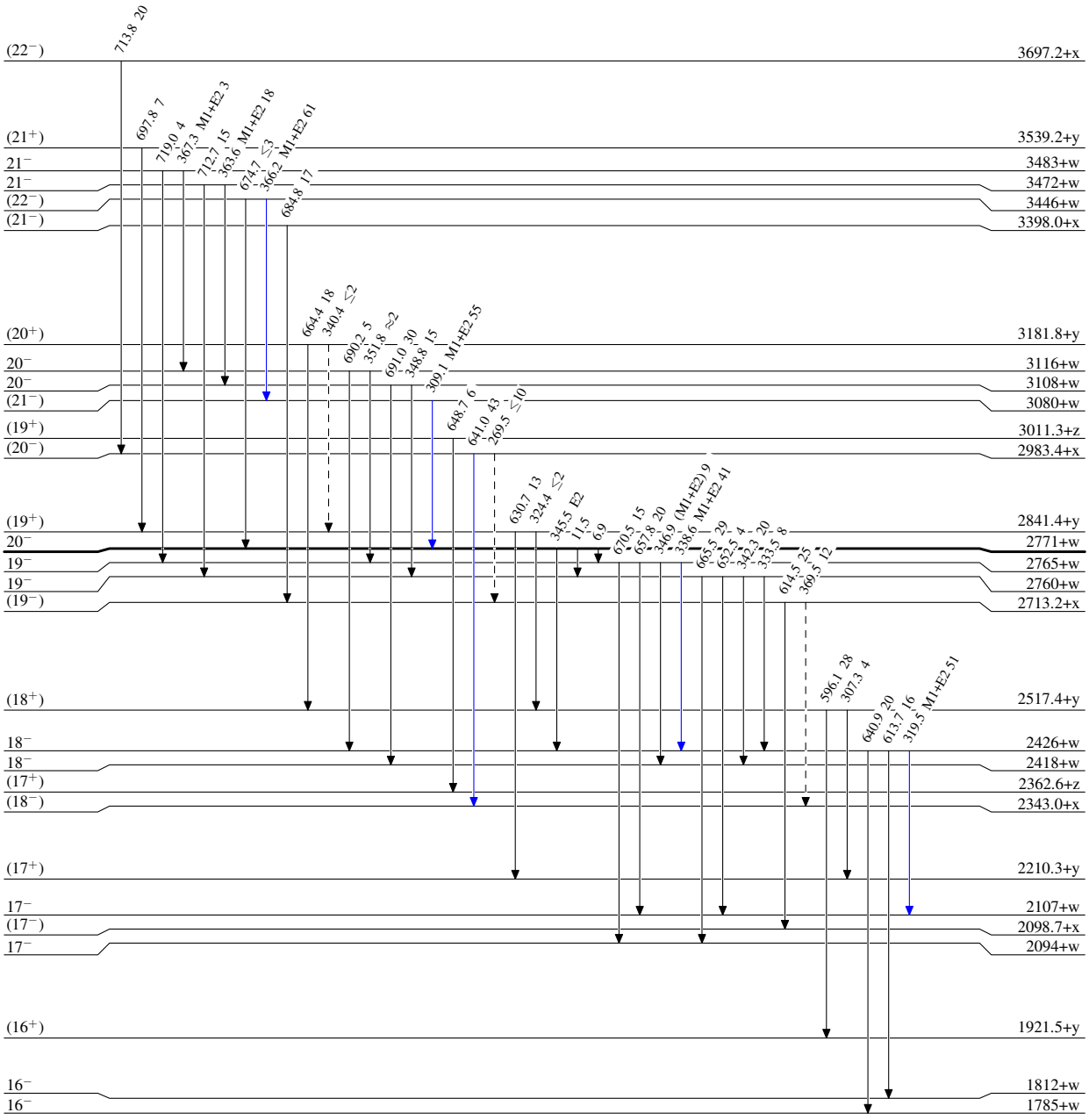
$^{176}_{73}Ta_{103}$

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme (continued)

Intensities: Relative I_γ

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



$^{176}_{73}Ta_{103}$

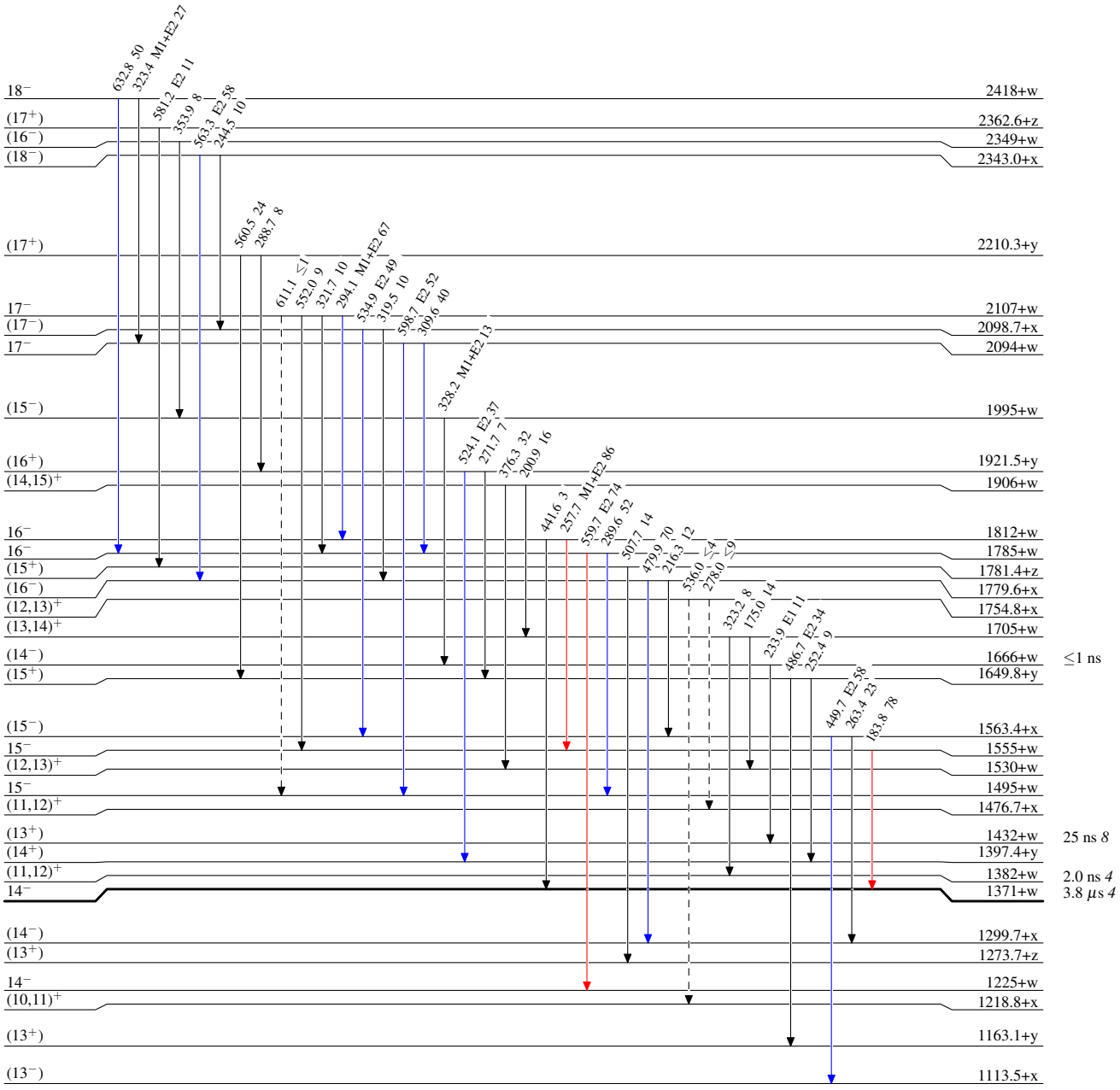
^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



$^{176}_{73}Ta_{103}$

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme (continued)

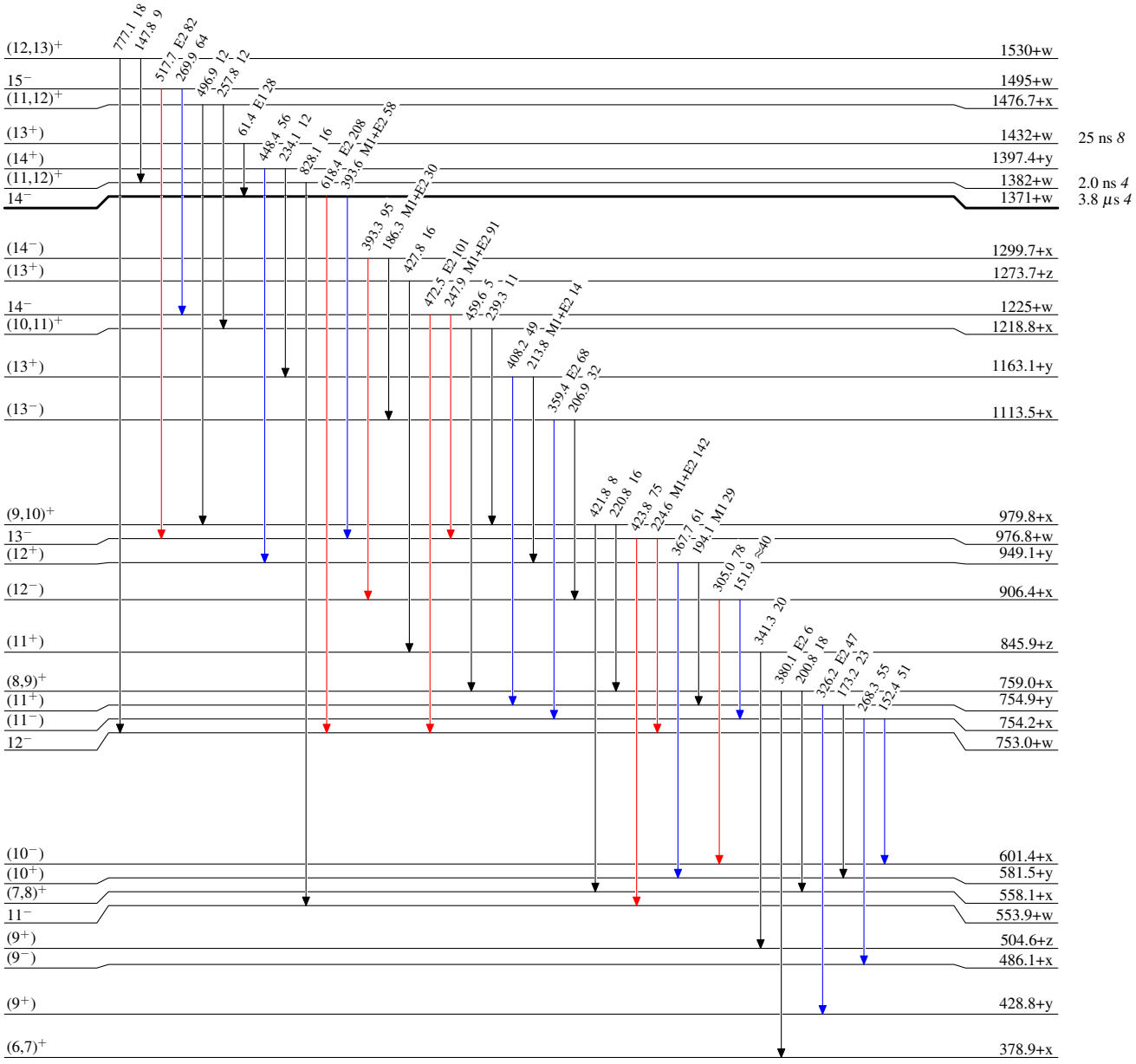
Intensities: Relative I_γ

Legend

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

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

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

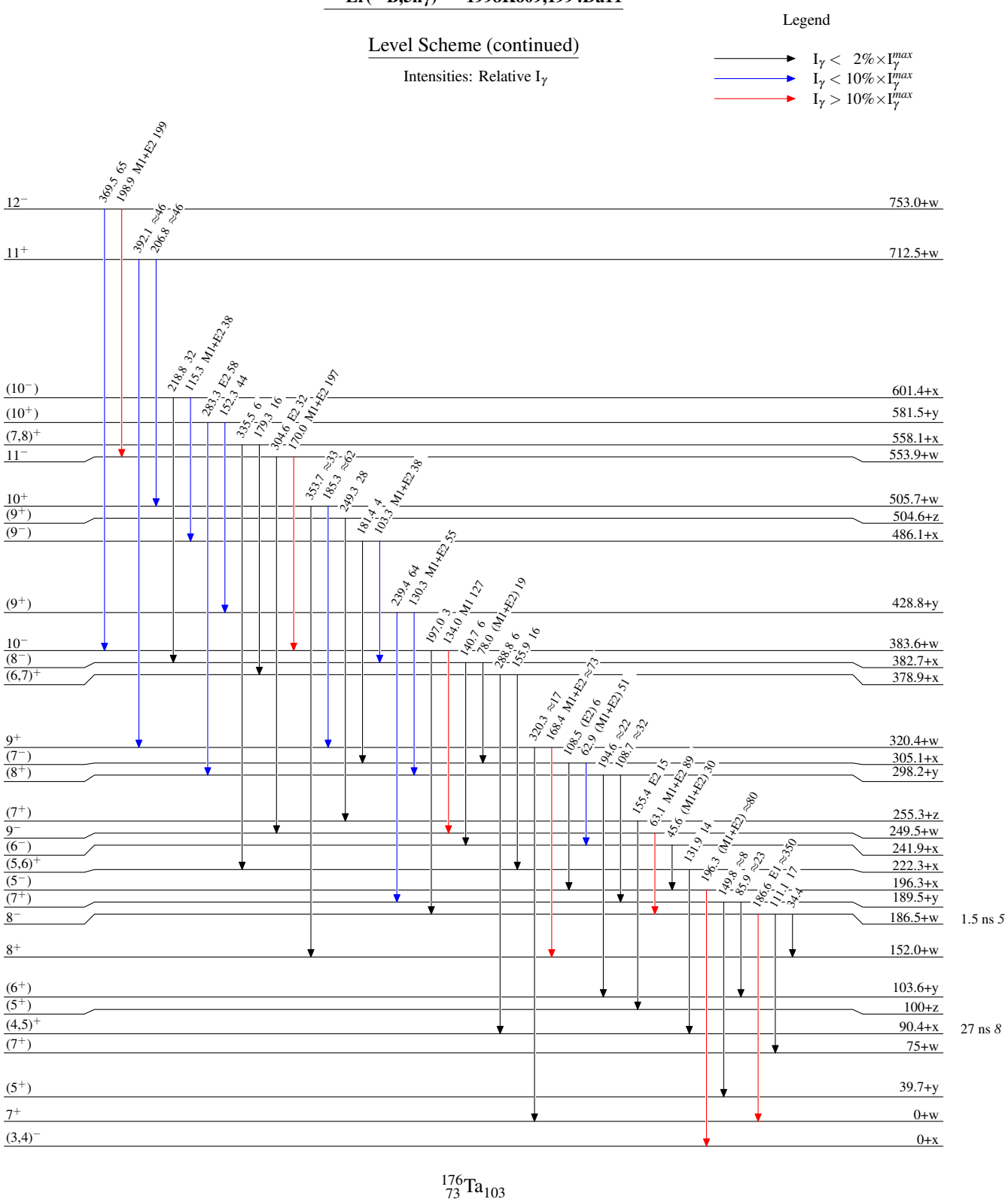


$^{176}_{73}Ta_{103}$

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme (continued)

Intensities: Relative I_γ

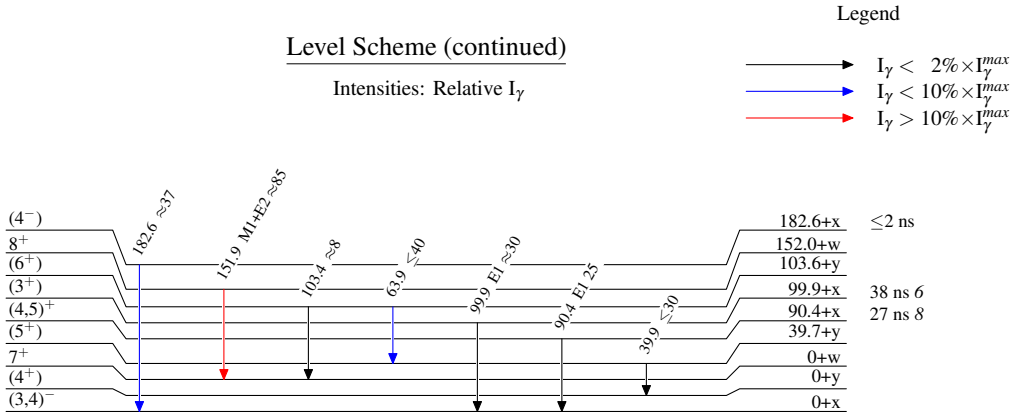


$^{176}_{73}Ta_{103}$

^{170}Er(^{11}B,5nγ) 1998Ko09,1994Da11

Level Scheme (continued)

Intensities: Relative I_γ



$^{176}_{73}Ta_{103}$