^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

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

2000Dr11: ^{176}Yb(^{7}Li,3nγ), E(^{7}Li)=28 MeV. Measured E(ce), I(ce), Eγ, and Iγ using a superconducting solenoidal spectrometer operated in lens mode and a Compton-suppressed Ge detector. Revisions to the level scheme from 1998Dr07 are also given; some changes are based on the new results from 2000Dr11 and some are corrections of typographical errors.

1999Sa59: ^{176}Yb(^{11}B,α3nγ), E(^{11}B)=52 MeV for PEX array and 55, 57 MeV for NORDBALL array. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$-α, $\gamma\gamma(\theta)$(DCO), and $\gamma\gamma$(t) using PEX array and NORDBALL array. PEX array consisted of four Compton-suppressed Euroball Cluster detectors, one Clover detector, and 25 silicon detectors. The NORDBALL array consisted of 18 Compton-suppressed coaxial Ge detectors, two LEPS detectors, and 30 silicon detectors. Configuration assignments using BCS calculations.

1998Dr07, 1996Dr02: ^{176}Yb(^{11}B,α3nγ), E(^{11}B)=55,65 MeV and ^{176}Yb(^{7}Li,3nγ), E(^{7}Li)=28 MeV. Measured Eγ, Iγ, $\gamma\gamma$(t) $\gamma(\theta)$, $\gamma\gamma$, and γ-α coincidences using the CAESAR array consisting of six Compton-suppressed HPGe detectors and a particle array with 14 fast/slow plastic combinations.

The level schemes of 1999Sa59 and 1998Dr07/2000Dr11 are in overall good agreement. Major discrepancies are noted in the comments. As the level scheme of 1999Sa59 is more extensive, it is in general adopted here.

α: Additional information 1.

α: Additional information 2.

^{180}Ta Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
0.0[@]	1$^+$		
39.50[@] *10*	2$^+$		
77.1[e] *8*	9$^-$		Additional information 3.
107.60[j] *10*	0$^-$	19.2 ns *7*	T$_{1/2}$: weighted average of 23 ns *2* (1999Sa59) and 18.7 ns *7* (1998Dr07), both from $\gamma\gamma$(t).
110.50[@] *15*	3$^+$		
130.48[j] *19*	1$^-$		
171.00[j] *17*	2$^-$		
177.76[c] *8*	8$^+$	70.0 ns *14*	T$_{1/2}$: other: 50 ns *19* from $\gamma\gamma$(t) in 1999Sa59.
184.34[@] *17*	4$^+$		
233.90[j] *20*	3$^-$		
279.93[e] *7*	10$^-$		
310.05[@] *18*	5$^+$		
317.80[j] *23*	4$^-$		
356.95 *9*	7$^+$	42 ns *3*	K^{π}=7$^+$, π5/2[402]ν9/2[624]. T$_{1/2}$: weighted average of 55 ns *12* (1999Sa59) and 41 ns *3* (1998Dr07), both from $\gamma\gamma$(t).
374.03[c] *10*	9$^+$		
415.44[@] *19*	6$^+$		
419.51[j] *25*	5$^-$		
423.00[k] *15*	1$^-$		
463.07[d] *13*	7$^-$	31.2 ns *19*	T$_{1/2}$: weighted average of 35 ns *5* (1999Sa59) and 30.5 ns *21* (1998Dr07), both from $\gamma\gamma$(t).
477.46[k] *21*	2$^-$		
505.03[e] *7*	11$^-$		
508.1? *3*	(2)		E(level): reported only in 2000Dr11.
515.64[b] *8*	8$^+$	<1 ns	
519.36[&] *17*	4$^+$	37.4 ns *20*	T$_{1/2}$: weighted average of 48 ns *8* (1999Sa59) and 36.7 ns *21* (1998Dr07), both from $\gamma\gamma$(t). J$^{\pi}$: assignment from 2000Dr11 based on M1 409γ to 3$^+$. J^{π} assignment of 4$^{(-)}$ and 4 in 1998Dr07 and 1999Sa59, respectively.
538.5? *3*	(2)		E(level): reported only in 2000Dr11, 1998Dr07.
543.73[k] *20*	(3$^-$)		

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^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

^{180}Ta Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
547.3[j] *3*	6^-		
574.22[i] *15*	6^-	<2 ns	
575.64[f] *10*	8^+	<1 ns	
591.6[a] *11*	(5^+)	16.1 ns *19*	$T_{1/2}$: weighted average of 13 ns *5* (1999Sa59) and 16.6 ns *21* (1998Dr07), both from $\gamma\gamma$(t). Jπ: proposed as (5^-) in 1998Dr07 and 1999Sa59 based on tentative $4^{(-)}$ assignment to 519.4-keV level.
595.26[c] *10*	10^+		
599.35[@] *19*	7^+		
641.18[&] *19*	5^+		
657.73[k] *22*	(4^-)		
679.97[d] *15*	8^-		
683.85 *14*	(6)		Jπ: assignment from 1998Dr07.
685.7[j] *3*	7^-		
722.6? *5*	(4)		E(level): 732.6 in Table 1 of 1998Dr07 seems a misprint. Level reported only by 1998Dr07, 2000Dr11.
723.21[b] *10*	9^+		
732.2[a] *11*	(6^+)		Jπ: proposed as (6^-) in 1998Dr07 and 1999Sa59 based on (5^-) assignment to 591.6-keV level.
734.22[@] *20*	8^+		
752.12[e] *9*	12^-		
762.89[i] *15*	7^-		
775.8? *11*	(2)		E(level): level reported only by 1998Dr07, 2000Dr11.
786.85[&] *21*	6^+		
806.77[f] *10*	9^+		
830.75 *14*	(6)		Jπ: assignment from 1998Dr07.
840.74[c] *11*	11^+		
856.6[j] *3*	8^-		
865.35 *25*	(7)		Jπ: assignment from 1998Dr07.
890.32 *18*	(7)		Jπ: assignment from 1998Dr07.
893.9[a] *11*	(7^+)		Jπ: proposed as (7^-) in 1998Dr07 and 1999Sa59 based on (6^-) assignment to 732.2-keV level.
907.0 *11*	(7)		E(level): level reported only by 1998Dr07.
922.08[d] *15*	9^-		
956.13[b] *10*	10^+		
956.16[&] *22*	7^+		
975.5[i] *4*	8^-		
976.01[@] *20*	9^+		
1016.45 *17*	(7)		Jπ: assignment from 1998Dr07.
1020.44[e] *10*	13^-		
1030.2[j] *3*	9^-		
1035.0? *11*	(7)		E(level): level reported only by 1998Dr07.
1057.00[f] *10*	10^+		
1076.2[a] *11*	(8^+)		Jπ: proposed as (8^-) in 1998Dr07 and 1999Sa59 based on (7^-) assignment to 893.9-keV level.
1109.87[c] *12*	12^+		
1140.07[@] *21*	10^+		
1148.72[&] *24*	8^+		
1174.84[p] *13*	(11)		Jπ: assignment from 1998Dr07.
1188.54[d] *16*	10^-		
1212.27[b] *11*	11^+		
1215.6[i] *4*	9^-		
1240.7[j] *3*	10^-		
1252.64 *14*			

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^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

^{180}Ta Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
1270.73 *22*			
1277.4[a] *11*	(9$^+$)		J$^{\pi}$: proposed as (9$^-$) in 1998Dr07 and 1999Sa59 based on (8$^-$) assignment to 1076.2-keV level.
1293.24 *22*			
1309.49[e] *11*	14$^-$		
1326.87[f] *12*	11$^+$		
1338.93[o] *8*	11$^-$		
1353.74 *24*			
1363.9[&] *5*	9$^+$		E(level): reported only in 1998Dr07, 2000Dr11.
1389.34[p] *22*			
1401.55[c] *13*	13$^+$		
1434.80[@] *21*	11$^+$		
1446.8[j] *3*	11$^-$		
1452.0[s] *8*	15$^-$	31.2 μs *14*	T$_{1/2}$: from $\gamma\gamma$(t) in 1996Dr02. Other: 30 μs *8* from $\gamma\gamma$(t) in 1999Sa59.
1463.54 *22*			
1478.37[d] *17*	11$^-$		
1490.15[b] *12*	12$^+$		
1498.0[a] *11*	(10$^+$)		J$^{\pi}$: proposed as (10$^-$) in 1998Dr07 and 1999Sa59 based on (9$^-$) assignment to 1277.4-keV level.
1541.63 *13*			
1546.51[o] *18*	(12)		
1573.34 *22*			
1580.7 *4*	(12)		E(level): reported only by 1998Dr07.
1597.20[n] *9*	13$^-$	<1 ns	T$_{1/2}$: Other: <2.4 ns from $\gamma\gamma$(t) in 1998Dr07.
1616.31[f] *14*	12$^+$		
1618.62[e] *12*	15$^-$		
1629.55[@] *22*	12$^+$		E(level): as proposed in 1999Sa59. The 12$^+$ member of the 1$^+$ ground state band is proposed in 1998Dr07, 2000Dr11 at 1774 keV with two tentative depopulating transitions of 337 keV and 532 keV. Both transitions are placed as depopulating the 1967-keV level (13$^+$ member of the 1$^+$ g.s. band) in 1999Sa59.
1671.43[q] *12*	(12)		J$^{\pi}$: assignment from 1998Dr07.
1698.5[j] *3*	12$^-$		
1708.14[h] *14*	11$^{(+)}$	<1 ns	
1715.34[c] *14*	14$^+$		
1734.7[a] *11*	(11$^+$)		J$^{\pi}$: proposed as (11$^-$) in 1998Dr07 and 1999Sa59 based on (10$^-$) assignment to 1498.0-keV level.
1788.16[b] *13*	13$^+$		
1790.12[d] *19*	12$^-$		
1791.9[s] *8*	16$^-$		
1805.61[o] *12*	(13)		
1841.14 *13*	(13$^-$)		J$^{\pi}$: assignment from 1998Dr07.
1863.2[q] *3*			
1879.83[n] *12*	14$^-$		
1904.20[m] *14*	13		
1904.40 *14*			
1924.80[f] *15*	13$^+$		
1941.3[j] *3*	13$^-$		
1941.40[l] *14*	14$^{(+)}$	<1 ns	
1946.80[e] *13*	16$^-$		
1967.47[@] *23*	13$^+$		
1970.84[h] *17*	12$^{(+)}$		

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^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

^{180}Ta Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
2006.08 *24*			
2050.21[c] *16*	15^{+}		
2071.00 *22*			
2105.05[b] *14*	14^{+}		
2122.8[d] *3*	13^{-}		
2124.63[o] *22*	(14)		
2156.9[s] *8*	17^{-}		
2159.8[q] *4*			
2182.46[n] *12*	15^{-}		
2186.6[m] *4*	14		
2197.45[@] *24*	14^{+}		
2261.0[h] *3*	13$^{(+)}$		
2294.05[e] *13*	17^{-}		
2320.80[l] *17*	15$^{(+)}$		
2327.6[r] *10*	(16^{+})		
2343.9 *3*			
2354.24 *24*			
2402.39[g] *16*	16^{+}		E(level): band assignment from 1999Sa59. 1998Dr07 identify level as member of ν9/2[624]π7/2[404] band.
2410.03[c] *16*	16^{+}		E(level): band assignment from 1999Sa59. Not assigned to a particular band structure in 1998Dr07.
2438.29[b] *16*	15^{+}		
2456.3[q] *4*			
2503.95[n] *13*	16^{-}		
2544.9[s] *8*	18^{-}		
2562.3 *8*			
2567.58[@] *25*	15^{+}		
2587.9[t] *8*	18$^{(+)}$	22 ns *2*	T$_{1/2}$: weighted average of 22 ns *5* (1999Sa59) and 22 ns *2* (1998Dr07), both from $\gamma\gamma$(t).
2657.82[e] *15*	18^{-}		
2660.43[g] *16*	17^{+}		
2672.1[r] *8*	(17^{+})		
2721.20[l] *20*	16$^{(+)}$		
2780.31[c] *19*	17^{+}		
2787.54[b] *17*	16^{+}		
2842.5[@] *4*	16^{+}		
2844.05[n] *16*	17^{-}		E(level): as proposed by 1999Sa59. The 17^{-} band member is reported at 2860 keV and decaying by a 676γ in 1998Dr07.
2899.4[u] *8*	19^{-}	<2 ns	
2943.61[g] *16*	18^{+}		
2954.2[s] *8*	19^{-}		
2985.1[t] *8*	19$^{(+)}$		
3041.25[e] *17*	19^{-}		
3047.8[r] *8*	(18^{+})		
3141.40[l] *22*	17$^{(+)}$		
3148.1[b] *4*	17^{+}		E(level): as proposed by 1999Sa59. The 17^{+} band member is reported at 3136 keV and decaying by a tentative 696γ in 1998Dr07.
3173?[c] *4*	18^{+}		
3173.2 *4*			
3200.7[n] *5*	18^{-}		
3253.29[g] *18*	19^{+}		
3308.6[u] *8*	20^{-}		

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^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

^{180}Ta Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
3383.5[s] 8	20$^-$	
3400.1[t] 8	20$^{(+)}$	
3435.1[e] 4	20$^-$	
3435.5[r] 14	(19$^+$)	
3532.3 8		
3582.9?[c] 14	(19$^+$)	
3738.0[u] 8	21$^-$	
3828.3[s] 8	21$^-$	
3831.8[t] 8	21$^{(+)}$	
3853.4?[e] 5	(21$^-$)	
4186.3[u] 8	22$^-$	E(level): as proposed by 1999Sa59. A (22), 4201-keV level decaying by a 462γ is proposed by 1998Dr07.

[†] From a least-squares fit to Eγ by evaluator.
[‡] From multipolarities of γ transitions and assumed band structure. The J^{π} assignments from 1999Sa59 and 1998Dr07/2000Dr11 are in good agreement; exceptions are noted in the comments.
[#] From $\gamma\gamma$(t) in 1999Sa59, except where noted.
[@] Band(A): $K^{\pi}=1^+$ band, $\pi 7/2^+[404]\nu 9/2^+[624]$.
[&] Band(B): K=4$^+$ band, $\pi 9/2^-[514]\nu 1/2^-[521]$.
[a] Band(C): K=(5$^+$) band, $\pi 9/2^-[514]\nu 1/2^-[510]$ (2000Dr11).
[b] Band(D): $K^{\pi}=8^+$ band, $\pi 9/2^-[514]\nu 7/2^-[503]$.
[c] Band(E): $K^{\pi}=8^+$ band, $\pi 7/2^+[404]\nu 9/2^+[624]$.
[d] Band(F): $K^{\pi}=7^-$ band, $\pi 7/2^+[404]\nu 7/2^-[514]$.
[e] Band(G): $K^{\pi}=9^-$ band, $\pi 9/2^-[514]\nu 9/2^+[624]$.
[f] Band(H): $K^{\pi}=8^+$ band, $\pi 9/2^-[514]\nu 7/2^-[514]$.
[g] Band(I): $K^{\pi}=8^+$ band, $\pi 7/2^+[404]\nu 9/2^+[624]\otimes[\nu i^2_{13/2}]$.
[h] Band(J): $K^{\pi}=11^+$ band, $\pi 7/2^+[404]\nu 9/2^+[624]\nu 1/2^-[510]\nu 7/2^-[514]$.
[i] Band(K): $K^{\pi}=6^-$ band, $\pi 7/2^+[404]\nu 5/2^-[512]$.
[j] Band(L): $K^{\pi}=0^-$ band, $\pi 9/2^-[514]\nu 9/2^+[624]$.
[k] Band(M): $K^{\pi}=1^-$ band, $\pi 7/2^+[404]\nu 5/2^-[512]$.
[l] Band(N): $K^{\pi}=14^{(+)}$ band, 4-quasiparticle band.
[m] Band(O): K=13 band, $\pi 7/2^+[404]\nu 9/2^+[624]\nu 7/2^-[514]\nu 3/2^-[512]$.
[n] Band(P): $K^{\pi}=13^-$ band, $\nu 9/2^+[624]\nu 5/2^-[512]\nu 3/2^-[512]$ $\pi 9/2^-[514]$ (1999Sa59) or $\nu 9/2^+[624]\nu 7/2^-[514]\nu 1/2^-[510]$ $\pi 9/2^-[514]$ (1998Dr07).
[o] Band(Q): $K^{\pi}=11^-$ band, $\nu 9/2^+[624]\pi 9/2^-[514]\otimes(\gamma-$vibration).
[p] Band(R): octupole band.
[q] Band(S): β band.
[r] Band(T): K=(16) band, $\nu 9/2^+[624]$ $\pi 5/2^+[402]\pi 7/2^+[404]\pi 9/2^-[514]\otimes$ (octupole vibration).
[s] Band(U): $K^{\pi}=15^-$ band, $\nu 9/2^+[624]$ $\pi 9/2^-[514]\pi 7/2^+[404]\pi 5/2^-[402]$.
[t] Band(V): $K^{\pi}=18^{(+)}$ band, $\nu 9/2^+[624]\nu 7/2^-[514]\nu 11/2^+[615]$ $\pi 9/2^-[514]$.
[u] Band(W): $K^{\pi}=19^-$ band, $\nu 9/2^+[624]\nu 7/2^-[514]\nu 1/2^-[510]$ $\pi 5/2^+[402]\pi 7/2^+[404]\pi 9/2^-[514]$.

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

$\gamma(^{180}Ta)$

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α	Iγ[&]	Comments
(23[@])		130.48	1^-	107.60	0^-				
39.5 *1*	2.1 *4*	39.50	2^+	0.0	1^+			9.5 *22*	
40.7 *1*	7.3 *8*	171.00	2^-	130.48	1^-	(M1)	10.21 *17*	11 *2*	Mult.: from intensity balance in 1998Dr07.
55.4 *3*	5.9 *16*	477.46	2^-	423.00	1^-			14 *3*	
62.9 *1*	16.4 *14*	233.90	3^-	171.00	2^-	(M1)	2.84	37 *3*	Mult.: from intensity balance in 1998Dr07.
63.2[@]		171.00	2^-	107.60	0^-			≈1.5	
65.6 *3*	4.5 *16*	543.73	(3^-)	477.46	2^-			≈7	
71.0 *1*	3.5 *5*	110.50	3^+	39.50	2^+			22 *4*	
72.2		591.6	(5^+)	519.36	4^+	M1(+E2)	12.6 *16*	≈1.5	α(exp)≈10 from intensity balance (1998Dr07). Mult.: from α(exp).
73.9 *1*	3.6 *6*	184.34	4^+	110.50	3^+			≈14	
83.9 *1*	8.1 *4*	317.80	4^-	233.90	3^-	(M1)	7.22	12.0 *15*	Mult.: from intensity balance in 1998Dr07.
100.6 *1*	69.0 *20*	177.76	8^+	77.1	9^-	E1	0.361	130 *12*	α(exp)=2.5 *3* (1999Sa59) from intensity balance. Mult.: α(exp) gives E1+M2 with δ=0.242 *18*. However, δ value is inconsistent with RUL for M2 transition. A_2=−0.06 *5* (1998Dr07).
101.7 *1*	10.2 *5*	419.51	5^-	317.80	4^-	(M1)	4.16	20.5 *15*	Mult.: from intensity balance in 1998Dr07.
105.4 *1*	6.7 *6*	415.44	6^+	310.05	5^+			6.7 *11*	
107.6 *1*	60 *5*	107.60	0^-	0.0	1^+	E1	0.303	160 *12*	α(exp)=0.03 *3* (1999Sa59) from intensity balance. Mult.: from α(exp). A_2=−0.01 *3* (1998Dr07).
111.1 *1*	2.63 *19*	574.22	6^-	463.07	7^-	M1(+E2)	2.8 *4*	≈6	α(exp)=2.6 *5* (1999Sa59) from intensity balance. Mult.: from α(exp).
114[@a]		538.5?	(2)	423.00	1^-				
114.0 *1*	1.7 *5*	657.73	(4^-)	543.73	(3^-)			7.8 *21*	
121.8 *1*	2.52 *24*	641.18	5^+	519.36	4^+			7.0 *12*	
125.7 *1*	25 *3*	310.05	5^+	184.34	4^+			9.9 *15*	
127.6 *1*	13.6 *5*	547.3	6^-	419.51	5^-	(M1)	2.17	24.0 *22*	A_2=−0.31 *13*. Mult.: from intensity balance in 1998Dr07.
134.8 *1*	7.3 *3*	734.22	8^+	599.35	7^+			2.9 *8*	
138.3 *1*	12.6 *5*	685.7	7^-	547.3	6^-			23 *3*	A_2=−0.19 *9* (1998Dr07).
140.6 *1*	1.95 *22*	732.2	(6^+)	591.6	(5^+)			9.5 *10*	
142.4[@]		1452.0	15^-	1309.49	14^-	(M1)	1.590	3.0 *7*	α(exp)=1.8 *3* (1996Dr02) from intensity balance. Mult.: from α(exp).
145.6 *1*	3.10 *22*	786.85	6^+	641.18	5^+			5.8 *8*	
147.8 *3*	0.24 *8*	723.21	9^+	575.64	8^+				
158.6 *1*	5.9 *3*	515.64	8^+	356.95	7^+	(M1)	1.173	6.4 *9*	Mult.: from conversion coefficient limit in 1998Dr07.
161.5 *1*	6.9 *5*	893.9	(7^+)	732.2	(6^+)			7.3 *7*	
164.0 *1*	3.73 *17*	1140.07	10^+	976.01	9^+			2.1 *4*	
169.2 *1*	2.76 *19*	956.16	7^+	786.85	6^+			2.6 *5*	
170.9 *1*	15.9 *5*	856.6	8^-	685.7	7^-			25.0 *23*	A_2=−0.20 *9* (1998Dr07).
173.5 *1*	12.0 *4*	1030.2	9^-	856.6	8^-			18.8 *19*	A_2=−0.10 *23* (1998Dr07).

$^{180}_{73}Ta_{107}$-6

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

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

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α	Iγ[&]	Comments
178[@a]		722.6?	(4)	543.73	(3$^-$)					
178.9 *1*	17.2 *10*	356.95	7$^+$	177.76	8$^+$	M1		0.836	16.4 *12*	α(exp)=0.96 *10* (1999Sa59) from intensity balance. Mult.: from α(exp). A_2=−0.14 *3* (1998Dr07).
178.9 *2*	0.64 *11*	1353.74		1174.84	(11)					
181.5 *2*	0.62 *11*	865.35	(7)	683.85	(6)				0.7 *2*	
182.1 *1*	4.2 *3*	1076.2	(8$^+$)	893.9	(7$^+$)				3.4 *9*	
183.9 *1*	15.5 *7*	599.35	7$^+$	415.44	6$^+$				10.1 *16*	A_2=+0.21 *12* (1998Dr07).
185.3[@]		419.51	5$^-$	233.90	3$^-$				3.2 *5*	I_γ: Iγ(185γ)/Iγ(102γ)≤0.19 (1998Dr07).
185.7 *1*	0.70 *10*	1016.45	(7)	830.75	(6)				0.5 *2*	
188.6 *1*	1.28 *13*	762.89	7$^-$	574.22	6$^-$				0.5 *2*	
192.5 *1*	1.28 *14*	1148.72	8$^+$	956.16	7$^+$				1.3 *3*	
194.7 *1*	1.74 *12*	1629.55	12$^+$	1434.80	11$^+$					
196.2 *1*	63.7 *23*	374.03	9$^+$	177.76	8$^+$	D+Q	4.7 *11*	0.49 *18*	26.2 *18*	R(DCO)=1.4 *2* (1334γ gated) (1999Sa59). δ(E2/M1) given as 3.6 to 5.8 in 1999Sa59 based on R(DCO). A_2=+0.02 *7* (1998Dr07).
200.8 *1*	2.25 *23*	1277.4	(9$^+$)	1076.2	(8$^+$)				1.5 *3*	
202.7 *1*	140 *4*	279.93	10$^-$	77.1	9$^-$				216 *8*	A_2=+0.20 *7* (1998Dr07).
202.7 *1*	0.79 *22*	1541.63		1338.93	11$^-$					
205.9 *1*	5.34 *21*	1446.8	11$^-$	1240.7	10$^-$				8.5 *14*	
207.5 *1*	18.5 *7*	723.21	9$^+$	515.64	8$^+$				6.2 *13*	
209.3 *1*	1.1 *4*	519.36	4$^+$	310.05	5$^+$				5.5 *6*	
210.0[a] *1*	≤0.09	975.5	8$^-$	762.89	7$^-$					
210.5 *1*	11.2 *4*	1240.7	10$^-$	1030.2	9$^-$				16.0 *15*	A_2=−0.45 *24* (1998Dr07).
214[@a]		722.6?	(4)	508.1?	(2)					
214[@]		1363.9	9$^+$	1148.72	8$^+$				≈0.6	
216.8 *1*	5.7 *3*	679.97	8$^-$	463.07	7$^-$				4.4 *6*	
218.0[@]		574.22	6$^-$	356.95	7$^+$				5.1 *6*	
218.5 *1*	7.1 *4*	575.64	8$^+$	356.95	7$^+$				2.4 *3*	
220.0 *2*	0.91 *17*	1498.0	(10$^+$)	1277.4	(9$^+$)				0.8 *2*	
221.1 *1*	24.4 *8*	595.26	10$^+$	374.03	9$^+$				9.0 *16*	
225.0 *1*	98 *3*	505.03	11$^-$	279.93	10$^-$	D+Q	0.4		142 *9*	R(DCO)=1.1 *1* (1092γ E2 gated) (1999Sa59). δ: from R(DCO) analysis. A_2=+0.17 *9* (1998Dr07).
229.7 *5*	0.80 *13*	547.3	6$^-$	317.80	4$^-$				3.2 *4*	I_γ: Iγ(230γ)/Iγ(128γ)≤0.19 (1998Dr07).
231.0 *5*	3.1 *3*	415.44	6$^+$	184.34	4$^+$				3.4 *4*	I_γ: Iγ(231γ)/Iγ(105γ)=0.50 *13* (1998Dr07).
231.0 *1*	4.7 *3*	806.77	9$^+$	575.64	8$^+$	D			0.9 *2*	R(DCO)=0.7 *2* (398γ gated) (1999Sa59).
232.8 *1*	12.7 *5*	956.13	10$^+$	723.21	9$^+$				3.3 *5*	
236.8 *2*	0.32 *12*	1734.7	(11$^+$)	1498.0	(10$^+$)				≈0.4	
241.7 *1*	8.9 *4*	976.01	9$^+$	734.22	8$^+$				4.8 *6*	
241.8 *1*	2.33 *14*	922.08	9$^-$	679.97	8$^-$				2.0 *4*	

$^{180}_{73}Ta_{107}$-7

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

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

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α	Iγ[&]	Comments
242.8 *1*	2.89 *13*	1941.3	13^-	1698.5	12^-				≈3	
245.4 *1*	8.2 *3*	840.74	11^+	595.26	10^+				2.4 *3*	
246.9 *1*	49.8 *16*	752.12	12^-	505.03	11^-				67 *4*	A_2=+0.20 *9* (1998Dr07).
250.0 *1*	4.02 *23*	1057.00	10^+	806.77	9^+				≈0.8	
250.2 *1*	0.89 *8*	2660.43	17^+	2410.03	16^+					
251.6 *1*	4.21 *18*	1698.5	12^-	1446.8	11^-				4.0 *6*	
252.1 *1*	8.5 *5*	423.00	1^-	171.00	2^-				13.6 *17*	A_2=−0.18 *4* (1998Dr07).
256.0[@]		830.75	(6)	574.22	6^-				1.2 *4*	
256.0 *1*	7.2 *3*	1212.27	11^+	956.13	10^+				1.5 *3*	
257.8 *1*	0.90 *8*	2660.43	17^+	2402.39	16^+					
258.3 *1*	9.2 *4*	1597.20	13^-	1338.93	11^-	Q			12 *3*	R(DCO)=1.2 *2* (1262γ gated) (1999Sa59).
262.7 *1*	1.26 *13*	1970.84	$12^{(+)}$	1708.14	$11^{(+)}$					
266.2 *1*	1.25 *10*	1188.54	10^-	922.08	9^-				1.0 *2*	
266.4 *1*	1.01 *12*	685.7	7^-	419.51	5^-				3.4 *8*	I_γ: Iγ(266γ)/Iγ(138γ)≤0.16 (1998Dr07).
268.2 *7*	0.34 *20*	786.85	6^+	519.36	4^+				1.8 *3*	I_γ: Iγ(268γ)/Iγ(146γ)=0.31 *6* (1998Dr07).
268.2 *1*	26.8 *9*	1020.44	13^-	752.12	12^-				48 *3*	A_2=+0.10 *5* (1998Dr07).
268.9 *1*	4.13 *20*	1109.87	12^+	840.74	11^+				2.0 *3*	
269.7 *1*	2.79 *18*	1326.87	11^+	1057.00	10^+				≈0.5	
277.6 *1*	3.39 *16*	1490.15	12^+	1212.27	11^+				1.0 *3*	
282.4 *3*	0.37 *11*	2186.6	14	1904.20	13					
282.6 *1*	6.4 *3*	1879.83	14^-	1597.20	13^-				6 *1*	
282.9 *1*	0.53 *8*	2943.61	18^+	2660.43	17^+					
285.3 *1*	14.3 *9*	463.07	7^-	177.76	8^+	E1(+M2)	<0.3	0.10 *6*	16.3 *22*	α(exp)=0.30 *11* (1999Sa59) from intensity balance, α(K)exp≤0.08 (2000Dr11). Mult.,δ: from α(K)exp. Other: 0.65 *19* from α(exp) gives M2 strength inconsistent with RUL. A_2=−0.13 *4* (1998Dr07).
288.8 *1*	14.0 *5*	1309.49	14^-	1020.44	13^-				21 *3*	
289.3 *1*	3.3 *3*	599.35	7^+	310.05	5^+				5.7 *9*	I_γ: Iγ(289γ)/Iγ(184γ)=0.56 *11* (1998Dr07).
289.3 *1*	1.80 *16*	1616.31	12^+	1326.87	11^+					
289.8 *1*	0.46 *9*	1478.37	11^-	1188.54	10^-				0.4 *2*	
290.1 *2*	0.41 *9*	2261.0	$13^{(+)}$	1970.84	$12^{(+)}$					
291.0 *2*	0.90 *14*	806.77	9^+	515.64	8^+					
291.3 *1*	1.78 *14*	1401.55	13^+	1109.87	12^+				0.6 *2*	
294.7 *1*	3.41 *17*	1434.80	11^+	1140.07	10^+				2.5 *6*	
295.0 *5*	0.29 *9*	975.5	8^-	679.97	8^-					
297.9 *1*	1.41 *10*	1788.16	13^+	1490.15	12^+				0.5 *1*	
299.9 *1*	1.45 *15*	762.89	7^-	463.07	7^-				1.7 *3*	
302.4 *8*	2.0 *5*	893.9	(7^+)	591.6	(5^+)				2.0 *4*	I_γ: Iγ(302γ)/Iγ(162γ)=0.28 *6* (1998Dr07).
302.4 *1*	2.15 *13*	2182.46	15^-	1879.83	14^-				≈1.5	
307.0 *1*	2.62 *20*	1904.20	13	1597.20	13^-				≈3	R(DCO)=1.4 *7* (1092γ E2 gated) (1999Sa59).
308.2 *2*	0.59 *12*	1924.80	13^+	1616.31	12^+					
308.9 *1*	7.2 *3*	1618.62	15^-	1309.49	14^-				10.9 *15*	

$^{180}_{73}Ta_{107}$-8

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

γ(^{180}Ta) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α	Iγ[&]	Comments
309.1 *1*	1.34 *14*	856.6	8^-	547.3	6^-				6.3 *11*	I_γ: Iγ(309γ)/Iγ(171γ)=0.17 *6* (1998Dr07).
309.7 *1*	0.46 *8*	3253.29	19^+	2943.61	18^+					
311.5 *4*	0.20 *7*	1790.12	12^-	1478.37	11^-				≈0.4	
311.5 *1*	3.22 *15*	2899.4	19^-	2587.9	$18^{(+)}$	D			11.0 *15*	R(DCO)=0.9 *2* (431γ gated) (1999Sa59). A_2=−0.40 *17* (1998Dr07).
313.5 *1*	1.03 *9*	1715.34	14^+	1401.55	13^+					
315.2 *2*	1.17 *19*	956.16	7^+	641.18	5^+				2.0 *6*	I_γ: Iγ(315γ)/Iγ(169γ)=0.78 *16* (1998Dr07).
315.4 *1*	12.7 *5*	423.00	1^-	107.60	0^-	M1		0.1763	26.3 *20*	α(K)exp=0.23 *3* (2000Dr11). Mult.: from α(K)exp. A_2=−0.11 *3* (1998Dr07).
316.1 *1*	1.31 *17*	890.32	(7)	574.22	6^-				0.5 *2*	
316.8 *1*	0.72 *9*	2105.05	14^+	1788.16	13^+				≈0.2	
318.8 *1*	6.8 *4*	734.22	8^+	415.44	6^+				3.9 *7*	I_γ: Iγ(319γ)/Iγ(135γ)=1.4 *6* (1998Dr07).
321.3 *1*	0.96 *10*	2503.95	16^-	2182.46	15^-				≈1	
325.5[@]		1904.20	13	1580.7	(12)				≈3.5	
326.9 *1*	2.2 *3*	683.85	(6)	356.95	7^+				2.5 *3*	
328.0 *1*	3.32 *16*	1946.80	16^-	1618.62	15^-				6.2 *10*	
332[@]		907.0	(7)	574.22	6^-				0.6 *2*	
332.5 *1*	2.08 *23*	1671.43	(12)	1338.93	11^-				2.2 *6*	
332.5 *2*	0.41 *8*	2438.29	15^+	2105.05	14^+					
333.9 *4*	0.45 *12*	1057.00	10^+	723.21	9^+					
335[@]		2122.8	13^-	1788.16	13^+				≈0.2	
335.1 *1*	0.55 *23*	519.36	4^+	184.34	4^+				6.8 *8*	
337.8 *1*	22.3 *10*	515.64	8^+	177.76	8^+	M1+E2	0.72 *19*	0.116 *11*	19.2 *15*	α(K)exp=0.094 *9* (2000Dr11). Mult.,δ: from α(K)exp. R(DCO)=1.1 *3* (441γ E2 gated) (1999Sa59). A_2=+0.35 *5* (1998Dr07).
337.9 *1*	0.96 *11*	1967.47	13^+	1629.55	12^+					
339.8 *1*	48.2 *18*	1791.9	16^-	1452.0	15^-	(D)			22.1 *18*	R(DCO)=0.73 *28* (880γ gated) (1999Sa59). A_2=+0.28 *12* (1998Dr07).
339.8 *6*	0.21 *9*	2844.05	17^-	2503.95	16^-					
344.1 *1*	2.5 *4*	1076.2	(8^+)	732.2	(6^+)				5.2 *8*	I_γ: Iγ(344γ)/Iγ(182γ)=1.5 *2* (1998Dr07).
344.2 *1*	8.8 *4*	1941.40	$14^{(+)}$	1597.20	13^-	D			8.0 *15*	R(DCO)=0.7 *2* (1092γ E2 gated) (1999Sa59).
344.6 *8*	0.15 *9*	2672.1	(17^+)	2327.6	(16^+)					
344.7 *1*	1.71 *14*	1030.2	9^-	685.7	7^-				5.4 *10*	I_γ: Iγ(345γ)/Iγ(174γ)=0.19 *6* (1998Dr07).
346.8 *1*	1.79 *23*	477.46	2^-	130.48	1^-				3.8 *8*	
347.0 *1*	1.73 *12*	2294.05	17^-	1946.80	16^-				2.4 *7*	
349.0 *1*	3.98 *23*	723.21	9^+	374.03	9^+				2.8 *7*	
349.0 *9*	0.16 *9*	2787.54	16^+	2438.29	15^+					
354.4 *2*	0.39 *6*	2899.4	19^-	2544.9	18^-					
361[@a]		956.13	10^+	595.26	10^+					
361.9 *13*	0.14 *6*	3148.1	17^+	2787.54	16^+					

$^{180}_{73}Ta_{107}$-9

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

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

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult. #	α	$I\gamma$ &	Comments
362.1 *2*	1.06 *16*	1148.72	8^+	786.85	6^+			1.7 *3*	I_γ: $I\gamma(362\gamma)/I\gamma(193\gamma)=1.3$ *4* (1998Dr07).
363.6 *1*	0.75 *10*	2657.82	18^-	2294.05	17^-			≈1	
364.9 *1*	23.9 *8*	2156.9	17^-	1791.9	16^-			11.6 *16*	$A_2=-0.06$ *4* (1998Dr07).
366.4 *4*	1.58 *18*	723.21	9^+	356.95	7^+			0.8 *2*	
372.8 *1*	6.8 *4*	543.73	(3^-)	171.00	2^-			3.6 *5*	
373.1 *2*	0.35 *8*	2343.9		1970.84	$12^{(+)}$				
376.3 *2*	0.42 *8*	3047.8	(18^+)	2672.1	(17^+)				
376.7 *1*	3.15 *20*	976.01	9^+	599.35	7^+			2.4 *5*	I_γ: $I\gamma(377\gamma)/I\gamma(242\gamma)=0.50$ *2* (1998Dr07).
378 @a		508.1?	(2)	130.48	1^-				
379.4 *1*	4.29 *19*	2320.80	$15^{(+)}$	1941.40	$14^{(+)}$	D		4.0 *9*	R(DCO)=1.2 *2* (344γ gated) (1999Sa59).
383.7 *1*	2.2 *3*	1277.4	(9^+)	893.9	(7^+)			2.5 *3*	I_γ: $I\gamma(384\gamma)/I\gamma(201\gamma)=1.6$ *4* (1998Dr07).
384.0 @		423.00	1^-	39.50	2^+			≈1	
384.0 *1*	1.21 *12*	1240.7	10^-	856.6	8^-			3.8 *8*	I_γ: $I\gamma(384\gamma)/I\gamma(211\gamma)=0.30$ *7* (1998Dr07).
388.0 *1*	6.5 *3*	2544.9	18^-	2156.9	17^-			2.2 *3*	
397.1 *1*	2.44 *13*	2985.1	$19^{(+)}$	2587.9	$18^{(+)}$			8.8 *7*	
398.1 *1*	9.2 *6*	575.64	8^+	177.76	8^+			5.6 *7*	
400.4 *1*	1.55 *10*	2721.20	$16^{(+)}$	2320.80	$15^{(+)}$			≈3	
401.8 *5*	0.35 *11*	975.5	8^-	574.22	6^-				
402 @a		865.35	(7)	463.07	7^-				
405.9 *1*	6.2 *3*	1140.07	10^+	734.22	8^+			3.0 *6*	I_γ: $I\gamma(406\gamma)/I\gamma(164\gamma)=1.4$ *7* (1998Dr07).
407.5 @		1363.9	9^+	956.16	7^+			≈0.8	
408.8 *1*	3.6 *14*	519.36	4^+	110.50	3^+	M1	0.0883	45 *12*	α(K)exp=0.082 *7*, α(L)exp≤0.021, α(M)exp≈0.004 (2000Dr11). Mult.: from α(K)exp. $A_2=-0.16$ *5* (1998Dr07).
409.2 *1*	2.43 *17*	2954.2	19^-	2544.9	18^-			≈1.5	
409.3 *1*	2.04 *14*	3308.6	20^-	2899.4	19^-	D		≈2.2	R(DCO)=1.1 *2* (312γ gated) (1999Sa59).
415.0 *1*	0.74 *7*	3400.1	$20^{(+)}$	2985.1	$19^{(+)}$			0.5 *1*	
416.7 *1*	1.24 *11*	1446.8	11^-	1030.2	9^-			3.2 *7*	I_γ: $I\gamma(417\gamma)/I\gamma(206\gamma)=0.6$ *2* (1998Dr07).
417.5 *1*	35.4 *13*	595.26	10^+	177.76	8^+	E2	0.0321	15.0 *13*	α(K)exp=0.020 *3* (2000Dr11). Mult.: from α(K)exp. $A_2=+0.24$ *7* (1998Dr07). I_γ: $I\gamma(418\gamma)/I\gamma(221\gamma)=2.3$ *4* (1998Dr07).
420.2 *1*	0.73 *7*	3141.40	$17^{(+)}$	2721.20	$16^{(+)}$				
422.0 *1*	1.62 *21*	1498.0	(10^+)	1076.2	(8^+)			1.4 *4*	I_γ: $I\gamma(422\gamma)/I\gamma(220\gamma)=1.9$ *7* (1998Dr07).
424.0 @a		423.00	1^-	0.0	1^+				
428.0 *1*	22.1 *9*	505.03	11^-	77.1	9^-	Q		37 *3*	R(DCO)=1.1 *4* (1092γ E2 gated) (1999Sa59). $A_2=+0.33$ *10* (1998Dr07). I_γ: $I\gamma(428\gamma)/I\gamma(225\gamma)=0.29$ *2* (1998Dr07).
429.3 *1*	0.47 *10*	3738.0	21^-	3308.6	20^-			≈3	
429.4 *1*	1.00 *14*	3383.5	20^-	2954.2	19^-				
431.0 *1*	9.6 *4*	2587.9	$18^{(+)}$	2156.9	17^-	D		22.9 *15*	$A_2=-0.20$ *6* (1998Dr07).
431.7		1452.0	15^-	1020.44	13^-			40	E_γ: from 1998Dr07.

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

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

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Iγ[&]	Comments
432.1 *3*	0.27 *8*	3831.8	$21^{(+)}$	3400.1	$20^{(+)}$			
432.8 *1*	3.56 *23*	806.77	9^+	374.03	9^+		≈1	
438.6 *1*	1.50 *19*	515.64	8^+	77.1	9^-			
440.5 *1*	4.67 *25*	956.13	10^+	515.64	8^+		1.8 *3*	I_γ: Iγ(441γ)/Iγ(233γ)=0.58 *5* (1998Dr07).
444.8 *1*	0.54 *7*	3828.3	21^-	3383.5	20^-			
448.3 *1*	0.57 *5*	4186.3	22^-	3738.0	21^-			
449.8 *1*	1.11 *16*	806.77	9^+	356.95	7^+		≈4	
452.7 *3*	0.47 *10*	1215.6	9^-	762.89	7^-			
457.3 *1*	1.47 *19*	1734.7	(11^+)	1277.4	(9^+)		≈1	
457.9 *1*	1.11 *9*	1698.5	12^-	1240.7	10^-			
458.8 *1*	2.30 *15*	1434.80	11^+	976.01	9^+		≈1.5	
459.1 *1*	1.86 *16*	922.08	9^-	463.07	7^-		1.3 *3*	I_γ: Iγ(459γ)/Iγ(242γ)=1.15 *2* (1998Dr07).
461.7 *1*	1.20 *15*	1057.00	10^+	595.26	10^+			
466.8 *1*	36.8 *12*	840.74	11^+	374.03	9^+		13.0 *18*	I_γ: Iγ(467γ)/Iγ(245γ)=7.4 *18* (1998Dr07).
472.3 *1*	27.5 *9*	752.12	12^-	279.93	10^-		41.2 *20*	A_2=+0.17 *7* (1998Dr07). I_γ: Iγ(472γ)/Iγ(247γ)=0.44 *3* (1998Dr07).
473.8 *1*	2.0 *3*	830.75	(6)	356.95	7^+		1.5 *3*	
473.8 *2*	1.15 *23*	2071.00		1597.20	13^-			
474.4 *2*	0.63 *14*	2354.24		1879.83	14^-			
481.5 *1*	1.30 *16*	1057.00	10^+	575.64	8^+	Q	1.6 *3*	R(DCO)=1.2 *3* (398γ gated).
489.1 *1*	5.4 *3*	1212.27	11^+	723.21	9^+		1.8 *3*	I_γ: Iγ(489γ)/Iγ(256γ)=1.20 *14* (1998Dr07).
489.5 *1*	3.51 *18*	1629.55	12^+	1140.07	10^+			
494.7 *11*	0.12 *7*	1941.3	13^-	1446.8	11^-			
502.8 *1*	1.31 *11*	1904.40		1401.55	13^+			
508.8 *1*	2.68 *16*	1188.54	10^-	679.97	8^-		1.0 *3*	I_γ: Iγ(509γ)/Iγ(266γ)=1.66 *4* (1998Dr07).
514.6 *1*	27.4 *9*	1109.87	12^+	595.26	10^+		11.0 *15*	I_γ: Iγ(515γ)/Iγ(269γ)=5.0 *9* (1998Dr07).
515.4 *1*	24.4 *8*	1020.44	13^-	505.03	11^-		50 *4*	A_2=+0.19 *14* (1998Dr07). I_γ: Iγ(515γ)/Iγ(268γ)=0.94 *10* (1998Dr07).
520.2 *1*	2.50 *19*	1326.87	11^+	806.77	9^+			
532.7 *1*	0.89 *10*	1967.47	13^+	1434.80	11^+			
533.7 *1*	0.93 *9*	2943.61	18^+	2410.03	16^+			
534.1 *1*	4.76 *23*	1490.15	12^+	956.13	10^+		1.4 *3*	I_γ: Iγ(534γ)/Iγ(278γ)=1.40 *19* (1998Dr07).
535[@]		890.32	(7)	356.95	7^+		1.2 *3*	
541.4 *1*	0.84 *8*	2943.61	18^+	2402.39	16^+			
546.0 *2*	0.78 *20*	723.21	9^+	177.76	8^+			
553.5 *10*	0.12 *9*	2261.0	$13^{(+)}$	1708.14	$11^{(+)}$			
556.3 *1*	1.37 *12*	1478.37	11^-	922.08	9^-		1.1 *2*	I_γ: Iγ(556γ)/Iγ(290γ)=2.7 *9* (1998Dr07).
557.5 *1*	18.3 *6*	1309.49	14^-	752.12	12^-	Q	33.7 *22*	A_2=+0.37 *13* (1998Dr07). I_γ: Iγ(558γ)/Iγ(289γ)=1.25 *12* (1998Dr07).
559.6 *2*	1.23 *18*	1616.31	12^+	1057.00	10^+			
561.0 *1*	16.7 *6*	1401.55	13^+	840.74	11^+		6.1 *9*	I_γ: Iγ(561γ)/Iγ(291γ)=5.2 *18* (1998Dr07).
567.9 *1*	1.85 *13*	2197.45	14^+	1629.55	12^+			
576.1 *1*	3.82 *19*	1788.16	13^+	1212.27	11^+		0.9 *3*	I_γ: Iγ(576γ)/Iγ(298γ)=1.7 *4* (1998Dr07).

$^{180}_{73}Ta_{107}$-11

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

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

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Iγ[&]	Comments
582.4 *2*	0.93 *16*	956.13	10^+	374.03	9^+			
585.3 *1*	1.32 *16*	2182.46	15^-	1597.20	13^-		≈4.0	
592.8 *2*	0.63 *8*	3253.29	19^+	2660.43	17^+			
598.0 *1*	2.20 *18*	1924.80	13^+	1326.87	11^+			
598.3 *1*	14.6 *5*	1618.62	15^-	1020.44	13^-		22 *2*	I_γ: Iγ(598γ)/Iγ(309γ)=2.0 *3* (1998Dr07).
600.1 *1*	1.22 *11*	2567.58	15^+	1967.47	13^+			
601.6 *1*	1.56 *12*	1790.12	12^-	1188.54	10^-		≈0.7	
605.6 *1*	16.7 *6*	1715.34	14^+	1109.87	12^+	Q	5.6 *9*	R(DCO)=1.1 *2* (687γ gated) (1999Sa59).
610.8 *2*	0.54 *8*	2660.43	17^+	2050.21	15^+			
614.8 *1*	2.92 *16*	2105.05	14^+	1490.15	12^+		0.9 *2*	
624.3 *1*	1.42 *12*	2503.95	16^-	1879.83	14^-		2.6 *3*	
629.3 *16*	0.65 *21*	806.77	9^+	177.76	8^+			
632.9 *1*	0.59 *7*	3532.3		2899.4	19^-			
637.4 *1*	8.1 *3*	1946.80	16^-	1309.49	14^-		12.0 *15*	
644.4 *2*	0.53 *8*	2122.8	13^-	1478.37	11^-		≈0.4	
645.1 *3*	0.37 *7*	2842.5	16^+	2197.45	14^+			
648.8 *1*	4.97 *23*	2050.21	15^+	1401.55	13^+		2.0 *4*	
650.3 *1*	1.09 *10*	2438.29	15^+	1788.16	13^+		0.6 *2*	
661.6 *1*	0.78 *10*	2844.05	17^-	2182.46	15^-			
668[@a]		775.8?	(2)	107.60	0^-		≈1	
675.5 *1*	4.84 *21*	2294.05	17^-	1618.62	15^-		11.0 *18*	
678[@]	14 *2*	1035.0?	(7)	356.95	7^+		1.4 *2*	
682.5 *1*	0.73 *9*	2787.54	16^+	2105.05	14^+		0.5 *1*	
687.0 *1*	4.12 *20*	2402.39	16^+	1715.34	14^+		1.5 *3*	
694.6 *1*	4.98 *22*	2410.03	16^+	1715.34	14^+		2.3 *4*	
696.7 *4*	0.34 *8*	3200.7	18^-	2503.95	16^-			
705.4 *4*	0.56 *20*	2156.9	17^-	1452.0	15^-		1.4 *2*	I_γ: Iγ(705γ)/Iγ(365γ)=0.13 *4* (1998Dr07).
709.7 *3*	0.27 *7*	3148.1	17^+	2438.29	15^+			
711.2 *1*	2.57 *14*	2657.82	18^-	1946.80	16^-		≈6	
730.1 *1*	1.32 *11*	2780.31	17^+	2050.21	15^+		1.0 *2*	
742.4 *6*	0.20 *8*	2899.4	19^-	2156.9	17^-			
747.2 *1*	1.15 *10*	3041.25	19^-	2294.05	17^-		4.5 *10*	
753.0 *1*	1.06 *15*	2544.9	18^-	1791.9	16^-		0.6 *2*	I_γ: Iγ(753γ)/Iγ(388γ)=0.29 *11* (1998Dr07).
765[a] *4*	0.05 *6*	3173?	18^+	2410.03	16^+			
770.4 *2*	0.86 *16*	2562.3		1791.9	16^-			
770.8 *3*	0.31 *7*	3173.2		2402.39	16^+			
777.3 *3*	0.33 *8*	3435.1	20^-	2657.82	18^-		≈2.5	
794.2 *8*	0.22 *9*	1904.40		1109.87	12^+			
797.4 *1*	0.91 *11*	2954.2	19^-	2156.9	17^-		0.5 *1*	I_γ: Iγ(797γ)/Iγ(409γ)=0.25 *8* (1998Dr07).
804.3[a] *13*	0.11 *6*	3582.9?	(19^+)	2780.31	17^+		≈0.5	
812.4 *2*	0.55 *8*	3400.1	$20^{(+)}$	2587.9	$18^{(+)}$		0.6 *1*	I_γ: Iγ(812γ)/Iγ(415γ)=1.0 *3* (1998Dr07).
813.9[a] *4*	0.22 *6*	3853.4?	(21^-)	3041.25	19^-		≈2	

$^{180}_{73}Ta_{107}$-12

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

γ(^{180}Ta) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Iγ [&]	Comments
838.2 *2*	0.68 *10*	3383.5	20^-	2544.9	18^-			
845.0 *1*	6.3 *3*	1597.20	13^-	752.12	12^-		7.4 *18*	
846.5 *2*	0.56 *8*	3831.8	$21^{(+)}$	2985.1	$19^{(+)}$		≈0.7	
875.7 *11*	0.17 *11*	2327.6	(16^+)	1452.0	15^-			
878.6 *1*	2.09 *25*	1252.64		374.03	9^+			
880.4 *1*	2.64 *22*	2672.1	(17^+)	1791.9	16^-	(D)		R(DCO)=0.7 *3* (340γ M1 gated) (1999Sa59).
884.3 *2*	1.16 *17*	1389.34		505.03	11^-			
890.6 *11*	0.21 *11*	3435.5	(19^+)	2544.9	18^-			
890.7 *1*	0.86 *15*	3047.8	(18^+)	2156.9	17^-			
894.9 *1*	3.3 *3*	1174.84	(11)	279.93	10^-		≈8	
896.2 *2*	1.17 *16*	2006.08		1109.87	12^+			
896.7 *2*	1.3 *3*	1270.73		374.03	9^+			
1013.3 *2*	2.5 *3*	1293.24		279.93	10^-			
1042.3 *3*	0.93 *20*	1546.51	(12)	505.03	11^-			
1052.7 *5*	0.50 *15*	1805.61	(13)	752.12	12^-			
1058.8 *2*	2.3 *3*	1338.93	11^-	279.93	10^-			
1063.7 *1*	1.87 *19*	1904.40		840.74	11^+			
1090 [@]		1841.14	(13^-)	752.12	12^-		≈6	
1092.2 *1*	19.0 *7*	1597.20	13^-	505.03	11^-	Q	26 *3*	A_2=+0.23 *9* (1998Dr07).
1183.6 *2*	2.2 *3*	1463.54		279.93	10^-			
1261.9 *1*	37 *6*	1338.93	11^-	77.1	9^-		22 *3*	
1266.2 *2*	2.7 *4*	1546.51	(12)	279.93	10^-			
1293.4 *2*	2.2 *3*	1573.34		279.93	10^-			
1300.6 *1*	3.2 *3*	1805.61	(13)	505.03	11^-			
1300.8 [@]		1580.7	(12)	279.93	10^-		≈10	
1334.1 *1*	5.7 *4*	1708.14	$11^{(+)}$	374.03	9^+			
1336.1 *1*	2.64 *23*	1841.14	(13^-)	505.03	11^-		≈6	
1358.2 *3*	1.10 *18*	1863.2		505.03	11^-			
1372.5 *2*	1.30 *18*	2124.63	(14)	752.12	12^-			
1391.5 *2*	2.0 *3*	1671.43	(12)	279.93	10^-			
1407.7 *4*	0.63 *14*	2159.8		752.12	12^-			
1435.9 *3*	0.74 *13*	2456.3		1020.44	13^-			

[†] From 1999Sa59, except where noted. 2002We01 have noted that the energies between 250 keV and 500 keV have a systematic discrepancy of about 0.4 keV compared with those from 1998Dr07 or 2002We01 (^{180}Hf(p,nγ),(d,2nγ)).

[‡] From 1999Sa59 at E(^{11}B)=57 MeV.

[#] From $\gamma(\theta)$ and R(DCO) in 1998Dr07 and 1999Sa59, respectively, except where noted.

[@] Observed only by 1998Dr07.

[&] From 1998Dr07. Authors state that values are indicative only, as they are from a number of different measurements.

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

$^{180}_{73}Ta_{107}$-13

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme

Intensities: Relative I_γ

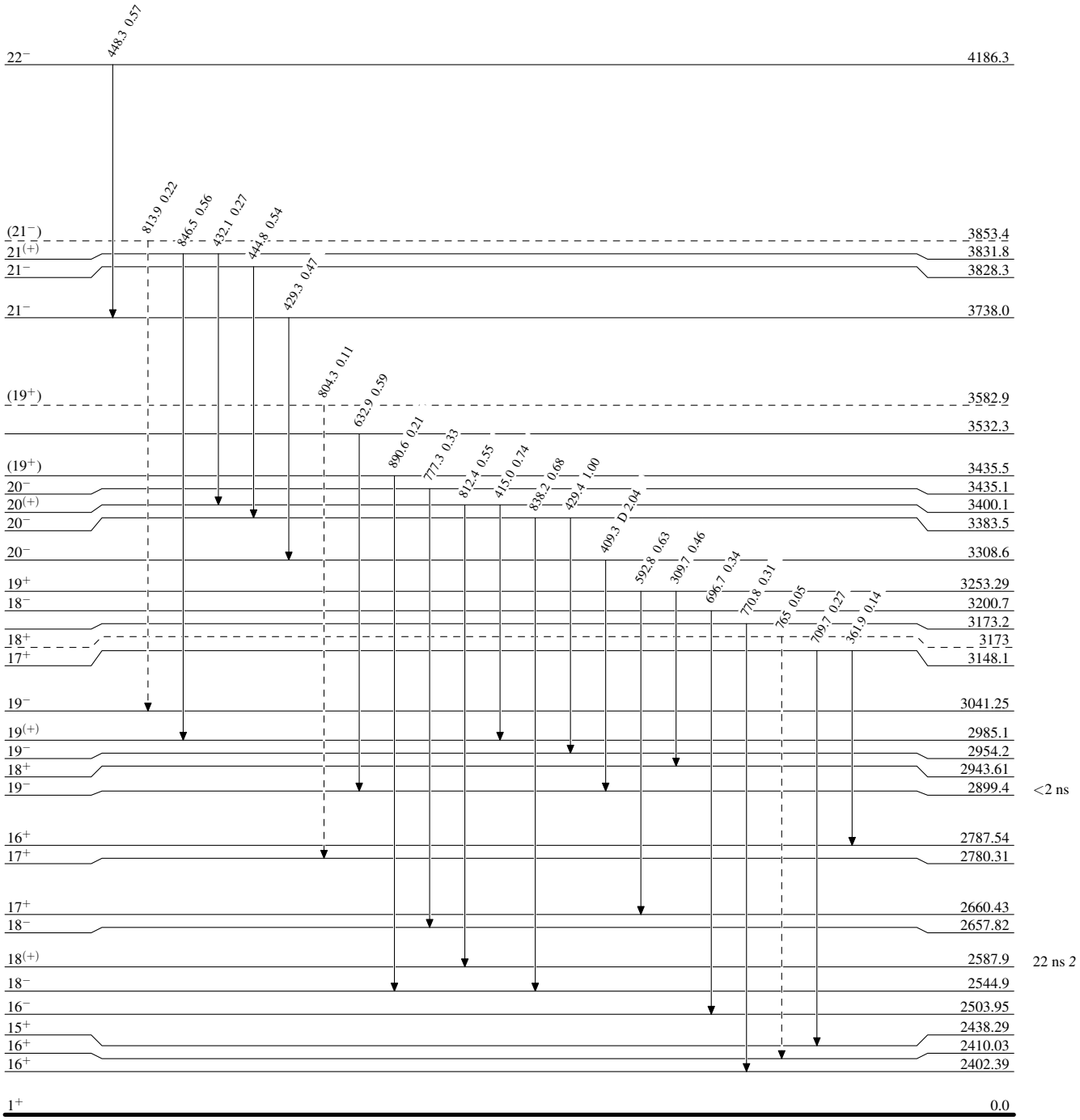
Legend

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

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

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

γ Decay (Uncertain)



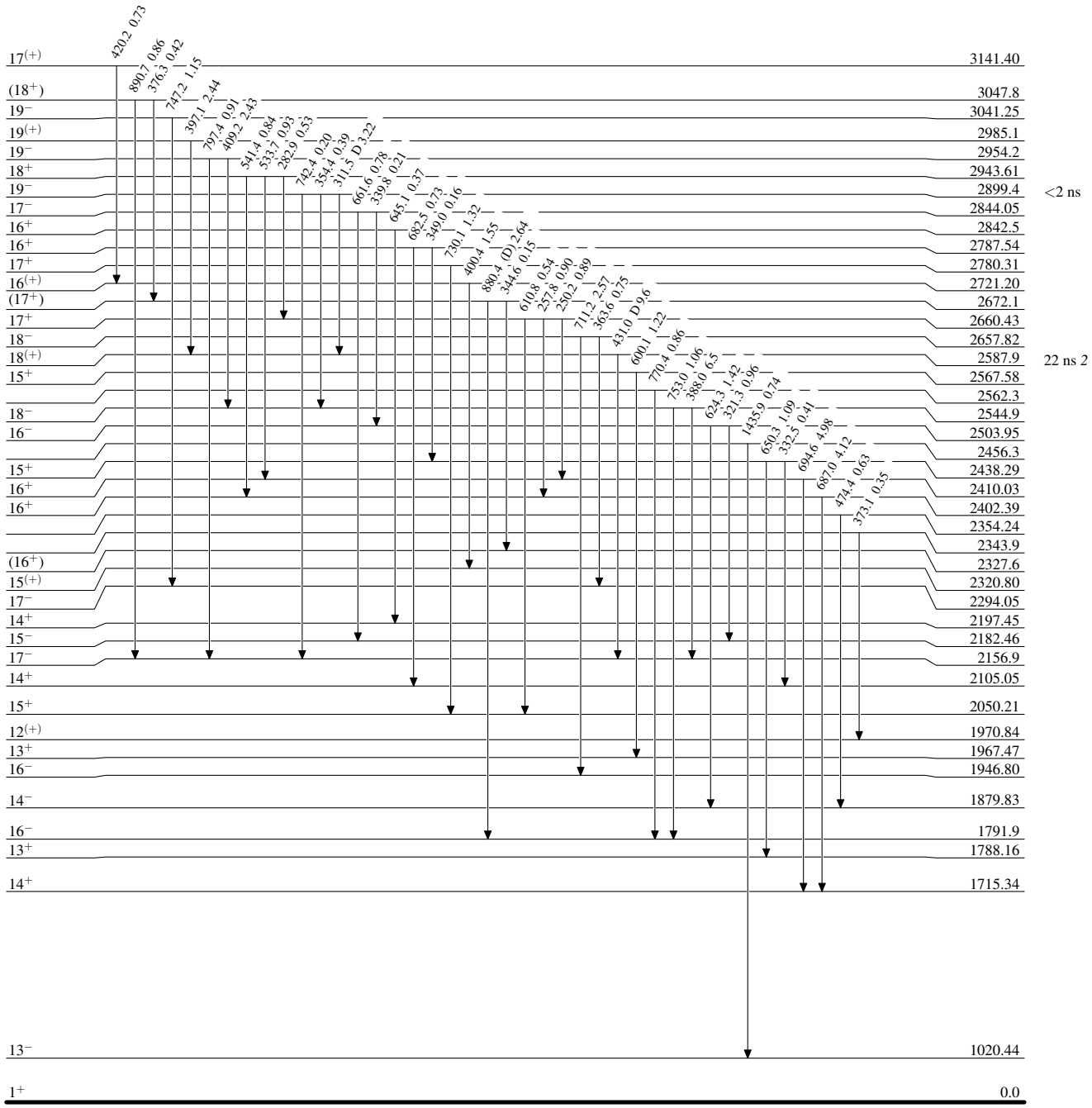
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

Intensities: Relative I_γ

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



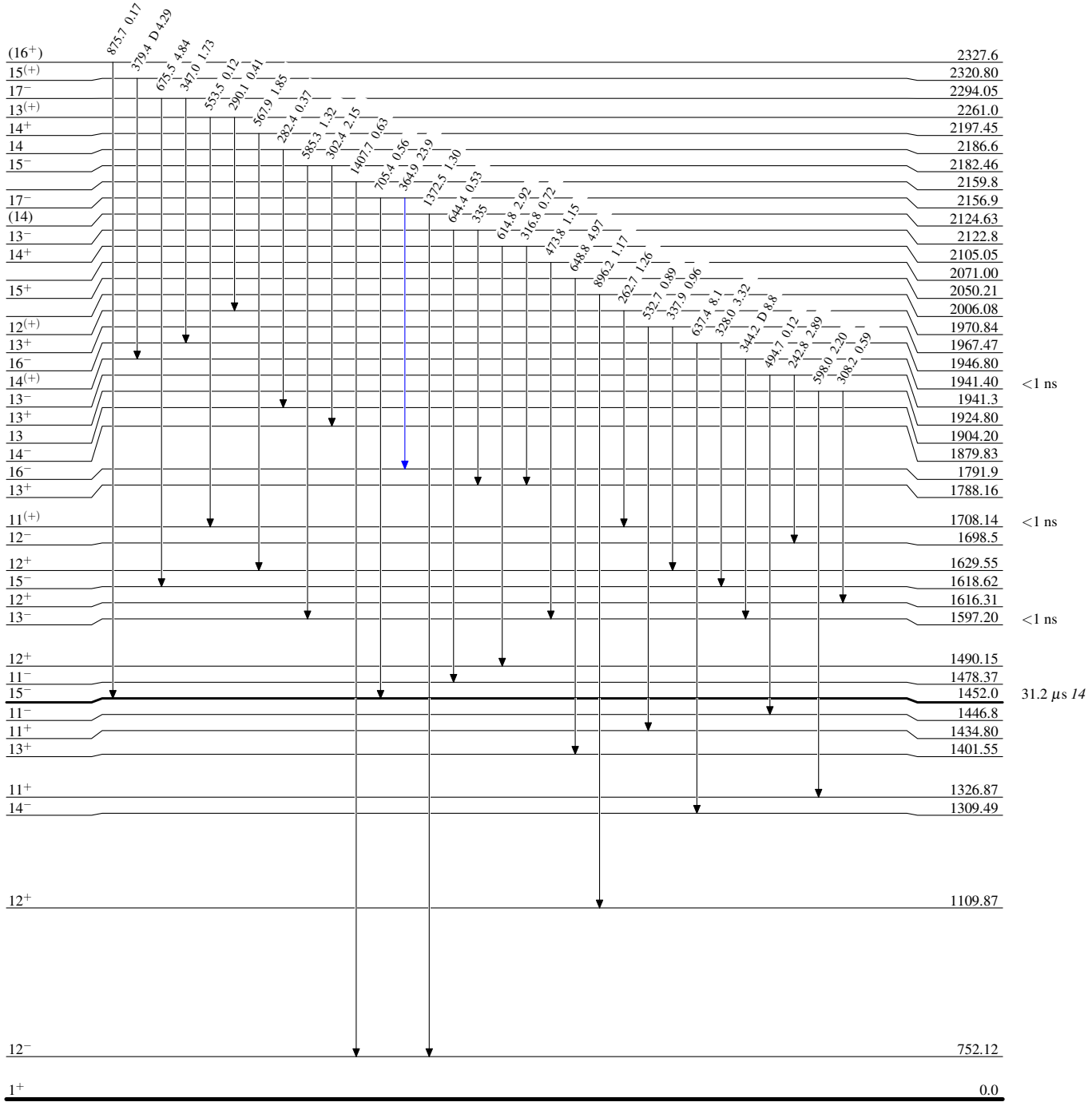
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

Intensities: Relative I_γ

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

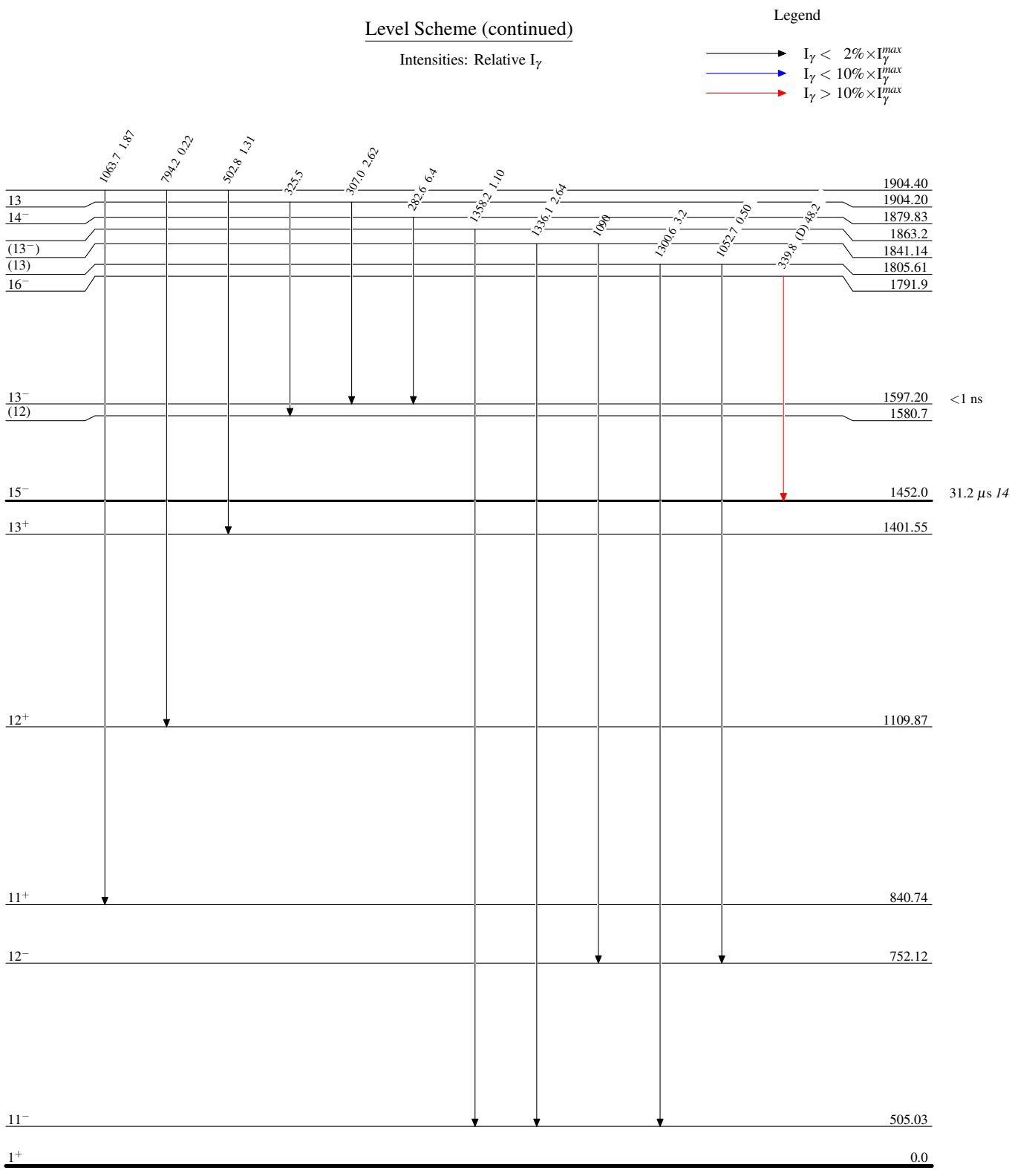


$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

Intensities: Relative I_γ



$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

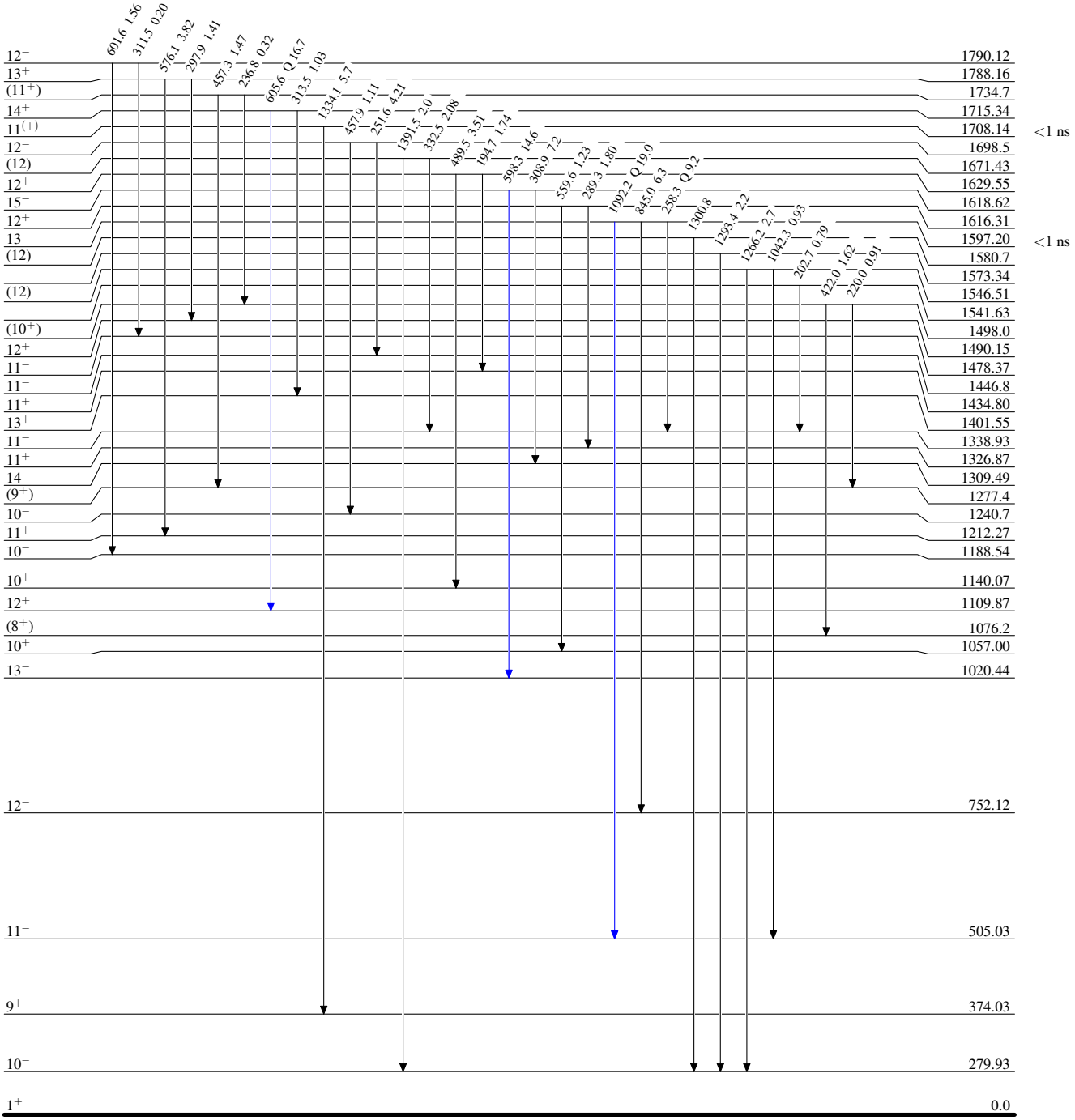
Intensities: Relative I_γ

Legend

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

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

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



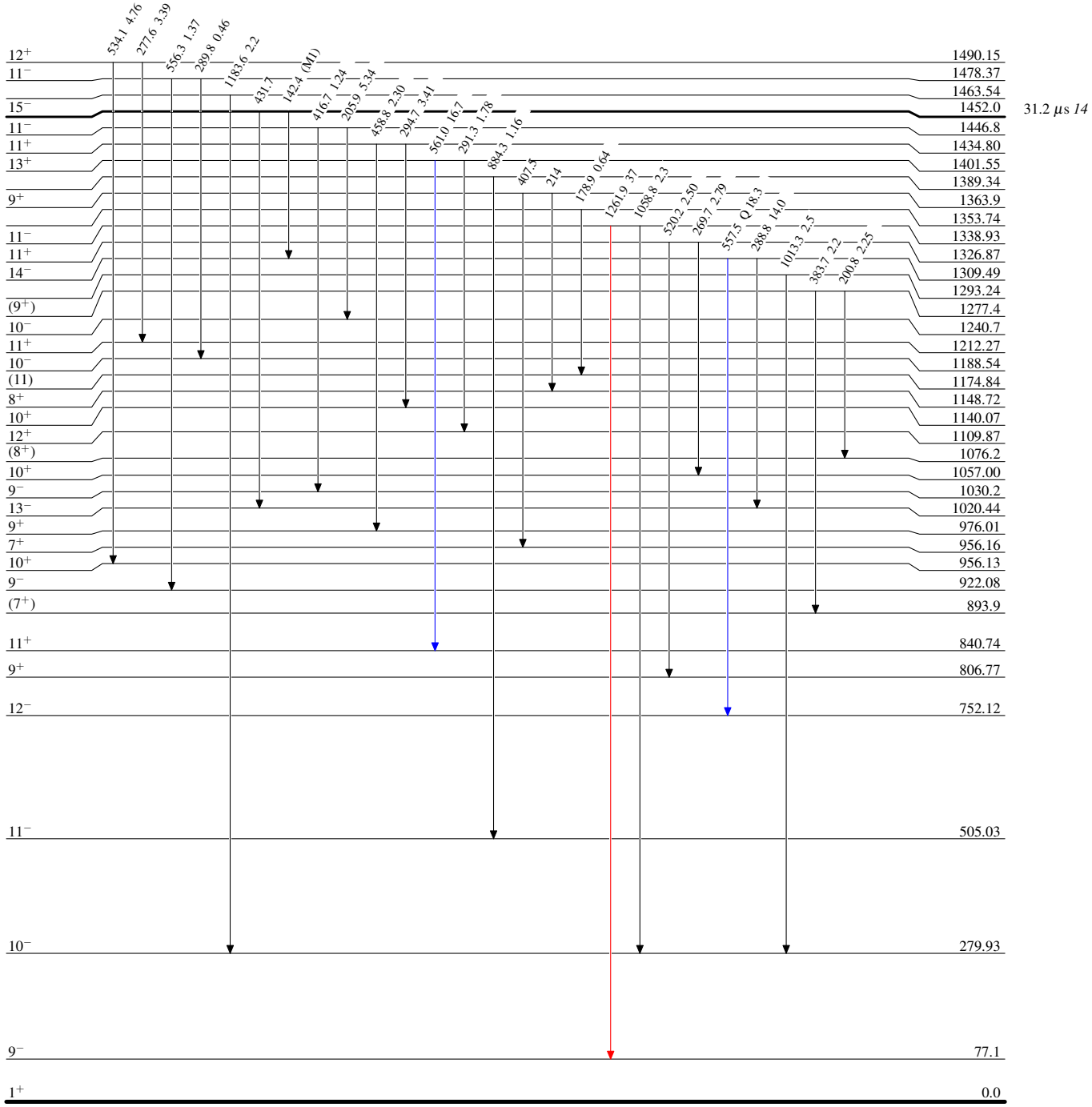
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

Intensities: Relative I_γ

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



$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

Level Scheme (continued)

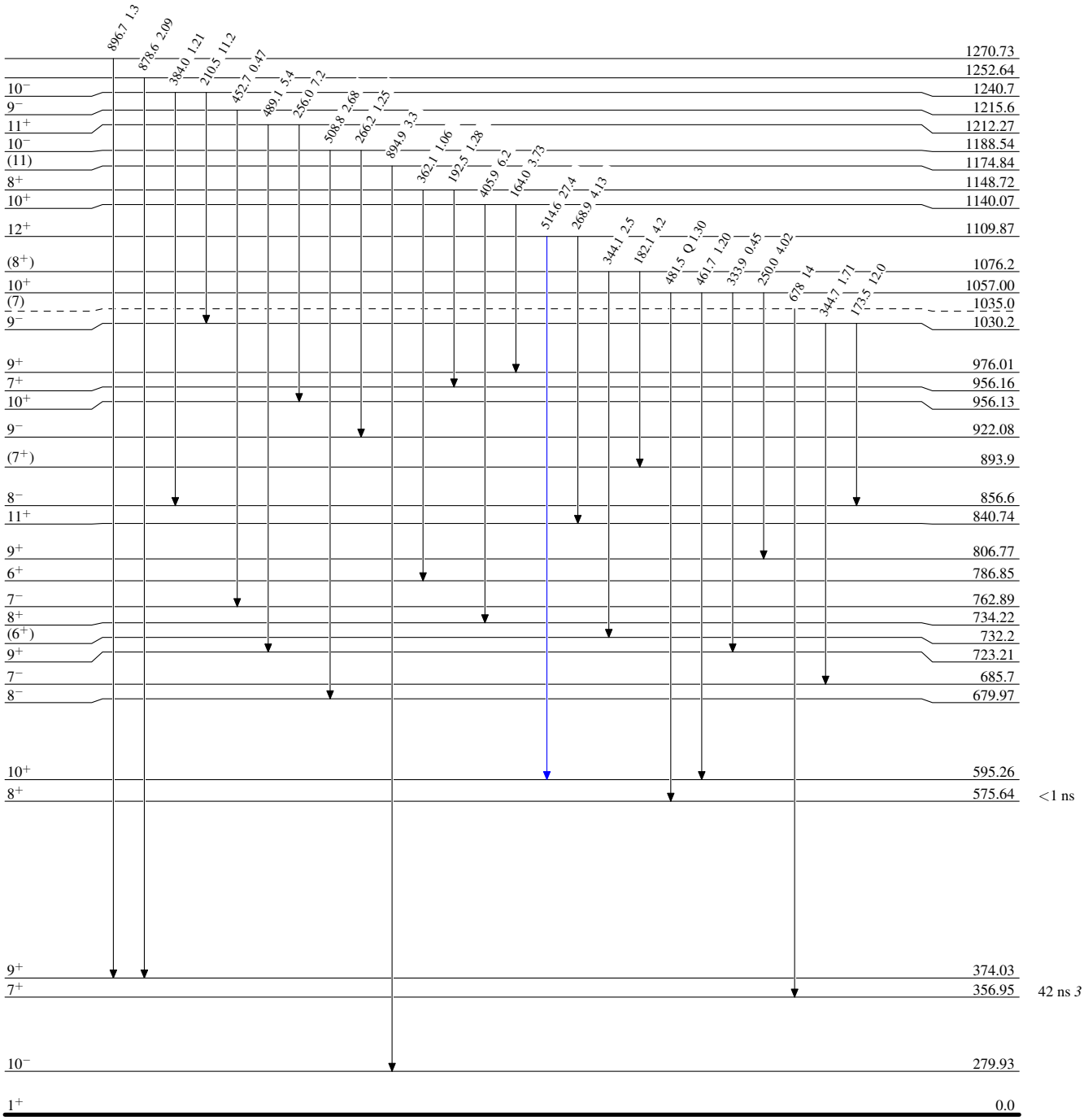
Intensities: Relative I_γ

Legend

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

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

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



$^{180}_{73}Ta_{107}$

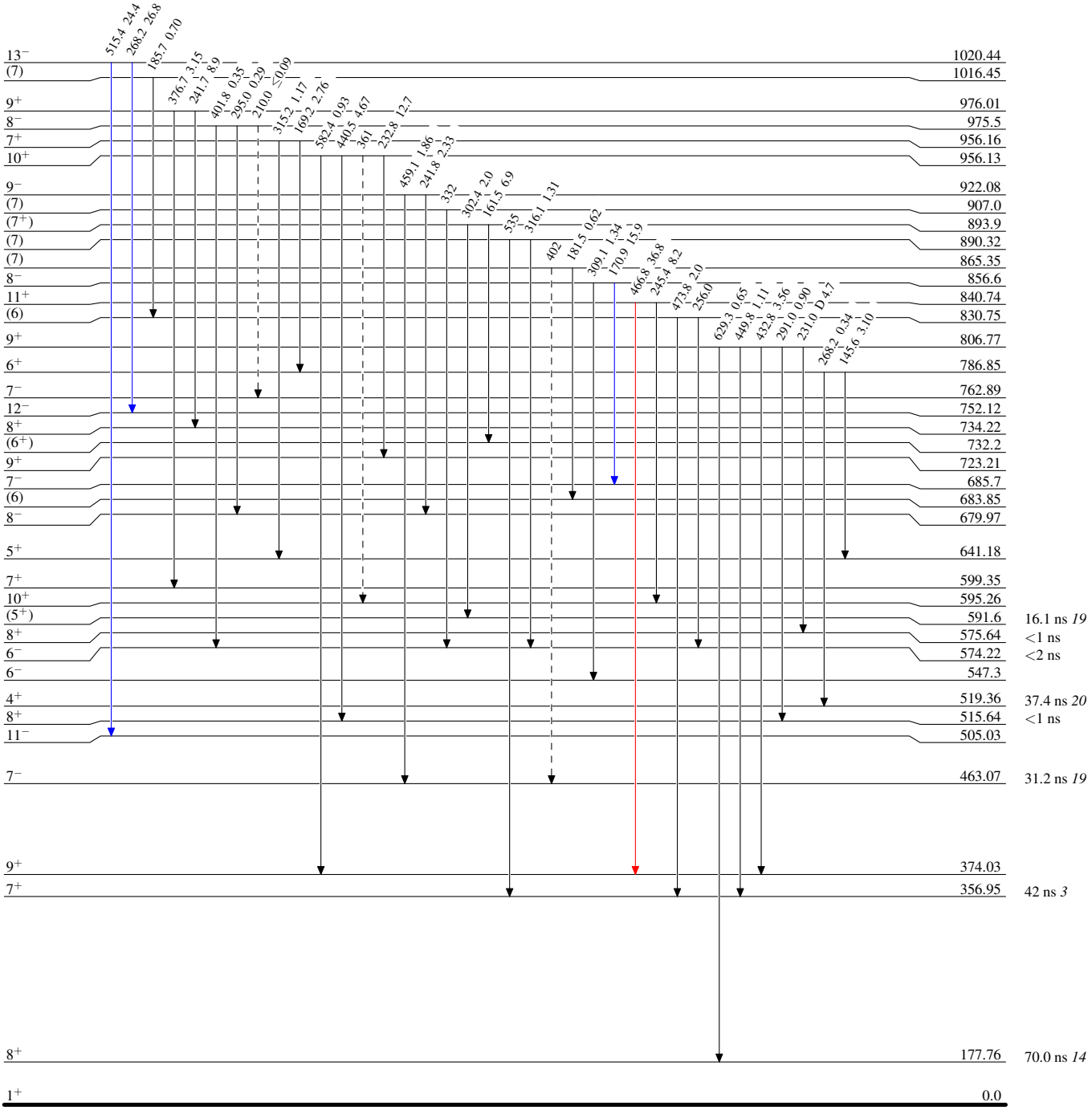
^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

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)

Level Scheme (continued)

Intensities: Relative I_γ



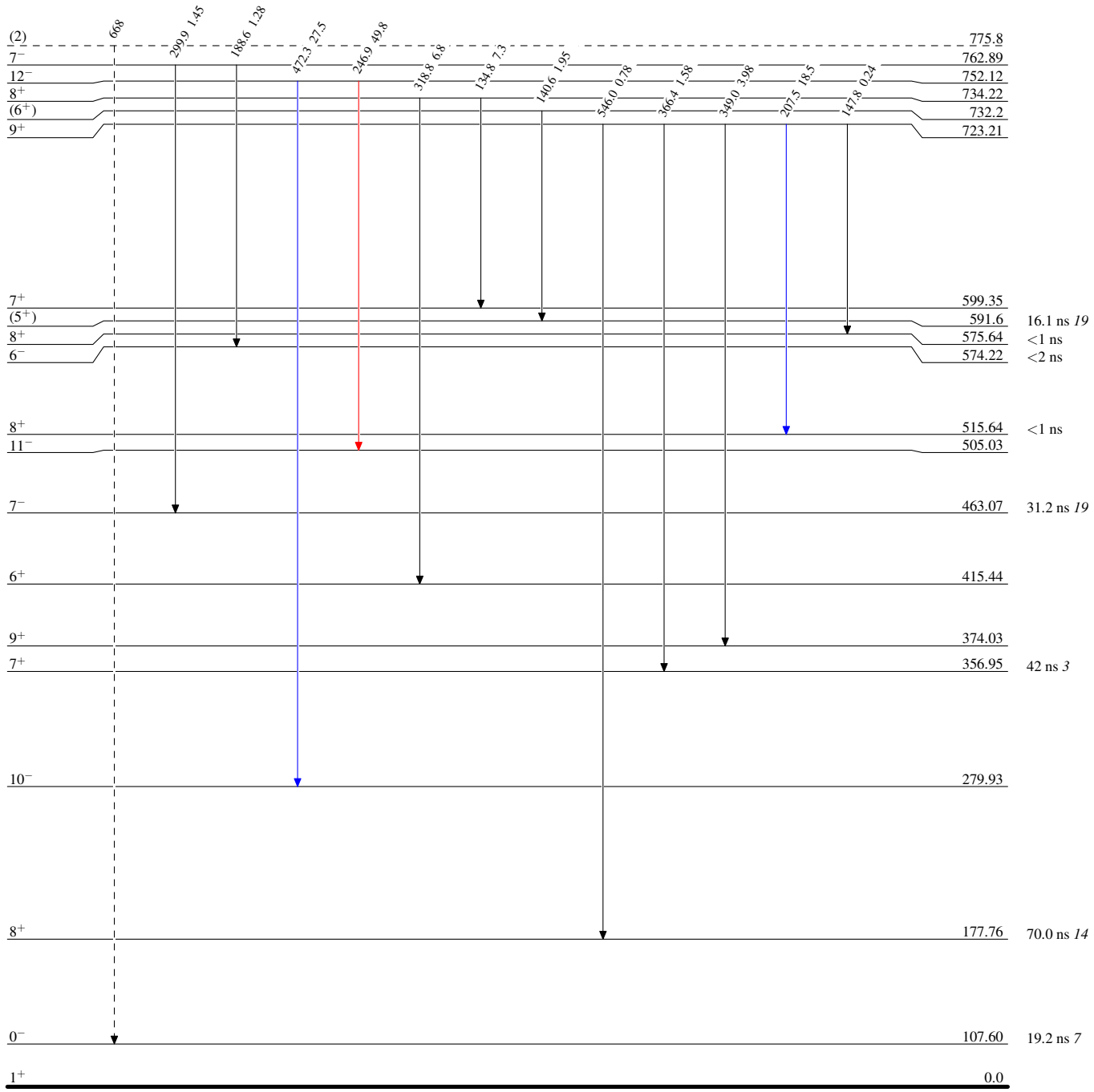
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) **1999Sa59,1998Dr07**

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)



$^{180}_{73}Ta_{107}$

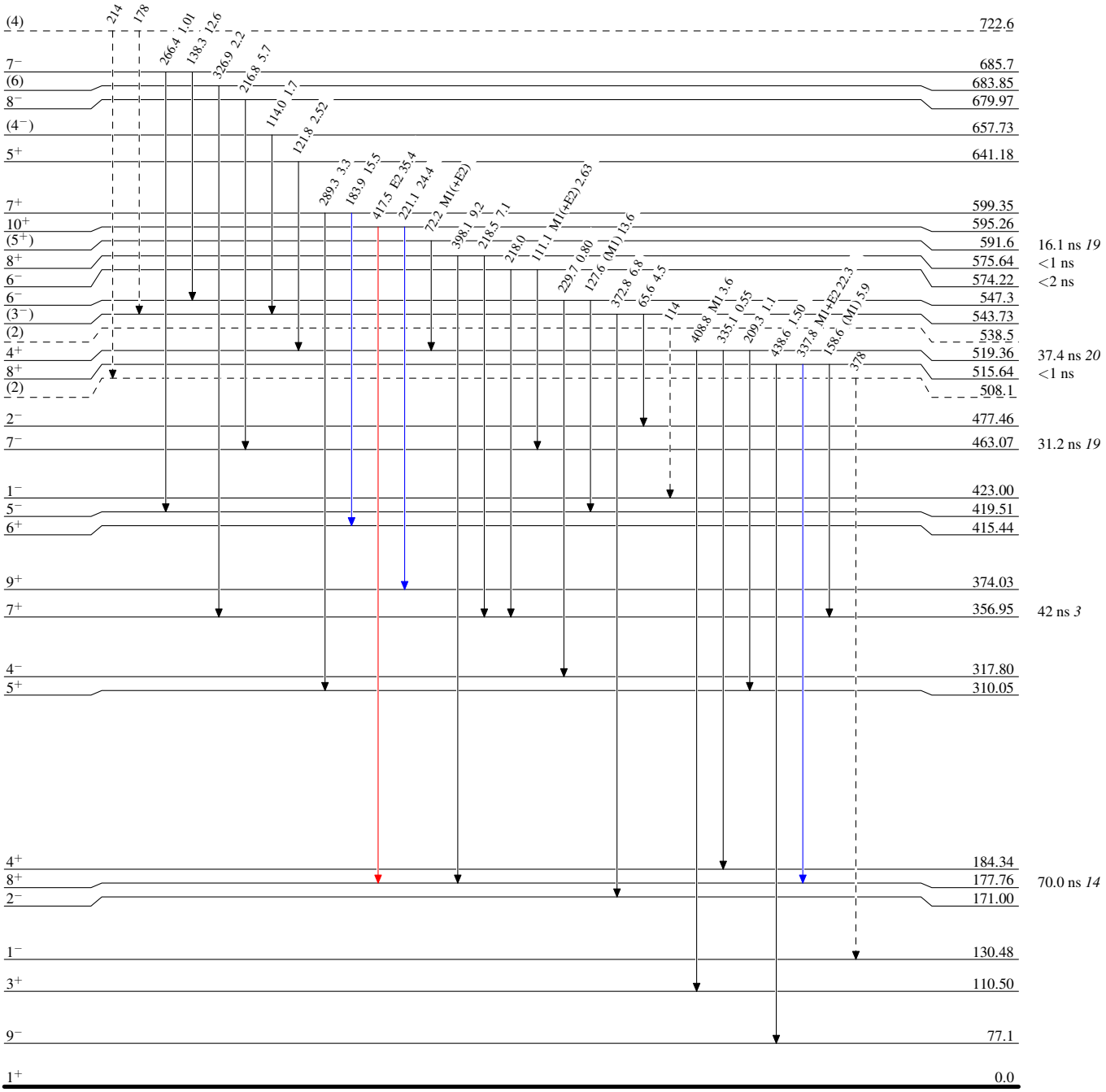
^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) **1999Sa59,1998Dr07**

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)

Level Scheme (continued)

Intensities: Relative I_γ



$^{180}_{73}Ta_{107}$

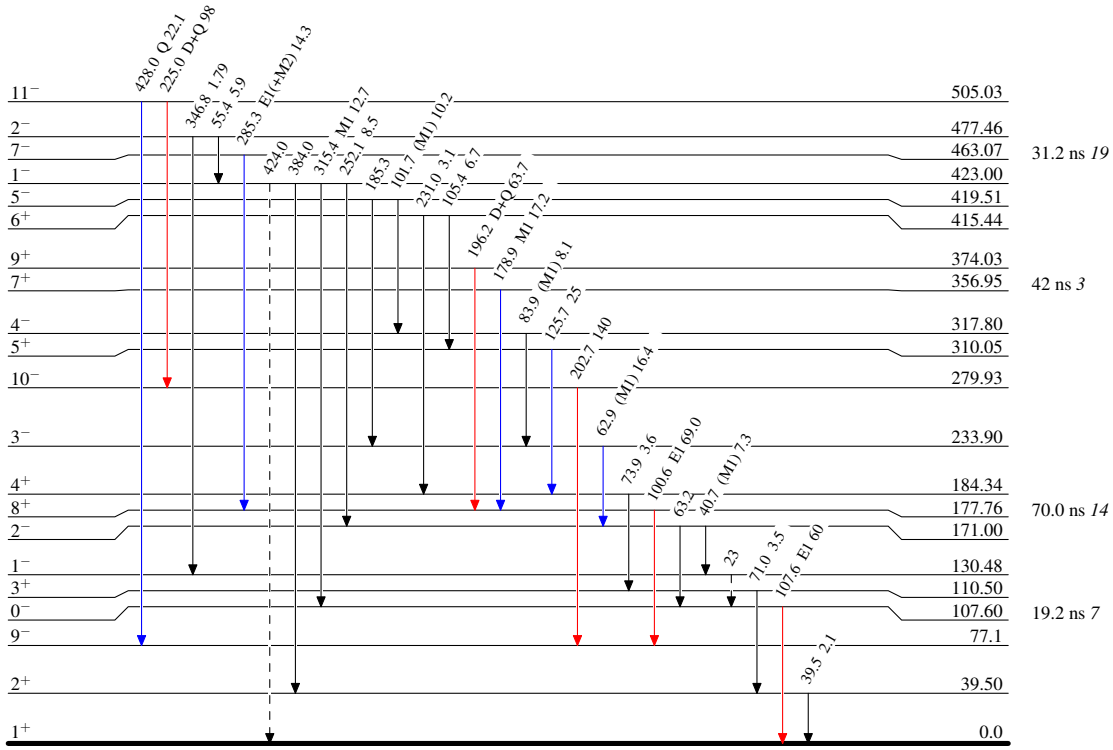
^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07

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)

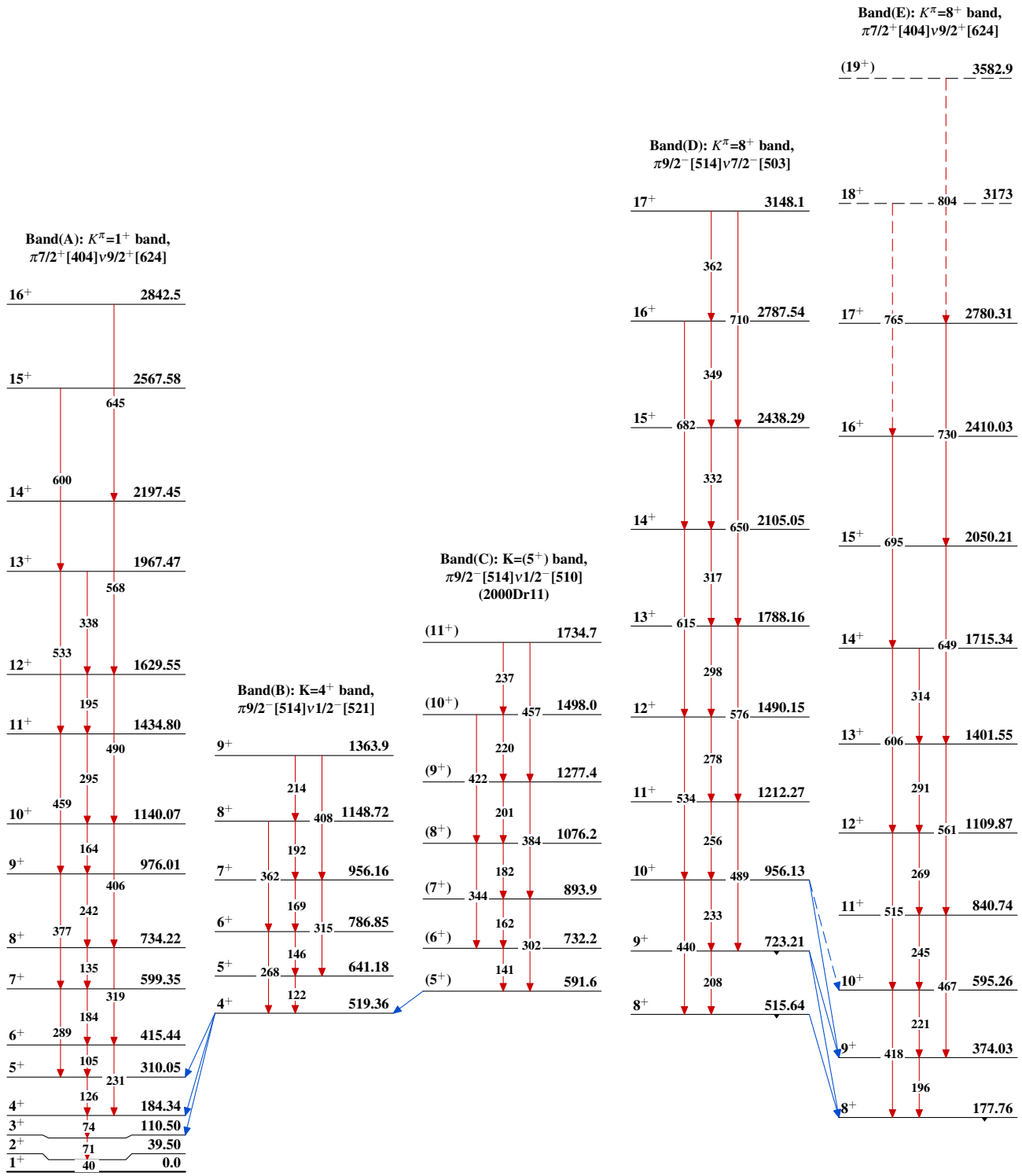
Level Scheme (continued)

Intensities: Relative I_γ



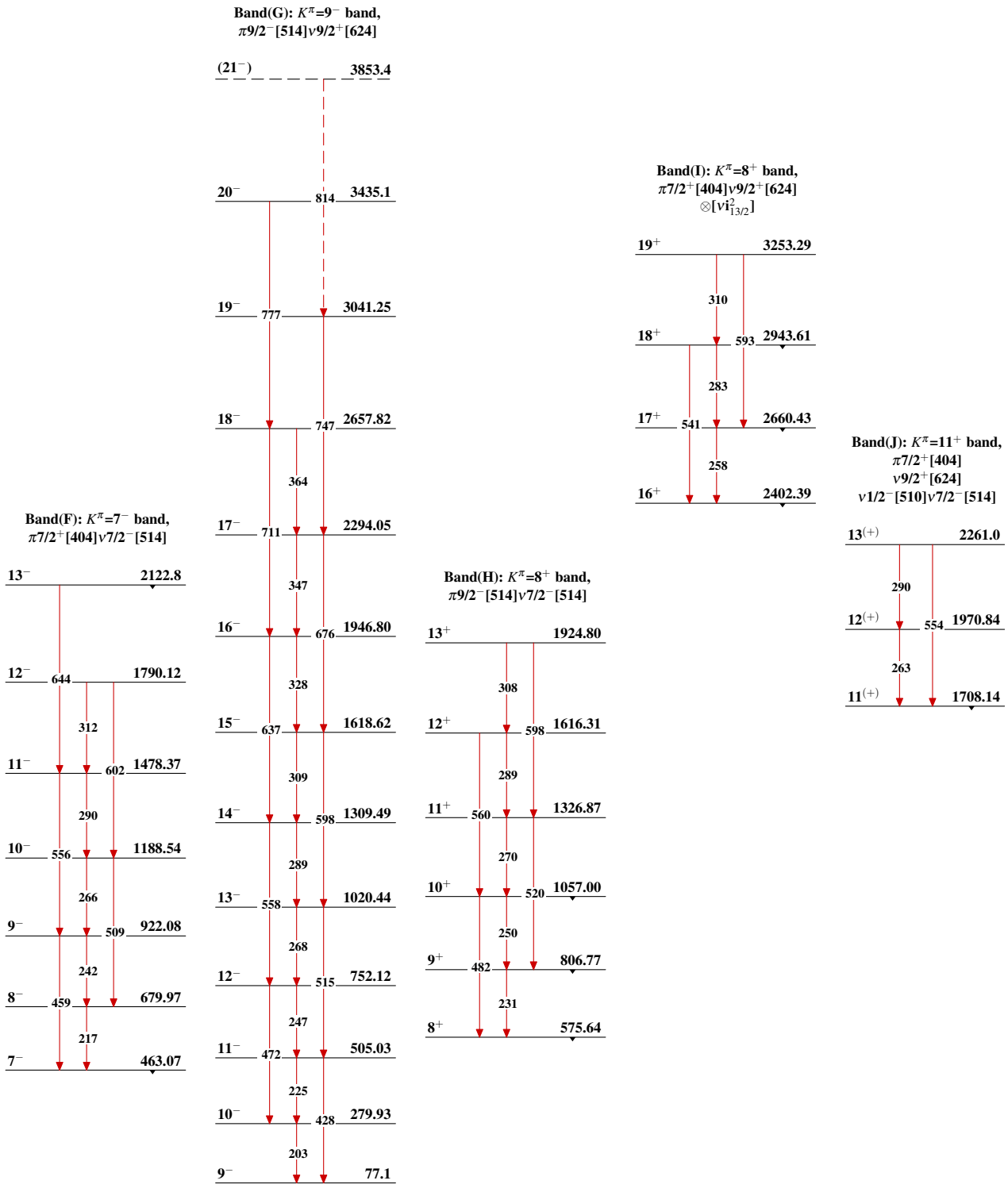
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07



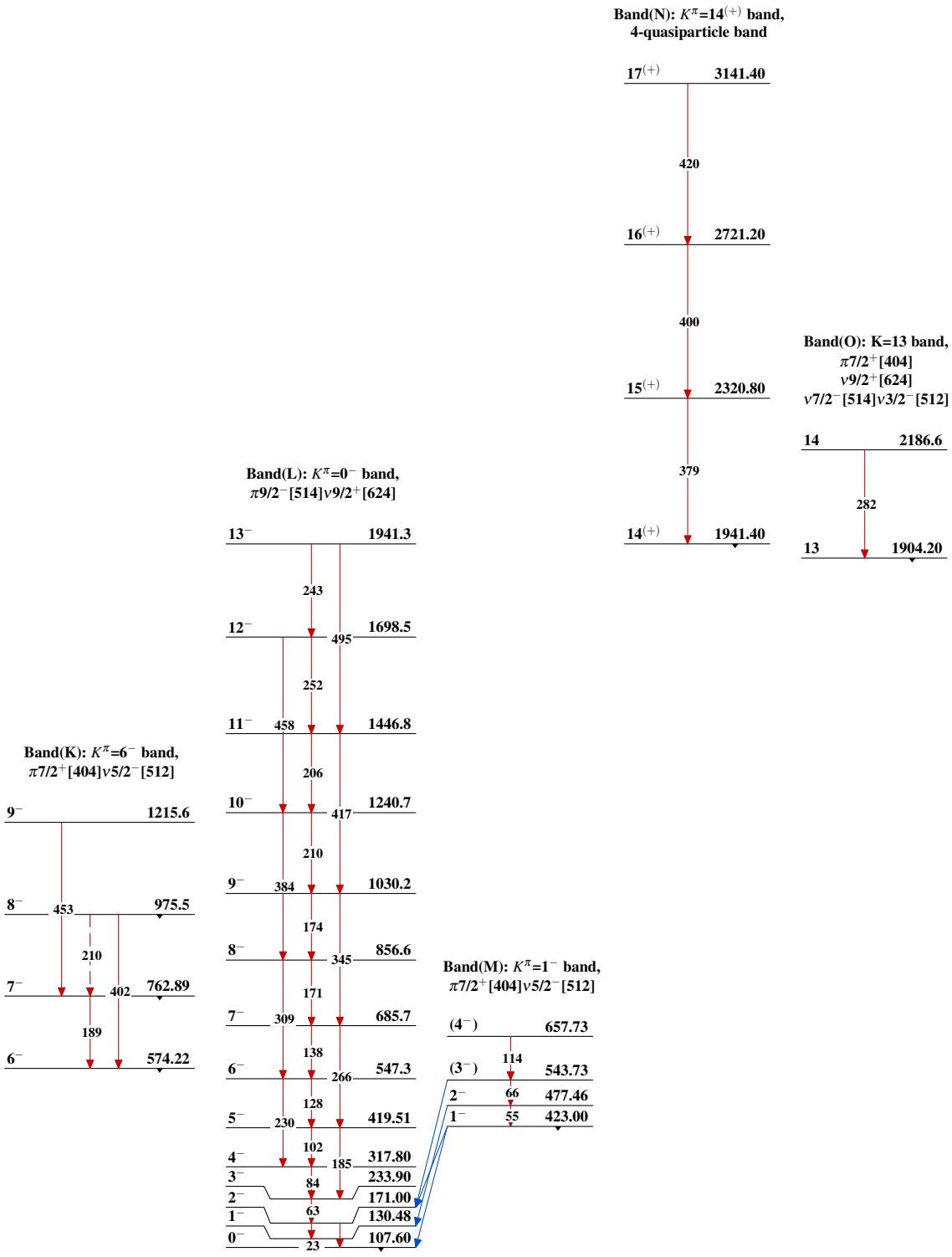
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)



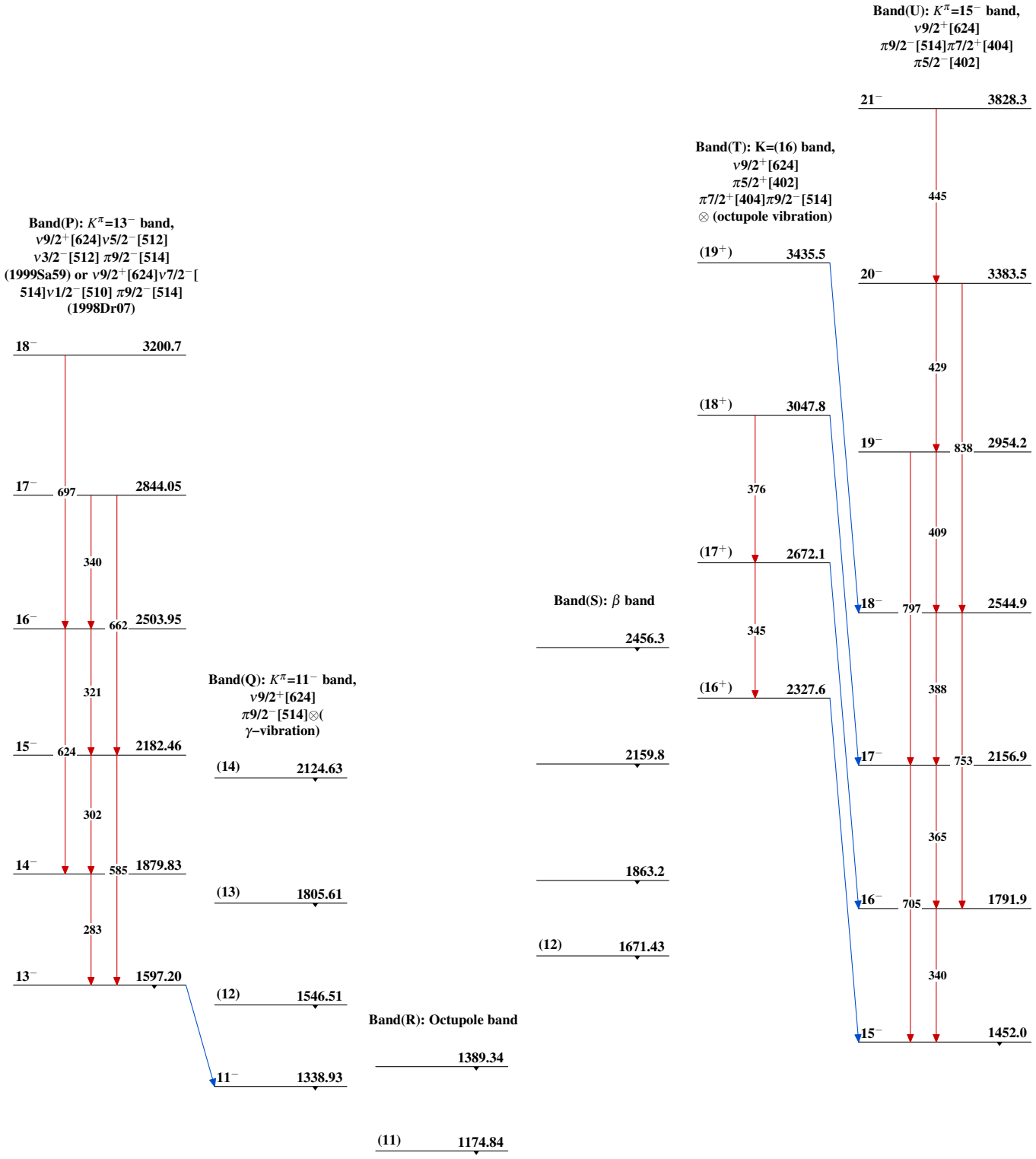
$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)

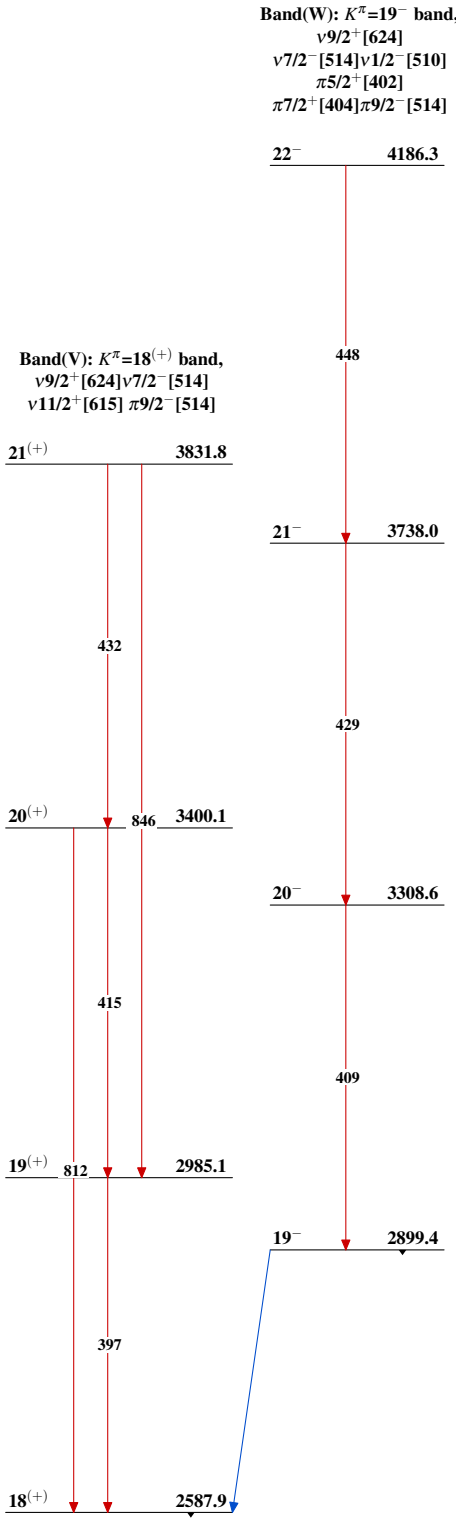


$^{180}_{73}Ta_{107}$

^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)



^{176}Yb(^{11}B,α3nγ),(^{7}Li,3nγ) 1999Sa59,1998Dr07 (continued)



$^{180}_{73}Ta_{107}$