Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. Mccutchan	NDS 165, 1 (2020)	1-Mar-2020

Q(β^-)=6584 *7*; S(n)=5723 *8*; S(p)=10118 *7*; Q(α)=−6157 *7* 2017Wa10
S(2n)=12898 *8*; S(2p)=23226 *7* (2017Wa10).
α: Additional information 1.

^{90}Rb Levels

Cross Reference (XREF) Flags

A ^{90}Kr β^- decay
B ^{90}Rb IT decay (258 s)
C ^{235}U(n,Fγ)

E(level)[†]	J$^\pi$	$T_{1/2}$[‡]	XREF	Comments
0	0$^-$	158 s *5*	ABC	%β^-=100 J$^\pi$: J=0 from atomic-beam measurement (1979Ek02). π from ^{90}Rb(g.s.) β^- decay with log $f^{1u}t$=8.42 *6* to ^{90}Sr(832) 2$^+$ state. $T_{1/2}$: weighted average of 153 s *3* (1969Ca03) and 162 s *3* (1977Hu03), both from γ(t) with mass separated sources and Ge(Li).
106.90 *3*	3$^-$	258 s *4*	ABC	%β^-=97.5 *4*; %IT=2.5 *4* μ=1.6160 *6* (1981Th04) Q=+0.25 *7* (1981Th04,2016St14) %IT: from measured Iγ, α and normalization (1981Ta05), see ^{90}Rb β^- decay (258 s). J$^\pi$: J=3 from atomic-beam measurement (1979Ek02); M3 106.9γ to 0$^-$. $T_{1/2}$: weighted average of 258 s *5* (1967Am01) and 258 s *4* (1977Hu03), both from γ(t) with mass separated sources and Ge(Li). μ: from atomic-beam laser spectroscopy (1981Th04). Other: 1.612 *5* (atomic-beam magnetic resonance, 1979Ek02). Q: from atomic-beam laser spectroscopy (1981Th04,2016St14). Measured value given in 1981Th04 is 0.20 *5*, evaluated to +0.25 *7* by 2016St14.
121.79 *3*	(1$^-$)		A	J$^\pi$: (M1) 121.8γ to 0$^-$.
162.72 *18*	4$^-$	<7 ns	C	J$^\pi$: M1+E2 55.8γ to 3$^-$. Configuration=$\pi p_{3/2}^{-1}\otimes\nu(d_{5/2}^3)$ or less likely $\pi f_{5/2}^{-1}\otimes\nu(d_{5/2}^3)$.
227.83 *3*	(2$^-$)		A	J$^\pi$: (M1+E2) 106.05γ to (1$^-$) and (M1+E2) 120.92γ to 3$^-$.
242.19 *3*			A	
356.23 *3*			A	
536.91 *6*			A	
614.42 *4*			A	
661.28 *3*			A	
676.10 *5*			A	
712.46 *8*			A	
740.87 *5*			A	
838.20 *4*			A	
933.08 *6*			A	
1102.19 *6*			A	
1127.90 *20*	(5$^+$)	<7 ns	C	J$^\pi$: $\gamma\gamma(\theta)$ for 965-56 cascade in ^{235}U(n,Fγ) gives 5 or 6; (M1+E2) 365.1γ from 6$^{(+)}$ favors (5$^+$).
1153.41 *7*			A	
1204.75 *20*	5	<7 ns	C	J$^\pi$: from $\gamma\gamma(\theta)$ for the 1042-55.8 cascade in ^{235}U(n,Fγ); J=4 and 6 are excluded by the $\gamma\gamma(\theta)$ analysis. Proposed configuration=$\pi f_{5/2}^{-1}\otimes\nu(d_{5/2}^3)$ (2016Cz01) which would result in J^π=5$^-$.
1400.6 *4*			A	
1462.97 *16*			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{90}Rb Levels (continued)

E(level)†	Jπ	$T_{1/2}$‡	XREF	Comments
1492.98 *21*	$6^{(+)}$	<7 ns	C	Jπ: $\gamma\gamma(\theta)$ data for 365-965 cascade in ^{235}U(n,Fγ) are consistent with 6−>5−>4 or 6−>6−>4 sequences and large δ(Q/D) value for the 365γ in both spin sequences. This implies mult=M1+E2, and thus the same parity for 1493 and 1128 levels. The $\gamma\gamma(\theta)$ data for the 288-1042 cascade is consistent with J=5 or 6 for 1493 level. Absence of transition to 163, 4^- level suggests positive parity for J=6 for the 1493 level.
1688.17 *18*			A	
1703.67 *23*	(7,6)	<7 ns	C	Jπ: $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ) is consistent with J=6 or 7, but absence of transitions to 1128, (5^+) and 1204, 5 makes J=6 less likely.
1780.01 *3*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=4.6.
1901.63 *12*			A	
2127.58 *5*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=5.78.
2271.34 *9*			A	
2433.59 *19*			A	
2500.4 *4*	$(8^+,7)$		C	Jπ: 1007.1γ to $6^{(+)}$.
2686.96 *25*	(8,9)		C	Jπ: 186.5γ to $(8^+,7)$, 983.3γ to (7,6).
3083.07 *7*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=4.9.
3093.74 *12*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=5.3.
3238.68 *14*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=5.7.
3401.3 *3*			C	
3475.6 *4*			A	
3518.2 *4*			C	
3625.2 *4*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=5.3.
3633.8 *6*			C	
3703.98 *20*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=4.9.
3878.6 *3*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=4.9.
3881.3 *3*	1^+		A	Jπ: β^- decay from ^{90}Kr(g.s.) with log *ft*=4.5.

† From least-squares fit to adopted γ-ray data.
‡ From $\gamma\gamma$(t) in ^{235}U(n,Fγ), except where noted.

$\gamma(^{90}Rb)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	δ	α	Comments
106.90	3^-	106.92 *15*	100	0	0^-	M3		10.76	α(K)=8.72 *14*; α(L)=1.72 *3*; α(M)=0.294 *5*; α(N)=0.0314 *5*; α(O)=0.001041 *16* B(M3)(W.u.)=0.0085 *15* Mult.: from α(K)exp/α(L)exp=6.2 *12* in ^{90}Kr β^- decay and level scheme requirement of ΔJ=3.
121.79	(1^-)	121.82 *3*	100	0	0^-	(M1)		0.0844	α(K)=0.0744 *11*; α(L)=0.00838 *12*; α(M)=0.001386 *20*; α(N)=0.0001564 *22* α(O)=6.64×10^{-6} *10* Mult.,δ: from α(K)exp in ^{90}Kr β^- decay.
162.72	4^-	55.8 *1*	100	106.90	3^-	M1+E2	0.298 *25*	1.35 *10*	α(K)=1.12 *8*; α(L)=0.191 *19*; α(M)=0.032 *3*; α(N)=0.0033 *3*; α(O)=9.0×10^{-5} *6* Mult.,δ: from α(exp) in ^{235}U(n,Fγ).
227.83	(2^-)	106.05 *3*	12.8 *8*	121.79	(1^-)	(M1+E2)	0.5 *2*	0.255 *85*	α(K)=0.220 *72*; α(L)=0.030 *12*; α(M)=0.0049 *19*; α(N)=5.3×10^{-4} *20*; α(O)=1.78×10^{-5} *53* Mult.,δ: from α(K)exp in ^{90}Kr β^- decay.
		120.92 *3*	100 *7*	106.90	3^-	(M1+E2)	0.5 *2*	0.165 *52*	α(K)=0.143 *44*; α(L)=0.0187 *66*; α(M)=0.0031 *11*; α(N)=3.3×10^{-4} *12*; α(O)=1.18×10^{-5} *33* Mult.,δ: from α(K)exp in ^{90}Kr β^- decay.
		227.76 *8*	3.6 *4*	0	0^-	[E2]		0.0478	α(K)=0.0418 *6*; α(L)=0.00510 *8*; α(M)=0.000840 *12*; α(N)=9.16×10^{-5} *13*; α(O)=3.40×10^{-6} *5*
242.19		242.19 *3*	100	0	0^-				
356.23		234.44 *3*	100 *5*	121.79	(1^-)				
		249.32 *3*	52 *5*	106.90	3^-				
		356.00 *20*	4.0 *15*	0	0^-				
536.91		180.66 *15*	26 *14*	356.23					
		309.07 *9*	92 *8*	227.83	(2^-)				
		429.93 *14*	100 *21*	106.90	3^-				
614.42		386.48 *9*	10.7 *10*	227.83	(2^-)				
		492.63 *5*	100 *3*	121.79	(1^-)				
		508.0 *3*	5.2 *16*	106.90	3^-				
		614.38 *9*	17.4 *13*	0	0^-				
661.28		305.10 *18*	0.18 *4*	356.23					
		419.12 *5*	1.04 *4*	242.19					
		433.47 *5*	4.24 *13*	227.83	(2^-)				
		539.49 *4*	100.0 *23*	121.79	(1^-)				
		554.37 *5*	16.5 *4*	106.90	3^-				
		661.23 *5*	1.08 *4*	0	0^-				
676.10		433.9 *3*	17 *6*	242.19					
		569.20 *5*	100 *4*	106.90	3^-				
712.46		470.34 *8*	100	242.19					
740.87		498.59 *12*	14.0 *11*	242.19					
		619.08 *5*	100 *3*	121.79	(1^-)				

$^{90}_{37}Rb_{53}$-3

$\gamma(^{90}Rb)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	δ	α	Comments
838.20		731.33 *4*	100	106.90	3^-				
933.08		220.82 *14*	10 *5*	712.46					
		396.54 *21*	13 *3*	536.91					
		577.1 *3*	14 *4*	356.23					
		690.72 *7*	100 *4*	242.19					
		705.47 *12*	31 *3*	227.83	(2^-)				
1102.19		565.19 *8*	100 *8*	536.91					
		745.8 *4*	30 *10*	356.23					
		980.29 *11*	91 *8*	121.79	(1^-)				
1127.90	(5^+)	965.2‡ *1*	100‡	162.72	4^-				δ: δ(Q/D)=+0.24 *+21−28* or +3 *+16−3* for J(1127.9 level)=5 from $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ).
1153.41		925.49 *9*	100 *7*	227.83	(2^-)				
		1031.2 *3*	28 *7*	121.79	(1^-)				
1204.75	5	1042.0‡ *1*	100‡ *4*	162.72	4^-	D(+Q)	−0.08 *+26−29*		Mult.,δ: from $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ).
1400.6		739.0 *10*	40 *14*	661.28					
		1293.7 *4*	100 *27*	106.90	3^-				
1462.97		1341.31 *22*	100	121.79	(1^-)				
1492.98	$6^{(+)}$	288.2‡ *1*	100‡ *16*	1204.75	5	D,D+Q			Mult.,δ: δ(Q/D)=+0.05 *4* or +8.5 *+48−22* for J(1492.98 level)=6 from $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ). Mult.,δ: δ(Q/D)=+0.76 *+13−11* or −3.5 *+8−14* for J(1492.98 level)=5 from $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ).
		365.1‡ *1*	67‡ *16*	1127.90	(5^+)	(M1+E2)		0.0072 *22*	α(K)=0.0063 *19*; α(L)=7.1×10^{-4} *23*; α(M)=1.18×10^{-4} *38*; α(N)=1.32×10^{-5} *41*; α(O)=5.4×10^{-7} *15* Mult.: all $\gamma\gamma(\theta)$ solutions in ^{235}U(n,Fγ) lead to significant quadrupole admixture suggestive of mult=(M1+E2) rather than (E1+M2). δ: δ(Q/D)=+0.47 *+42−31* or +1.8 *+26−17* for J(1127.9 level)=5 from $\gamma\gamma(\theta)$ in ^{235}U(n,Fγ).
1688.17		585.86 *20*	76 *12*	1102.19					
		947.6 *4*	88 *30*	740.87					
		1460.6 *5*	100 *30*	227.83	(2^-)				
1703.67	(7,6)	210.7‡ *1*	100‡	1492.98	$6^{(+)}$				
1780.01	1^+	626.49 *8*	0.73 *5*	1153.41					
		677.69 *7*	0.98 *5*	1102.19					
		941.86 *5*	3.43 *9*	838.20					
		1039.11 *8*	1.07 *5*	740.87					
		1103.92 *7*	0.88 *5*	676.10					
		1118.69 *5*	100.0 *22*	661.28					
		1165.56 *6*	2.12 *8*	614.42					
		1423.77 *6*	7.53 *17*	356.23					
		1537.85 *5*	24.8 *5*	242.19					
		1552.18 *6*	5.63 *14*	227.83	(2^-)				

$^{90}_{37}Rb_{53}$-4

Adopted Levels, Gammas (continued)

γ(^{90}Rb) (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}†	E_f	J^{π}_f
1780.01	1+	1658.18 6	3.40 9	121.79	(1−)
		1780.04 6	17.2 4	0	0−
1901.63		1240.34 11	100	661.28	
2127.58	1+	1386.62 15	14.2 14	740.87	
		1466.26 15	17.9 14	661.28	
		1885.42 15	16.4 12	242.19	
		1899.61 16	13.9 12	227.83	(2−)
		2006.00 14	8.5 15	121.79	(1−)
		2127.52 7	100 4	0	0−
2271.34		1530.50 20	14 7	740.87	
		2149.51 10	100 5	121.79	(1−)
2433.59		1692.6 5	69 18	740.87	
		1819.1 3	66 11	614.42	
		2191.5 3	100 11	242.19	
		2205.6 6	34 11	227.83	(2−)
2500.4	(8+,7)	1007.1‡ 5	100‡	1492.98	6(+)
2686.96	(8,9)	186.5‡ 3	33‡ 13	2500.4	(8+,7)
		983.3‡ 1	100‡ 20	1703.67	(7,6)
3083.07	1+	1303.4 3	10.7 18	1780.01	1+
		1620.22 22	17.4 18	1462.97	
		1980.99 15	19.6 14	1102.19	
		2421.5 8	5.8 18	661.28	
		2468.56 11	54 5	614.42	
		2726.68 11	100 4	356.23	
		2855.4 3	37 8	227.83	(2−)
3093.74	1+	2160.9 6	17 5	933.08	
		2352.7 4	47 9	740.87	
		2417.33 23	100 9	676.10	
		2432.78 21	80 9	661.28	
		2479.4 7	20 11	614.42	
		2865.73 21	98 9	227.83	(2−)
3238.68	1+	967.33 11	100 9	2271.34	
		2497.6 15	7 4	740.87	
		3010.3 8	15 6	227.83	(2−)
3401.3		714.6‡ 2	100‡	2686.96	(8,9)
3475.6		392.6 4	100 50	3083.07	1+
		1695.2 19	55 32	1780.01	1+
3518.2		117.2 2	1.0×10^2 3	3401.3	
		830.7 3	6.×10^1 3	2686.96	(8,9)
3625.2	1+	2948.8 5	59 30	676.10	
		3269.0 4	100 18	356.23	
3633.8		1133.4‡ 4	100‡ 3	2500.4	(8+,7)
3703.98	1+	465.28 19	100 17	3238.68	1+
		621.3 9	6.×10^1 4	3083.07	1+
		2770.9 4	83 17	933.08	
3878.6	1+	1751.0 3	100 20	2127.58	1+
		3217.1 21	19 15	661.28	
3881.3	1+	3205.1 6	31 8	676.10	
		3344.3 3	100 14	536.91	

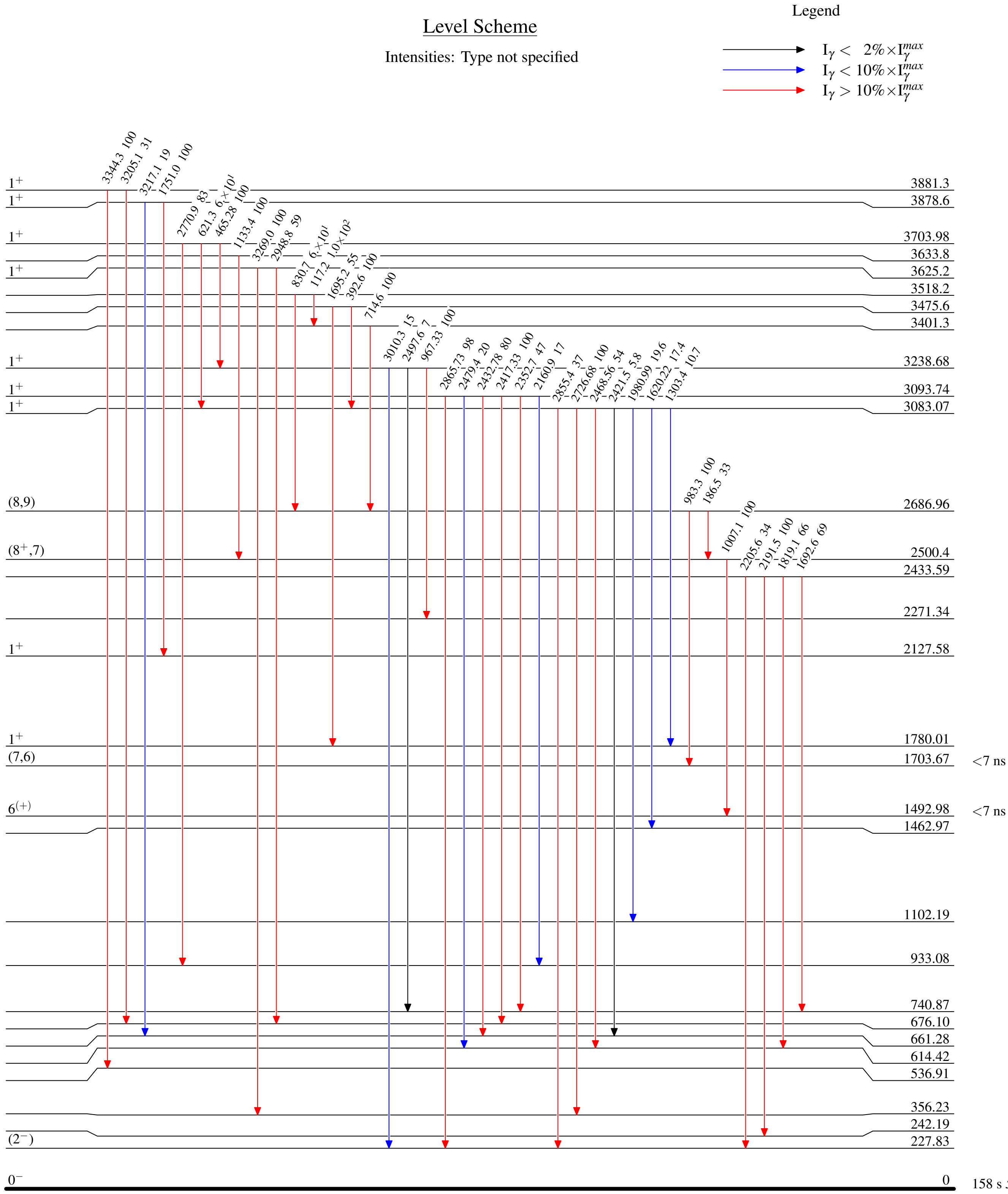
† From ^{90}Kr β^- decay.
‡ From ^{235}U(n,Fγ).

$^{90}_{37}Rb_{53}$-5

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

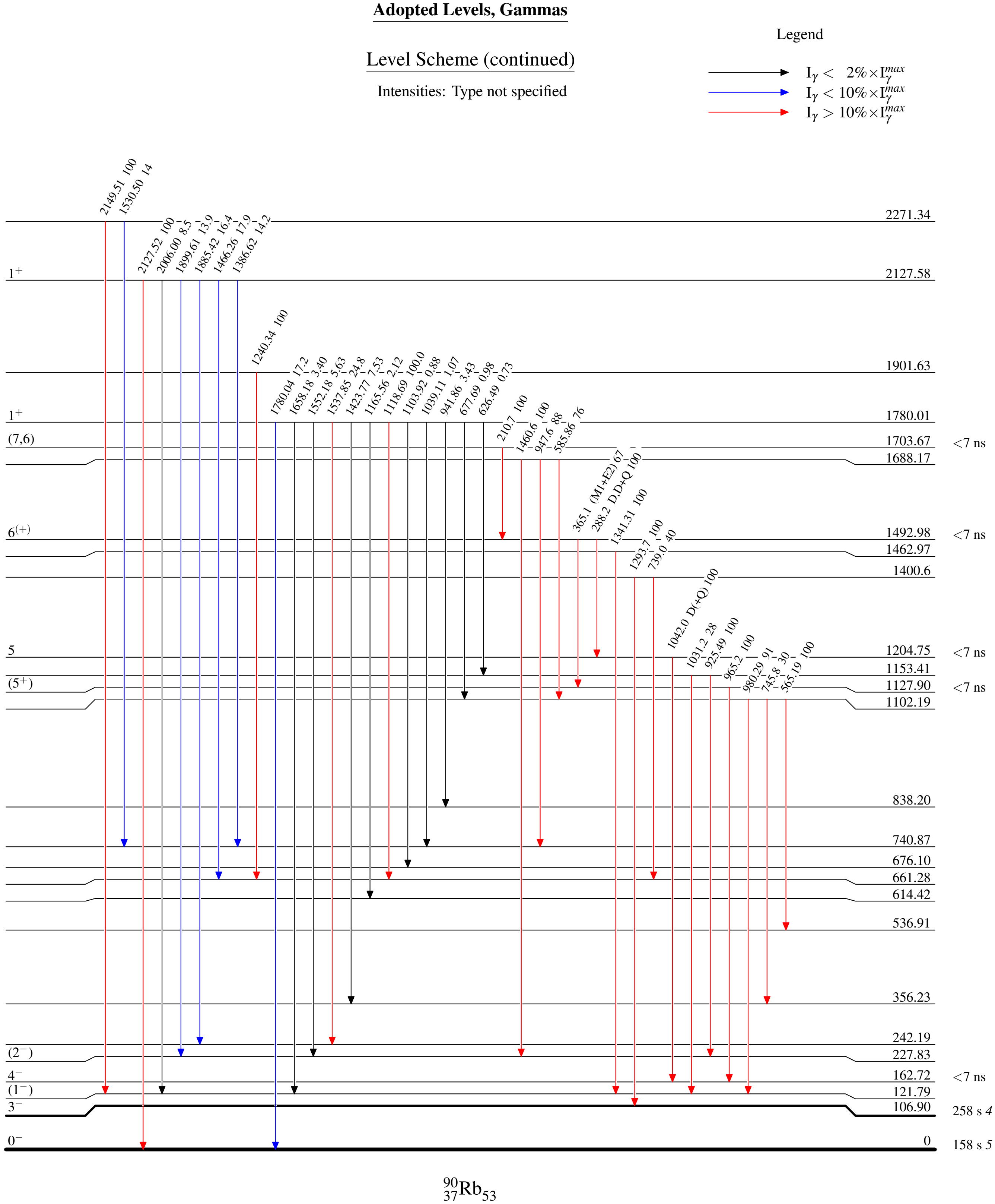


$^{90}_{37}Rb_{53}$

Adopted Levels, Gammas

Level Scheme (continued)

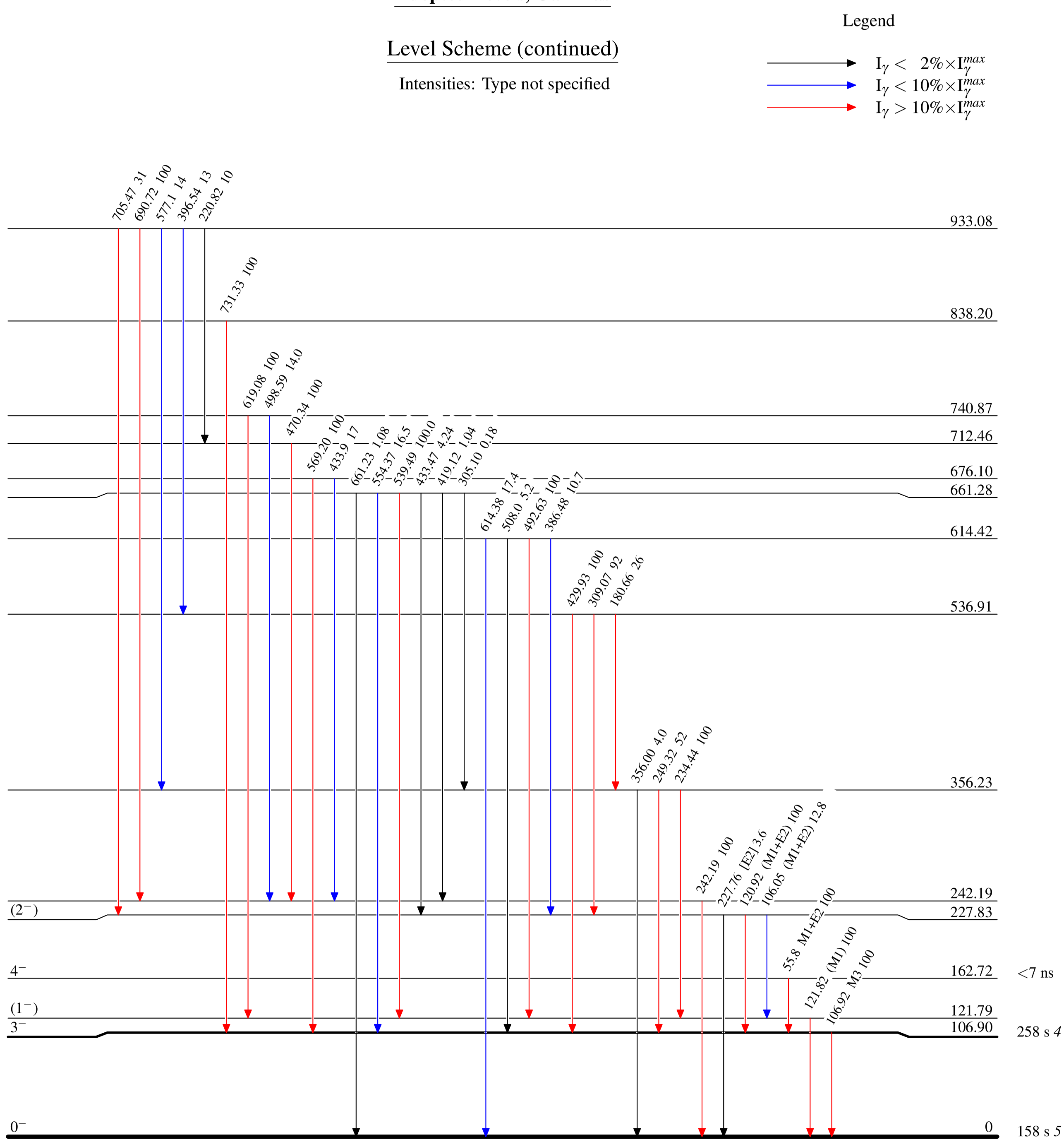
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{90}_{37}Rb_{53}$