^{90}Kr β^- decay 1979Du04

History

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

Parent: ^{90}Kr: E=0; $J^\pi=0^+$; $T_{1/2}$=32.32 s *9*; Q(β^-)=4405 *7*; %β^- decay=100.0

1979Du04: Activity from ^{235}U(n,F) followed by mass separation. Measured Eγ, Iγ, ce, $\gamma\gamma$ coincidences. Magnetic spectrometer, Ge(Li).

1979Bo26: High precision measurements of Eγ, Iγ(t) following n-induced fission. Anti-Compton and curved crystal spectrometers.

1976Wo05: Activity from ^{235}U(n,F). Measured Iγ, Iβ using Ge(Li) detectors and plastic scintillators.

Others: 1962Wa34, 1970Ma11, 1974Gr29.

All data are from 1979Du04, except as noted.

For a discussion of the differences between decay schemes of 1979Du04 and 1970Ma11, see 1979Du04.

α: Additional information 1.

^{90}Rb Levels

E(level)	J^π†	$T_{1/2}$†	E(level)	J^π†	E(level)	J^π†
0	0^-	158 s *5*	740.87 *5*		2271.34 *9*	
106.90 *3*	3^-	258 s *4*	838.20 *4*		2433.59 *19*	
121.79 *3*	(1^-)		933.08 *6*		3083.07 *7*	1^+
227.83 *3*	(2^-)		1102.19 *6*		3093.74 *12*	1^+
242.19 *3*			1153.41 *7*		3238.68 *14*	1^+
356.23 *3*			1400.6 *4*		3475.6 *4*	
536.91 *6*			1462.97 *16*		3625.2 *4*	1^+
614.42 *4*			1688.17 *18*		3703.98 *20*	1^+
661.28 *3*			1780.01 *3*	1^+	3878.6 *3*	1^+
676.10 *5*			1901.63 *12*		3881.3 *3*	1^+
712.46 *8*			2127.58 *5*	1^+		

† From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(524 *7*)	3881.3	0.148 *22*	4.54 *7*	av Eβ=166.5 *26*
(526 *7*)	3878.6	0.069 *16*	4.88 *11*	av Eβ=167.5 *26*
(701 *7*)	3703.98	0.17 *4*	4.93 *11*	av Eβ=234.3 *28*
(780 *7*)	3625.2	0.105 *25*	5.31 *11*	av Eβ=265.7 *29*
(929 *7*)	3475.6	0.036 *15*	6.05 *19*	av Eβ=326.8 *30*
(1166 *7*)	3238.68	0.19 *3*	5.70 *7*	av Eβ=427.2 *31*
(1311 *7*)	3093.74	0.69 *7*	5.34 *5*	av Eβ=490.3 *31*
(1322 *7*)	3083.07	2.07 *19*	4.87 *4*	av Eβ=495.0 *31*
(1971 *7*)	2433.59	0.30 *4*	6.41 *6*	av Eβ=788.1 *33*
(2134 *7*)	2271.34	0.10 *3*	7.03 *13*	av Eβ=863.1 *33*
(2277 *7*)	2127.58	2.29 *19*	5.78 *4*	av Eβ=929.9 *33*
(2503 *7*)	1901.63	0.35 *4*	6.77 *5*	av Eβ=1035.7 *33*
(2625 *7*)	1780.01	65 *6*	4.59 *4*	av Eβ=1092.9 *33*
(2717 *7*)	1688.17	0.18 *4*	7.21 *10*	av Eβ=1136.2 *33*
(2942# *7*)	1462.97	<0.029	>8.2	av Eβ=1242.7 *34*
(3004 *7*)	1400.6	0.082 *19*	7.74 *10*	av Eβ=1272.3 *34*
(3472 *7*)	933.08	0.58 *6*	7.16 *5*	av Eβ=1495.0 *34*
(3567 *7*)	838.20	0.15 *6*	7.80 *18*	av Eβ=1540.4 *34*
(3664 *7*)	740.87	0.34 *7*	7.50 *9*	av Eβ=1586.9 *34*
(3693 *7*)	712.46	0.20 *3*	7.74 *7*	av Eβ=1600.5 *34*

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^{90}Kr β^- decay 1979Du04 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†][‡]	Log *ft*	Comments
(3729 *7*)	676.10	0.10 *5*	8.06 *22*	av Eβ=1617.9 *34*
(3791 *7*)	614.42	0.20 *7*	7.79 *16*	av Eβ=1647.5 *34*
(4049[#] *7*)	356.23	<0.29	>7.8	av Eβ=1771.4 *34*
(4177[#] *7*)	227.83	<0.2	>8.0	av Eβ=1833.1 *34*
(4283 *7*)	121.79	<1.5	>7.1	av Eβ=1884.0 *34*
(4405 *7*)	0	29 *4*	5.92 *6*	av Eβ=1942.6 *34*

[†] Ground state feeding from 1976Wo05 from absolute β counting. Iβ for excited states obtained by intensity imbalance at each level, assuming no β^- feeding to the 106.9 level with $\Delta J=3$, $\Delta\pi$=no.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{90}Rb)$

Iγ normalization: from Σ(I(γ+ce)(to g.s) + I(γ+ce)(to 106.9-keV isomer)) = 100 − 29 % *4*, where Iβ(to g.s.)=29 % *4* was measured by 1976Wo05. Normalization factor of 0.047 *3* given by 1976Wo05 is incorrect. It was possibly deduced without including the sum of γ-ray transition intensities to the 106.9-keV isomer. Current normalization of 0.039 *3* deduced by evaluator agrees with normalization factor of 0.0389 *27* from 1975Ko16.

E$_\gamma$[†@]	I$_\gamma$[†&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	δ[‡]	α	Comments
106.05[#] *3*	11.5 *7*	227.83	(2$^-$)	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: α(K)exp=0.22 *6* (1979Du04).
106.92[#] *15*	1.1 *3*	106.90	3$^-$	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* I$_\gamma$: main depopulating intensity via ^{90}Rb β^- decay (258 s). α(K)exp/α(L)exp=6.2 *12* (1979Du04). Mult.: α(K)exp/α(L)exp yields E2, M2 or M3. From atomic beam measurements, J of ground state is 0 and J of 106.9-keV isomer is 3, resulting in M3 as only possible multipolarity.
120.92[#] *3*	90 *6*	227.83	(2$^-$)	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: α(K)exp=0.15 *4* (1979Du04).
121.82[#] *3*	910 *30*	121.79	(1$^-$)	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.: α(K)exp=0.14 *4* (1979Du04). E$_\gamma$: other: 121.837 *4* (1979Bo26).
180.66 *15*	1.0 *5*	536.91		356.23					
220.82 *14*	1.0 *5*	933.08		712.46					

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^{90}Kr β^- decay 1979Du04 (continued)

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

E_γ †@	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α	Comments
227.76 *8*	3.2 *3*	227.83	(2$^-$)	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*
234.44 *3*	68 *3*	356.23		121.79	(1$^-$)			E_γ: other: 234.477 *42* (1979Bo26).
242.19 *3*	255 *8*	242.19		0	0$^-$			E_γ: other: 242.248 *20* (1979Bo26).
249.32 *3*	35 *3*	356.23		106.90	3$^-$			
305.10 *18*	1.4 *3*	661.28		356.23				
309.07 *9*	3.5 *3*	536.91		227.83	(2$^-$)			
356.00 *20*	2.7 *10*	356.23		0	0$^-$			
386.48 *9*	3.3 *3*	614.42		227.83	(2$^-$)			
392.6 *4*	0.6 *3*	3475.6		3083.07	1$^+$			
396.54 *21*	1.3 *3*	933.08		536.91				
419.12 *5*	8.2 *3*	661.28		242.19				
429.93 *14*	3.8 *8*	536.91		106.90	3$^-$			
433.47 *5*	33.5 *10*	661.28		227.83	(2$^-$)			
433.9 *3*	2.6 *8*	676.10		242.19				
465.28 *19*	1.8 *3*	3703.98	1$^+$	3238.68	1$^+$			
470.34 *8*	6.1 *4*	712.46		242.19				
x476.10 *11*	3.4 *3*							
492.63 *5*	31.0 *8*	614.42		121.79	(1$^-$)			
498.59 *12*	3.9 *3*	740.87		242.19				
508.0 *3*	1.6 *5*	614.42		106.90	3$^-$			
539.49 *4*	790 *18*	661.28		121.79	(1$^-$)			E_γ: other: 539.631 *20* (1979Bo26).
554.37 *5*	130 *3*	661.28		106.90	3$^-$			E_γ: other: 554.339 *18* (1979Bo26).
565.19 *8*	5.3 *4*	1102.19		536.91				
569.20 *5*	15.5 *5*	676.10		106.90	3$^-$			
577.1 *3*	1.4 *4*	933.08		356.23				
585.86 *20*	1.3 *2*	1688.17		1102.19				
614.38 *9*	5.4 *4*	614.42		0	0$^-$			
619.08 *5*	27.8 *8*	740.87		121.79	(1$^-$)			
621.3 *9*	1.0 *7*	3703.98	1$^+$	3083.07	1$^+$			
626.49 *8*	7.3 *5*	1780.01	1$^+$	1153.41				
x658.1 *5*	0.8 *3*							
661.23 *5*	8.5 *3*	661.28		0	0$^-$			
677.69 *7*	9.8 *5*	1780.01	1$^+$	1102.19				
690.72 *7*	10.2 *4*	933.08		242.19				
705.47 *12*	3.2 *3*	933.08		227.83	(2$^-$)			
731.33 *4*	38.1 *10*	838.20		106.90	3$^-$			
739.0 *10*	0.6 *2*	1400.6		661.28				
745.8 *4*	1.6 *5*	1102.19		356.23				
925.49 *9*	5.7 *4*	1153.41		227.83	(2$^-$)			
941.86 *5*	34.3 *9*	1780.01	1$^+$	838.20				
947.6 *4*	1.5 *5*	1688.17		740.87				
967.33 *11*	5.5 *5*	3238.68	1$^+$	2271.34				
980.29 *11*	4.8 *4*	1102.19		121.79	(1$^-$)			
1031.2 *3*	1.6 *4*	1153.41		121.79	(1$^-$)			
1039.11 *8*	10.7 *5*	1780.01	1$^+$	740.87				
1103.92 *7*	8.8 *5*	1780.01	1$^+$	676.10				
1118.69 *5*	1000 *22*	1780.01	1$^+$	661.28				
1165.56 *6*	21.2 *8*	1780.01	1$^+$	614.42				
1240.34 *11*	9.0 *6*	1901.63		661.28				
1293.7 *4*	1.5 *4*	1400.6		106.90	3$^-$			
1303.36 *24*	2.4 *4*	3083.07	1$^+$	1780.01	1$^+$			
x1309.68 *10*	7.1 *4*							
1341.31 *22*	4.0 *5*	1462.97		121.79	(1$^-$)			
1386.62 *15*	5.0 *5*	2127.58	1$^+$	740.87				

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^{90}Kr β^- decay 1979Du04 (continued)

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

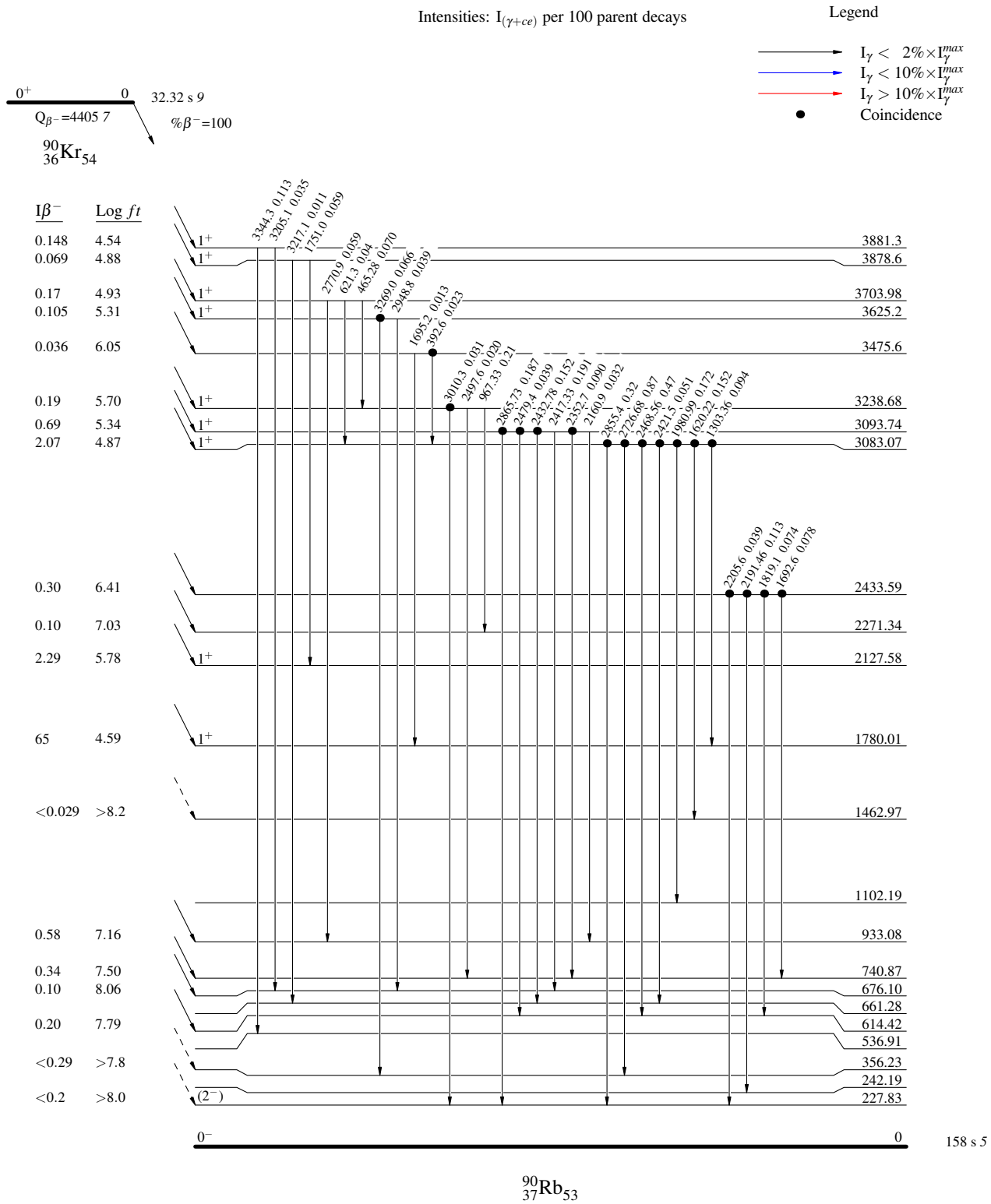
E_γ †@	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	E_γ †@	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π
1423.77 *6*	75.3 *17*	1780.01	1^+	356.23		2352.7 *4*	2.3 *4*	3093.74	1^+	740.87	
1460.6 *5*	1.7 *5*	1688.17		227.83	(2^-)	2417.33 *23*	4.9 *4*	3093.74	1^+	676.10	
1466.26 *15*	6.3 *5*	2127.58	1^+	661.28		2421.5 *8*	1.3 *4*	3083.07	1^+	661.28	
1530.50 *20*	1.0 *5*	2271.34		740.87		2432.78 *21*	3.9 *4*	3093.74	1^+	661.28	
1537.85 *5*	248 *5*	1780.01	1^+	242.19		2468.56 *11*	12.0 *10*	3083.07	1^+	614.42	
1552.18 *6*	56.3 *14*	1780.01	1^+	227.83	(2^-)	2479.4 *7*	1.0 *5*	3093.74	1^+	614.42	
1620.22 *22*	3.9 *4*	3083.07	1^+	1462.97		2497.6 *15*	0.4 *2*	3238.68	1^+	740.87	
1658.18 *6*	34.0 *9*	1780.01	1^+	121.79	(1^-)	2726.68 *11*	22.4 *9*	3083.07	1^+	356.23	
1692.6 *5*	2.0 *5*	2433.59		740.87		2770.9 *4*	1.5 *3*	3703.98	1^+	933.08	
1695.2 *19*	0.33 *19*	3475.6		1780.01	1^+	2855.4 *3*	8.3 *16*	3083.07	1^+	227.83	(2^-)
1751.0 *3*	1.5 *3*	3878.6	1^+	2127.58	1^+	2865.73 *21*	4.8 *4*	3093.74	1^+	227.83	(2^-)
1780.04 *6*	172 *4*	1780.01	1^+	0	0^-	2948.8 *5*	1.0 *5*	3625.2	1^+	676.10	
1819.1 *3*	1.9 *3*	2433.59		614.42		3010.3 *8*	0.79 *25*	3238.68	1^+	227.83	(2^-)
1885.42 *15*	5.8 *4*	2127.58	1^+	242.19		3205.1 *6*	0.89 *22*	3881.3	1^+	676.10	
1899.61 *16*	4.9 *4*	2127.58	1^+	227.83	(2^-)	3217.1 *21*	0.28 *22*	3878.6	1^+	661.28	
1980.99 *15*	4.4 *3*	3083.07	1^+	1102.19		[x]3256.2 *12*	0.53 *22*				
2006.00 *14*	3.0 *5*	2127.58	1^+	121.79	(1^-)	3269.0 *4*	1.7 *3*	3625.2	1^+	356.23	
2127.52 *7*	35.3 *12*	2127.58	1^+	0	0^-	3344.3 *3*	2.9 *4*	3881.3	1^+	536.91	
2149.51 *10*	7.1 *3*	2271.34		121.79	(1^-)	[x]3465.1 *9*	0.9 *3*				
2160.9 *6*	0.81 *24*	3093.74	1^+	933.08		[x]3855.3 *4*	3.1 *3*				
2191.46 *25*	2.9 *3*	2433.59		242.19		[x]4166.5 *10*	0.8 *3*				
2205.6 *6*	1.0 *3*	2433.59		227.83	(2^-)						

† From 1979Du04.
‡ From the Adopted Levels. In cases were Adopted values originate from this dataset, supporting evidence is given in the comments.
# The 106-keV and 121-keV doublets were resolved by γ and conversion electron measurements (1979Du04).
@ From a least-squares fit to Eγ, by evaluators.
& For absolute intensity per 100 decays, multiply by 0.039 *3*.
x γ ray not placed in level scheme.

^{90}Kr β^- decay 1979Du04

Decay Scheme

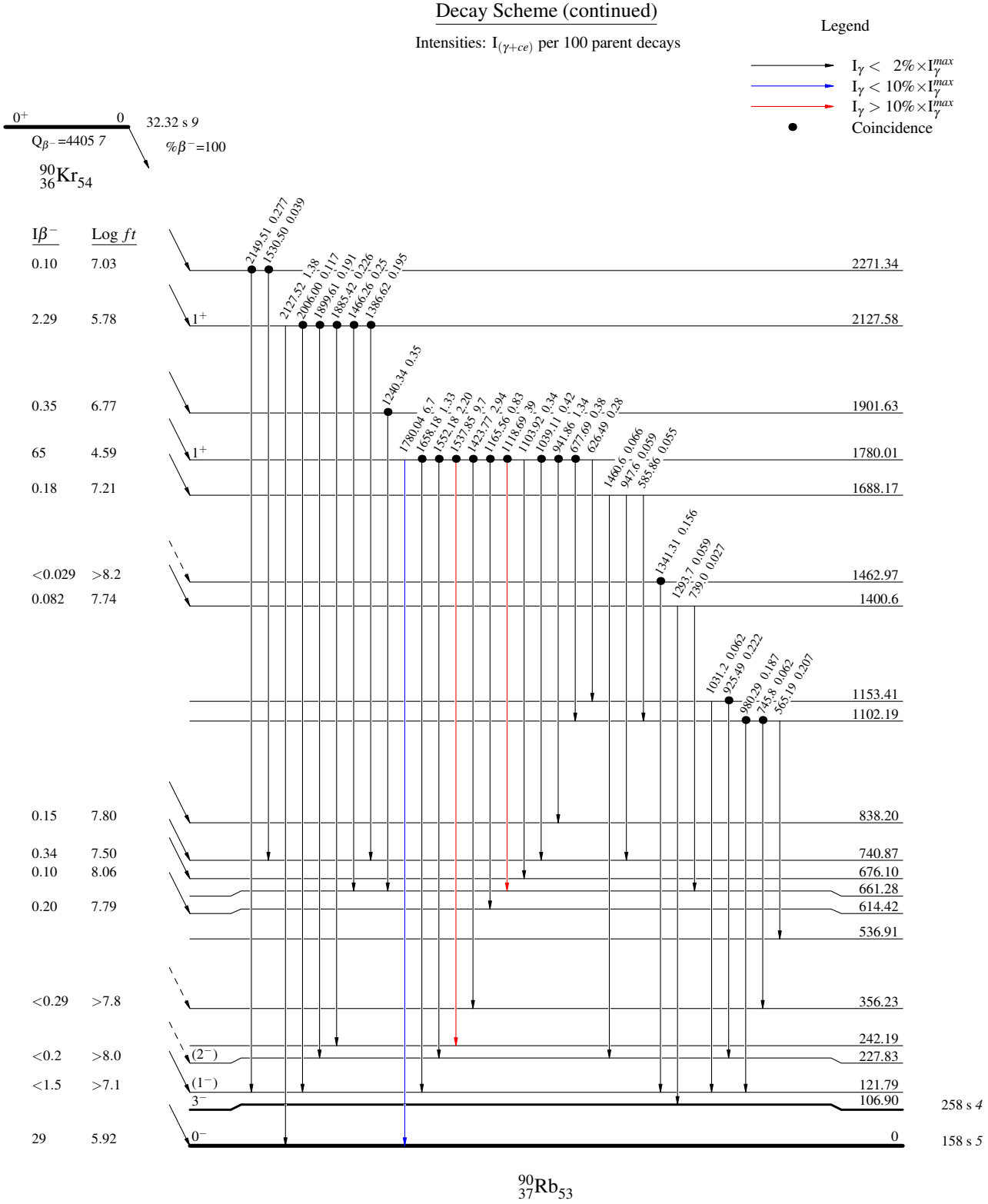
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{90}Kr β^- decay 1979Du04

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{90}Kr β^- decay 1979Du04

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays