^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 93, 33 (2001)	11-May-2001

Parent: ^{130}Sn: E=1946.88; J^π=(7$^-$); $T_{1/2}$=1.7 min *1*; Q(β^-)=2148 *15*; %β^- decay=100.0

1994WaZU, 1987StZO (also 1988StZQ): measured Eγ, Iγ, $\gamma\gamma$.

1974Ke08 (also 1973Ke24): measured Eγ, Iγ, $\gamma\gamma$, ce, $T_{1/2}$. A total of 20 γ rays were reported, five of which were assigned in a level scheme.

1990St13, 1977Lu06: measured $\beta\gamma$.

1979Bo26: measured Eγ with a curved-crystal spectrometer.

^{130}Sb Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	(8$^-$)		
5.04 *24*	(4,5)$^+$	6.3 min *2*	$T_{1/2}$: from Adopted Levels.
68.04 *12*	($^+$)		J^π: 5$^+$ (1994WaZU).
84.67 *4*	(6$^-$,7$^-$,8$^-$)		J^π: 6$^-$ (1994WaZU).
111.73 *11*	($^-$)		J^π: 5$^-$ (1994WaZU).
144.911 *5*	(7$^-$,8$^-$)		J^π: 7$^-$ (1994WaZU).
689.03 *5*			J^π: 6$^-$ (1994WaZU).
733.39 *5*	(6,7,8)		J^π: 7$^-$ (1994WaZU).
814.6 *5*			
870.96 *9*			J^π: 7$^-$ (1994WaZU).
882.96 *7*			J^π: 6$^-$ (1994WaZU).
937.71 *7*	(6,7,8)		J^π: 7$^-$ (1994WaZU).
1044.64 *5*	(6,7,8)		
1047.40 *6*			
1096.8 *8*			
1159.85 *7*			J^π: 7$^-$,8$^-$ (1994WaZU).
1261.8 *3*			
1306.14 *9*			J^π: 7$^-$ (1994WaZU).
1352.9 *5*			
1358.7 *4*			
1482.4 *4*			
1636.92 *10*			
1716.6 *5*			
1726.72 *20*			
1810.5 *4*			
1813.0 *4*			
1893.24 *21*			
1912.61 *13*			
2023.0 *5*			
2026.65 *11*			
2085.1 *5*			
2096.5 *8*			
2178.7 *5*			
2200.5 *4*			
2271.8 *4*			
2394.78 *9*			
2416.8 *5*			
2457.4 *5*			
2484.04 *18*			
2526.30 *18*			
2535.2 *5*			
2546.27 *12*			
2580.3 *7*			

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^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO (continued)

^{130}Sb Levels (continued)

E(level)†
2614.9 *5*
2636.6 *10*
2761.9 *5*
2820.2 *8*
2983.1 *5*

† From least-squares adjustment to Eγ's.
‡ From Adopted Levels, based on log *ft* values and transition multipolarities.

β^- radiations

E(decay)	E(level)	Iβ⁻†	Log *ft*	Comments
(1112 *15*)	2983.1	0.39	6.0	av Eβ=393 *7*
(1275 *15*)	2820.2	0.66	6.0	av Eβ=462 *7*
(1333 *15*)	2761.9	0.92	5.9	av Eβ=487 *7*
(1458 *15*)	2636.6	0.23	6.7	av Eβ=541 *7*
(1480 *15*)	2614.9	0.11	7.0	av Eβ=551 *7*
(1515 *15*)	2580.3	0.64	6.3	av Eβ=566 *7*
(1549 *15*)	2546.27	0.85	6.2	av Eβ=581 *7*
(1560 *15*)	2535.2	0.074	7.3	av Eβ=586 *7*
(1569 *15*)	2526.30	0.42	6.5	av Eβ=590 *7*
(1611 *15*)	2484.04	1.6	6.0	av Eβ=608 *7*
(1637 *15*)	2457.4	0.25	6.8	av Eβ=620 *7*
(1678 *15*)	2416.8	0.32	6.7	av Eβ=638 *7*
(1700 *15*)	2394.78	4.1	5.7	av Eβ=648 *7*
(1823 *15*)	2271.8	0.87	6.5	av Eβ=703 *7*
(1894 *15*)	2200.5	0.60	6.7	av Eβ=735 *7*
(1916 *15*)	2178.7	0.32	7.0	av Eβ=745 *7*
(1998 *15*)	2096.5	0.025	8.2	av Eβ=782 *7*
(2010 *15*)	2085.1	0.12	7.5	av Eβ=787 *7*
(2068 *15*)	2026.65	0.22	7.3	av Eβ=813 *7*
(2072 *15*)	2023.0	0.41	7.0	av Eβ=815 *7*
(2182 *15*)	1912.61	0.12	7.7	av Eβ=865 *7*
(2202 *15*)	1893.24	0.15	7.6	av Eβ=874 *7*
(2282 *15*)	1813.0	0.94	6.8	av Eβ=911 *7*
(2368 *15*)	1726.72	0.25	7.5	av Eβ=950 *7*
(2378 *15*)	1716.6	0.36	7.3	av Eβ=955 *7*
(2458 *15*)	1636.92	0.21	7.6	av Eβ=992 *7*
(2612 *15*)	1482.4	0.46	7.4	av Eβ=1063 *7*
(2736 *15*)	1358.7	1.2	7.1	av Eβ=1120 *7*
(2742 *15*)	1352.9	0.37	7.6	av Eβ=1123 *7*
(2789 *15*)	1306.14	1.3	7.0	av Eβ=1145 *7*
(2833 *15*)	1261.8	0.72	7.3	av Eβ=1165 *7*
(2935 *15*)	1159.85	1.3	7.2	av Eβ=1213 *7*
(2998 *15*)	1096.8	0.44	7.7	av Eβ=1242 *7*
(3047 *15*)	1047.40	2.4	7.0	av Eβ=1265 *7*
(3050 *15*)	1044.64	9.6	6.4	av Eβ=1267 *7* E(decay): 2990 *160* (1990St13), 2970 *270* (1977Lu06) from (145γ)β coin; 2900 *111* (1990St13), 3180 *570* (1977Lu06) from (311γ)β coin; 2905 *60* (1990St13), 2960 *310* (1977Lu06) from (900γ)β coin.
(3157 *15*)	937.71	5.1	6.7	av Eβ=1316 *7*
(3212 *15*)	882.96	0.80	7.5	av Eβ=1342 *7*
(3224 *15*)	870.96	0.25	8.0	av Eβ=1348 *7*

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^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(3280 *15*)	814.6	0.49	7.7	av Eβ=1374 *7*
(3361 *15*)	733.39	24	6.2	av Eβ=1412 *7*
(3950 *15*)	144.911	21	6.6	av Eβ=1689 *7*
(3983 *15*)	111.73	3.4	7.2	av Eβ=1705 *7*
(4010 *15*)	84.67	8 *8*	7.5	av Eβ=1717 *7*
(4027 *15*)	68.04	8.4	7.6	av Eβ=1725 *7*
(4095[‡] *15*)	0.0			

[†] Absolute intensity per 100 decays.
[‡] Existence of this branch is questionable.

$\gamma(^{130}Sb)$

Iγ normalization: Σ (I(γ+ce) of γ's to g.s. and 4.8 level)=100, assuming no β^- feeding to g.s. and 4.8 level.

E$_\gamma$[†]	I$_\gamma$[†e]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	α[f]	Comments
43.69 *5*	7.64 *22*	111.73	(−)	68.04	(+)	(E1)[#]	1.90	
44.1 *5*	3.0 *7*	733.39	(6,7,8)	689.03		(M1)[#]	6.7	
60.21 *5*	14.6 *1*	144.911	(7−,8−)	84.67	(6−,7−,8−)	(M1)[#]	2.69	α(K)= 2.317; α(L)= 0.299; α(M)= 0.0591; α(N+..)=0.01369
63.0 *2*	18.0 *4*	68.04	(+)	5.04	(4,5)+	(M1)[#]	2.36	
84.67 *5*	41.5 *5*	84.67	(6−,7−,8−)	0.0	(8−)	M1,E2	2.0 *10*	α(K)= 1.999; α(L)= 0.799; α(M)= 0.1642; α(N+..)= 0.0353 E$_\gamma$: other: 84.208 *1* (1979Bo26). This value deviates significantly from 84.7 *1* (1974Ke08) and 84.67 (1987StZO), thus it is not used. Mult.: α(K)exp=1.19 *25* gives M1+E2 with δ=0.7 *3*; K/L=2.3 gives E2.
x91.9[@] *1*	7[@] *2*							
x96.7[@] *1*	7[@] *2*							
125.6 *5*	1.5 *4*	814.6		689.03		[D,E2]	0.42 *32*	
144.911 *5*	98.5 *5*	144.911	(7−,8−)	0.0	(8−)	M1	0.2209	α(K)= 0.1907; α(L)=0.02430; α(M)=0.00479; α(N+..)=0.00111 α(K)exp=0.17 *4*; K/L=9.3 E$_\gamma$: from 1979Bo26. Eγ=144.90 *5* (1987StZO).
149.62 *5*	1.9 *2*	882.96		733.39	(6,7,8)	[D,E2]	0.23 *17*	
222.48 *8*	1.7 *1*	1159.85		937.71	(6,7,8)			E$_\gamma$: level-energy difference=222.15.
311.18 *5*	20.1 *2*	1044.64	(6,7,8)	733.39	(6,7,8)	[D,E2]	0.021 *12*	
314.0 *2*	0.8 *1*	1047.40		733.39	(6,7,8)			
323.9 *5*	1.4 *2*	1261.8		937.71	(6,7,8)			
425.7[&] *2*	0.5 *1*	1159.85		733.39	(6,7,8)			
482.2 *1*	1.61 *8*	2394.78		1912.61				
544.09 *5*	25.5 *6*	689.03		144.911	(7−,8−)			
611.3 *5*	2.7 *2*	1482.4		870.96				
648.5 *1*	11.1 *10*	733.39	(6,7,8)	84.67	(6−,7−,8−)			
669.7 *5*	3.6 *2*	1358.7		689.03				

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^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO (continued)

$\gamma(^{130}Sb)$ (continued)

E_γ †	I_γ †e	E_i(level)	J_i^π	E_f	J_f^π
733.4 *1*	100 *10*	733.39	(6,7,8)	0.0	(8$^-$)
737.9 *5*	1.2 *4*	882.96		144.911	(7$^-$,8$^-$)
769.8 *5*	2.8 *2*	2580.3		1810.5	
771.0 *1*	6.6 *2*	882.96		111.73	($^-$)
853.33[a] *8*	17.8 *4*	937.71	(6,7,8)	84.67	(6$^-$,7$^-$,8$^-$)
870.92 *9*	6.5 *2*	870.96		0.0	(8$^-$)
875.4 *5*	2.9 *4*	1813.0		937.71	(6,7,8)
899.79 *5*	35.4 *4*	1044.64	(6,7,8)	144.911	(7$^-$,8$^-$)
902.6 *1*	2.66 *2*	1047.40		144.911	(7$^-$,8$^-$)
x912.6[@] *5*	8[@] *2*				
938.0 *3*	18.0 *10*	937.71	(6,7,8)	0.0	(8$^-$)
939.3 *5*	1.4 *1*	1810.5		870.96	
962.69 *6*	7.7 *4*	1047.40		84.67	(6$^-$,7$^-$,8$^-$)
x972.2[@] *5*	9[@] *2*				
1001.8 *8*	1.9 *2*	2484.04		1482.4	
1014.7 *1*	4.5 *2*	1159.85		144.911	(7$^-$,8$^-$)
1028.8 *8*	1.90 *10*	1096.8		68.04	($^+$)
1029.5 *5*	0.89 *8*	1912.61		882.96	
1117.1 *3*	2.00 *5*	1261.8		144.911	(7$^-$,8$^-$)
1134.1 *5*	1.4 *2*	2178.7		1044.64	(6,7,8)
1153.2 *5*	0.6 *1*	2200.5		1047.40	
1155.8 *5*	2.0 *2*	2200.5		1044.64	(6,7,8)
1159.6 *2*	0.64 *5*	1159.85		0.0	(8$^-$)
1178.2 *2*	3.0 *2*	2484.04		1306.14	
1179.5 *5*	0.65 *11*	1912.61		733.39	(6,7,8)
1195.3[b] *2*	0.8 *1*	1306.14		111.73	($^-$)
1204.2 *2*	0.63 *6*	1893.24		689.03	
1208.0 *5*	1.59 *4*	1352.9		144.911	(7$^-$,8$^-$)
1213.8 *5*	1.53 *11*	1358.7		144.911	(7$^-$,8$^-$)
1214.1 *5*	0.51 *2*	2085.1		870.96	
1221.1 *5*	7.7 *4*	1306.14		84.67	(6$^-$,7$^-$,8$^-$)
x1223.7[d] *5*	0.61 *7*				
1224.2 *5*	0.57 *7*	1912.61		689.03	
1227.1 *5*	1.0 *1*	2271.8		1044.64	(6,7,8)
1235.7 *5*	1.7 *2*	2394.78		1159.85	
1273.7 *5*	0.28 *1*	2535.2		1261.8	
1289.6 *5*	1.8 *1*	2023.0		733.39	(6,7,8)
1306.0 *1*	4.2 *1*	1306.14		0.0	(8$^-$)
1334.1 *8*	2.3 *2*	2271.8		937.71	(6,7,8)
1337.6 *1*	0.14 *1*	2026.65		689.03	
1350.7 *5*	3.0 *2*	2394.78		1044.64	(6,7,8)
1407.5 *8*	0.11 *4*	2096.5		689.03	
1439.0 *5*	1.4 *2*	2484.04		1044.64	(6,7,8)
1455.8 *5*	4.01 *7*	2761.9		1306.14	
1456.5 *5*	4.2 *5*	2394.78		937.71	(6,7,8)
x1478.5[@] *8*	9[@] *2*				
1479.0 *2*	0.26 *2*	2526.30		1047.40	
1483.1 *8*	1.2 *1*	1482.4		0.0	(8$^-$)
1492.0 *1*	0.93 *4*	1636.92		144.911	(7$^-$,8$^-$)
1511.6 *2*	1.6 *2*	2394.78		882.96	
1519.7 *8*	1.0 *2*	2457.4		937.71	(6,7,8)
1523.4[c]	0.08[c]	2394.78		870.96	
1538.5 *5*	0.49 *6*	2271.8		733.39	(6,7,8)
1571.7 *5*	1.58 *5*	1716.6		144.911	(7$^-$,8$^-$)
1581.8 *2*	1.1 *1*	1726.72		144.911	(7$^-$,8$^-$)

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^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO (continued)

$\gamma(^{130}Sb)$ (continued)

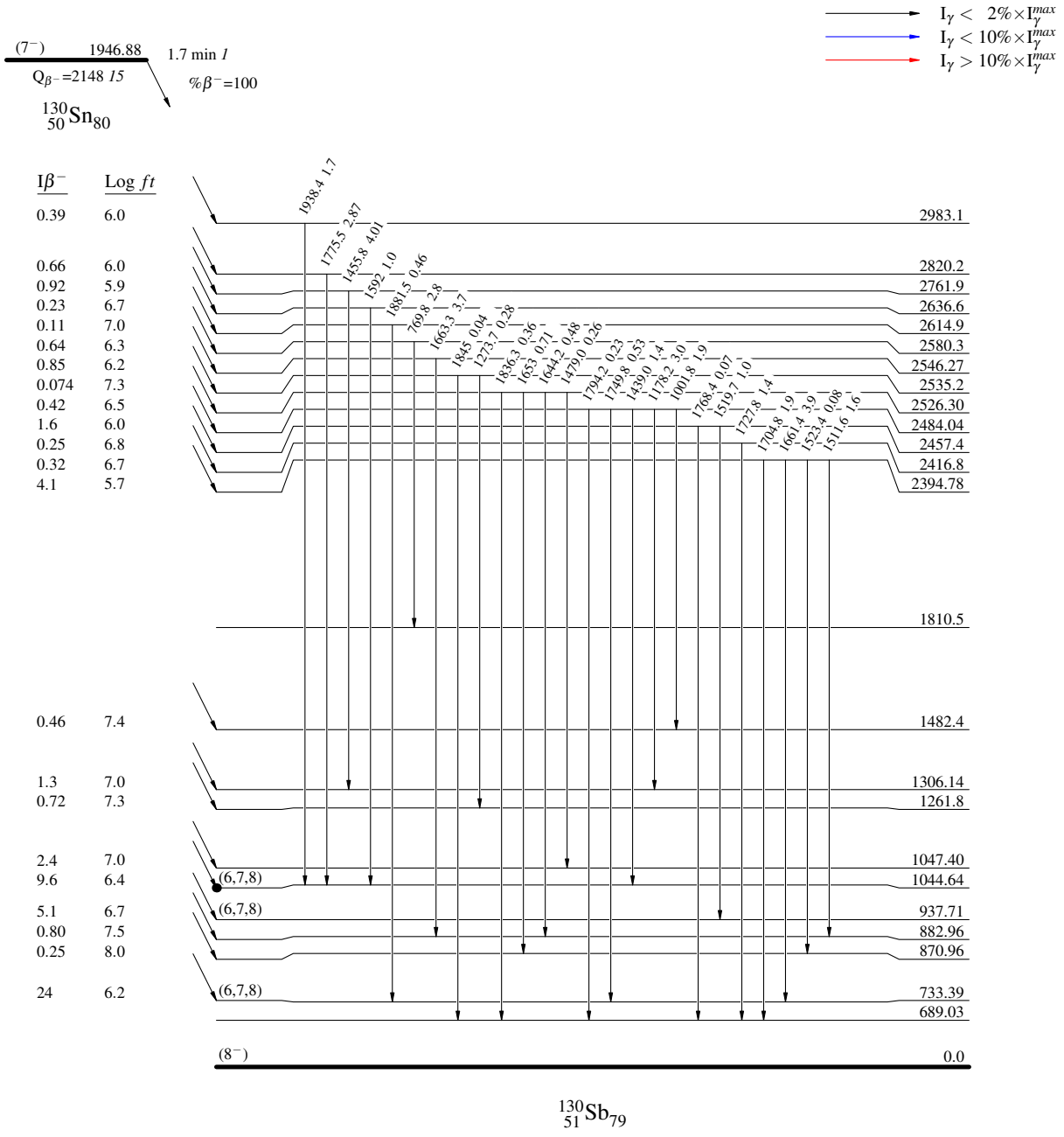
E_γ [†]	I_γ [†e]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [†]	I_γ [†e]	E_i(level)	E_f	J_f^π
1592 *1*	1.0 *1*	2636.6		1044.64	(6,7,8)	1768.4 *5*	0.07 *1*	2457.4	689.03	
1644.2 *5*	0.48 *10*	2526.30		882.96		1775.5 *8*	2.87 *8*	2820.2	1044.64	(6,7,8)
1653 *1*	0.71 *11*	2526.30		870.96		1794.2 *5*	0.23 *2*	2484.04	689.03	
1661.4 *1*	3.9 *2*	2394.78		733.39	(6,7,8)	1836.3 *5*	0.36 *5*	2526.30	689.03	
1663.3 *1*	3.7 *1*	2546.27		882.96		1845 *1*	0.04 *1*	2535.2	689.03	
1665.8 *5*	1.16 *10*	1810.5		144.911	$(7^-,8^-)$	1881.5 *5*	0.46 *8*	2614.9	733.39	(6,7,8)
1668.0 *5*	1.17 *10*	1813.0		144.911	$(7^-,8^-)$	1882.0 *5*	0.82 *4*	2026.65	144.911	$(7^-,8^-)$
1704.8 *5*	1.9 *2*	2394.78		689.03		1938.4 *5*	1.7 *2*	2983.1	1044.64	(6,7,8)
1727.8 *5*	1.4 *1*	2416.8		689.03		[x]2153.2[@] *8*	4[@] *2*			
1749.8 *5*	0.53 *10*	2484.04		733.39	(6,7,8)					

† From 1987StZO.
‡ From α(K)exp and K/L (1974Ke08).
# From intensity balance (1994WaZU,1987StZO).
@ From 1974Ke08, who state that the identification is uncertain, and that the transition may belong to the decay of the 3.8-min activity. This transition is considered as suspect by the evaluator, since with the intensity quoted by 1974Ke08, it should have been detected in the γ and $\gamma\gamma$ coin experiment of 1987StZO.
& Level-energy difference=426.5.
[a] Level-energy difference=853.04.
[b] Level-energy difference=1194.4.
[c] From level scheme figure of 1987StZO.
[d] Placement 1912.6-688.98 shown by 1987StZO seems a misprint, since same placement is shown for 1224.2γ.
[e] For absolute intensity per 100 decays, multiply by 0.23 *3*.
[f] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[x] γ ray not placed in level scheme.

^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO

Decay Scheme

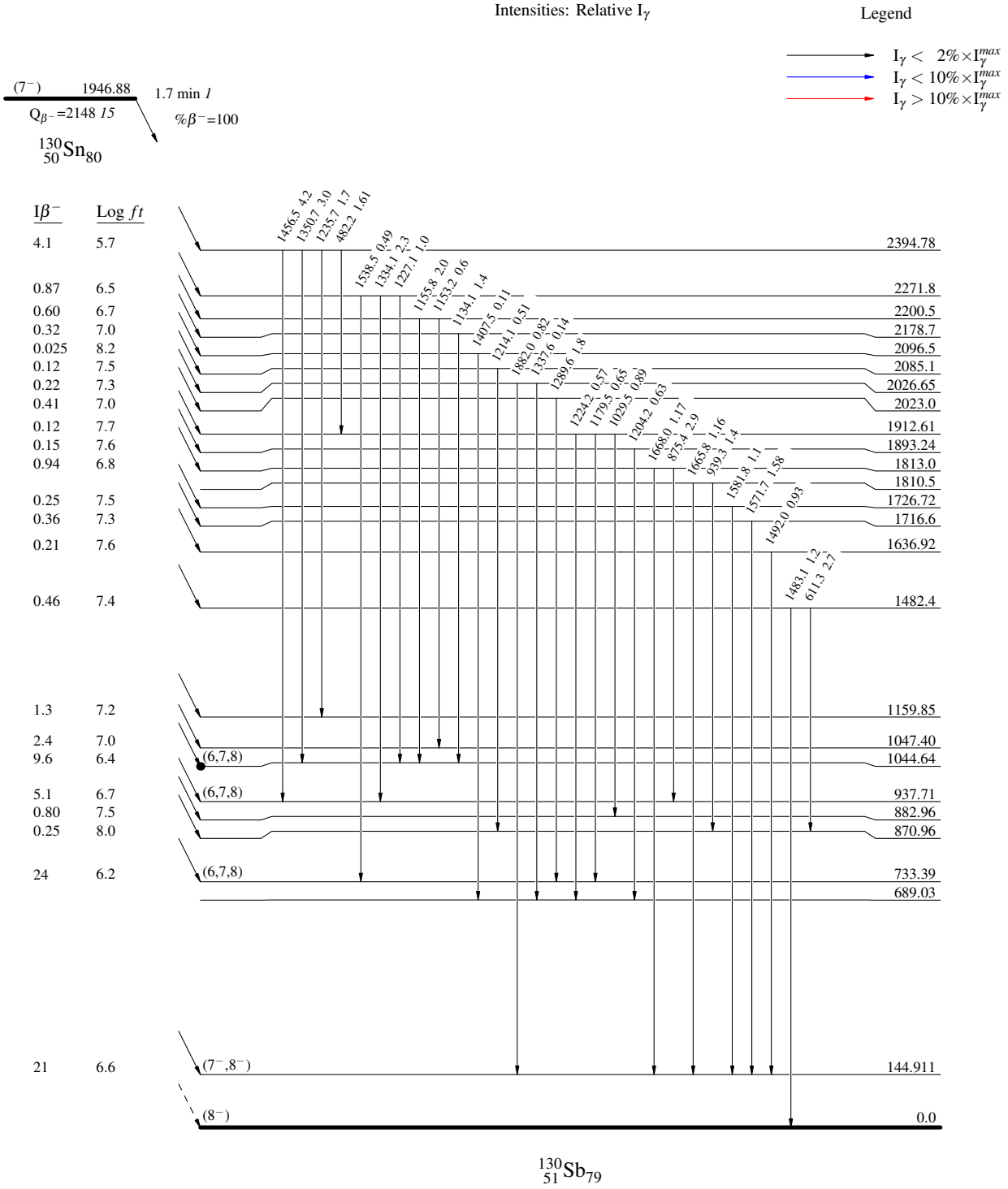
Intensities: Relative I_γ



^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO

Decay Scheme (continued)

Intensities: Relative I_γ



^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO

Decay Scheme (continued)

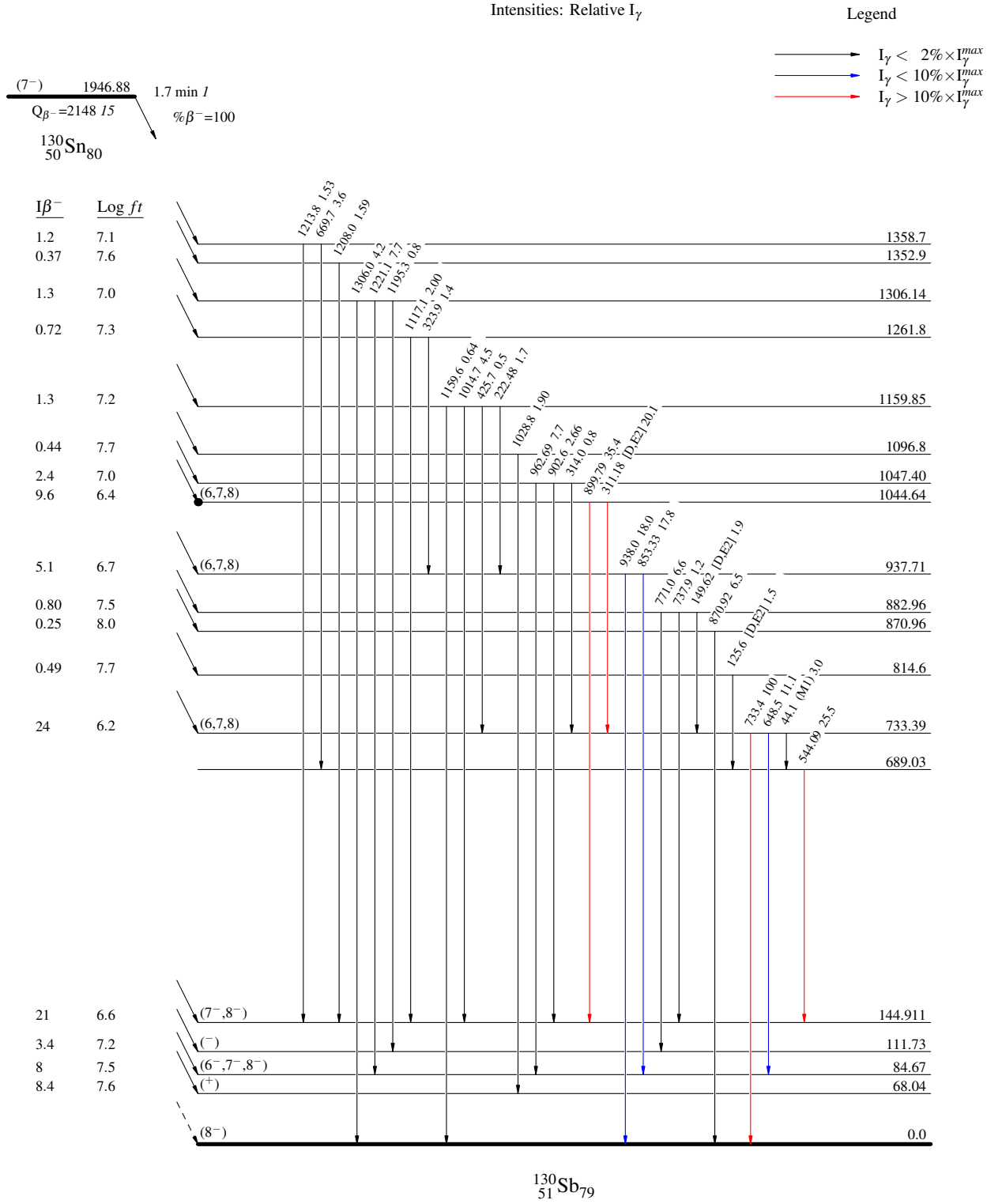
Intensities: Relative I_γ

Legend

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

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

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



^{130}Sn β^- decay (1.7 min) 1994WaZU,1987StZO

Decay Scheme (continued)

Intensities: Relative I_γ