

Adopted Levels, Gammas

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

$Q(\beta^-)=5067$ 15; $S(n)=5.73\times 10^3$ 3; $S(p)=8968$ 24; $Q(\alpha)=-6.94\times 10^3$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record 4959 25 5839 33 9.05E3 12 -7006 48 [1995Au04](#).

[Additional information 1.](#)

 ^{130}Sb LevelsCross Reference (XREF) Flags

A ^{130}Sn β^- decay (3.72 min)

B ^{130}Sn β^- decay (1.7 min)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	(8 ⁻)	39.5 min 8	B	$\% \beta^- = 100$ T _{1/2} : weighted average of 40.0 min 8 (1974Er07), 40.9 min 5 (1974Fo06), 40 min 1 (1971Ki15), 37.2 min 3 (1967Ha27). Others: 39 min 3 (1966To02), 35.6 min 21 (1963Br18), 37 min 3 (1962Dr01), 33 min 2 (1962Ha16). J ^π : probable shell-model configuration= $\pi g_{7/2} \nu h_{11/2}^{-1}$.
4.8 2	(4,5) ⁺	6.3 min 2	AB	$\% \beta^- = 100$ E(level): from 1994WaZU in ^{130}Sn β^- decay (1.7 min) <30 from syst (of neighboring odd-odd Sb isotopes). J ^π : log ft=6.6 to 4 ⁺ ; possible first-forbidden transition (log ft=7.4) to 5 ⁻ ; M1,E2 – M1 cascade from a positive-parity (267) level. T _{1/2} : weighted average of 5.7 min 3 (1974Er07), 6.33 min 12 (1974Fo06), 6.51 min 7 (1974Gr29), 6.6 min 4 (1974Ke08). Others: 1963Br18 , 1962Dr01 , 1962Ha16 .
68.04 12	(⁺)		B	J ^π : (M1) γ to (4,5) ⁺ .
74.82 4	(3,4,5) ⁺	3.6 ns 3	A	T _{1/2} : $\gamma\gamma(t)$ (1974Ke08). J ^π : M1 γ to (4,5) ⁺ ; M1,E2 – M1,E2 cascade from 1 ⁺ .
84.67 4	(6 ⁻ ,7 ⁻ ,8 ⁻)		B	J ^π : E2 γ to (8 ⁻); possible β^- feeding from (7 ⁻).
111.73 11	(⁻)		B	J ^π : (E1) γ to (⁺).
144.911 5	(7 ⁻ ,8 ⁻)		B	J ^π : M1 γ to (8 ⁻); log ft=6.6 from (7 ⁻).
267.24 4	(2,3) ⁺		A	J ^π : M1,E2 γ from 1 ⁺ ; no β^- feeding from 0 ⁺ .
346.40 4	(2 ⁺ ,3 ⁺)		A	J ^π : γ from 1 ⁺ ; γ to (4,5) ⁺ .
689.03 5			B	J ^π : γ to (7 ⁻ ,8 ⁻). See also comment for 733 level.
702.32 6	1 ⁺		A	J ^π : log ft=5.2 from 0 ⁺ .
731.16 4	(2 ⁺ ,3 ⁺)		A	J ^π : γ from 1 ⁺ ; γ to (4,5) ⁺ .
733.39 5	(6,7,8)		B	J ^π : log ft=6.2 from (7 ⁻). (M1) γ between 733 and 689 levels suggests same parity for both the levels.
749.40 5	(2) ⁺		A	J ^π : M1 γ from (1) ⁺ ; no β^- feeding from 0 ⁺ .
814.6 5			B	
818.53 4	(1) ⁺		A	J ^π : M1,E2 γ from 1 ⁺ ; possible β^- feeding (log ft=5.9) from 0 ⁺ .
870.96 9			B	J ^π : γ to (8 ⁻).
882.96 7			B	
937.71 7	(6,7,8)		B	J ^π : log ft=6.7 from (7 ⁻).
1031.3 3			A	
1044.64 5	(6,7,8)		B	J ^π : log ft=6.4 from (7 ⁻).
1047.40 6			B	
1047.67 20	1 ⁺		A	J ^π : log ft=4.1 from 0 ⁺ .
1096.8 8			B	
1159.85 7			B	
1192.3 3			A	
1261.8 3			B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{130}Sb Levels (continued)

E(level) [†]	J^π [‡]	XREF	Comments
1306.14 9		B	
1352.9 5		B	
1358.7 4		B	
1394.33 14	(1 ⁺)	A	J^π : possible allowed transition ($\log ft=5.5$) from 0 ⁺ .
1460.3 4		A	J^π : γ to 1 ⁺ .
1482.4 4		B	
1555.9 3		A	
1636.92 10		B	
1716.6 5		B	
1726.72 20		B	
1810.5 4		B	
1813.0 4		B	
1893.24 21		B	
1912.61 13		B	
2023.0 5		B	
2026.65 11		B	
2085.1 5		B	
2096.5 8		B	
2178.7 5		B	
2200.5 4		B	
2271.8 4		B	
2394.78 9		B	
2416.8 5		B	
2457.4 5		B	
2484.04 18		B	
2526.30 18		B	
2535.2 5		B	
2546.27 12		B	
2580.3 7		B	
2614.9 5		B	
2636.6 10		B	
2761.9 5		B	
2820.2 8		B	
2983.1 5		B	

[†] From least-squares adjustment to $E\gamma$'s.[‡] No spins are assigned to levels above 1044. Low spins (0,1,2) are expected for levels populated in the decay of 3.72-min isomer, and high spins ($J=6,7,8$) for levels populated in the decay of the 1.7-min isomer. Assignments proposed (probably from shell-model considerations) by 1994WaZU and 1987StZO are listed under comments in decay datasets. $\gamma(^{130}\text{Sb})$

$E_i(\text{level})$	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [†]	α^a	Comments
68.04	(⁺)	63.0 2	100	4.8	(4,5) ⁺	(M1)	2.36	
74.82	(3,4,5) ⁺	70.01 5	100	4.8	(4,5) ⁺	M1	1.740	$\alpha(K)=1.500$; $\alpha(L)=0.1933$; $\alpha(M)=0.0381$; $\alpha(N+..)=0.00883$ $B(M1)(W.u.)=6.5\times 10^{-3} 6$
84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)	84.67 5	100	0.0	(8 ⁻)	M1,E2	2.0 10	$\alpha(K)=1.999$; $\alpha(L)=0.799$; $\alpha(M)=0.1642$; $\alpha(N+..)=0.0353$
111.73	(⁻)	43.69 5	100	68.04	(⁺)	(E1)	1.90	
144.911	(7 ⁻ ,8 ⁻)	60.21 5	14.82 10	84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)	(M1)	2.69	$\alpha(K)=2.317$; $\alpha(L)=0.299$; $\alpha(M)=0.0591$; $\alpha(N+..)=0.01369$
		144.911 5	100.0 5	0.0	(8 ⁻)	M1	0.2209	$\alpha(K)=0.1907$; $\alpha(L)=0.02430$; $\alpha(M)=0.00479$; $\alpha(N+..)=0.00111$

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{130}\text{Sb})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [†]	α^a	Comments
267.24	(2,3) ⁺	192.419 13	100	74.82	(3,4,5) ⁺	M1,E2	0.11 2	
346.40	(2 ⁺ ,3 ⁺)	271.6 1	2.2 8	74.82	(3,4,5) ⁺			
		341.61 5	100.0 10	4.8	(4,5) ⁺			
689.03		544.09 5	100	144.911	(7 ⁻ ,8 ⁻)			
702.32	1 ⁺	435.05 5	100.0 4	267.24	(2,3) ⁺	M1,E2		
		627.51 6	19.3 3	74.82	(3,4,5) ⁺			
731.16	(2 ⁺ ,3 ⁺)	384.80 8	100 6	346.40	(2 ⁺ ,3 ⁺)			
		656.3 1	69 3	74.82	(3,4,5) ⁺			
		726.37 5	69 3	4.8	(4,5) ⁺			
733.39	(6,7,8)	44.1 5	3.0 7	689.03		(M1)	6.7	
		648.5 1	11.1 10	84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)			
		733.4 1	100 10	0.0	(8 ⁻)			
749.40	(2) ⁺	403.2 3	14.1 11	346.40	(2 ⁺ ,3 ⁺)			
		482.0 1	54.3 14	267.24	(2,3) ⁺			
		674.6 2	18.1 16	74.82	(3,4,5) ⁺			
		744.58 8	100.0 8	4.8	(4,5) ⁺			
814.6		125.6 5	100	689.03				
818.53	(1) ⁺	69.09 5	9.8 4	749.40	(2) ⁺	M1	2.0	
		472.2 1	4.65 21	346.40	(2 ⁺ ,3 ⁺)			
		551.37 5	11.2 3	267.24	(2,3) ⁺			
		743.66 5	100.0 3	74.82	(3,4,5) ⁺			
870.96		870.92 9	100	0.0	(8 ⁻)			
882.96		149.62 5	29 3	733.39	(6,7,8)			
		737.9 5	18 6	144.911	(7 ⁻ ,8 ⁻)			
		771.0 1	100 3	111.73	(⁻)			
937.71	(6,7,8)	853.33 [‡] 8	98.9 22	84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)			
		938.0 3	100 6	0.0	(8 ⁻)			
1031.3		763.6 5	100 44	267.24	(2,3) ⁺			
		956.7 3	23 7	74.82	(3,4,5) ⁺			
1044.64	(6,7,8)	311.18 5	56.8 6	733.39	(6,7,8)			
		899.79 5	100.0 11	144.911	(7 ⁻ ,8 ⁻)			
1047.40		314.0 2	10.4 13	733.39	(6,7,8)			
		902.6 1	34.6 3	144.911	(7 ⁻ ,8 ⁻)			
		962.69 6	100 5	84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)			
1047.67	1 ⁺	229.14 5	34.6 1	818.53	(1) ⁺	M1,E2	0.077 13	
		316.48 5	2.36 5	731.16	(2 ⁺ ,3 ⁺)			
		345.1 2	0.44 4	702.32	1 ⁺			
		701.6 2	0.40 4	346.40	(2 ⁺ ,3 ⁺)			
		780.44 5	100.0 1	267.24	(2,3) ⁺	M1,E2		
1096.8		1028.8 8	100	68.04	(⁺)			
1159.85		222.48 [#] 8	37.8 22	937.71	(6,7,8)			
		425.7 2	11.1 22	733.39	(6,7,8)			
		1014.7 1	100 4	144.911	(7 ⁻ ,8 ⁻)			
		1159.6 2	14.2 11	0.0	(8 ⁻)			
1192.3		925.1 3	100	267.24	(2,3) ⁺			
1261.8		323.9 5	70 10	937.71	(6,7,8)			
		1117.1 3	100 3	144.911	(7 ⁻ ,8 ⁻)			
1306.14		1195.3 [@] 2	10.4 13	111.73	(⁻)			
		1221.1 5	100 5	84.67	(6 ⁻ ,7 ⁻ ,8 ⁻)			
		1306.0 1	54.6 13	0.0	(8 ⁻)			
1352.9		1208.0 5	100	144.911	(7 ⁻ ,8 ⁻)			
1358.7		669.7 5	100 5	689.03				
		1213.8 5	43 3	144.911	(7 ⁻ ,8 ⁻)			
1394.33	(1 ⁺)	663.7 2	100 8	731.16	(2 ⁺ ,3 ⁺)			
		692.3 5	38 6	702.32	1 ⁺			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{130}\text{Sb})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π
1394.33	(1 ⁺)	1047.3 & 2	67 6	346.40	(2 ⁺ ,3 ⁺)
		1128.0 10	35 6	267.24	(2,3) ⁺
1460.3		729.3 5	100 6	731.16	(2 ⁺ ,3 ⁺)
		757.9 5	65 18	702.32	1 ⁺
1482.4		611.3 5	100 7	870.96	
		1483.1 8	44 4	0.0	(8 ⁻)
1555.9		825.9 6	68 8	731.16	(2 ⁺ ,3 ⁺)
		1288.3 3	100 8	267.24	(2,3) ⁺
1636.92		1492.0 1	100	144.911	(7 ⁻ ,8 ⁻)
1716.6		1571.7 5	100	144.911	(7 ⁻ ,8 ⁻)
1726.72		1581.8 2	100	144.911	(7 ⁻ ,8 ⁻)
1810.5		939.3 5	100 7	870.96	
		1665.8 5	83 7	144.911	(7 ⁻ ,8 ⁻)
1813.0		875.4 5	100 14	937.71	(6,7,8)
		1668.0 5	40 4	144.911	(7 ⁻ ,8 ⁻)
1893.24		1204.2 2	100	689.03	
1912.61		1029.5 5	100 9	882.96	
		1179.5 5	73 12	733.39	(6,7,8)
		1224.2 5	64 8	689.03	
2023.0		1289.6 5	100	733.39	(6,7,8)
2026.65		1337.6 1	17.1 12	689.03	
		1882.0 5	100 5	144.911	(7 ⁻ ,8 ⁻)
2085.1		1214.1 5	100	870.96	
2096.5		1407.5 8	100	689.03	
2178.7		1134.1 5	100	1044.64	(6,7,8)
2200.5		1153.2 5	30 5	1047.40	
		1155.8 5	100 10	1044.64	(6,7,8)
2271.8		1227.1 5	43 4	1044.64	(6,7,8)
		1334.1 8	100 9	937.71	(6,7,8)
		1538.5 5	21 3	733.39	(6,7,8)
2394.78		482.2 1	38.3 19	1912.61	
		1235.7 5	40 5	1159.85	
		1350.7 5	71 5	1044.64	(6,7,8)
		1456.5 5	100 12	937.71	(6,7,8)
		1511.6 2	38 5	882.96	
		1523.4	1.9	870.96	
		1661.4 1	93 5	733.39	(6,7,8)
		1704.8 5	45 5	689.03	
2416.8		1727.8 5	100	689.03	
2457.4		1519.7 8	100 20	937.71	(6,7,8)
		1768.4 5	7.0 10	689.03	
2484.04		1001.8 8	63 7	1482.4	
		1178.2 2	100 7	1306.14	
		1439.0 5	47 7	1044.64	(6,7,8)
		1749.8 5	18 3	733.39	(6,7,8)
		1794.2 5	7.7 8	689.03	
2526.30		1479.0 2	37 3	1047.40	
		1644.2 5	68 14	882.96	
		1653 1	100 15	870.96	
		1836.3 5	51 7	689.03	
2535.2		1273.7 5	100 4	1261.8	
		1845 1	14 4	689.03	
2546.27		1663.3 1	100	882.96	
2580.3		769.8 5	100	1810.5	
2614.9		1881.5 5	100	733.39	(6,7,8)
2636.6		1592 1	100	1044.64	(6,7,8)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

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

<u>$E_i(\text{level})$</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J_f^π</u>
2761.9	1455.8 5	100	1306.14	
2820.2	1775.5 8	100	1044.64	(6,7,8)
2983.1	1938.4 5	100	1044.64	(6,7,8)

[†] From 3.72-min ^{130}Sn decay or 1.7-min ^{130}Sn decay.

[‡] Level-energy difference=853.04.

Level-energy difference=222.15.

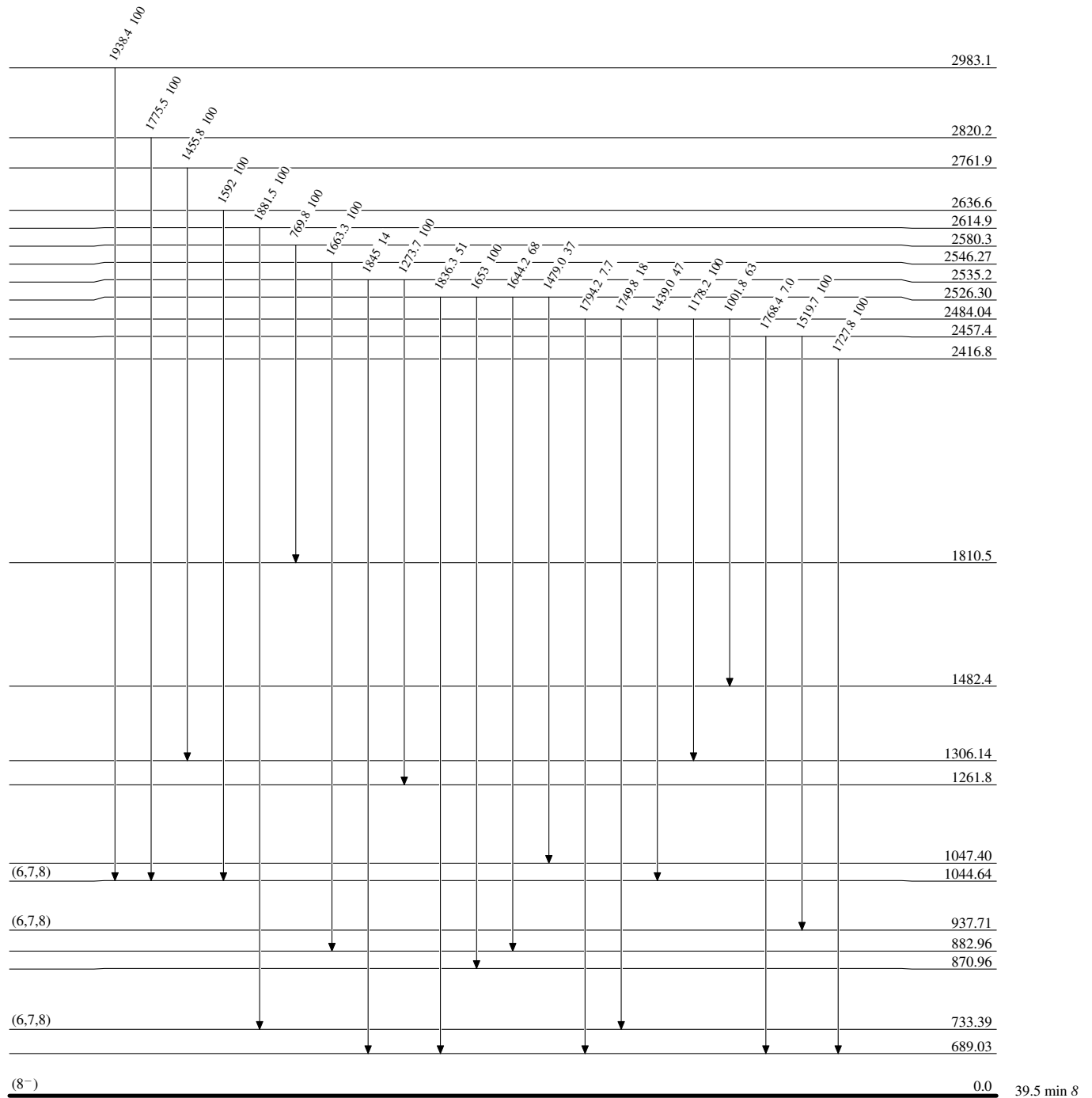
@ Level-energy difference=1194.4.

& Level-energy difference=1047.9.

^a 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.

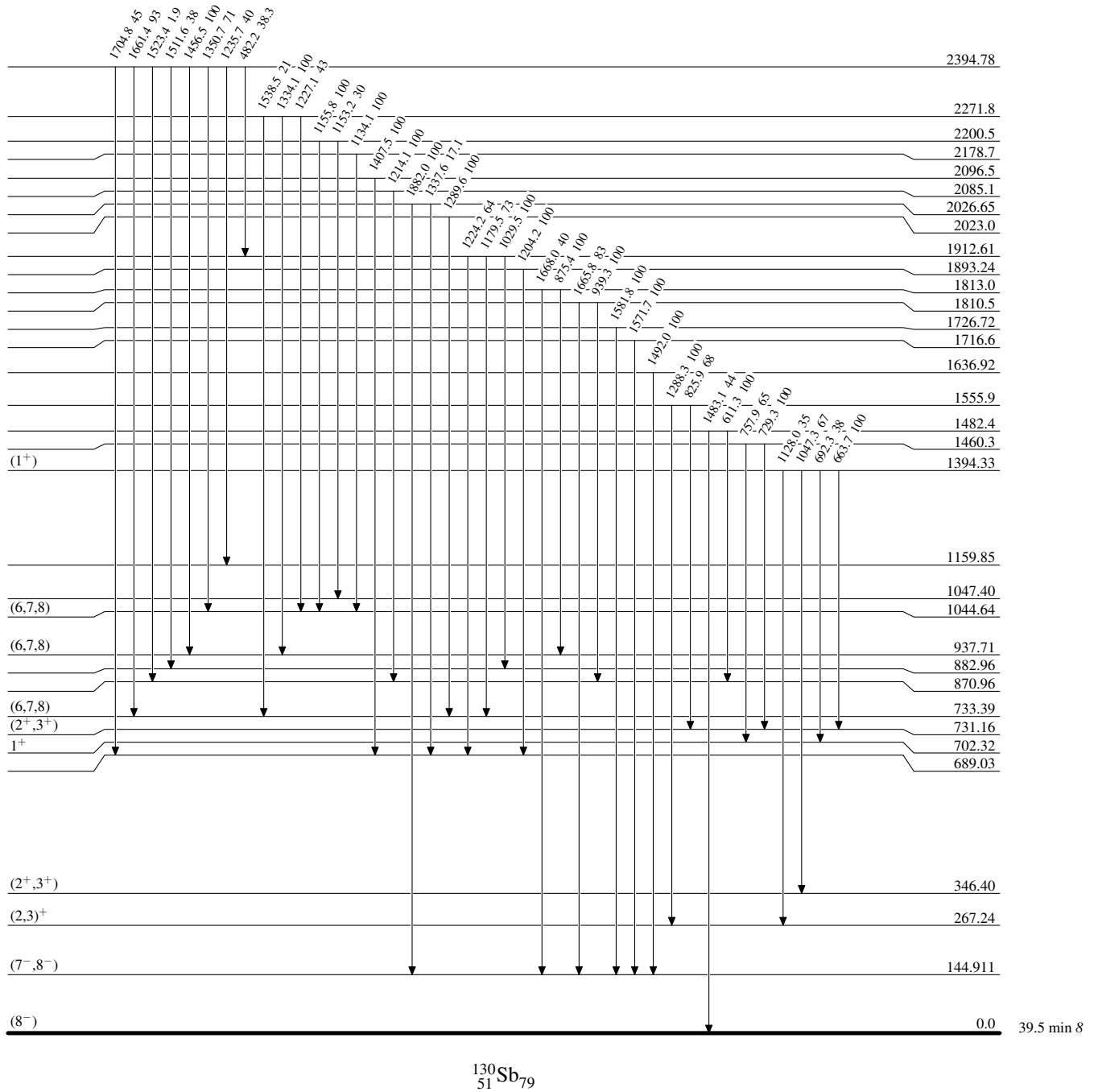
Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level



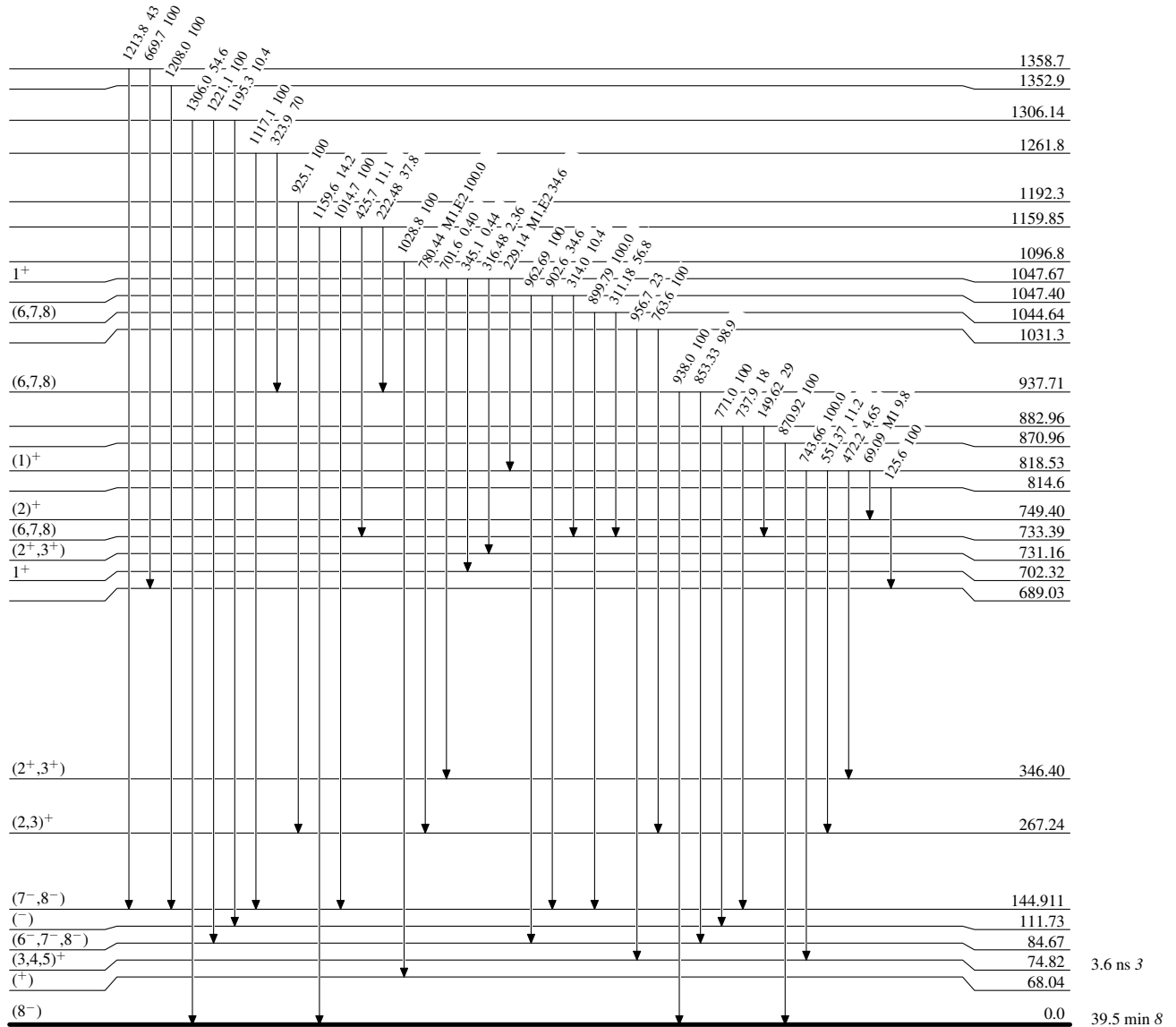
Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



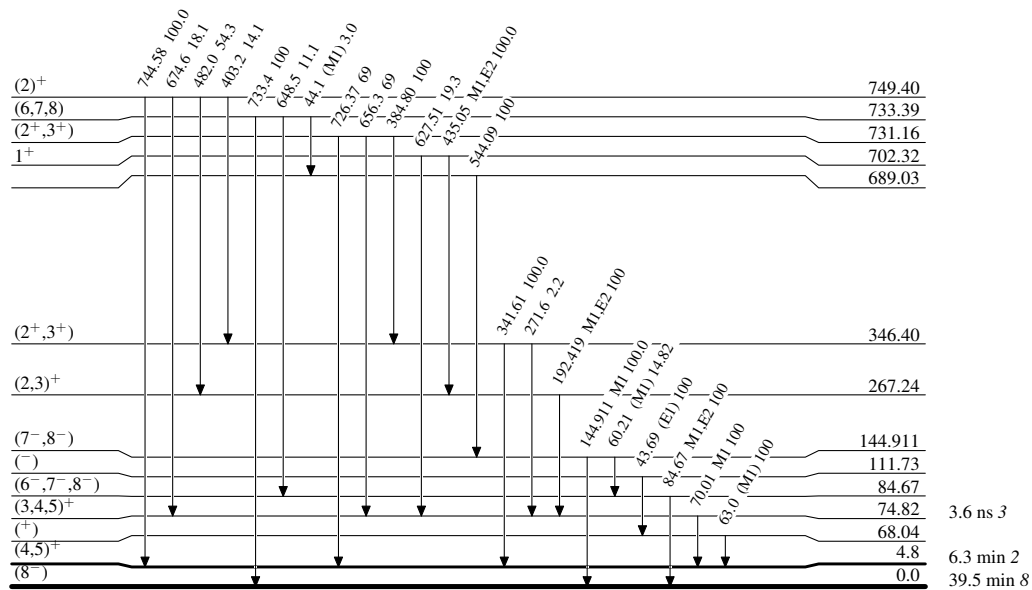
Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

 $^{130}_{51}\text{Sb}_{79}$