^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Janos Timar and Zoltan Elekes, Balraj Singh	NDS 121, 143 (2014)	31-May-2014

Parent: ^{129}Sn: E=35.15 *5*; J^π=11/2$^-$; $T_{1/2}$=6.9 min *1*; Q(β^-)=4022 *29*; %β^- decay=100.0

^{129}Sn-Q(β^-): From 2012Wa38.

^{129}Sn-E,$T_{1/2}$,J^π: From Adopted Levels of ^{129}Sn.

1987StZO, 1987St23, 1988StZQ: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, ce, $\gamma\gamma$-coin, $T_{1/2}$.

1982Hu09: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, $\gamma\gamma$-coin, $T_{1/2}$.

1977He24: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, $\gamma\gamma$-coin.

1980De35: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, scin γ, β, ce, $\gamma\gamma$-, $\beta\gamma$-coin.

1974Fo06: ^{235}U(n,F) E=th, chem; pc, β, Ge detector.

See also ^{129}Sb IT decay (17.7 min) and ^{129}Sn β^- decay (2.23 min).

The decay scheme first proposed by 1982Hu09 is substantially extended and revised in 1987StZO, only a small portion of which is presented in 1987St23. A 17-min isomer is observed by 1982Hu09 and 1987St23; however, only the latter specify the level. 1977He24 propose a 3−μs isomer at 1703.4 keV which is not confirmed by 1982Hu09 and 1987St23.

In the opinion of evaluators, the decay scheme of 6.9-min ^{129}Sn is not known well from either the work of 1987StZO (also 1987St23) or 1982Hu09. In the present dataset, evaluators have adopted data from 1987StZO (also 1987St23,1988StZQ) since this work seems more reliable in terms of $\gamma\gamma$-coincidence data and inventory of γ-ray transitions. However, there remain several misprints (and possible mistakes) in data presented by 1987StZO, not all of which have been resolved. The multipolarities of γ transitions (some of which have large conversion coefficients) remain largely unknown. The spins and parities assigned by 1987StZO are tentative at best.

^{129}Sb Levels

Following levels proposed in 1982Hu09 are not confirmed in 1987StZO. The gamma rays assigned in 1982Hu09 either have been placed elsewhere or not seen in 1987StZO: 1978.4, 1999.5, 2263.0, 2555.9, 2714.3, 2792.5. These are omitted here.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	7/2$^+$	4.366 h *26*	
1128.63 *4*	(11/2$^+$)		
1161.40 *4*	(9/2$^+$)		
1851.31 *6*	(19/2$^-$)	17.7 min *1*	%IT=15 (1987St23); %β^-=85 $T_{1/2}$: from Adopted Levels.
1861.07 *5*	(15/2$^-$)	>2 μs	$T_{1/2}$: from coin resolving time (1987St23). 1982Hu09 propose a ground-state transition of 1861.2 keV from this level, but in view of implied M4 multipolarity, this transition is unlikely. This γ was not reported in 1987StZO.
1911.21 *5*	(13/2$^-$)		
1922.33 *6*	(11/2$^-$)		
1928.64 *5*	(17/2$^-$)		
1940.38 *8*	(15/2$^-$,17/2$^-$)		
1972.75 *5*	(13/2$^-$)		
1991.96 *5*	(13/2$^-$)		
2031.07 *5*	(11/2$^-$,13/2$^-$)		J^π: 11/2$^-$ in 1987StZO.
2148.13 *5*	(15/2$^-$)		
2148.47 *7*	(9/2,11/2,13/2)		
2221.33 *12*	(9/2,11/2,13/2)		
2232.17 *11*	(9/2$^-$,11/2,13/2)		J^π: 11/2$^-$ in 1987StZO.
2247.35 *7*	(13/2$^-$,15/2$^+$)		J^π: 15/2$^-$ in 1987StZO.
2271.57 *7*	(15/2$^-$)		J^π: 13/2$^-$,(15/2$^-$) in 1987StZO.
2294.69 *8*	(9/2$^-$ to 15/2$^+$)		
2297.24 *10*	(13/2$^-$,15/2$^+$)		J^π: 15/2$^-$ in 1987StZO.
2303.36 *7*	(9/2$^-$,11/2,13/2$^+$)		J^π: 11/2$^-$ in 1987StZO.

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^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

^{129}Sb Levels (continued)

E(level)[†]	J$^\pi$[‡]	Comments
2317.10 *7*	(9/2,11/2,13/2$^+$)	J$^\pi$: 9/2$^-$,11/2$^-$ in 1987StZO.
2329.85 *21*	(13/2$^-$)	J$^\pi$: 11/2$^-$ in 1987StZO.
2369.21 *10*	(9/2,11/2,13/2$^+$)	J$^\pi$: 9/2$^-$ in 1987StZO.
2377.5 *6*	(9/2,11/2,13/2)	
2430.25 *6*	(11/2$^-$,13/2$^+$)	J$^\pi$: 11/2$^-$ in 1987StZO.
2434.44 *8*	(13/2$^-$,15/2$^+$)	J$^\pi$: 15/2$^-$ in 1987StZO.
2564.81 *10*	(11/2$^-$,13/2)	J$^\pi$: 13/2$^-$,(11/2$^-$) in 1987StZO.
2568.29 *8*	(11/2$^-$,13/2$^+$)	J$^\pi$: 11/2$^-$,(9/2$^-$) in 1987StZO.
2611.26 *8*	(11/2$^-$,13/2$^+$)	J$^\pi$: 11/2$^-$ in 1987StZO.
2665.04 *8*	(9/2,11/2,13/2$^+$)	J$^\pi$: 7/2 to 11/2 in 1987StZO.
2678.30 *9*	(9/2,11/2,13/2)	J$^\pi$: 13/2$^-$ in 1987StZO.
2698.47 *21*	(11/2$^-$,13/2)	
2722.8 *3*	(11/2$^-$,13/2)	J$^\pi$: 13/2$^-$ in 1987StZO.
2726.29 *10*	(9/2,11/2,13/2)	J$^\pi$: 9/2$^-$,11/2$^-$ in 1987StZO.
2766.91 *10*	(9/2,11/2,13/2)	
2796.81 *21*	(9/2,11/2,13/2$^+$)	J$^\pi$: 7/2 to 13/2 in 1987StZO.
2822.73 *19*	(9/2$^-$,11/2,13/2)	
2864.40 *19*	(11/2$^-$,13/2)	J$^\pi$: 13/2$^-$ in 1987StZO.
2882.08 *15*	(9/2,11/2,13/2$^+$)	J$^\pi$: 9/2,11/2 in 1987StZO.
2884.44 *15*	(9/2,11/2,13/2)	
2948.25 *21*	(9/2,11/2,13/2)	
2960.5 *4*	(9/2,11/2,13/2)	
3013.8 *4*	(9/2,11/2,13/2)	
3031.96 *21*	(9/2$^-$,11/2,13/2)	
3070.02 *8*	(9/2,11/2,13/2)	
3097.03 *20*	(9/2$^-$,11/2,13/2)	J$^\pi$: 9/2$^-$,13/2$^-$ in 1987StZO.
3130.8 *8*	(9/2,11/2,13/2)	
3148.13 *8*	(9/2,11/2,13/2)	
3164.05 *11*	(9/2,11/2,13/2)	
3208.70 *12*	(9/2,11/2,13/2)	
3274.17 *12*	(9/2$^-$,11/2,13/2)	J$^\pi$: 11/2$^-$ in 1987StZO.
3280.72 *8*	(13/2$^-$)	J$^\pi$: 15/2$^-$ in 1987StZO.

[†] From least-squares fit to Eγ data. The uncertainties of following Eγ values were doubled in order to obtain an acceptable least-squares fit with reduced χ^2=2.1 instead of 4.1 without this adjustment: 159γ from 2430 level, 445γ from 2678 level, 1174γ from 2303 level, 296γ, 408γ, 423γ and 695γ from 2726 level. Critical χ^2=1.6.

[‡] As proposed by 1987StZO and 1987St23 from systematics and shell-model calculations in 1981Sa15. All assignments are considered as tentative.

β^- radiations

There are negative β feedings of −1.7% *7* at 1928 level, −0.55% *8* at 2148.1 level, and −0.18% *13* at 2271 level. These are not surprising since both levels involve low-energy transitions, multipolarities of which are only assumed M1 values, small admixtures can easily affect these feedings.

E(decay)	E(level)	Iβ^-[†#]	Log *ft*[‡]	Comments
(7.8×10^2 *3*)	3280.72	1.7 *2*	5.5	av Eβ=257 *12* Iβ^-: 1987StZO list 1.8 *4*.
(7.8×10^2 *3*)	3274.17	3.06 *11*	5.2	av Eβ=260 *12* Iβ^-: 1987StZO list 3.37 *3*.

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^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†][#]	Log ft[‡]	Comments
(8.5×10^2 *3*)	3208.70	0.60 *5*	6.1	av Eβ=286 *12* Iβ⁻: 1987StZO list 0.69 *5*.
(8.9×10^2 *3*)	3164.05	0.39 *2*	6.3	av Eβ=303 *12* Iβ⁻: 1987StZO list 0.45 *1*.
(9.1×10^2 *3*)	3148.13	2.11 *8*	5.6	av Eβ=310 *12* Iβ⁻: 1987StZO list 2.41 *3*.
(9.3×10^2 *3*)	3130.8	0.51 *4*	6.3	av Eβ=317 *12* Iβ⁻: 1987StZO list 0.58 *3*.
(9.6×10^2 *3*)	3097.03	1.23 *6*	5.9	av Eβ=331 *12* Iβ⁻: 1987StZO list 1.4.
(9.9×10^2 *3*)	3070.02	0.86 *4*	6.1	av Eβ=342 *12* Iβ⁻: 1987StZO list 0.98 *2*.
(1.03×10^3 *3*)	3031.96	0.57 *3*	6.4	av Eβ=357 *12* Iβ⁻: 1987StZO list 0.64 *2*.
(1.04×10^3 *3*)	3013.8	0.221 *14*	6.8	av Eβ=365 *12* Iβ⁻: 1987StZO list 0.27 *1*.
(1.10×10^3 *3*)	2960.5	0.96 *4*	6.3	av Eβ=387 *13* Iβ⁻: 1987StZO list 1.10 *1*.
(1.11×10^3 *3*)	2948.25	0.322 *14*	6.8	av Eβ=392 *13* Iβ⁻: 1987StZO list 0.37 *1*.
(1.17×10^3 *3*)	2884.44	1.44 *7*	6.2	av Eβ=419 *13* Iβ⁻: 1987StZO list 1.6.
(1.18×10^3 *3*)	2882.08	2.5 *2*	6.0	av Eβ=420 *13* Iβ⁻: 1987StZO list 1.46 *2*.
(1.19×10^3 *3*)	2864.40	3.13 *11*	5.9	av Eβ=427 *13* Iβ⁻: 1987StZO list 3.62 *4*.
(1.23×10^3 *3*)	2822.73	5.5 *2*	5.7	av Eβ=445 *13* Iβ⁻: 1987StZO list 0.26 *2*.
(1.26×10^3 *3*)	2796.81	0.72 *3*	6.6	av Eβ=456 *13* Iβ⁻: 1987StZO list 0.82 *2*.
(1.29×10^3 *3*)	2766.91	0.56 *9*	6.8	av Eβ=469 *13* Iβ⁻: 1987StZO list 0.64 *9*.
(1.33×10^3 *3*)	2726.29	11.0 *5*	5.5	av Eβ=486 *13* Iβ⁻: 1987StZO list 12.7 *3*.
(1.33×10^3 *3*)	2722.8	1.17 *13*	6.5	av Eβ=488 *13* Iβ⁻: 1987StZO list 1.3 *1*.
(1.36×10^3 *3*)	2698.47	0.68 *3*	6.8	av Eβ=498 *13* Iβ⁻: 1987StZO list 0.78 *1*.
(1.38×10^3 *3*)	2678.30	0.72 *4*	6.8	av Eβ=507 *13* Iβ⁻: 1987StZO list 0.82 *3*.
(1.39×10^3 *3*)	2665.04	1.87 *7*	6.4	av Eβ=513 *13* Iβ⁻: 1987StZO list 2.14 *3*.
(1.45×10^3 *3*)	2611.26	3.39 *13*	6.2	av Eβ=536 *13* Iβ⁻: 1987StZO list 3.9 *1*.
(1.49×10^3 *3*)	2568.29	1.18 *5*	6.7	av Eβ=555 *13* Iβ⁻: 1987StZO list 1.35 *4*.
(1.49×10^3 *3*)	2564.81	2.95 *11*	6.3	av Eβ=556 *13* Iβ⁻: 1987StZO list 3.37 *4*.
(1.62×10^3 *3*)	2434.44	0.044 *17*	8.3	av Eβ=613 *13* Iβ⁻: 1987StZO list 0.05 *2*.
(1.63×10^3 *3*)	2430.25	0.24 *10*	7.5	av Eβ=615 *13* Iβ⁻: 1987StZO list 0.3 *1*.
(1.68×10^3 *3*)	2377.5	0.67 *3*	7.1	av Eβ=639 *13* Iβ⁻: 1987StZO list 0.77 *2*.
(1.69×10^3 *3*)	2369.21	3.46 *12*	6.4	av Eβ=642 *13*

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^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†#]	Log ft[‡]	Comments
				Iβ^-: 1987StZO list 4.0 *1*.
(1.73×10^3 *3*)	2329.85	0.45 *2*	7.3	av Eβ=660 *13*
				Iβ^-: 1987StZO list 0.25 *1*.
(1.74×10^3 *3*)	2317.10	0.7 *6*	7.2	av Eβ=666 *13*
				Iβ^-: 1987StZO list 0.8 *4*.
(1.75×10^3 *3*)	2303.36	1.1 *3*	7.0	av Eβ=672 *13*
				Iβ^-: 1987StZO list 1.3 *3*.
(1.76×10^3 *3*)	2297.24	0.18 *9*	7.8	av Eβ=674 *13*
				Iβ^-: 1987StZO list 0.2 *1*.
(1.76×10^3 *3*)	2294.69	0.33 *5*	7.5	av Eβ=676 *13*
				Iβ^-: 1987StZO list 0.4 *1*.
(1.81×10^3 *3*)	2247.35	0.26 *13*	7.7	av Eβ=697 *13*
				Iβ^-: 1987StZO list 0.8 *1*.
(1.82×10^3 *3*)	2232.17	2.2 *3*	6.8	av Eβ=704 *13*
				Iβ^-: 1987StZO list 2.0 *3*.
(1.84×10^3 *3*)	2221.33	2.80 *10*	6.7	av Eβ=708 *13*
				Iβ^-: 1987StZO list 3.20 *3*.
(1.91×10^3 *3*)	2148.47	1.70 *6*	6.9	av Eβ=741 *13*
				Iβ^-: 1987StZO list 1.9.
(2.03×10^3 *3*)	2031.07	3.6 *5*	6.7	av Eβ=794 *14*
				Iβ^-: 1987StZO list 4.2 *1*.
(2.07×10^3 *3*)	1991.96	1.2 *3*	7.2	av Eβ=812 *14*
				Iβ^-: 1987StZO list 1.3 *4*.
(2.08×10^3 *3*)	1972.75	9.5 *6*	6.4	av Eβ=821 *14*
				Iβ^-: 1987StZO list 11.5 *1*.
(2.13×10^3 *3*)	1922.33	5.7 *21*	6.6	av Eβ=844 *14*
				Iβ^-: 1987StZO list 6.7 *23*.
(2.15×10^3 *3*)	1911.21	6.5 *7*	6.6	av Eβ=849 *14*
				Iβ^-: 1987StZO list 7.1 *4*.
(2.90×10^3 *3*)	1161.40	2.9 *21*	7.5	av Eβ=1195 *14*
				Iβ^-: 1987StZO list 3.2 *24*.
(2.93×10^3 *3*)	1128.63	5.8 *9*	7.2	av Eβ=1210 *14*
				Iβ^-: 1987StZO list 1.1 *1*.
(4.06×10^3 *3*)	0.0	≈2	≈9.9[1*u*]	av Eβ=1723 *14*
				Iβ^-: Iβ(1U to g.s.)≈2% is estimated by the evaluators from systematics of log ft for 11/2$^-$ to 7/2$^+$ transitions in this region. 1987StZO assume no β feeding for this level.

† From γ-ray intensity balance. All feedings should be considered as approximate since multipolarities of many low-energy transitions are not known, these are only assumed here.

‡ All values are considered as approximate.

Absolute intensity per 100 decays.

$\gamma(^{129}Sb)$

Iγ normalization: From summed I(γ+ce)=98 to g.s. and 1851-keV isomer, assuming 2% β feeding to g.s..

Gamma rays reported in 1982Hu09 but not confirmed in 1987StZO

Eγ	Iγ	Level	Eγ	Iγ	Level
97.5 2	1.2 4		579.4 2	6.0 10	
103.7 3	0.8 3		604.9 1	9.0 20	
109.6 4	1.5 6		692.4 2	5.0 10	2723.1
148.8 1	2.1 3	1999.5	780.5 7	1.0 5	
206.4 2	1.3 3		792.2 5	2.0 10	2714.3
225.6 1	2.8 4		801.0 2	4.0 10	2723.1
232.5 2	1.4 3	2263.0	815.6 2	2.7 7	
238.7 1	4.1 4	2555.9	862.7 2	2.3 8	2714.3
241.6 1	1.7 3	2220.5	928.4 2	5.1 15	
264.3 6	1.3 9	2263.0	931.2 7	0.9 6	2792.5
266.5 2	4.8 7	2822.4	970.1 2	3.0 10	
315.1 2	2.1 5		1002.9 1	9.0 20	
352.5 2	2.7 7	2331.2	1101.0 4	1.3 5	2263.0
364.5 1	4.4 8		1349.7 2	3.0 10	
421.4 6	0.7 3	2331.2	1861.2 10	1.0 5	1860.9
435.4 2	2.2 6				

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	$I_{(\gamma+ce)}$[#]	Comments
(9.76 *8*)		1861.07	(15/2$^-$)	1851.31	(19/2$^-$)	[E2]	3.39×10^4	26.2 *13*	α(L)=2.72×10^4 *4*; α(M)=5.59×10^3 *8* α(N)=989 *14*; α(O)=63.6 *9* E_γ: from level-energy difference. $I_{(\gamma+ce)}$: from intensity balance at 1861 level, 5% uncertainty assigned by evaluators. 1987St23 list 25.8 and 1987StZO list 18.6 *5*.
39.04 *5*	0.092 *5*	2031.07	(11/2$^-$,13/2$^-$)	1991.96	(13/2$^-$)	[M1]	9.40		Mult.: M1 suggested by 1987StZO, but I(γ+ce)=1.14 *6* and Iγ=0.092 *5* (1987StZO) give δ(E2/M1)=0.22 *5*.
44.04 *5*	0.64 *3*	1972.75	(13/2$^-$)	1928.64	(17/2$^-$)	[E2]	31.9	21.0 *10*	I_γ: from I(γ+ce) listed in 1987St23 (and 1987StZO) and α for E2. Iγ=1.93 *10* listed in 1987StZO gives δ(E2/M1)=0.37 *5*, α(exp)=9.7 *8*.
50.13 *5*	3.28 *3*	1911.21	(13/2$^-$)	1861.07	(15/2$^-$)	[M1]	4.53		Additional information 5.
61.55 *5*	1.22 *4*	1972.75	(13/2$^-$)	1911.21	(13/2$^-$)	[M1]	2.49		
67.47 *5*	2.9 *3*	1928.64	(17/2$^-$)	1861.07	(15/2$^-$)	[M1]	1.91		I_γ: from I(γ+ce)=8.4 in 1987St23 and α. 1987StZO list I(γ+ce)=0.64 *6* and Iγ=0.22 *2*, which seems erroneous. Additional information 8.
69.67 *5*	3.41 *10*	1991.96	(13/2$^-$)	1922.33	(11/2$^-$)	[M1]	1.742		Additional information 11.
77.34 *5*	9.3 *3*	1928.64	(17/2$^-$)	1851.31	(19/2$^-$)	[M1]	1.29		I_γ: from I(γ+ce)=21.4 *5* in 1987St23, 1987StZO and α.

^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

$\gamma(^{129}Sb)$ (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [@]	Comments
								1987StZO list Iγ=0.706 *5*, which seems in erroneous. Additional information 9.
79.4 *1*	0.27 *13*	1940.38	(15/2$^-$,17/2$^-$)	1861.07	(15/2$^-$)	[M1]	1.20	I_γ: from I(γ+ce)=0.6 *3* in 1987StZO and α. 1987StZO list Iγ=0.07 *1*, which seems erroneous in view of γ spectrum shown in author's figure iii-31 and intensity of 79.4γ therein.
80.68 *5*	2.2 *3*	1991.96	(13/2$^-$)	1911.21	(13/2$^-$)	[M1]	1.142	
82.5 *2*	0.54 *1*	2329.85	(13/2$^-$)	2247.35	(13/2$^-$,15/2$^+$)	[M1]	1.07	Mult.: M1 proposed by 1987StZO but E2 implied by their spin-parity assignments to levels concerned.
108.81 *5*	1.66 *5*	2031.07	(11/2$^-$,13/2$^-$)	1922.33	(11/2$^-$)	[M1]	0.49	Additional information 12.
111.78 *5*	1.79 *2*	1972.75	(13/2$^-$)	1861.07	(15/2$^-$)	[M1]	0.452	Additional information 10.
117.40 *5*	3.77 *3*	2148.47	(9/2,11/2,13/2)	2031.07	(11/2$^-$,13/2$^-$)	[D,E2]	0.5 *4*	Mult.: E1 suggested by 1987StZO. Additional information 18.
119.92 *5*	5.62 *9*	2031.07	(11/2$^-$,13/2$^-$)	1911.21	(13/2$^-$)	[M1]	0.37	Additional information 13.
123.44 *5*	4.84 *3*	2271.57	(15/2$^-$)	2148.13	(15/2$^-$)	[M1]	0.34	
130.91 *5*	0.40 *3*	1991.96	(13/2$^-$)	1861.07	(15/2$^-$)	[M1]	0.290	
135.7 *1*	0.22 *3*	2430.25	(11/2$^-$,13/2$^+$)	2294.69	(9/2$^-$ to 15/2$^+$)	[M1]	0.26	
145.3 *6*	1.37 *3*	2377.5	(9/2,11/2,13/2)	2232.17	(9/2$^-$,11/2,13/2)	[M1]	0.22	
156.18 *5*	1.05 *3*	2148.13	(15/2$^-$)	1991.96	(13/2$^-$)	[M1]	0.18	Additional information 15.
159.4 *2*	0.94 *2*	2430.25	(11/2$^-$,13/2$^+$)	2271.57	(15/2$^-$)	[M1]	0.17	Additional information 31.
175.36 *5*	0.91 *2*	2148.13	(15/2$^-$)	1972.75	(13/2$^-$)	[M1]	0.13	
219.48 *5*	7.30 *7*	2148.13	(15/2$^-$)	1928.64	(17/2$^-$)	[M1,E2]	0.088 *17*	Additional information 16.
236.96 *5*	3.18 *3*	2148.13	(15/2$^-$)	1911.21	(13/2$^-$)	[M1]	0.058	Additional information 17.
258.2 *4*	0.10 *1*	2822.73	(9/2$^-$,11/2,13/2)	2564.81	(11/2$^-$,13/2)			
279.6 *1*	0.4 *2*	2271.57	(15/2$^-$)	1991.96	(13/2$^-$)			
285.98 *6*	1.4 *2*	2317.10	(9/2,11/2,13/2$^+$)	2031.07	(11/2$^-$,13/2$^-$)			Additional information 27.
295.0 *3*	6.97 *5*	2726.29	(9/2,11/2,13/2)	2430.25	(11/2$^-$,13/2$^+$)			
296.2 *5*	0.69 *7*	2568.29	(11/2$^-$,13/2$^+$)	2271.57	(15/2$^-$)			
299.0 *1*	6.97 *7*	2221.33	(9/2,11/2,13/2)	1922.33	(11/2$^-$)			Additional information 19.
307.00 *5*	0.6 *3*	2247.35	(13/2$^-$,15/2$^+$)	1940.38	(15/2$^-$,17/2$^-$)			Additional information 21.
311.47 *5*	4.88 *6*	2303.36	(9/2$^-$,11/2,13/2$^+$)	1991.96	(13/2$^-$)			Additional information 24.
320.9 *1*	8.5 *7*	2232.17	(9/2$^-$,11/2,13/2)	1911.21	(13/2$^-$)			Additional information 20.
322.03 *8*	1.1 *1*	2294.69	(9/2$^-$ to 15/2$^+$)	1972.75	(13/2$^-$)			Additional information 22.
336.12 *5*	1.16 *6*	2247.35	(13/2$^-$,15/2$^+$)	1911.21	(13/2$^-$)			
339.6 *2*	0.5 *1*	2611.26	(11/2$^-$,13/2$^+$)	2271.57	(15/2$^-$)			
368.6 *1*	0.79 *8*	2297.24	(13/2$^-$,15/2$^+$)	1928.64	(17/2$^-$)			
386.0 *2*	0.47 *4*	2297.24	(13/2$^-$,15/2$^+$)	1911.21	(13/2$^-$)			Additional information 23.
408.0 *2*	6.8 *7*	2726.29	(9/2,11/2,13/2)	2317.10	(9/2,11/2,13/2$^+$)			E_γ: poor fit. Level-energy difference=409.2. Additional information 36.
417.0 *2*	1.91 *5*	2564.81	(11/2$^-$,13/2)	2148.13	(15/2$^-$)			
422.3 *2*	3.37 *5*	2726.29	(9/2,11/2,13/2)	2303.36	(9/2$^-$,11/2,13/2$^+$)			Additional information 37.
425.4 *5*	0.8 *2*	2722.8	(11/2$^-$,13/2)	2297.24	(13/2$^-$,15/2$^+$)			
426.9 *2*	1.69 *3*	2698.47	(11/2$^-$,13/2)	2271.57	(15/2$^-$)			Additional information 33.

$^{129}_{51}Sb_{78}$-6

^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

$\gamma(^{129}Sb)$ (continued)

E_γ †	I_γ †#	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α@	Comments
445.2 *2*	1.32 *5*	2678.30	(9/2,11/2,13/2)	2232.17	(9/2$^-$,11/2,13/2)			
451.4 *5*	1.4 *2*	2722.8	(11/2$^-$,13/2)	2271.57	(15/2$^-$)			Additional information 34.
505.5 *2*	13.3 *3*	2822.73	(9/2$^-$,11/2,13/2)	2317.10	(9/2,11/2,13/2$^+$)			Additional information 40.
505.80 *5*	0.11 *4*	2434.44	(13/2$^-$,15/2$^+$)	1928.64	(17/2$^-$)			
507.84 *7*	2.5 *2*	2430.25	(11/2$^-$,13/2$^+$)	1922.33	(11/2$^-$)			
519.04 *6*	1.98 *6*	2430.25	(11/2$^-$,13/2$^+$)	1911.21	(13/2$^-$)			
574.7 *5*	0.72 *7*	2722.8	(11/2$^-$,13/2)	2148.13	(15/2$^-$)			Additional information 35.
578.8 *2*	3.1 *5*	2882.08	(9/2,11/2,13/2$^+$)	2303.36	(9/2$^-$,11/2,13/2$^+$)			Additional information 43.
592.8 *2*	1.96 *5*	2864.40	(11/2$^-$,13/2)	2271.57	(15/2$^-$)			
618.6 *4*	4.21 *7*	2611.26	(11/2$^-$,13/2$^+$)	1991.96	(13/2$^-$)			
688.5 *2*	2.55 *6*	2611.26	(11/2$^-$,13/2$^+$)	1922.33	(11/2$^-$)			
695.43 *5*	6.06 *6*	2726.29	(9/2,11/2,13/2)	2031.07	(11/2$^-$,13/2$^-$)			Additional information 38.
699.64 *6*	2.32 *5*	1861.07	(15/2$^-$)	1161.40	(9/2$^+$)	[E3]	0.0076	
716.4 *4*	5.83 *6*	2864.40	(11/2$^-$,13/2)	2148.13	(15/2$^-$)			Additional information 42.
722.69 *5*		1851.31	(19/2$^-$)	1128.63	(11/2$^+$)	(M4)	0.0547	α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21* α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4* I_γ: ≈6.8 deduced by evaluators from total I(γ+ce) feeding this level and 15% IT decay. 1987StZO (also 1987St23) list 18.9 *10*, probably from observation in a spectrum run for a certain counting schedule. The decay of 17.7-min isomer does not reach equilibrium. Additional information 3. Mult.: from α(K)exp=0.049 *9* (1987St23).
732.48 *5*	1.10 *1*	1861.07	(15/2$^-$)	1128.63	(11/2$^+$)	[M2]	0.0095	Additional information 4.
761.0 *1*	47 *5*	1922.33	(11/2$^-$)	1161.40	(9/2$^+$)			Additional information 7.
782.59 *5*	32.2 *10*	1911.21	(13/2$^-$)	1128.63	(11/2$^+$)			Additional information 6.
827.4 *8*	1.27 *6*	3130.8	(9/2,11/2,13/2)	2303.36	(9/2$^-$,11/2,13/2$^+$)			
844.58 *8*	1.4 *2*	2766.91	(9/2,11/2,13/2)	1922.33	(11/2$^-$)			
851.3 *9*	0.35 *2*	2822.73	(9/2$^-$,11/2,13/2)	1972.75	(13/2$^-$)			Additional information 41.
891.6 *1*	1.5 *1*	3208.70	(9/2,11/2,13/2)	2317.10	(9/2,11/2,13/2$^+$)			
902.39 *5*	10.6 *10*	2031.07	(11/2$^-$,13/2$^-$)	1128.63	(11/2$^+$)			Additional information 14.
961.8 *2*	0.09 *1*	2884.44	(9/2,11/2,13/2)	1922.33	(11/2$^-$)			Additional information 45.
1059.2 *2*	1.41 *4*	3031.96	(9/2$^-$,11/2,13/2)	1972.75	(13/2$^-$)			
1066.2 *7*	1.16 *6*	3097.03	(9/2$^-$,11/2,13/2)	2031.07	(11/2$^-$,13/2$^-$)			
1128.60 *5*	100.0 *10*	1128.63	(11/2$^+$)	0.0	7/2$^+$			Additional information 1.
1141.5 *8*	4.3 *4*	2303.36	(9/2$^-$,11/2,13/2$^+$)	1161.40	(9/2$^+$)			Additional information 25.
1147.69 *6*	2.13 *5*	3070.02	(9/2,11/2,13/2)	1922.33	(11/2$^-$)			
1155.72 *9*	16.23 *7*	2317.10	(9/2,11/2,13/2$^+$)	1161.40	(9/2$^+$)			Additional information 28.
1161.42 *5*	98.7 *10*	1161.40	(9/2$^+$)	0.0	7/2$^+$			Additional information 2.
1174.42 *5*	1.41 *9*	2303.36	(9/2$^-$,11/2,13/2$^+$)	1128.63	(11/2$^+$)			Additional information 26.
1185.8 *2*	1.91 *8*	3097.03	(9/2$^-$,11/2,13/2)	1911.21	(13/2$^-$)			
1188.6 *5*	5.8 *10*	2317.10	(9/2,11/2,13/2$^+$)	1128.63	(11/2$^+$)			Additional information 29.
1207.7 *2*	6.89 *6*	2369.21	(9/2,11/2,13/2$^+$)	1161.40	(9/2$^+$)			Additional information 30.

$^{129}_{51}Sb_{78}$-7

^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23 (continued)

$\gamma(^{129}Sb)$ (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1225.80 *5*	5.25 *6*	3148.13	(9/2,11/2,13/2)	1922.33	(11/2$^-$)	
1240.6 *1*	1.72 *9*	2369.21	(9/2,11/2,13/2$^+$)	1128.63	(11/2$^+$)	
1268.6 *2*	1.7 *1*	2430.25	(11/2$^-$,13/2$^+$)	1161.40	(9/2$^+$)	
1301.4 *1*	0.27 *4*	3274.17	(9/2$^-$,11/2,13/2)	1972.75	(13/2$^-$)	
1352.07 *5*	4.1 *4*	3280.72	(13/2$^-$)	1928.64	(17/2$^-$)	
1406.89 *7*	2.25 *3*	2568.29	(11/2$^-$,13/2$^+$)	1161.40	(9/2$^+$)	
1436.1 *1*	5.52 *7*	2564.81	(11/2$^-$,13/2)	1128.63	(11/2$^+$)	Additional information 32.
1449.97 *8*	1.18 *4*	2611.26	(11/2$^-$,13/2$^+$)	1161.40	(9/2$^+$)	
1503.63 *7*	4.65 *7*	2665.04	(9/2,11/2,13/2$^+$)	1161.40	(9/2$^+$)	
1549.69 *8*	0.47 *4*	2678.30	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
1597.4 *2*	4.12 *6*	2726.29	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	Additional information 39.
1635.4 *2*	1.79 *4*	2796.81	(9/2,11/2,13/2$^+$)	1161.40	(9/2$^+$)	
1720.6 *2*	3.18 *4*	2882.08	(9/2,11/2,13/2$^+$)	1161.40	(9/2$^+$)	Additional information 44.
1756.1 *2*	3.5 *1*	2884.44	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
1819.6 *2*	0.80 *2*	2948.25	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
1831.9 *4*	2.39 *3*	2960.5	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
1885.2 *4*	0.55 *3*	3013.8	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
2035.4 *1*	0.98 *3*	3164.05	(9/2,11/2,13/2)	1128.63	(11/2$^+$)	
2146 *1*	7.33 *7*	3274.17	(9/2$^-$,11/2,13/2)	1128.63	(11/2$^+$)	

[†] From 1987StZO. Detailed γ-ray data are also available from 1982Hu09, but many γ rays in this work as listed in above table have not been confirmed in the work of 1987StZO. These probably belong to unidentified impurities.

[‡] Assumed multipolarities up to Eγ=250 keV, based on assignments made in 1987StZO and as suggested by authors′ listed Iγ+ce and Iγ values in table III-16. Only some of these multipolarity assignments are given in Adopted dataset.

[#] For absolute intensity per 100 decays, multiply by 0.402 *13*.

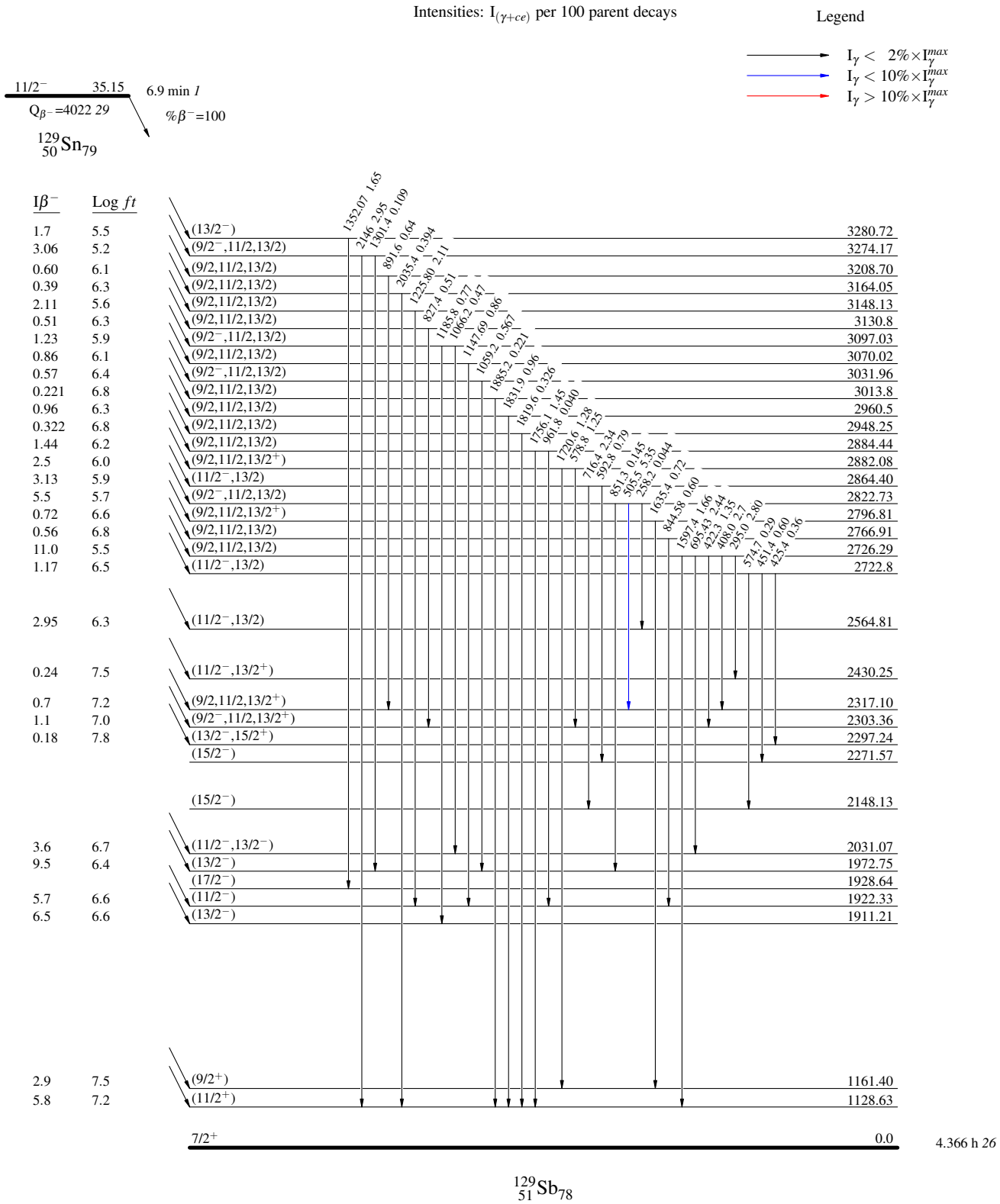
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{129}_{51}Sb_{78}$-8

^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23

Decay Scheme

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

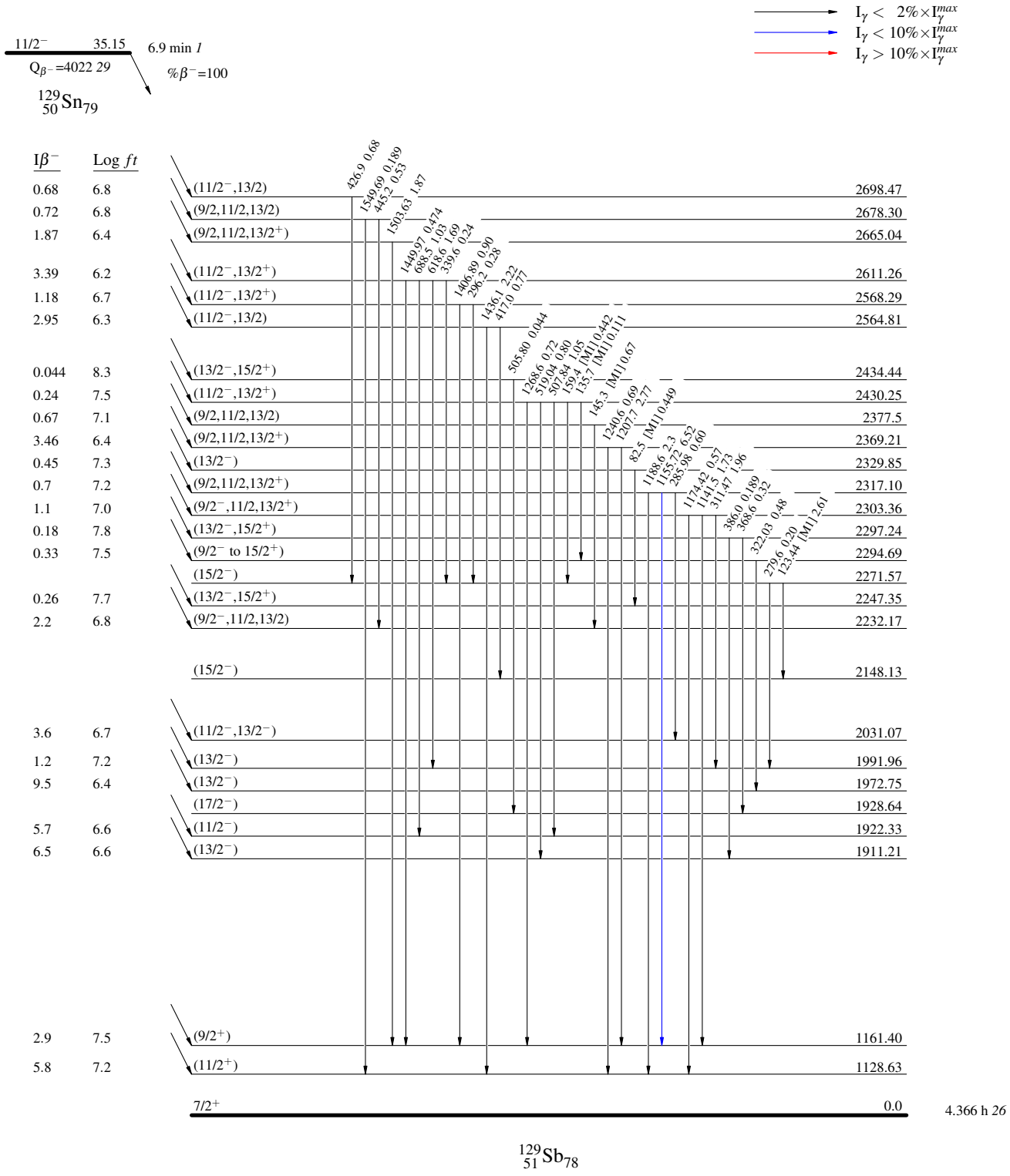


^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23

Decay Scheme (continued)

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

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



^{129}Sn β^- decay (6.9 min) 1987StZO,1987St23

Decay Scheme (continued)

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