^{123}Sn β^- decay (129.2 d) 1974Ra03,1966Au04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Parent: ^{123}Sn: E=0.0; J^π=11/2$^-$; $T_{1/2}$=129.2 d *5*; Q(β^-)=1408.2 *24*; %β^- decay=100.0

^{123}Sn-J^π,$T_{1/2}$: From Adopted Levels of ^{123}Sn.

^{123}Sn-Q(β^-): From 2021Wa16.

1974Ra03: ^{123}Sn activity was produced by irradiation of 95% enriched ^{122}Sn with thermal neutrons at ORNL. γ rays were detected with a 50-cm^3 Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, J, π, β-decay branching ratios, log *ft*. Comparisons with available data.

1966Au04: ^{123}Sn activity was produced by irradiating 10 mg of enriched ^{122}Sn metal in the ORR reactor at ORNL. γ rays were detected with NaI(Tl) and Ge(Li) detectors; β particles were detected with a 4π electron detector. Measured Eγ, Iγ, Eβ, Iβ, $\gamma\gamma$-coin, $\beta\gamma$-coin. Deduced levels, J, π, β-decay branching ratios.

Others (measured parent $T_{1/2}$): 1949Le05, 1950Ne52, 1951Co34, 1966La13, 1968Er03, 1973Be18, 2004AdZX.

^{123}Sb Levels

E(level)†	J^π‡	$T_{1/2}$‡
0.0	7/2$^+$	stable
160.33 *5*	5/2$^+$	0.61 ns *4*
1030.23 *10*	9/2$^+$	0.190 ps *+16−14*
1088.65 *10*	11/2$^+$	0.52 ps *+5−4*
1181.28 *15*	(5/2,7/2)	
1260.9 *3*	(9/2$^+$)	
1337.42 *15*	7/2$^+$,9/2$^+$	

† From a least-squares fit to γ-ray energies.

‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(70.8 *24*)	1337.42	0.00098 *21*	9.8 *1*	av Eβ=18.29 *65*
(147.3 *24*)	1260.9	0.00014 *6*	11.6 *2*	av Eβ=39.50 *70*
(226.9 *24*)	1181.28	0.0022 *5*	11.0 *1*	av Eβ=63.08 *74*
(319.5 *24*)	1088.65	0.60 *12*	9.0 *1*	av Eβ=92.27 *78* E(decay): 310 *10* (1966Au04). Iβ^-: from 1966Au04, determined from their measured intensities of β transition to g.s. and 1089γ. A %20 uncertainty is assumed by the evaluator.
(378.0 *24*)	1030.23	0.031 *7*	10.6 *1*	av Eβ=111.56 *81*
(1408.2 *24*)	0.0	99.37 *13*	9.88^{1u} *1*	av Eβ=527.8 *10* E(β)=1.42 MeV *1*, ΔJ=2 yes shape (magnetic spectrometer 1950Ke11).

† From γ+ce intensity balance at each level, assuming a 20% uncertainty in normalizing I(γ+ce) to %Iγ(1088γ)=0.60 measured by 1966Au04.

‡ Absolute intensity per 100 decays.

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$\gamma(^{123}Sb)$

Iγ normalization, I(γ+ce) normalization: From Iβ=0.6% to 1089-keV level, determined from βγ-coin by 1966Au04. A 20% uncertainty has been assumed by the evaluator.

E_γ[‡]	I_γ[‡#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	$I_{(\gamma+ce)}$[#]	Comments
160.33 *5*	0.320 *16*	160.33	5/2$^+$	0.0	7/2$^+$	M1+E2	0.078 *10*	0.1668	0.373 *18*	ce(K)/(γ+ce)=0.1233 *16*; ce(L)/(γ+ce)=0.01582 *23*; ce(M)/(γ+ce)=0.00313 *5* ce(N)/(γ+ce)=0.000604 *9*; ce(O)/(γ+ce)=5.95×10^{-5} *9* α(K)=0.1439 *21*; α(L)=0.0185 *3*; α(M)=0.00365 *6* α(N)=0.000705 *11*; α(O)=6.94×10^{-5} *10* E_γ: from 40.06-min isomer decay in 1974Ra03. Other: a very weak peak of 155 *10* seen in coincidence with 1030γ in 1966Au04, with about 4% of the intensity of 1030γ, making a level at 1187; but this placement and the 1187 level were not confirmed in other studies and instead, the 155γ could correspond to 160γ here. $I_{(\gamma+ce)}$: from intensity balance at 160 level. I_γ: from I(γ+ce) and α. Mult.,δ: from Adopted Gammas.
1021.00 *20*	0.321 *16*	1181.28	(5/2,7/2)	160.33	5/2$^+$					
1030.23 *10*	5.17 *20*	1030.23	9/2$^+$	0.0	7/2$^+$					E_γ: other: 1030 *1* (1966Au04), I(1032/1088)=0.056 *6*.
1088.64 *10*	100	1088.65	11/2$^+$	0.0	7/2$^+$					E_γ: other: 1089 *1* (1966Au04).
1100.5 *4*	0.014 *7*	1260.9	(9/2$^+$)	160.33	5/2$^+$					
1177.06 *20*	0.038 *4*	1337.42	7/2$^+$,9/2$^+$	160.33	5/2$^+$					
1181.23 *20*	0.049 *5*	1181.28	(5/2,7/2)	0.0	7/2$^+$					
1260.9 *4*	0.009 *5*	1260.9	(9/2$^+$)	0.0	7/2$^+$					
1337.44 *20*	0.126 *7*	1337.42	7/2$^+$,9/2$^+$	0.0	7/2$^+$					

[†] Additional information 1.
[‡] From 1974Ra03.
[#] For absolute intensity per 100 decays, multiply by 0.0060 *12*.

$^{123}_{51}Sb_{72}$-2

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Decay Scheme

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