^{110}Sb ε decay 1976Ox01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal and F. G. Kondev	NDS 113, 1315 (2012)	1-Aug-2011

Parent: ^{110}Sb: E=0.0; $J^\pi=(3^+)$; $T_{1/2}$=23.6 s *3*; Q(ε)=8394 *15*; %ε+%$β^+$ decay=100.0

^{110}Sb was produced via ^{112}Sn(p,3n) reaction. The proton beam was accelerated from 25 to 60 MeV in 5 MeV intervals at the McGill cyclotron. Isotropically enriched 79.6% metallic powder tin targets sealed in thin-walled beryllium tubes were used. γ-rays were detected using two Ge(Li) detectors. Measured: Eγ, Iγ, γγ-coin.

Others: 1972Mi26, 1972Si28.

^{110}Sn Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0	0^+	2545.4 *5*	2^+	2947.8 *3*	$(3,4^+)$	3540.2 *7*	4^+
1211.72 *10*	2^+	2694.2 *5*	4^+	2976.8 *5*	$(2,3,4^+)$	3629.3 *4*	$(3,4^+)$
2120.71 *23*	2^+	2821.0 *4*	$(2^+,3,4^+)$	3182.6 *6*	$(2,3,4^+)$	3884.7 *7*	3^-
2196.43 *14*	4^+	2833.1 *3*	2^+	3222.1 *4*	$(3,4^+)$	5005.7 *6*	$(2,3,4^+)$
2455.1 *3*	4^+	2914.6 *10*	2^+	3446.4 *5*	$(2,3,4^+)$		

† From least-squares fit to Eγ′s.

‡ From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*†	I(ε+β+)†‡	Comments
(3388 *15*)	5005.7	2.6 *4*	1.4 *3*	4.72 *14*	4.0 *3*	av Eβ=1021 *93*; εK=0.29 *6*; εL=0.038 *8*; εM+=0.0097 *19*
(4509 *15*)	3884.7	2.3 *4*	0.35 *8*	5.57 *13*	2.6 *4*	av Eβ=1543 *95*; εK=0.115 *20*; εL=0.0148 *25*; εM+=0.0038 *7*
(4765 *15*)	3629.3	2.0 *3*	0.24 *5*	5.78 *12*	2.2 *3*	av Eβ=1664 *95*; εK=0.095 *16*; εL=0.0122 *20*; εM+=0.0031 *5*
(4854 *15*)	3540.2	1.26 *19*	0.15 *3*	6.01 *12*	1.41 *21*	av Eβ=1706 *95*; εK=0.089 *14*; εL=0.0115 *18*; εM+=0.0029 *5*
(4948 *15*)	3446.4	2.5 *3*	0.27 *5*	5.76 *11*	2.8 *3*	av Eβ=1750 *95*; εK=0.084 *13*; εL=0.0107 *17*; εM+=0.0028 *5*
(5172 *15*)	3222.1	3.9 *5*	0.36 *7*	5.68 *11*	4.3 *5*	av Eβ=1857 *96*; εK=0.072 *11*; εL=0.0092 *14*; εM+=0.0024 *4*
(5211 *15*)	3182.6	4.5 *4*	0.40 *7*	5.64 *10*	4.9 *4*	av Eβ=1875 *96*; εK=0.070 *11*; εL=0.0090 *13*; εM+=0.0023 *4*
(5417 *15*)	2976.8	0.4 *4*	0.03 *3*	6.8 *5*	0.4 *4*	av Eβ=1973 *96*; εK=0.061 *9*; εL=0.0078 *11*; εM+=0.0020 *3*
(5446 *15*)	2947.8	19.2 *9*	1.44 *21*	5.12 *10*	20.6 *9*	av Eβ=1987 *96*; εK=0.060 *9*; εL=0.0077 *11*; εM+=0.0020 *3*
(5479 *15*)	2914.6	0.45 *12*	0.033 *10*	6.77 *15*	0.48 *13*	av Eβ=2003 *96*; εK=0.059 *8*; εL=0.0075 *11*; εM+=0.0019 *3*
(5561 *15*)	2833.1	5.4 *5*	0.38 *6*	5.72 *10*	5.8 *5*	av Eβ=2042 *96*; εK=0.056 *8*; εL=0.0072 *10*; εM+=0.00184 *25*
(5573 *15*)	2821.0	3.09 *20*	0.21 *3*	5.97 *10*	3.30 *21*	av Eβ=2048 *96*; εK=0.055 *8*; εL=0.0071 *10*; εM+=0.00182 *25*
(5700 *15*)	2694.2	3.9 *3*	0.25 *4*	5.92 *9*	4.2 *3*	av Eβ=2108 *96*; εK=0.051 *7*; εL=0.0066 *9*; εM+=0.00169 *23*
(5849 *15*)	2545.4	1.5 *3*	0.087 *20*	6.40 *12*	1.6 *3*	av Eβ=2179 *96*; εK=0.047 *6*; εL=0.0060 *8*; εM+=0.00154 *20*
(5939 *15*)	2455.1	11.9 *9*	0.65 *9*	5.55 *9*	12.5 *9*	av Eβ=2223 *96*; εK=0.045 *6*; εL=0.0057 *8*; εM+=0.00146 *19*
(6198 *15*)	2196.43	17.4 *20*	0.81 *14*	5.49 *10*	18.2 *21*	av Eβ=2347 *97*; εK=0.038 *5*; εL=0.0049 *6*;

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^{110}Sb ε decay 1976Ox01 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log ft†	I(ε+β+)†‡	Comments
						εM+=0.00126 *15*
(6273 *15*)	2120.71	3.9 *10*	0.18 *5*	6.16 *13*	4.1 *10*	av Eβ=2383 *97*; εK=0.037 *5*; εL=0.0047 *6*; εM+=0.00121 *15*
(7182 *15*)	1211.72	6.5 *23*	0.18 *7*	6.27 *17*	6.7 *24*	av Eβ=2821 *97*; εK=0.0233 *24*; εL=0.0030 *3*; εM+=0.00077 *8*

† From total intensity balances and the level scheme.
‡ Absolute intensity per 100 decays.

γ(^{110}Sn)

Iγ normalization: From Σ I(γ+ce) to g.s.=100 with the assumption that there is no direct β⁻feeding to the ^{110}Sn g.s.

E_γ‡	I_γ‡@	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
x511	200 *40*							I_γ: From Iγ(511γ)/Iγ(1211.7γ)=2.0 *4*.
624.4 *5*	1.1 *1*	2821.0	(2+,3,4+)	2196.43	4+			
636.5 *4*	4.7 *4*	2833.1	2+	2196.43	4+			
751.5 *4*	4.5 *4*	2947.8	(3,4+)	2196.43	4+			
766.8 *6*	0.9 *3*	3222.1	(3,4+)	2455.1	4+			
796.2 *7*	0.45 *10*	3629.3	(3,4+)	2833.1	2+			
827.1 *3*	10.3 *7*	2947.8	(3,4+)	2120.71	2+			
908.9 *3*	8.5 *7*	2120.71	2+	1211.72	2+			
984.7 *1*	34.1 *21*	2196.43	4+	1211.72	2+	E2		
x996.7 *5*	1.4 *2*							
1025.8 *4*	2.5 *3*	3222.1	(3,4+)	2196.43	4+			
1101.2 *6*	0.83 *20*	3222.1	(3,4+)	2120.71	2+			
1211.7 *1*	100	1211.72	2+	0.0	0+	E2	0.000860 *12*	α=0.000860 *12*; α(K)=0.000741 *11*; α(L)=8.96×10⁻⁵ *13*; α(M)=1.747×10⁻⁵ *25*; α(N+..)=1.199×10⁻⁵ α(N)=3.28×10⁻⁶ *5*; α(O)=2.83×10⁻⁷ *4*; α(IPF)=8.42×10⁻⁶ *12*
1243.3 *3*	14.6 *9*	2455.1	4+	1211.72	2+	E2	0.000820 *12*	α=0.000820 *12*; α(K)=0.000702 *10*; α(L)=8.48×10⁻⁵ *12*; α(M)=1.653×10⁻⁵ *24*; α(N+..)=1.644×10⁻⁵ α(N)=3.11×10⁻⁶ *5*; α(O)=2.68×10⁻⁷ *4*; α(IPF)=1.306×10⁻⁵ *19*
1325.6 *6*	0.55 *10*	3446.4	(2,3,4+)	2120.71	2+			
1333.6 *5*	1.7 *2*	2545.4	2+	1211.72	2+			
1339.2 *7*	0.52 *10*	3884.7	3−	2545.4	2+			
x1351.8 *6*	1.4 *2*							
1375.8 *9*	0.24 *10*	5005.7	(2,3,4+)	3629.3	(3,4+)			
1419.6 *9*	0.34 *10*	3540.2	4+	2120.71	2+			
1432.6 *5*	1.4 *2*	3629.3	(3,4+)	2196.43	4+			
1482.5 *4*	4.6 *3*	2694.2	4+	1211.72	2+			
1609.5 *5*	2.5 *2*	2821.0	(2+,3,4+)	1211.72	2+			
1621.4 *5*	1.8 *3*	2833.1	2+	1211.72	2+			
1702.5 *12*	0.28 *10*	2914.6	2+	1211.72	2+			
1735.9 *5*	7.7 *4*	2947.8	(3,4+)	1211.72	2+			
1765.3 *5*	4.4 *3*	2976.8	(2,3,4+)	1211.72	2+			

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^{110}Sb ε decay 1976Ox01 (continued)

γ(^{110}Sn) (continued)

E_γ ‡	I_γ ‡@	E_i(level)	J_i^π	E_f	J_f^π
x1780.2 *12*	0.36 *10*				
1970.9 *6*	5.3 *4*	3182.6	(2,3,4$^+$)	1211.72	2$^+$
2010.1 *12*	0.45 *15*	3222.1	(3,4$^+$)	1211.72	2$^+$
2029.1 *6*	4.0 *3*	5005.7	(2,3,4$^+$)	2976.8	(2,3,4$^+$)
2120.8 *6*	8.0 *4*	2120.71	2$^+$	0.0	0$^+$
2172.3 *15*	0.12 *5*	5005.7	(2,3,4$^+$)	2833.1	2$^+$
2234.9 *8*	2.5 *3*	3446.4	(2,3,4$^+$)	1211.72	2$^+$
2328.4 *8*	1.2 *2*	3540.2	4$^+$	1211.72	2$^+$
x2382.4 *10*	0.90 *20*				
2417.8 *12*	0.78 *20*	3629.3	(3,4$^+$)	1211.72	2$^+$
2545.4 *15*	0.59 *20*	2545.4	2$^+$	0.0	0$^+$
2673.2 *10*	2.3 *4*	3884.7	3$^-$	1211.72	2$^+$
2834.3 *15*	0.39 *20*	2833.1	2$^+$	0.0	0$^+$
2915.1 *15*	0.24 *10*	2914.6	2$^+$	0.0	0$^+$

† Additional information 1.
‡ From E_p=40 MeV (Iγ(1211.7)=100) in 1976Ox01.
# From adopted gammas.
@ For absolute intensity per 100 decays, multiply by 0.916 *4*.
x γ ray not placed in level scheme.

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Decay Scheme

Intensities: Relative I_γ

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