^{131}Sb β^- decay 1975Hn01,1971Bl04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, I. Mitropolsky, A. Rodionov	NDS 107, 2715 (2006)	17-Jul-2006

Parent: ^{131}Sb: E=0.0; J^π=(7/2$^+$); $T_{1/2}$=23.03 min *4*; Q(β^-)=3221 *21*; %β^- decay=100.0

1971Bl04: ^{131}Sb(β^-) $T_{1/2}$=23 min [from ^{235}U(n,F)]; measured γ's in 100-3700 keV energy range, $\gamma\gamma$-coin; Ge(Li).

1975Hn01,1974GnZZ: ^{131}Sb(β^-) $T_{1/2}$=23 min [from ^{235}U(n,F)]; measured γ's in 20-4000 keV energy range, $\gamma\gamma$-coin. Ge(Li).

The decay scheme was based on ^{131}Sb(β^-) data of 1971Bl04 and 1975Hn01, and (d,p) data of 2003To08.

^{131}Te Levels

The levels at 1036, 1467 and 1853 suggested in 1971Bl04 are not adopted as they are missing in reaction data and are not obtained in coincidences. 1975Hn01 suggested level at 2759 based on comparison to available reaction data; however, L(d,p)=1 for 2752 seems inconsistent with the deduced feedings of this level, and the level is not included too. The level at 2017 is adopted as it suggested in 1975Hn01 and 2003To08.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	3/2$^+$	25.0 min *1*	%β^-=100 *5*
182.250 *20*	11/2$^-$	33.25 h *2*	%β^-=74.5 *5*; %IT=25.9 *5* Total $\beta^-+\gamma$ feeding to state is 6.5% *9* recalculated by evaluators from data from 1965Sa23 and current $T_{1/2}$=33.25 h and %IT. $T_{1/2}$: from Adopted Levels.
295.78 *10*	1/2$^+$		
642.27 *8*	5/2$^+$		
776.85 *12*			
943.32 *8*	(7/2)$^+$		
1050.85 *23*	3/2$^+$		
1207.37 *9*	5/2$^+$		
1267.57 *14*	(7/2$^+$,9/2$^+$)		
1398.91 *20*	5/2$^+$		
1470.31 *20*	(5/2)$^+$		
1601.76? *23*			
1669.62 *13*			
1721.8 *5*	7/2$^-$,5/2$^+$		
1876.37 *10*	(5/2$^+$,7/2$^+$,9/2$^+$)		
2016.5 *9*	5/2$^+$		
2066.87 *20*	(7/2$^+$,9/2$^+$)		
2179.7 *3*	(5/2,7/2)		
2226.19 *17*	(5/2,7/2,9/2)		
2335.48 *18*	5/2$^-$		
2398.43 *11*	(5/2,7/2)		
2496.43 *18*	(5/2$^+$,7/2$^+$)		
2551.92 *19*	(5/2$^+$)		
2598.96 *25*	(5/2$^+$,7/2$^+$,9/2$^+$)		
2662.20 *19*	(5/2$^+$,7/2$^+$)		

[†] From least-squares fit to Eγ's.

[‡] From (d,p) data 2003To08. See 1971Bl04 and 1975Hn01 for other suggested spin and parity assignments based on log *ft*'s, γ excitation and deexcitation, and systematics.

^{131}Sb β^- decay 1975Hn01,1971Bl04 (continued)

β^- radiations

1973Jo02 deduced β-strength function from total-absorption γ-spectra.

E(decay)	E(level)	Iβ^-‡#	Log *ft*	Comments
(559 *21*)	2662.20	2.3 *7*	5.37 *15*	av Eβ=174.7 *77*
(622 *21*)	2598.96	2.9 *5*	5.43 *10*	av Eβ=198.0 *79*
(669 *21*)	2551.92	2.5 *4*	5.61 *9*	av Eβ=215.6 *80*
(725 *21*)	2496.43	2.9 *5*	5.66 *9*	av Eβ=236.8 *81*
(823 *21*)	2398.43	2.8 *3*	5.88 *7*	av Eβ=274.9 *83*
(886 *21*)	2335.48	1.9 *8*	6.16 *19*	av Eβ=299.9 *85*
(995 *21*)	2226.19	1.10 *25*	6.58 *11*	av Eβ=344.2 *86*
(1041 *21*)	2179.7	2.8 *5*	6.25 *9*	av Eβ=363.1 *87*
1.14×10^3† *25*	2066.87	8.6 *9*	5.93 *6*	av Eβ=410.2 *89*
(1205 *21*)	2016.5	0.7 *4*	7.09 *25*	av Eβ=431.6 *89*
1.31×10^3† *8*	1876.37	29 *2*	5.65 *4*	av Eβ=491.1 *91*
(1499 *21*)	1721.8	2.5 *2*	6.90 *5*	av Eβ=558.1 *92*
(1551 *21*)	1669.62	4.2 *4*	6.73 *5*	av Eβ=581.0 *93*
(1619@ *21*)	1601.76?	2.7 *4*	7.00 *7*	av Eβ=611.0 *93*
(1751 *21*)	1470.31	1.6 *2*	7.36 *6*	av Eβ=669.1 *94*
(1822 *21*)	1398.91	1.4 *2*	7.48 *7*	av Eβ=701.0 *94*
(1953 *21*)	1267.57	5.3 *7*	7.03 *6*	av Eβ=760.0 *95*
(2014 *21*)	1207.37	2.9 *5*	7.34 *8*	av Eβ=787.2 *95*
(2170 *21*)	1050.85	1.9 *7*	7.66 *16*	av Eβ=858.1 *96*
2.15×10^3† *62*	943.32	5.8 *19*	7.26 *15*	av Eβ=907.3 *96*
(2579 *21*)	642.27	12 *5*	7.16 *19*	av Eβ=1045.6 *97*
(2925@ *21*)	295.78	0.3 *9*	11.8^{2u} *13*	av Eβ=1206.9 *95*
(3039@ *21*)	182.250	6.5 *9*	9.12^{1u} *7*	av Eβ=1247.9 *97*

† From 1977Lu06 ($\beta\gamma$ coin; Si, Ge(Li)). Eβ(to 1876) is the weighted average of 1.30 MeV *10* and 1.32 MeV *12*.
‡ From net γ feeding of each level.
# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.

^{131}Sb β^- decay 1975Hn01,1971Bl04 (continued)

$\gamma(^{131}Te)$

Iγ normalization, I(γ+ce) normalization: from ΣIγ(1+α)(to g.s., excluding IT)=96.5 *9*. See comment on 182 state for total feeding to isomer.
E(A),M(B) From the adopted gammas.

E_γ †b	I_γ #e	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α f	$I_{(\gamma+ce)}$ ‡e	Comments
134.6 *1*	5.4 *20*	776.85		642.27	$5/2^+$				
159.9 *5*	1.0 *3*	2226.19	(5/2,7/2,9/2)	2066.87	$(7/2^+,9/2^+)$				
(182.25 *2*)	0.137@ *CA*	182.250	$11/2^-$	0.0	$3/2^+$	(M4)	25.2	3.57 *14*	ce(K)/(γ+ce)=0.650 *8*; ce(L)/(γ+ce)=0.246 *5*; ce(M)/(γ+ce)=0.0544 *11*; ce(N+)/(γ+ce)=0.01154 *23* ce(N)/(γ+ce)=0.01055 *21*; ce(O)/(γ+ce)=0.000990 *20*
274.26& *29*	<5.2&	1050.85	$3/2^+$	776.85					I_γ: Iγ=2.8 *3* in 1971Bl04.
295.7& *1*	<6.9&	295.78	$1/2^+$	0.0	$3/2^+$	[M1,E2]	0.038 *3*		α(K)=0.0321 *16*; α(L)=0.0047 *8*; α(M)=0.00094 *17*; α(N+..)=0.00020 *4* α(N)=0.00018 *4*; α(O)=1.89×10^{-5} *23* I_γ: Iγ=4.2 *4* in 1971Bl04.
301.3 *3*	5.1 *10*	943.32	$(7/2)^+$	642.27	$5/2^+$	[M1,E2]	0.0359 *22*		α(K)=0.0304 *14*; α(L)=0.0044 *8*; α(M)=0.00089 *16*; α(N+..)=0.00019 *3* α(N)=0.00017 *3*; α(O)=1.78×10^{-5} *21* I_γ: Iγ=3.0 *3* in 1971Bl04.
323.8a *4*	2.6 *8*	1267.57	$(7/2^+,9/2^+)$	943.32	$(7/2)^+$	[M1,E2]	0.0293 *10*		α(K)=0.0249 *4*; α(L)=0.0035 *5*; α(M)=0.00071 *10*; α(N+..)=0.00017 *2*
326.2 *4*	2.6 *13*	2662.20	$(5/2^+,7/2^+)$	2335.48	$5/2^-$				
x433.81& *19*	<8.3&								
456.7ah *5*	≤3.0	2179.7	(5/2,7/2)	1721.8	$7/2^-,5/2^+$				
619.78 *26*	3.4 *6*	2496.43	$(5/2^+,7/2^+)$	1876.37	$(5/2^+,7/2^+,9/2^+)$				
625.65 *26*	5.2 *9*	1267.57	$(7/2^+,9/2^+)$	642.27	$5/2^+$				
642.3 *1*	50 *9*	642.27	$5/2^+$	0.0	$3/2^+$				
x657.9& *3*	<15.5&								
669.00 *19*	4.1 *7*	1876.37	$(5/2^+,7/2^+,9/2^+)$	1207.37	$5/2^+$				
726.3 *1*	8.7 *8*	1669.62		943.32	$(7/2)^+$				
824.91 *19*	5.6 *7*	1601.76?		776.85					
x854.6 *2*	7.0 *8*								
866h *1*	1.0b *2*	2335.48	$5/2^-$	1470.31	$(5/2)^+$				
911.0 *4*	1.50 *3*	1207.37	$5/2^+$	295.78	$1/2^+$				

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^{131}Sb β^- decay 1975Hn01,1971Bl04 (continued)

$\gamma(^{131}Te)$ (continued)

E_γ [†b]	I_γ [#e]	E_i(level)	J_i^π	E_f	J_f^π	Comments
933.09 *10*	56 *3*	1876.37	$(5/2^+,7/2^+,9/2^+)$	943.32	$(7/2)^+$	
943.41 *10*	100	943.32	$(7/2)^+$	0.0	$3/2^+$	
958.59 *10*	1.3 *4*	2226.19	(5/2,7/2,9/2)	1267.57	$(7/2^+,9/2^+)$	
[x]991.5[a] *5*	3.0 *10*					
1050.4 *4*	1.4 *7*	1050.85	$3/2^+$	0.0	$3/2^+$	
1123.63 *19*	18.9 *16*	2066.87	$(7/2^+,9/2^+)$	943.32	$(7/2)^+$	
1191.9[gch] *6*	2.2[g] *2*	2398.43	(5/2,7/2)	1207.37	$5/2^+$	
1191.9[gch] *6*	2.2[g] *2*	2662.20	$(5/2^+,7/2^+)$	1470.31	$(5/2)^+$	
1207.4 *1*	8.7 *7*	1207.37	$5/2^+$	0.0	$3/2^+$	
1233.76 *19*	4.9 *10*	1876.37	$(5/2^+,7/2^+,9/2^+)$	642.27	$5/2^+$	
[x]1249.1 *2*	1.1 *5*					
1267.57 *19*	6.3 *5*	1267.57	$(7/2^+,9/2^+)$	0.0	$3/2^+$	
1284.7[gdh] *8*	1.1[g] *2*	2226.19	(5/2,7/2,9/2)	943.32	$(7/2)^+$	
1284.7[gd] *5*	1.1[g] *2*	2335.48	$5/2^-$	1050.85	$3/2^+$	
1331.8 *3*	1.8 *2*	2598.96	$(5/2^+,7/2^+,9/2^+)$	1267.57	$(7/2^+,9/2^+)$	
[x]1360.29 *26*	2.0 *10*					I_γ: Iγ=1.0 *2* in 1971Bl04.
1392.0 *4*	1.7 *6*	2335.48	$5/2^-$	943.32	$(7/2)^+$	
1398.9 *2*	2.9 *3*	1398.91	$5/2^+$	0.0	$3/2^+$	I_γ: Iγ=1.8 *2* in 1971Bl04.
1455.1 *1*	1.0 *5*	2398.43	(5/2,7/2)	943.32	$(7/2)^+$	
1470.3 *2*	3.3 *3*	1470.31	$(5/2)^+$	0.0	$3/2^+$	
[x]1517.18 *29*	2.6 *3*					
1538.0 *4*	1.0 *6*	2179.7	(5/2,7/2)	642.27	$5/2^+$	
[x]1544.2 *3*	1.9 *8*					
1553.5 *4*	1.2 *6*	2496.43	$(5/2^+,7/2^+)$	943.32	$(7/2)^+$	
1559.0 *4*	0.9 *4*	2335.48	$5/2^-$	776.85		
[x]1573.5 *2*	2.2 *5*					
1608.8 *2*	3.0 *6*	2551.92	$(5/2^+)$	943.32	$(7/2)^+$	
1721.8 *5*	5.2 *3*	1721.8	$7/2^-,5/2^+$	0.0	$3/2^+$	I_γ: Iγ=4.3 *4* in 1971Bl04.
1756.1 *2*	2.4 *3*	2398.43	(5/2,7/2)	642.27	$5/2^+$	I_γ: Iγ=1.5 *2* in 1971Bl04.
1821.2 *5*	2.6 *5*	2598.96	$(5/2^+,7/2^+,9/2^+)$	776.85		
1854.31 *29*	9.0 *12*	2496.43	$(5/2^+,7/2^+)$	642.27	$5/2^+$	
[x]1854.4 *3*	8.9 *7*					
[x]1915.7 *6*	2.1 *10*					
1956.4 *5*	1.7 *8*	2598.96	$(5/2^+,7/2^+,9/2^+)$	642.27	$5/2^+$	
[x]1965.8 *4*	2.7 *13*					I_γ: Iγ=2.5 *3* in 1971Bl04.
[x]1984.6 *7*	0.9 *4*					
2016.5 *9*	1.4 *7*	2016.5	$5/2^+$	0.0	$3/2^+$	
[x]2031 *1*	0.5[b] *2*					
[x]2115.0 *10*	0.4 *2*					
[x]2149.6 *5*	1.2 *10*					I_γ: Iγ=0.9 *2* in 1971Bl04.
[x]2167.3 *7*	0.7 *3*					
2179.2 *4*	4.8 *7*	2179.7	(5/2,7/2)	0.0	$3/2^+$	

$^{131}_{52}Te_{79}$-4

^{131}Sb β^- decay 1975Hn01,1971Bl04 (continued)

$\gamma(^{131}Te)$ (continued)

E_γ [†b]	I_γ [#e]	E_i(level)	J_i^π	E_f	J_f^π	Comments
2255.4 *4*	1.5 *2*	2551.92	$(5/2^+)$	295.78	$1/2^+$	I_γ: Iγ=0.7 *2* in 1971Bl04.
2335.03 *29*	4.0 *2*	2335.48	$5/2^-$	0.0	$3/2^+$	
[x]2354.5 *3*	0.7 *3*					
2398.6 *6*	2.4 *2*	2398.43	(5/2,7/2)	0.0	$3/2^+$	I_γ: Iγ=1.8 *2* in 1971Bl04.
2496.3 *7*	1.4 *2*	2496.43	$(5/2^+,7/2^+)$	0.0	$3/2^+$	I_γ: Iγ=0.7 *2* in 1971Bl04.
2551.3 *9*	0.8 *2*	2551.92	$(5/2^+)$	0.0	$3/2^+$	
2662.3 *2*	2.3 *2*	2662.20	$(5/2^+,7/2^+)$	0.0	$3/2^+$	

[†] Weighted average from 1975Hn01 and 1971Bl04 when available, except as noted. 1971Bl04 did not measure transitions below 276 keV.
[‡] From total feeding to 182 level of 6.5% *9* and %IT=25.9 *5*.
[#] From 1975Hn01, except as noted.
[@] From I(γ+ce), α, and Iγ normalization.
[&] Exhibits complex $T_{1/2}$ (1975Hn01).
[a] Not reported by 1971Bl04.
[b] From 1971Bl04. Not reported by 1975Hn01.
[c] Placed as deexciting 2399 by 1975Hn01 and deexciting 2662 by 1971Bl04.
[d] Placed as deexciting 2226 and 2335 by 1975Hn01.
[e] For absolute intensity per 100 decays, multiply by 0.471 *24*.
[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.
[g] Multiply placed with undivided intensity.
[h] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{131}_{52}Te_{79}$-5

^{131}Sb β^- decay 1975Hn01,1971Bl04

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

$(7/2^+)$ 0.0 23.03 min 4
Q_{β^-}=3221 21
$\%\beta^-$=100.0
$^{131}_{51}Sb_{80}$

Iβ⁻	Log *ft*		
2.3	5.37	$(5/2^+,7/2^+)$	2662.20
2.9	5.43	$(5/2^+,7/2^+,9/2^+)$	2598.96
2.5	5.61	$(5/2^+)$	2551.92
2.9	5.66	$(5/2^+,7/2^+)$	2496.43
2.8	5.88	(5/2,7/2)	2398.43
1.9	6.16	$5/2^-$	2335.48
1.10	6.58	(5/2,7/2,9/2)	2226.19
2.8	6.25	(5/2,7/2)	2179.7
8.6	5.93	$(7/2^+,9/2^+)$	2066.87
0.7	7.09	$5/2^+$	2016.5
29	5.65	$(5/2^+,7/2^+,9/2^+)$	1876.37
2.5	6.90	$7/2^-,5/2^+$	1721.8
4.2	6.73		1669.62
2.7	7.00		1601.76
1.6	7.36	$(5/2)^+$	1470.31
1.4	7.48	$5/2^+$	1398.91
5.3	7.03	$(7/2^+,9/2^+)$	1267.57
2.9	7.34	$5/2^+$	1207.37
1.9	7.66	$3/2^+$	1050.85
5.8	7.26	$(7/2)^+$	943.32
			776.85
12	7.16	$5/2^+$	642.27
0.3	11.8^{2u}	$1/2^+$	295.78
6.5	9.12^{1u}	$11/2^-$	182.250
		$3/2^+$	0.0

33.25 h 2
25.0 min 1

$^{131}_{52}Te_{79}$

$^{131}_{52}Te_{79}$-6