^{135}Sb β^- decay (1.679 s) 1989Ho08,1979Kr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov	NDS 109, 517 (2008)	22-Jan-2008

Parent: ^{135}Sb: E=0.0; J$^\pi$=(7/2$^+$); $T_{1/2}$=1.679 s *15*; Q(β^-)=8120 *50*; %β^- decay=100.0
^{135}Sb-Q(β^-): measurement: 8120 *50* (1989Ho08).
1989Ho08: measured Eγ, Iγ, $\gamma\gamma$.
1979Kr03 (also 1976Kr18): measured delayed neutron spectrum.
Other β^-n studies: 1966To02, 1968To19, 1968To18, 1974Sh18, 1974Fr09, 1976Lu02, 1976Kr18, 1977Ru04, 1978Cr03, 1979Kr03, 1980Lu04, 1981Ho07, 1993Ru01. See 1975Iz03, 1977Ru10, 1982Ru01, 1984Ma39, 1989BrZI, 2002Pf04 for systematics, reviews and compilations.
Total decay energy of 6733 keV *360* calculated (by RADLIST code) from level scheme is lower than the expected value of 8120 keV *50*.

^{135}Te Levels

E(level)	J$^\pi$†	Comments
0.0	(7/2$^-$)	
658.65 *10*	(3/2$^-$)	
1083.3 *4*	(1/2$^-$)	
1127.06 *8*	(5/2$^-$)	
1179.88 *9*	(11/2$^-$)	
1246.18 *10*	(9/2$^-$)	
1380.14 *9*	(7/2$^-$,9/2)	
1442.22 *10*	(5/2$^-$,7/2,9/2$^-$)	
1653.97 *8*	(5/2$^-$)	
1702.34 *23*	(7/2$^-$,9/2,11/2$^-$)	
1837.19 *10*	(3/2$^-$,5/2$^-$)	
2017.88 *15*	(3/2$^-$,5/2,7/2$^-$)	
2193.80 *13*	(3/2$^-$ to 9/2$^-$)	
2339.07 *22*	(3/2$^-$ to 9/2$^-$)	
2370.56 *11*	(7/2$^-$,9/2$^-$)	
2376.6 *5*	(3/2$^-$,5/2,7/2$^-$)	
2448.76 *14*	(7/2$^-$,9/2)	
2569.43 *20*	(5/2,7/2,9/2)	
2602.3 *10*	(1/2 to 7/2$^-$)	
3122.05 *12*	(7/2$^-$,9/2,11/2$^-$)	
5080?# *90*	(9/2$^+$)‡	E(n) (I(n)): 162 *3* (11), 458 *2* (16) (1979Kr03).
5470# *90*	(9/2$^+$)‡	E(n) (I(n)): 549 *3* (13), 848 *2* (20) (1979Kr03).
5650?# *90*	(7/2$^+$)‡	E(n) (I(n)): 623 *3* (11), 738 *3* (11) (1979Kr03).
6010# *90*	(7/2$^+$)‡	E(n) (I(n)): 977 *2* (25), 1384 *4* (17) (1979Kr03).
6080# *90*	(7/2$^+$)‡	E(n) (I(n)): 1042 *2* (88), 1458 *2* (100) (1979Kr03). It is possible that 1042 transition is misplaced, it may be from 5810 level. See ^{135}Sb β^-n decay (^{134}Te in α=134) for details.
6170# *90*	(5/2$^+$)‡	E(n) (I(n)): 1251 *4* (10), 1549 *3* (26) (1979Kr03).
6240# *90*	(7/2$^+$)‡	E(n) (I(n)): 499 *3* (12), 1201 *2* (54), 1322 *4* (24), 1618 *5* (10) (1979Kr03). 499 transition is probably misplaced as the γ-ray study (1989Ho08) suggests no feeding of second 6$^+$ state in ^{134}Te.

† From 'Adopted Levels', unless otherwise stated.
‡ From the best agreement between neutron-branching ratios and optical-model transmission coefficient ratios (1979Kr03).
# From 1979Kr03 (also 1976Kr18), decays by neutrons to populate level in ^{134}Te. Relative neutron intensities are given under comments. Neutron intensity/100 decays of ^{135}Sb can be obtained by a multiplicative factor of≈0.015, based on 38% (1989Ho08) of total neutron intensity to excited states in ^{134}Te, 62% to g.s. of ^{134}Te and %β^-n=17.6.

^{135}Sb β^- decay (1.679 s) 1989Ho08,1979Kr03 (continued)

β^- radiations

Experimental β strength function measurements: 1974Sh18, 1975Al11, 1979Kr03, and 1989Ho08.

E(decay)	E(level)	Iβ^- ‡@	Log *ft*	Comments
(1.88×10^3 *10*)	6240	1.3†	4.7	av Eβ=727 *47*
(1.95×10^3 *10*)	6170	0.5†	5.1	av Eβ=758 *47*
(2.04×10^3 *10*)	6080	2.2† *6*	4.57 *15*	av Eβ=799 *47*
(2.11×10^3 *10*)	6010	0.6†	5.2	av Eβ=831 *47*
(2.47×10^3 *10*)	5650?	1.1† *7*	5.2 *3*	av Eβ=995 *48*
(2.65×10^3 *10*)	5470	0.5†	5.7	av Eβ=1078 *48*
(3.04×10^3 *10*)	5080?	0.4	6.0	av Eβ=1260 *48*
(5.00×10^3 *5*)	3122.05	≈1.3	≈6.4	av Eβ=2181 *24*
(5.52×10^3 *5*)	2602.3	≈0.5	≈7.0	av Eβ=2426 *24*
(5.55×10^3 *5*)	2569.43	2.3 *4*	6.39 *8*	av Eβ=2442 *24*
(5.67×10^3 *5*)	2448.76	1.4 *3*	6.65 *10*	av Eβ=2499 *24*
(5.74×10^3 *5*)	2376.6	0.13 *5*	7.71 *17*	av Eβ=2533 *24*
(5.75×10^3 *5*)	2370.56	1.2 *2*	6.74 *8*	av Eβ=2536 *24*
(5.78×10^3 *5*)	2339.07	0.27 *5*	7.40 *9*	av Eβ=2551 *24*
(5.93×10^3 *5*)	2193.80	0.67 *11*	7.05 *8*	av Eβ=2619 *24*
(6.10×10^3 *5*)	2017.88	0.84 *16*	7.01 *9*	av Eβ=2702 *24*
(6.28×10^3 *5*)	1837.19	1.4 *3*	6.85 *10*	av Eβ=2788 *24*
(6.42×10^3 *5*)	1702.34	0.50 *10*	7.33 *9*	av Eβ=2852 *24*
(6.47×10^3 *5*)	1653.97	3.7 *6*	6.48 *8*	av Eβ=2874 *24*
(6.68×10^3 *5*)	1442.22	4.9 *8*	6.42 *8*	av Eβ=2974 *24*
(6.74×10^3 *5*)	1380.14	5.6 *9*	6.38 *8*	av Eβ=3004 *24*
(6.87×10^3 *5*)	1246.18	4.5 *8*	6.51 *8*	av Eβ=3067 *24*
(6.94×10^3& *5*)	1179.88	<0.7	>9.4[1u]	av Eβ=3080 *24*
(6.99×10^3 *5*)	1127.06	4.5 *8*	6.55 *8*	av Eβ=3123 *24*
(8.12×10^3 *5*)	0.0	47# *6*	5.82 *6*	av Eβ=3654 *24*

† From total intensity of neutron transitions from this level as reported by 1979Kr03 multiplied by a normalization factor of≈0.015 based on total neutron feeding of 38% (1989Ho08) to excited states in ^{134}Te, 62% to ^{134}Te g.s. and %β^-n=17.6. It is assumed that the level does not have significant γ-decay mode (no line seen with Iγ>0.5% from unbound levels (1979Kr03)).

‡ An additional 11% of β intensity is accounted for by the neutron decay of (as yet undefined) unbound levels to ^{134}Te g.s. 8% γ decay of neutron-unbound levels (1979Kr03) most likely feeds excited states in ^{135}Te.

\# log *ft*>5.9 expected for a ΔJ=0, Δπ=yes transition suggests a lower (<40%) Iβ.

@ Absolute intensity per 100 decays.

& Existence of this branch is questionable.

$\gamma(^{135}$Te)

Iγ normalization: from Ti(1127γ)(per 100 decays)=7.1 *11* (1989Ho08), based on Ti(604γ)(per 100 decays of ^{135}Te decay)=27.9 *21* (priv comm from E. Lund to 1989Ho08 (ref. 12)).

E$_\gamma$ †	I$_\gamma$ ‡&	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
196.2 *5*	≈1.0	1442.22	(5/2$^-$,7/2,9/2$^-$)	1246.18	(9/2$^-$)
200.1 *5*	≈2.0	1380.14	(7/2$^-$,9/2)	1179.88	(11/2$^-$)
^{x}267#					

Continued on next page (footnotes at end of table)

^{135}Sb β^- decay (1.679 s) 1989Ho08,1979Kr03 (continued)

γ(^{135}Te) (continued)

E_γ †	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π
315.2 *5*	0.7 *3*	1442.22	(5/2⁻,7/2,9/2⁻)	1127.06	(5/2⁻)
ˣ360#					
407.8 *5*	1.0 *3*	1653.97	(5/2⁻)	1246.18	(9/2⁻)
424.7 *5*	1.3 *5*	1083.3	(1/2⁻)	658.65	(3/2⁻)
456.2 *5*	2.1 *8*	1702.34	(7/2⁻,9/2,11/2⁻)	1246.18	(9/2⁻)
468.5 *5*	1.3 *6*	1127.06	(5/2⁻)	658.65	(3/2⁻)
522.2 *5*	2.0	1702.34	(7/2⁻,9/2,11/2⁻)	1179.88	(11/2⁻)
526.84 *10*	23.1 *9*	1653.97	(5/2⁻)	1127.06	(5/2⁻)
570.7 *10*	0.6	1653.97	(5/2⁻)	1083.3	(1/2⁻)
658.57 *10*	19.3 *13*	658.65	(3/2⁻)	0.0	(7/2⁻)
716.9 *5*	1.3 *6*	2370.56	(7/2⁻,9/2⁻)	1653.97	(5/2⁻)
753.9 *5*	0.7 *4*	1837.19	(3/2⁻,5/2⁻)	1083.3	(1/2⁻)
ˣ871#					
892.0 *5*	2.2 *10*	2017.88	(3/2⁻,5/2,7/2⁻)	1127.06	(5/2⁻)
ˣ923#					
990.30 *10*	4.2 *3*	2370.56	(7/2⁻,9/2⁻)	1380.14	(7/2⁻,9/2)
1066.74 *10*	8.6 *4*	2193.80	(3/2⁻ to 9/2⁻)	1127.06	(5/2⁻)
ˣ1120#					
1124.7 *8*	3.0	2370.56	(7/2⁻,9/2⁻)	1246.18	(9/2⁻)
1127.03 *10*	100 *5*	1127.06	(5/2⁻)	0.0	(7/2⁻)
ˣ1132#					
1179.94 *10*	47 *3*	1179.88	(11/2⁻)	0.0	(7/2⁻)
1191.0 *5*	2.7 *10*	2370.56	(7/2⁻,9/2⁻)	1179.88	(11/2⁻)
1212.0 *2*	3.8 *4*	2339.07	(3/2⁻ to 9/2⁻)	1127.06	(5/2⁻)
1246.19 *10*	70 *3*	1246.18	(9/2⁻)	0.0	(7/2⁻)
1268.87 *10*	20.1 *8*	2448.76	(7/2⁻,9/2)	1179.88	(11/2⁻)
1358.9 *2*	3.8 *4*	2017.88	(3/2⁻,5/2,7/2⁻)	658.65	(3/2⁻)
1380.01 *10*	83 *3*	1380.14	(7/2⁻,9/2)	0.0	(7/2⁻)
1442.20 *10*	68 *2*	1442.22	(5/2⁻,7/2,9/2⁻)	0.0	(7/2⁻)
1654.04 *10*	29.2 *9*	1653.97	(5/2⁻)	0.0	(7/2⁻)
1702.4 *3*	3.0 *4*	1702.34	(7/2⁻,9/2,11/2⁻)	0.0	(7/2⁻)
1717.9 *5*	1.9 *6*	2376.6	(3/2⁻,5/2,7/2⁻)	658.65	(3/2⁻)
1741.8 *3*	2.0 *4*	3122.05	(7/2⁻,9/2,11/2⁻)	1380.14	(7/2⁻,9/2)
1837.18 *10*	19.1 *9*	1837.19	(3/2⁻,5/2⁻)	0.0	(7/2⁻)
1942.22 *10*	≈10	3122.05	(7/2⁻,9/2,11/2⁻)	1179.88	(11/2⁻)
1943.6	≈7	2602.3	(1/2 to 7/2⁻)	658.65	(3/2⁻)
2018.0 *2*	5.8 *4*	2017.88	(3/2⁻,5/2,7/2⁻)	0.0	(7/2⁻)
2193.8 *5*	0.8 *3*	2193.80	(3/2⁻ to 9/2⁻)	0.0	(7/2⁻)
2370.9 *2*	5.6 *4*	2370.56	(7/2⁻,9/2⁻)	0.0	(7/2⁻)
2569.4 *2*	32 *2*	2569.43	(5/2,7/2,9/2)	0.0	(7/2⁻)
3121.5 *3*	6.2 *3*	3122.05	(7/2⁻,9/2,11/2⁻)	0.0	(7/2⁻)
ˣ3292@					
ˣ3406@					

† From 1989Ho08.

‡ From 1989Ho08. 1979Kr03 estimate that total γ-ray intensity from neutron-unbound levels is at least 8% of the decay of ^{135}Sb.

Observed in coincidence measurements only.

@ From 1979Kr03. Iγ(3292γ+3406γ)/Iβ≈0.04 (1979Kr03).

& For absolute intensity per 100 decays, multiply by 0.071 *11*.

ˣ γ ray not placed in level scheme.

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Decay Scheme

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