^{127}Sb β^- decay (3.85 d) 1967Ra13,1967Ta05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. Hashizume	NDS 112, 1647 (2011)	1-Oct-2009

Parent: ^{127}Sb: E=0.0; $J^\pi=7/2^+$; $T_{1/2}$=3.85 d *5*; Q(β^-)=1581 *5*; %β^- decay=100.0

1967Ra13: ^{235}U(n,F),^{128}Te(γ,p) chem; semi γ, scin-semi $\beta\gamma$-, $\gamma\gamma$-coin.

1967Ta05: ^{128}Te(γ,p) chem; semi β, γ, scin $\beta\gamma$-coin.

1972Kr15: ^{235}U(n,F) chem; nuclear orientation $\gamma(\theta)$.

1974So03: ^{235}U(n,F) chem; semi $\gamma\gamma(\theta)$, ceγ(t).

1985De04: U(n,F) chem; semi, NaI(Tl), $\gamma\gamma(\theta)$.

The decay scheme is basically that constructed by 1967Ra13 but with the addition of three transitions (456γ, 624γ, 1155γ) as proposed by 1967Ta05. See also ^{127}Te IT decay (106.1 d).

^{127}Te Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	$3/2^+$	9.35 h *7*	
61.12 *10*	$1/2^+$		
87.7 *10*	$11/2^-$	106.1 d *7*	
340.1 *10*	$(9/2^-)$	0.41 ns *2*	$T_{1/2}$: from (ce 445γ)(252γ)(t), (ce 445γ)(ce 252γ)(t) (1974So03); other: 0.30 ns *8* (1968Is03).
473.24 *25*	$5/2^+$		
502.9 *4*	$3/2^+$		
631.0 *9*	$7/2^-$		
685.5 *5*	$7/2^+$		
763.7 *8*	$3/2^+$		
783.4 *3*	$5/2^+$		
785.2 *10*	$7/2^-$		
924.3 *6*	$7/2^+$		
1077.0 *5*	5/2,7/2,9/2		
1140.9 *5*	$5/2^+$		
1155.4 *7*	$5/2^+$		
1290.3 *5*	$5/2^+$		
1323.4? *8*			
1377.9 *9*	$5/2^+$		

[†] From a least-squares fit to E(γ's).

[‡] From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[‡]	Log *ft*	Comments
(203 *5*)	1377.9	0.07 *4*	7.8 *3*	av Eβ=55.8 *16*
(291 *5*)	1290.3	0.77 *22*	7.28 *13*	av Eβ=82.9 *16*
(426 *5*)	1155.4	0.9 *3*	7.76 *15*	av Eβ=127.6 *18*
(440 *5*)	1140.9	1.55 *20*	7.57 *6*	av Eβ=132.6 *18*
(504 *5*)	1077.0	5.4 *4*	7.23 *4*	av Eβ=155.0 *18*
(657 *5*)	924.3	1.3 *3*	8.24 *11*	av Eβ=210.9 *19*
(796 *5*)	785.2	4.5 *3*	8.00 *4*	av Eβ=264.2 *20*
(798 *5*)	783.4	18.0 *11*	7.40 *3*	av Eβ=265.1 *20* E(decay): 786 *5* from β(784γ) coin (1967Ra13).
890 *5*	685.5	35.8 *20*	7.28 *3*	av Eβ=303.9 *21* E(decay): from β(686γ) coin (1967Ra13).
(950 *5*)	631.0	4.6 *6*	8.27 *6*	av Eβ=325.7 *21*

Continued on next page (footnotes at end of table)

^{127}Sb β^- decay (3.85 d) 1967Ra13,1967Ta05 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[‡]	Log *ft*	Comments
1104 *5*	473.24	23.4 *16*	7.81 *4*	av Eβ=390.8 *21* E(decay): from β(473γ) coin (1967Ra13).
1244 *5*	340.1	1.7 *5*	9.13 *13*	av Eβ=446.6 *22* E(decay): from β(252γ) coin (1967Ra13).
1493 *5*	87.7	2.0[†] *5*	10.21[1u] *11*	av Eβ=561.9 *21* E(decay): from 1967Ra13.

[†] Measured value (1967Ta05).
[‡] Absolute intensity per 100 decays.

$\gamma(^{127}Te)$

Iγ normalization: The absolute normalization is obtained by requiring total I(γ+ce) to 88 level + I(γ+ce) to g.s. (except 88γ) to be 98.0% *5*, since measured Iβ(to 88 level)=2.0% *5*.

E_γ †	I_γ c	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α‡	$I_{(\gamma+ce)}$ c	Comments
61.1 a *1*	3.9 *3*	61.12	1/2+	0.0	3/2+	M1+E2	0.32 *+12−17*	3.5 *5*	17.5 *15*	ce(K)/(γ+ce)=0.60 *7*; ce(L)/(γ+ce)=0.14 *5*; ce(M)/(γ+ce)=0.030 *12*; ce(N+)/(γ+ce)=0.0062 *25* ce(N)/(γ+ce)=0.0056 *23*; ce(O)/(γ+ce)=0.00052 *18* ce(K)/(I_γ+I_{ce})=0.60 *7*; ce(L)/(I_γ+I_{ce})=0.14 *5*; ce(M)/(I_γ+I_{ce})=0.030 *12*; ce(N+)/(I_γ+I_{ce})=0.0062 *25*. $I_{(\gamma+ce)}$: from Σ(γ+ce)(to 61). Mult.: from δ, and $T_{1/2}$ expected from γγ-coin experiment in 1967Ra13. δ: from α calculated from ratio of I(γ+ce) to Iγ.
≈153		1077.0	5/2,7/2,9/2	924.3	7/2+					
154.3 *5*	0.4 *2*	785.2	7/2−	631.0	7/2−	D+Q				δ: +0.34 *21* or −2.3 *+8−20* (1985De04).
252.4 *3*	23.1 *9*	340.1	(9/2−)	87.7	11/2−	D+Q	−2.1 *5*			δ: weighted av of −1.53 *24* (1972Kr15), −1.61 *39* (1974So03), and −2.55 *20* (1985De04). Others: −0.56 *10* (1972Kr15), −0.31 *3* (1985De04).
280.4 *5*	1.8 *4*	783.4	5/2+	502.9	3/2+	(M1+E2)		0.044 *4*		α(K)=0.0375 *24*; α(L)=0.0055 *11*; α(M)=0.00111 *23*; α(N+..)=0.00024 *5* α(N)=0.00022 *5*; α(O)=2.2×10^{-5} *4* δ: −0.09 *2* or +7.8 *12* (1985De04).
290.8 *5*	5.5 *3*	631.0	7/2−	340.1	(9/2−)	(M1+E2)	+0.40 *3*	0.0378		α(K)=0.0325 *5*; α(L)=0.00428 *8*; α(M)=0.000857 *15*; α(N+..)=0.000187 *3* α(N)=0.000169 *3*; α(O)=1.81×10^{-5} *3* δ: others: +1.9 *5* (1974So03), +0.27 *+21−13* or 6 *+68−3* (1972Kr15).
293.3 b *9*	0.8 b *4*	924.3	7/2+	631.0	7/2−	E1(+M2)	+0.12 *13*	0.012 *7*		α(K)=0.011 *6*; α(L)=0.0013 *9*; α(M)=0.00027 *18*; α(N+..)=6.E−5 *4* α(N)=5.E−5 *4*; α(O)=6.E−6 *4*
310.0 *7*	0.7 *3*	783.4	5/2+	473.24	5/2+	(M1+E2)		0.0330 *18*		α(K)=0.0280 *10*; α(L)=0.0040 *6*; α(M)=0.00081 *13*; α(N+..)=0.00017 *3* α(N)=0.000158 *24*; α(O)=1.63×10^{-5} *17* δ: +0.10 *3* or −2.1 *+4−9* (1985De04).
391.8 *5*	2.6 *2*	1077.0	5/2,7/2,9/2	685.5	7/2+	D+Q	+0.15 *2*			δ: others: 0.55 *+51−19* or 2.8 *+25−15* (1972Kr15).
412.1 *5*	10.4 *11*	473.24	5/2+	61.12	1/2+	[E2]		0.01431		α(K)=0.01210 *18*; α(L)=0.00178 *3*;

^{127}Sb β^- decay (3.85 d) 1967Ra13,1967Ta05 (continued)

$\gamma(^{127}Te)$ (continued)

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[‡]	Comments
									α(M)=0.000357 *6*; α(N+..)=7.67×10^{-5} *12* α(N)=6.96×10^{-5} *11*; α(O)=7.10×10^{-6} *11*
441.0 *9*	1.9 *9*	502.9	3/2$^+$	61.12	1/2$^+$	D+Q			δ: +0.5 *+4−2* or <−4.0 (1985De04).
445.1 *5*	11.8 *3*	785.2	7/2$^-$	340.1	(9/2$^-$)	D+Q	−1.0 *4*		δ: weighted av of −0.90 *15* (1972Kr15), −3.14 *76* (1974So03), and −1.16 *30* (1985De04).
451.0 *7*	0.5 *2*	924.3	7/2$^+$	473.24	5/2$^+$	(M1+E2)		0.0115 *6*	α(K)=0.0099 *7*; α(L)=0.001321 *24*; α(M)=0.000264 *6*; α(N+..)=5.74×10^{-5} *9* α(N)=5.19×10^{-5} *9*; α(O)=5.50×10^{-6} *15* δ: +0.65 *76* or +1.16 *+22−63* (1985De04).
456[&d] *1*	0.3 *2*	1140.9	5/2$^+$	685.5	7/2$^+$				
473.0 *4*	70.1 *19*	473.24	5/2$^+$	0.0	3/2$^+$	(M1+E2)	−0.10 *3*	0.01077 *16*	α(K)=0.00933 *14*; α(L)=0.001160 *17*; α(M)=0.000231 *4*; α(N+..)=5.07×10^{-5} *8* α(N)=4.57×10^{-5} *7*; α(O)=4.99×10^{-6} *7* δ: weighted av of −0.10 *1* (1985De04) and −0.29 *6* (1972Kr15).
502.8[b] *6*	2.1[b] *7*	502.9	3/2$^+$	0.0	3/2$^+$	D+Q			δ: +0.34 *+90−24* or +2.1 *+3−9* (1985De04).
543.3 *5*	8.0 *12*	631.0	7/2$^-$	87.7	11/2$^-$	[E2]		0.00648 *10*	α=0.00648 *10*; α(K)=0.00553 *8*; α(L)=0.000761 *11*; α(M)=0.0001524 *22*; α(N+..)=3.30×10^{-5} *5* α(N)=2.99×10^{-5} *5*; α(O)=3.11×10^{-6} *5*
584.2[b] *11*	0.9[b] *5*	924.3	7/2$^+$	340.1	(9/2$^-$)				
603.5 *5*	12.1 *3*	1077.0	5/2,7/2,9/2	473.24	5/2$^+$	D+Q			δ: +0.14 *8* or −2.3 *5* (1985De04), +0.00 *7* or +1.65 *25* (1972Kr15).
624[&d] *1*	0.18 *6*	685.5	7/2$^+$	61.12	1/2$^+$				
637.8 *5*	1.2 *4*	1140.9	5/2$^+$	502.9	3/2$^+$	(M1+E2)		0.0047 *5*	α=0.0047 *5*; α(K)=0.0041 *5*; α(L)=0.00052 *4*; α(M)=0.000104 *8*; α(N+..)=2.27×10^{-5} *17* α(N)=2.05×10^{-5} *15*; α(O)=2.20×10^{-6} *20* δ: −0.42 *3* or −5.50 *84* (1985De04).
652.3 *9*	1.0 *2*	1155.4	5/2$^+$	502.9	3/2$^+$	D+Q			δ: +0.24 *7* or +2.1 *4* (1985De04).
667.5 *9*	2.0 *2*	1140.9	5/2$^+$	473.24	5/2$^+$				
682.3[b] *10*	1.5[b] *7*	1155.4	5/2$^+$	473.24	5/2$^+$				
685.7 *5*	100	685.5	7/2$^+$	0.0	3/2$^+$				
698.5[d] *5*	9.9 *2*	785.2	7/2$^-$	87.7	11/2$^-$				
722.2 *5*	5.1 *3*	783.4	5/2$^+$	61.12	1/2$^+$				
[x]745.9 *5*	0.4 *2*								
763.7 *8*	0.2 *1*	763.7	3/2$^+$	0.0	3/2$^+$				
783.7 *5*	41.1 *9*	783.4	5/2$^+$	0.0	3/2$^+$	(M1+E2)		0.0029 *4*	α=0.0029 *4*; α(K)=0.0025 *3*; α(L)=0.00031 *3*; α(M)=6.2×10^{-5} *6*; α(N+..)=1.36×10^{-5} *14* α(N)=1.22×10^{-5} *12*; α(O)=1.32×10^{-6} *15* δ: +0.21 *1* or −11.7 *9* (1972Kr15).
817.0 *6*	1.1 *5*	1290.3	5/2$^+$	473.24	5/2$^+$				
820.6[d] *6*	0.6 *3*	1323.4?		502.9	3/2$^+$				

$^{127}_{52}Te_{75}$-4

$\gamma(^{127}\text{Te})$ (continued)

E_γ[†]	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]
924.4 *9*	1.4 *2*	924.3	$7/2^+$	0.0	$3/2^+$	
1141.6 *8*	1.0 *2*	1140.9	$5/2^+$	0.0	$3/2^+$	D+Q
1155.2[&d] *10*	0.11 *6*	1155.4	$5/2^+$	0.0	$3/2^+$	
1290.3 *8*	1.0 *3*	1290.3	$5/2^+$	0.0	$3/2^+$	(D+Q)
1377.9 *9*	0.2 *1*	1377.9	$5/2^+$	0.0	$3/2^+$	

† From 1967Ra13, except as noted.
‡ Theoretical conversion coefficients are calculated using BrIcc code for the multipolarity and mixing ratio indicated.
# From $\gamma(\theta)$ (1972Kr15) and $\gamma\gamma(\theta)$ (1974So03,1985De04). The J^π's of initial and final levels of transitions are determined independently by (pol d,p) as shown in Adopted Levels. The assignments of transition multipolarities by $\gamma(\theta)$ and $\gamma\gamma(\theta)$ also support the results (evaluator).
@ From $\gamma\gamma(\theta)$ (1985De04), unless otherwise noted.
& Reported in 1967Ta05 only.
a From 1967Ta05.
b From $\gamma\gamma$ coin (1967Ra13).
c For absolute intensity per 100 decays, multiply by 0.368 *20*.
d Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{127}Sb β^- decay (3.85 d) 1967Ra13,1967Ta05

Decay Scheme

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

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

$^{127}_{51}Sb_{76}$: 7/2+ 0.0; 3.85 d 5; Q_{β^-}=1581 5; $\%\beta^-$=100

Iβ⁻	Log ft		
0.07	7.8	5/2+	1377.9
			1323.4
0.77	7.28	5/2+	1290.3
0.9	7.76	5/2+	1155.4
1.55	7.57	5/2+	1140.9
5.4	7.23	5/2,7/2,9/2	1077.0
1.3	8.24	7/2+	924.3
4.5	8.00	7/2−	785.2
18.0	7.40	5/2+	783.4
		3/2+	763.7
35.8	7.28	7/2+	685.5
4.6	8.27	7/2−	631.0
		3/2+	502.9
23.4	7.81	5/2+	473.24
1.7	9.13	(9/2−)	340.1
2.0	10.21[1u]	11/2−	87.7
		1/2+	61.12
		3/2+	0.0

1377.9 0.11; 820.6 0.22; 1290.3 (D+Q) 0.37; 817.0 0.40; 1155.2 0.040; 682.3 0.6; 652.3 D+Q 0.40; 1141.6 D+Q 0.40; 667.5 0.77; 637.8 (M1+E2) 0.44; 456 0.15; 603.5 D+Q 4.5; 391.8 D+Q 0.99; ≈153; 924.4 0.55; 584.2 0.33; 451.0 (M1+E2) 0.19; 295.3 E1(+M2) 0.30; 698.5 3.68; 445.1 D+Q 4.3; 154.3 D+Q 0.18; 783.7 (M1+E2) 15.2; 722.2 1.88; 310.0 (M1+E2) 0.27; 280.4 (M1+E2) 0.69; 763.7 0.11; 685.7 36.8; 624 0.066; 543.3 [E2] 3.0; 290.8 (M1+E2) 2.10; 502.8 D+Q 0.8; 441.0 D+Q 0.7; 473.0 (M1+E2) 26.1; 412.1 [E2] 3.9; 252.4 D+Q 8.5; 61.1 M1+E2 6.4

0.41 ns 2; 106.1 d 7; 9.35 h 7

$^{127}_{52}Te_{75}$