^{129}Sb β^- decay (17.7 min) 1995Zh37,1987St23,1982Hu09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Janos Timar and Zoltan Elekes, Balraj Singh	NDS 121, 143 (2014)	31-May-2014

Parent: ^{129}Sb: E=1850.31 *6*; J^π=(19/2$^-$); $T_{1/2}$=17.7 min *1*; Q(β^-)=2376 *21*; %β^- decay≈85.0

^{129}Sb-Q(β^-): From 2012Wa38.

^{129}Sb-E,J^π,$T_{1/2}$: From ^{129}Sb Adopted Levels.

1988StZQ, 1987St23: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, Eγ, Iγ, ce, $\gamma\gamma$-coin, half-life.

1982Hu09: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, $\gamma\gamma$-coin, half-life. A total of 29 γ rays reported up to 1843 keV, but only a few are common with those from 1987St23.

1988Go19 assigned a 16.7-min isomer to ^{131}Sb based on observation 433.8 and 642.3 gamma rays, but in an erratum (Phys. Rev. C 39, 1646 (1989) the authors revised its assignment to ^{129}Sb based on the work of 1982Hu09 and 1987St23; and also stated that 433.8 and 642.3 γ rays were in coin with a 759γ. While 433.8 and 759γ are confirmed in this decay, the origin of 642γ is not known.

1995Zh37: 17.7-min isomer produced in ^{130}Te(^{64}Ni,X) at 275 MeV. The authors estimate that ≈68% decay feeds the 1958, (21/2$^-$) level in ^{129}Te which decays by 434-658-760 γ cascade to 11/2$^-$ isomer at 105 keV.

^{129}Te Levels

Since the gamma-ray data from 1982Hu09 and 1988StZQ are in severe disagreement, only those transitions are placed in a level scheme which are consistent with in-beam high-spin γ-ray data from 1998Zh09, 1995Zh37.

E(level)	J^π[†]	$T_{1/2}$[†]	Comments
0.0	3/2$^+$	69.6 min *3*	
105.50 *5*	11/2$^-$	33.6 d *1*	%IT=63 *17*; %β^-=37 *17*
865.3 *1*	15/2$^{(-)}$		
1523.08 *14*	19/2$^{(-)}$		
1654.0 *1*	(17/2$^-$,19/2$^-$)		
1956.84 *16*	(21/2$^-$)		

[†] From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(2269 *21*)	1956.84	≈63	≈6.1	av Eβ=903.8 *96* Iβ^-: 1995Zh37 estimate ≈68%.
(2572 *21*)	1654.0	≈10	≈7.1	av Eβ=1042.9 *97*
(2703 *21*)	1523.08	≈9	≈7.2	

[†] From intensity balance. These feedings should be considered as approximate since the decay scheme is not well established.
[‡] Absolute intensity per 100 decays.

γ(^{129}Te)

Iγ normalization: Iγ(759.8)=100.

Gamma-ray data from 1982Hu09

Eγ	Iγ	Level	Eγ	Iγ	Level
39.0 2	6.0 20	1548.5	583.3 4	1.5 5	
61.1 8	3.0 10		657.78 8#	92 8	1417.6@
63.6 9	10.0 30		684.6 2#	3.5 10	2102.1

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 130.9 1   6.0 20              759.8 1# 100.0 9    759.8@
 146.0 2   1.8 5               788.7 2   4.0 15   1548.5@
 186.0 4   1.7 5               793.5 3   5.0 15
 250.5 2   2.0 5    2102.1     825.4 3   8.5 30
 281.1 4   1.0 3              1063.2 4   2.0 10
 346.9 3   2.0 5              1068.8 2#  4.0 15   1828.4
 410.8 1#  8.5 20   1828.4     1091.4 2   3.0 10   1851.4
 433.76 8# 73 8     1851.4@    1225.5 2   4.0 10
 435.6 3   1.8 5              1327.1 3   2.8 10
 438.0 2   1.8 5              1417.6 3   3.4 12   1417.6
 443.0 4   1.4 5              1843.1 5   1.8 5
 453.5 2   4.0 12

  @Energy of 105 keV should be added since the cascades are built
   on 105-keV, 11/2⁻ isomer.
  # γ near this energy reported in 1988StZQ
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           Gamma-ray data from 1988StZQ, 1987St23
  Eγ          Level       Eγ          Level

  232         2190        544@         544
  239         2020        658#        1524
  257         1781        684#@       1228
  307         2109        752         2275
  320         2109        754         1621
  314&        1934        761#         857
  341         2275        814@         814
  405         1623        877         1744
  410#        1934        929         1796
  434         1958       1031         1845
  523         2157       1067#        1934

  & 314γ shown incorrectly from 1958 level in Fig 6 of 1988StZQ
  # γ near this energy reported in 1982Hu09
  @ γ may be from decay of 4.366-h 129Sb populated by IT decay
    of 17.7-min 129Sb
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E_γ [†]	I_γ [†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [#]	Comments
105.50 *5*		105.50	$11/2^-$	0.0	$3/2^+$	M4		E_γ,Mult.: from Adopted Gammas.
130.9 *1*	6.0 *20*	1654.0	$(17/2^-,19/2^-)$	1523.08	$19/2^{(-)}$	[M1]	0.32	
433.76 *8*	73 *8*	1956.84	$(21/2^-)$	1523.08	$19/2^{(-)}$	[E2]	0.0123	
657.78 *8*	92 *8*	1523.08	$19/2^{(-)}$	865.3	$15/2^{(-)}$			
759.8 *1*	100.0 *9*	865.3	$15/2^{(-)}$	105.50	$11/2^-$			
788.7 *2*	4.0 *15*	1654.0	$(17/2^-,19/2^-)$	865.3	$15/2^{(-)}$			

[†] From 1982Hu09, unless otherwise stated.
[‡] For absolute intensity per 100 decays, multiply by ≈0.85.
[#] 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.

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Decay Scheme

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