^{128}In β^- decay (0.72 s) 1979Fo10,1981Fo02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Zoltan Elekes and Janos Timar	NDS 129, 191 (2015)	28-Feb-2015

Parent: ^{128}In: E=3.4×10^2 *6*; J$^\pi$=(8$^-$); T$_{1/2}$=0.72 s *10*; Q(β^-)=922×10^1 *15*; %β^- decay=100.0

1979Fo10: ^{235}U(n,F) E=th, on-line mass separation; Ge detector, $\gamma\gamma$; Ge ce, scintillator-scintillator $\beta\gamma$, $\beta\gamma$(t).

1981Fo02: same setup and authors as 1979Fo10; measured T$_{1/2}$ (2491), multipolarity (79γ, 321γ).

The decay scheme of ^{128}In is that proposed by 1979Fo10. The levels connected with γ-cascades to (5$^-$) and (7$^-$), based on the coincidence relations, were assigned to this decay.

^{128}Sn Levels

E(level)[†]	J$^\pi$	T$_{1/2}$	Comments
0.0	0$^+$	59.07 min *14*	T$_{1/2}$: from Adopted Levels.
1168.81 *5*	(2)$^+$		
2000.35 *7*	(4$^+$)		
2091.48 *11*	(7$^-$)	6.5 s *5*	T$_{1/2}$: from decay of 91.15γ.
2120.89 *9*	(5$^-$)	8.6 ns *8*	T$_{1/2}$: from $\beta\gamma$(t).
2378.06 *13*	(7$^-$)		
2412.69 *12*	(8$^+$)	<40 ns	T$_{1/2}$: from time distribution of 321γ (1981Fo02).
2491.89 *17*	(10$^+$)	2.69 μs *23*	T$_{1/2}$: From time distribution of 79.28γ (1981Fo02).
2547.08 *11*	(7$^-$)		
2959.47 *21*	(7,8,9)		
3175.77 *12*	(7$^-$)		
3383.11 *16*	(7$^-$)		
3608.48 *19*	(7,8,9$^-$)		
3633.44 *13*			
3769.06 *19*	(7,8,9)		
3871.46 *15*	(7$^-$,8$^-$,9$^-$)		
3958.53 *15*	(7$^-$,8$^-$,9$^-$)		
3987.5 *3*	(7,8,9$^-$)		
4065.34 *15*	(9$^-$)		
4213.61 *15*	(7$^-$,8$^-$,9$^-$)		
4243.01 *16*	(7$^-$,8$^-$,9$^-$)		
4898.00 *20*	(7$^-$,8$^-$,9$^-$)		

[†] E(levels) are based on a least-squares fit to the Eγ's.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(4.66×10^3 *16*)	4898.00	2.4 *4*	5.65 *12*	av Eβ=2029 *77*
(5.32×10^3 *16*)	4243.01	2.2 *4*	5.93 *12*	av Eβ=2339 *77*
(5.35×10^3 *16*)	4213.61	3.8 *5*	5.71 *11*	av Eβ=2353 *77*
(5.49×10^3 *16*)	4065.34	20.4 *23*	5.03 *10*	av Eβ=2423 *77*
(5.57×10^3 *16*)	3987.5	0.87 *22*	6.43 *14*	av Eβ=2460 *77*
5.43×10^3 *22*	3958.53	32 *4*	4.87 *10*	av Eβ=2474 *77* E(decay): from $\beta\gamma$ (1978Al18).
(5.69×10^3 *16*)	3871.46	3.4 *5*	5.88 *11*	av Eβ=2515 *77*
(5.79×10^3 *16*)	3769.06	1.40 *25*	6.29 *12*	av Eβ=2564 *77*
(5.95×10^3 *16*)	3608.48	1.50 *25*	6.32 *11*	av Eβ=2640 *77*
(6.18×10^3 *16*)	3383.11	0.4 *3*	7.0 *4*	av Eβ=2747 *77*
(6.38×10^3 *16*)	3175.77	2.1 *7*	6.31 *17*	av Eβ=2845 *77*
(6.60×10^3 *16*)	2959.47	0.86 *20*	6.76 *13*	av Eβ=2948 *77*

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^{128}In β^- decay (0.72 s) 1979Fo10,1981Fo02 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(7.01×10^3 *16*)	2547.08	≈0	≈7.7	av Eβ=3018 *65*
(7.07×10^3 *16*)	2491.89	7.2 *21*	5.97 *15*	av Eβ=3169 *77*
(7.15×10^3 *16*)	2412.69	≈0	≈8.1	av Eβ=3082 *65*
(7.18×10^3 *16*)	2378.06	4.7 *6*	6.19 *10*	av Eβ=3223 *77*
(7.47×10^3 *16*)	2091.48	14 *12*	5.8 *4*	av Eβ=3359 *77*

† Calculated by evaluators from γ intensities and their uncertainties given in 1979Fo10. The transition intensity out of the lowest-lying 5$^-$ and 7$^-$ levels has been taken to represent 100% of the decay of the high-spin isomer of the parent. The I(γ+ce) feeding these levels only amounts to 82.5%. The remaining intensity is being attributed to direct β^-transition from (8)$^-$ parent to (7$^-$) isomer in ^{128}Sn.

‡ Absolute intensity per 100 decays.

γ(^{128}Sn)

Iγ normalization: from Iγ(to g.s.)=100 and no β^-feedings to g.s..

E$_\gamma$[†]	I$_\gamma$[†&]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[@]	α[a]	Comments
79.28 *15*	1.8 *4*	2491.89	(10$^+$)	2412.69	(8$^+$)	E2	3.64	α(K)=2.42 *4*; α(L)=0.982 *16*; α(M)=0.201 *4*; α(N)=0.0354 *6*; α(O)=0.001331 *21* B(E2)(W.u.)=0.37 *4* Mult.: From ce (1981Fo02).
91.15 *10*	3.1[#] *4*	2091.48	(7$^-$)	2000.35	(4$^+$)	E3	26.3	α(K)exp=8.1 *24* α(K)=9.62 *14*; α(L)=13.31 *21*; α(M)=2.84 *5*; α(N)=0.494 *8*; α(O)=0.01410 *22* B(E3)(W.u.)=0.136 *11*
120.54 *5*	11.1 *10*	2120.89	(5$^-$)	2000.35	(4$^+$)	E1	0.1069	α(K)exp=0.08 *2* α(K)=0.0926 *13*; α(L)=0.01159 *17*; α(M)=0.00225 *4*; α(N)=0.000417 *6*; α(O)=3.21×10^{-5} *5* B(E1)(W.u.)=1.60×10^{-5} *15*
207.46 *15*	0.46 *10*	3383.11	(7$^-$)	3175.77	(7$^-$)			
257.17 *10*	4.4 *3*	2378.06	(7$^-$)	2120.89	(5$^-$)			
321.22 *7*	10.5 *7*	2412.69	(8$^+$)	2091.48	(7$^-$)	E1	0.00716	α(K)=0.00623 *9*; α(L)=0.000754 *11*; α(M)=0.0001469 *21*; α(N)=2.75×10^{-5} *4*; α(O)=2.28×10^{-6} *4* B(E1)(W.u.)=2.0×10^{-7} Mult.: From ce (1981Fo02).
[x]384.03 *25*	0.36 *10*							
426.19 *7*	1.6 *2*	2547.08	(7$^-$)	2120.89	(5$^-$)			
457.68 *7*	2.1 *2*	3633.44		3175.77	(7$^-$)			
468.0[‡] *3*	0.26 *10*	2959.47	(7,8,9)	2491.89	(10$^+$)			
546.59 *20*	0.60 *15*	2959.47	(7,8,9)	2412.69	(8$^+$)			
609.55 *15*	0.87 *15*	4243.01	(7$^-$,8$^-$,9$^-$)	3633.44				
[x]704.06 *15*	1.0 *1*							
[x]760.2 *3*	0.53 *15*							
763.12 *15*	1.1 *2*	3175.77	(7$^-$)	2412.69	(8$^+$)			
811.78 *25*	0.87 *20*	3987.5	(7,8,9$^-$)	3175.77	(7$^-$)			

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^{128}In β^- decay (0.72 s) 1979Fo10,1981Fo02 (continued)

$\gamma(^{128}Sn)$ (continued)

E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π
831.54 *5*	100[#] *5*	2000.35	(4^+)	1168.81	$(2)^+$
[x]904.29 *10*	3.0 *3*				
1054.91 *10*	5.8 *5*	3175.77	(7^-)	2120.89	(5^-)
1061.39 *15*	1.5 *2*	3608.48	$(7,8,9^-)$	2547.08	(7^-)
1067.25 *15*	1.3 *2*	4243.01	$(7^-,8^-,9^-)$	3175.77	(7^-)
[x]1082.19 *20*	1.0 *2*				
[x]1123.13 *15*	1.2 *2*				
1168.80 *5*	100[#] *5*	1168.81	$(2)^+$	0.0	0^+
[x]1236.46 *25*	0.8 *2*				
1261.81 *25*	0.9 *2*	3383.11	(7^-)	2120.89	(5^-)
1264.61 *20*	1.4 *2*	4898.00	$(7^-,8^-,9^-)$	3633.44	
1356.36 *15*	1.4 *2*	3769.06	(7,8,9)	2412.69	(8^+)
1514.79[‡] *25*	1.0 *2*	4898.00	$(7^-,8^-,9^-)$	3383.11	(7^-)
1573.37 *25*	0.9 *2*	4065.34	(9^-)	2491.89	(10^+)
[x]1593.6 *3*	0.8 *2*				
[x]1678.4 *3*	0.9 *2*				
1779.97 *10*	3.4 *3*	3871.46	$(7^-,8^-,9^-)$	2091.48	(7^-)
1867.04 *10*	32.3 *20*	3958.53	$(7^-,8^-,9^-)$	2091.48	(7^-)
[x]1967.8 *4*	0.8 *2*				
1973.86 *10*	19.5 *10*	4065.34	(9^-)	2091.48	(7^-)
2122.11 *10*	3.8 *3*	4213.61	$(7^-,8^-,9^-)$	2091.48	(7^-)
[x]2205.2 *5*	0.9 *2*				

[†] From 1979Fo10, unless otherwise noted.
[‡] Not placed in the decay scheme in 1979Fo10.
[#] These γ rays follow the 6.5 s half-life of the (7^-) level at 2378 keV in ^{128}Sn. Due to difficulties in obtaining sources with indium and tin in equilibrium, the uncertainties in the intensities of these γ rays may amount to about 25% (1979Fo10).
[@] From α(K)exp.
[&] For absolute intensity per 100 decays, multiply by 1.0 *1*.
[a] 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.
[x] γ ray not placed in level scheme.

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Decay Scheme

Intensities: Relative I_γ