Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	28-Feb-2018

Q(β^-)=14140 *60*; S(n)=2460 *60*; S(p)=1448×10[1] *12*; Q(α)=−10220 *SY* 2017Wa10
Estimated uncertainty (2017Wa10): 310 for Q(α).
S(2n)=8670 *70*, S(2p)=31290 *500* (syst), Q(β^-n)=6780 *60* (2017Wa10). Q(β^-2n)=1578 *60* (deduced by evaluator from masses in 2017Wa10).
1973Ke06: ^{132}In identified in separation of fission fragments.
2002Di12: ^{132}In from ^{238}U(p,X) E=1 or 1.4 GeV; CERN/ISOLDE facility with the use of ISOLDE Resonance Ionization Laser Ion Source.
Mass deduced from Q(β^-) measurement: 1995Me16.
2015Lo04: ^{132}In nuclide produced at RIBF-RIKEN facility in ^{9}Be(^{238}U,F) reaction at E=345 MeV/nucleon with an average intensity of 6×10[10] ions/s. Identification of ^{132}In was made by determining atomic Z and mass-to-charge ratio A/Q, where Q=charge state of the ions. The selectivity of ions was based on magnetic rigidity, time-of-flight and energy loss. The separated nuclei were implanted at a rate of 50 ions/s in a stack of eight double-sided silicon-strip detector (WAS3ABi), surrounded by EURICA array of 84 HPGe detectors. Correlations were recorded between the implanted ions and β rays. The half-life of ^{132}In isotope was measured from the correlated ion-β decay curves and maximum likelihood analysis technique as described in 2014Xu07 (Phys. Rev. Lett. 113, 032505). Comparison of measured half-lives with FRDM+QRPA, KTUY+GT2 and DF3+CQRPA theoretical calculations.
Theoretical nuclear structure calculations for ^{132}In: consult Nuclear Science References (NSR) database at www.nndc.bnl.gov/nsr/ for five articles.
Additional information 1.

^{132}In Levels

Cross Reference (XREF) Flags

A ^{132}Cd β^- decay (84 ms)
B ^{133}Cd β^-n decay (64 ms)

E(level)	J$^\pi$#	T$_{1/2}$	XREF	Comments
0.0‡	(7$^-$)‡	0.200 s *2*	B	%β^-=100; %β^-n=7.4 *14*; %β^-2n=? Theoretical T$_{1/2}$=81 ms, %β^-n=10.6, %β^-2n=0.01 (2003Mo09). Theoretical T$_{1/2}$=173 ms, %β^-n=59.8, %β^-2n=0.2 (2016Ma12). %β^-n: weighted average of 6.8% *14* (1986ReZU) and 10.7% *33* (1993Ru01, earlier value was 4.2 *9* in 1980Lu04). Others: 1986ReZU and 1986ReZS (1986Wa17 from the same group), 1984Ma39, 1982Ru01 and 1976Lu02 (same group as 1980Lu04 and 1993Ru01). Additional information 2. T$_{1/2}$: weighted average of 0.198 s *2* (2015Lo04, analysis of the (implanted ions)β correlated decay curve in time and position); 0.206 s *6* (2002Di12); 0.221 s *11* (1993Ru01); 0.186 s *22* (1986Bj01); 0.204 s *6* (1986Wa17,1986ReZU,1986ReZS). Others: 0.22 s *3* (1980Lu04), 0.12 s *2* (1973Ke06,1973Ke27), 0.3 s *1* (1976Lu02).
25?†‡ *25*	(6$^-$)‡		B	
75?†‡ *25*	(5$^-$)‡		B	
161?†‡ *25*	(4$^-$)‡		B	
264?†‡ *25*	(3$^-$)‡		B	
491?†‡ *25*	(2$^-$)‡		B	
≈800	(1$^-$)		A	Probable configuration=$\nu f_{7/2}\otimes\pi g_{9/2}^{-1}$.
848?†‡ *25*	(1$^-$)‡		B	E(level): this level may be the same as ≈800 from ^{132}Cd β^- decay.
≈1200	(1$^+$)		A	Probable configuration=$\nu p_{3/2}\otimes\pi p_{1/2}^{-1}$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{132}In Levels (continued)

E(level)	J^{π}[#]	XREF	Comments
≈5000[@]	(1$^-$)	A	Probable configuration=$\nu h_{11/2}\otimes\pi g^{-1}_{9/2}$.
≈5200[@]	(1$^+$)	A	Probable configuration=$\nu f_{7/2}\otimes\pi f^{-1}_{5/2}$.
≈5900[@]	(1$^+$)	A	Probable configuration=$\nu g_{7/2}\otimes\pi g^{-1}_{9/2}$.
≈8100[@&]	(1$^+$)	A	
≈8600[@&]	(1$^+$)	A	
≈9300[@&]	(1$^+$)	A	

† From plot (solid line in red) in Fig. 4a and text of 2016Ju02, based on the assignment of 357-227-103-86-50−(25) γ cascade to a ΔJ=1 sequence of levels from J^{π}=(1$^-$) to (7$^-$) ground state forming members of $\pi g^{-1}_{9/2}\otimes\nu f_{7/2}$ multiplet from shell model calculations for four different 2-qp configurations for relevant valence protons and neutrons, as described by 2016Ju02 in their Fig. 4a (black solid lines) and text. Evaluator indicates all the excited levels as tentative since the assignment of γ rays to ^{132}In from the β^-n decay of ^{133}Cd and the ordering of the γ rays in the proposed cascade seems tenuous at the moment in the absence of observation of (^{133}Cd)γ correlated events and $\gamma\gamma$-coincidence relationships. Based on a statement by 2005Kr20, 2016Ju02 assume 100% β^-n decay of ^{133}Cd to ^{132}In, however, evaluator′s perusal of 2005Kr20 paper indicates that authors of 2005Kr20 do not seem to claim 100% β^-n decay branch of ^{133}Cd based on solid experimental facts.

‡ Member of $\pi 0g^{-1}_{9/2}\otimes\nu 1f_{7/2}$ multiplet.

[#] Probable shell-model configurations and estimated log *ft* values for excited states.

[@] Level decays by neutrons to ^{131}In.

[&] Member of configuration=$\nu g^{-1}_{7/2}\otimes\pi g^{-1}_{9/2}$.

γ(^{132}In)

E_i(level)	J^{π}_i	E_{γ}	E_f	J^{π}_f
25?	(6$^-$)	(25 *25*)	0.0	(7$^-$)
75?	(5$^-$)	50[†]	25?	(6$^-$)
161?	(4$^-$)	86[†]	75?	(5$^-$)
264?	(3$^-$)	103[†]	161?	(4$^-$)
491?	(2$^-$)	227[†]	264?	(3$^-$)
848?	(1$^-$)	357[†]	491?	(2$^-$)

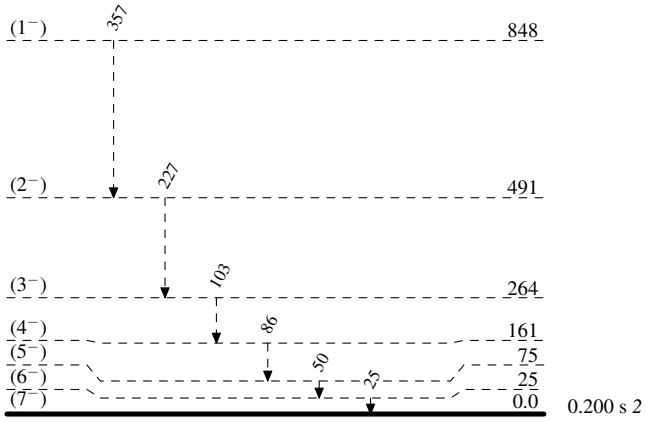
† Placement of transition in the level scheme is uncertain.

Legend

Adopted Levels, Gammas

Level Scheme

γ Decay (Uncertain)



$^{132}_{49}In_{83}$