

^{78}Cu β^- n decay (331.7 ms) 2005Va19,2012Ko29

Type	Author	Citation	History Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

Parent: ^{78}Cu : E=0.0; $J^\pi=(6^-)$; $T_{1/2}=331.7$ ms 20; $Q(\beta^-n)=5928$ 23; % β^-n decay=51 10

$^{78}\text{Cu}-J^\pi$: From hyperfine structure study using laser spectroscopy (2017De30). Also $J=(6)$ in 2011Ko36, laser spectroscopy measurement.

$^{78}\text{Cu}-T_{1/2}$: Weighted average of 330.7 ms 20 (2014Xu07), 338 ms 11 (2012Ko29), 335 ms 17 (2010Ho12), 335 ms 6 (2000KoZH), 342 ms 11 (1991Kr15). Others: 323 ms +11-19 (2005Ho08), 290 ms 103 (2005Va19).

$^{78}\text{Cu}-Q(\beta^-n)$: From mass excess for $^{78}\text{Cu}=-44790$ 23 (weighted average of -44472 17 and -44819 22 measured by 2017We16) and mass excess for $^{77}\text{Zn}=-58789.2$ 20 (2017Wa10). Other: 6220 500 (2017Wa10).

$^{78}\text{Cu}-\%\beta^-n$ decay: % $\beta^-n=51$ 10 for the decay of ^{78}Cu (weighted average of 65 8 (2009Wi03, same value in 2012Ko29); and 44.0 54 (2010Ho12). Others: ≥ 65 20 (2005Va19), >10 (2000KoZH).

2005Va19 (also thesis: 2002VaZX): ^{78}Cu produced by $^{238}\text{U}(n,F)$ and $^{238}\text{U}(p,F)$ at ISOLDE facility, measured $E\gamma$, $I\gamma$, $\gamma\gamma$, $\beta\gamma$, timing of $\beta\gamma$ and $\gamma\gamma$ coin spectra.

2012Ko29: secondary ^{78}Cu beam produced from a primary proton beam at E=54 MeV impinging on a ^{238}U target at the Holifield Radioactive Ion Beam Facility (HRIBF) at Oak Ridge National Laboratory (ORNL). The Cu isotopes were accelerated to about 3 MeV/nucleon in the tandem accelerator and transmitted to the measuring station through a microchannel plate (MCP) detector and mini ionization chamber (mini-IC). Measured $E\gamma$, $I\gamma$, half-life, % β^-n .

 ^{77}Zn Levels

E(level)	J^π [†]	$T_{1/2}$ [†]
0.0	$7/2^+$	2.08 s 5
114.9? 2	(9/2 ⁺)	
803.6? 3	(11/2 ⁺)	

[†] From the Adopted Levels.

 $\gamma(^{77}\text{Zn})$

E γ	I γ	E i (level)	J i^π	E f	J f^π	Mult. [†]	δ [‡]	α [‡]	Comments
114.9 2	100 16	114.9?	(9/2 ⁺)	0.0	$7/2^+$	[M1+E2]	0.10 3	0.046 2	$\alpha(K)=0.041$ 2; $\alpha(L)=0.0043$ 3; $\alpha(M)=0.00062$ 4; $\alpha(N)=2.38\times 10^{-5}$ 12
688.7 [#] 3	803.6?	(11/2 ⁺)	114.9? (9/2 ⁺)						Other $I\gamma=111$ 13 (2012Ko29).

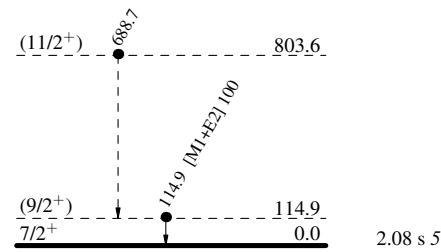
[†] From the Adopted Gammas.

[‡] 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.

Placement of transition in the level scheme is uncertain.

$^{78}\text{Cu} \beta^- \text{n decay (331.7 ms)}$ **2005Va19,2012Ko29**

Legend

Decay SchemeIntensities: Relative I_γ  $^{77}_{30}\text{Zn}_{47}$