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

History

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

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

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

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

^{78}Cu-%β^-n decay: %β^-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}U(n,F) and ^{238}U(p,F) at ISOLDE facility, measured Eγ, Iγ, $\gamma\gamma$, $\beta\gamma$, 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 Eγ, Iγ, 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.

γ(^{77}Zn)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J^π_i	E$_f$	J^π_f	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*	α(K)=0.041 *2*; α(L)=0.0043 *3*; α(M)=0.00062 *4*; α(N)=2.38×10^{-5} *12* Other Iγ=111 *13* (2012Ko29).
688.7[#] *3*		803.6?	(11/2$^+$)	114.9?	(9/2$^+$)				

[†] 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.

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Legend

- - - - - - ► γ Decay (Uncertain)
● Coincidence

Decay Scheme

Intensities: Relative I_γ