

⁶⁹Cu β⁻ decay 1985Ru05,1966Va12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 115, 1 (2014)	31-Jul-2013

Parent: ⁶⁹Cu: E=0.0; J^π=3/2⁻; T_{1/2}=2.85 min 15; Q(β⁻)=2681.4 17; %β⁻ decay=100.0

1985Ru05: ⁶⁹Cu produced by irradiation of W target with 11.5 MeV/nucleon ⁷⁶Se beam followed by on-line mass separation.

Measured E_γ, I_γ, T_{1/2}, βγ coincidences using 4π plastic β and Ge detectors.

1966Va12: ⁶⁹Cu produced by photonuclear reactions on enriched Zn Measured β-γ, γ-γ coincidence with NaI(Tl), Ge(Li) detector with 5.5 keV resolution at 1 MeV and < 10 % efficiency and a plastic scintillator (4π beta spectrometer).

⁶⁹Zn Levels

E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]
0.0	1/2 ⁻	1007.66 14	1/2 ⁻ , 3/2 ⁻	1429.55 15	1/2 ⁻ , 3/2 ⁻ , 5/2 ⁻	1828.01 17	3/2 ⁻
531.30 13	5/2 ⁻	1180.73 14	5/2 ⁻	1458.3 5	5/2 ⁻	1893.4 5	-
834.46 12	(3/2) ⁻	1251.67 19	1/2, 3/2	1633.2 6	5/2 ⁺	2032.8 3	5/2 ⁻

[†] From least squares fit to E_γ data.

[‡] From Adopted Levels.

β⁻ radiations

E(decay)	E(level)	Iβ ⁻ ^{†‡}	Log ft	Comments
(648.6 17)	2032.8	0.46 8	4.97 8	av Eβ=217.65 68
(788.0 18)	1893.4	0.066 15	6.12 11	av Eβ=273.57 73
(853.4 17)	1828.01	1.8 3	4.82 8	av Eβ=300.46 71
(1048.2 18)	1633.2	0.042 10	6.78 11	av Eβ=382.59 78
(1223.1 18)	1458.3	0.028 11	7.22 18	av Eβ=458.43 78
(1251.8 17)	1429.55	6.9 11	4.87 8	av Eβ=471.06 75
(1429.7 17)	1251.67	0.55 10	6.19 9	av Eβ=550.03 77
(1500.7 17)	1180.73	4.2 7	5.39 8	av Eβ=581.89 77
(1673.7 17)	1007.66	24 4	4.83 8	av Eβ=660.35 78
(1846.9 17)	834.46	8.8 15	5.44 8	av Eβ=739.77 79
(2150.1 17)	531.30	2.5 6	6.26 11	av Eβ=880.46 80
(2681.4 17)	0.0	51 8	5.35 8	av Eβ=1130.76 81

E(decay): Eβ=2.48 MeV 7 estimated by 1966Va12 from the gross β⁻ spectrum is an underestimate due to interference of ⁶⁸Cu and ⁶³Zn. See evaluated mass and Q(β⁻) value (2012Wa38).

[†] From intensity balance at each level.

[‡] Absolute intensity per 100 decays.

γ(⁶⁹Zn)

I_γ normalization: from g.s. branching of < 51% 4 determined by 1985Ru05 from the ratio of β⁻ coincident 1007 γ rays to the number of all β⁻ decays; where the < sign is used to allow for the fact that contributions from other isotopes to β⁻ singles spectrum are neglected. The evaluator has doubled the uncertainty in the g.s. branching and taken it to be 51% 8 to allow for this. β⁻ branching to the g.s. from the data of 1966Va12 is 79% 5.

$^{69}\text{Cu} \beta^-$ decay 1985Ru05,1966Va12 (continued) $\gamma(^{69}\text{Zn})$ (continued)

E_γ †	I_γ ‡#	$E_i(\text{level})$	J_i^π	E_f	J_f^π
^x 167.2 3	1.1 3				
173.4 2	11 1	1007.66	1/2 ⁻ ,3/2 ⁻	834.46	(3/2) ⁻
173.4 @ 2	<2	1180.73	5/2 ⁻	1007.66	1/2 ⁻ ,3/2 ⁻
178.2 3	1.5 3	1429.55	1/2 ⁻ ,3/2 ⁻ ,5/2 ⁻	1251.67	1/2,3/2
346.3 3	4 1	1180.73	5/2 ⁻	834.46	(3/2) ⁻
417.4 3	7 1	1251.67	1/2,3/2	834.46	(3/2) ⁻
421.8 3	6 1	1429.55	1/2 ⁻ ,3/2 ⁻ ,5/2 ⁻	1007.66	1/2 ⁻ ,3/2 ⁻
^x 434.0 3	4 1				
476.3 3	8 1	1007.66	1/2 ⁻ ,3/2 ⁻	531.30	5/2 ⁻
531.2 2	255 15	531.30	5/2 ⁻	0.0	1/2 ⁻
594.9 2	112 5	1429.55	1/2 ⁻ ,3/2 ⁻ ,5/2 ⁻	834.46	(3/2) ⁻
647.4 4	5 1	1828.01	3/2 ⁻	1180.73	5/2 ⁻
649.4 2	89 5	1180.73	5/2 ⁻	531.30	5/2 ⁻
820.7 5	4 2	1828.01	3/2 ⁻	1007.66	1/2 ⁻ ,3/2 ⁻
834.4 2	560 20	834.46	(3/2) ⁻	0.0	1/2 ⁻
851.8 4	6 1	2032.8	5/2 ⁻	1180.73	5/2 ⁻
898.2 3	28 2	1429.55	1/2 ⁻ ,3/2 ⁻ ,5/2 ⁻	531.30	5/2 ⁻
993.4 2	49 3	1828.01	3/2 ⁻	834.46	(3/2) ⁻
1007.5 2	1000 30	1007.66	1/2 ⁻ ,3/2 ⁻	0.0	1/2 ⁻
1180.7 2	98 3	1180.73	5/2 ⁻	0.0	1/2 ⁻
^x 1205 1	5 2				
1251.8 3	18 1	1251.67	1/2,3/2	0.0	1/2 ⁻
1296.6 3	10 1	1828.01	3/2 ⁻	531.30	5/2 ⁻
1361.9 5	2.0 3	1893.4	-	531.30	5/2 ⁻
1429.8 3	146 5	1429.55	1/2 ⁻ ,3/2 ⁻ ,5/2 ⁻	0.0	1/2 ⁻
1458.3 5	1.2 4	1458.3	5/2 ⁻	0.0	1/2 ⁻
1501.6 3	12 1	2032.8	5/2 ⁻	531.30	5/2 ⁻
^x 1594.2 5	4 1				
1633.2 6	1.8 3	1633.2	5/2 ⁺	0.0	1/2 ⁻
1828.6 5	11 1	1828.01	3/2 ⁻	0.0	1/2 ⁻
1894 1	0.8 3	1893.4	-	0.0	1/2 ⁻
2033 1	1.7 4	2032.8	5/2 ⁻	0.0	1/2 ⁻

† From 1985Ru05. Transitions with $E_\gamma = 84, 110, 2026, 2170,$ and 2400 reported by 1966Va12 were not seen by 1985Ru05 The evaluator has not included $E_\gamma = 3210$ from Table 6 (1985Ru05) as the energy is larger than $Q(\beta^-)$.

‡ Relative intensity (1985Ru05).

For absolute intensity per 100 decays, multiply by 0.0234 37.

@ Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

$^{69}\text{Cu} \beta^-$ decay 1985Ru05,1966Va12

Decay Scheme

Legend

Intensities: Relative I_γ

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - γ Decay (Uncertain)
- Coincidence

