

⁶⁸Cu IT decay (3.75 min) 2003Ho31

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 113, 1735 (2012)	1-Mar-2012

Parent: ⁶⁸Cu: E=721.26 8; J^π=6⁻; T_{1/2}=3.75 min 5; %IT decay=86 2

⁶⁸Cu-%IT decay: I_γ's indicate 114.8 20 IT decays and 17.7 13 3.75-min β⁻ decays per hundred 526γ's.

2003Ho31: ⁶⁸Zn(n,p), E(n)=14 MeV on 99.4% enriched ⁶⁸Zn target. Measured E_γ, I_γ, γγ, γγ(t) using two BaF₂ detectors and an n-type Ge detector.

1975Ti01: ⁶⁸Zn(n,p), E(n)=14.9 MeV. Measured E_γ, I_γ using Ge(Li) detector.

1972Sw01: ⁶⁸Zn(n,p), E(n)=14.7 MeV on natural and enriched targets followed by radiochemical separation. Measured E_γ, I_γ, Eβ, Iβ, γγ- and βγ-coincidences using a Ge(Li), NaI(Tl) and plastic detector.

1971Si19: ⁶⁸Zn(n,p), E(n)=14 MeV on natural and enriched targets followed by radiochemical separation. Measured E_γ, I_γ, Eβ, Iβ, T_{1/2}, γγ- and βγ-coincidences using a Ge(Li) detector, NaI(Tl) detectors (for γγ) and a NE102A plastic scintillator.

1969Wa22: ⁶⁸Zn(n,p), E(n)=14.7 MeV on natural and enriched targets followed by radiochemical separation. Measured E_γ, I_γ, Eβ, Iβ, T_{1/2}, γγ- and βγ-coincidences using a Ge(Li) detector, NaI(Tl) detectors (for γγ) and a plastic scintillator.

α: [Additional information 1](#).

⁶⁸Cu Levels

E(level) [†]	J ^π [‡]	T _{1/2}	Comments
0.0	1 ⁺	30.9 [‡] s 6	
84.11 6	2 ⁺	7.84 ns 8	T _{1/2} : from γγ(t) in 2003Ho31 . J ^π : M1 84γ to 1 ⁺ .
610.53 8	3 ⁺	<40 ps	T _{1/2} : from γγ(t) in 2003Ho31 . J ^π : E2 610γ to 1 ⁺ . 1975Ti01 and 1972Sw01 assign the level as 3 ⁻ and the 610γ as M2, however, this is excluded by RUL.
721.26 8	6 ⁻	3.75 min 5	T _{1/2} : from γ(t) in 1971Si19 . Others: 3.8 min I (1969Wa22), 3.8 min I (1974Ar22). %IT=86 2, %β ⁻ =14 2.

[†] From a least-squares fit to E_γ's by evaluator.

[‡] From the Adopted Levels.

γ(⁶⁸Cu)

I_γ normalization: From ΣTI(to g.s.)=I(526γ)+I(610γ)+I(637γ)=86 2.

E _γ [†]	I _γ ^{‡#}	E _i (level)	J _i ^π	E _f	J _f ^π	Mult.	α	Comments
84.12 6	109 4	84.11	2 ⁺	0.0	1 ⁺	M1	0.0856	α(K)=0.0765 11; α(L)=0.00795 12; α(M)=0.001117 16; α(N+..)=3.30×10 ⁻⁵ 5 I _γ : Others: 95 5 (1975Ti01), 96.4 58 (1972Sw01). 2003Ho31 suggest discrepancy is due to change in intensity of 80γ and 81γ in ¹³³ Ba source used for efficiency calibration. α(exp)=0.05 4. α(exp): deduced from intensity balance. Mult.: α(exp) allows E1 or M1. See comment on J ^π (84 level) in the Adopted Levels.
110.74 6	22.2 7	721.26	6 ⁻	610.53	3 ⁺	E3	3.69	α(K)=3.11 5; α(L)=0.504 8; α(M)=0.0694 10; α(N+..)=0.001172 17 α(exp)=3.53 15. α(exp): deduced from intensity balance.

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⁶⁸Cu IT decay (3.75 min) 2003Ho31 (continued)

γ(⁶⁸Cu) (continued)

<u>E_γ[†]</u>	<u>I_γ^{‡#}</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>α</u>	<u>Comments</u>
526.44 6	100	610.53	3 ⁺	84.11	2 ⁺			Mult.: α(exp) allows E3 or M3; placement in the decay scheme requires Δπ=yes.
610.3 3	0.5 2	610.53	3 ⁺	0.0	1 ⁺	E2	0.000991 14	α=0.000991 14; α(K)=0.000889 13; α(L)=8.92×10 ⁻⁵ 13; α(M)=1.252×10 ⁻⁵ 18; α(N+..)=3.74×10 ⁻⁷ 15; I _γ : Others: 1.7 5 (1975Ti01), 1.4 4 (1972Sw01). Discrepancy could be due to coincidence summing effects.
637.14 6	14.3 4	721.26	6 ⁻	84.11	2 ⁺	M4	0.01077	Mult.: from the Adopted Gammas. α(K)=0.00958 14; α(L)=0.001041 15; α(M)=0.0001468 21; α(N+..)=4.26×10 ⁻⁶ 6 Mult.: from the Adopted Gammas.

[†] From 2003Ho31.

[‡] From 2003Ho31 relative to I(526γ)=100. I_γ's are in general in good agreement with prior measurements, except where noted.

[#] For absolute intensity per 100 decays, multiply by 0.748 18.

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Decay Scheme

Intensities: I_(γ+ce) per 100 parent decays
%IT=86 2

Legend

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}

