^{58}Zn ε decay (86 ms) 2005Ka46,1998Jo18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Caroline D. Nesaraja, Scott D. Geraedts and Balraj Singh	NDS 111, 897 (2010)	12-Jan-2010

Parent: ^{58}Zn: E=0.0; $J^{\pi}=0^+$; $T_{1/2}$=86 ms *8*; Q(ε)=9364 *50*; %ε+%$β^+$ decay=100.0

^{58}Zn-$T_{1/2}$: Weighted average of 90 ms *8* (2009Fu15), 83 ms *10* (2005Ka46), 83 ms *10* (2002Lo13), 86 ms *18* (1998Jo18). Methods: γ decay timing (2009Fu15), β-gated timing (1998Jo18), β(fragment) timing correlations (2002Lo13). Method not discussed in 2005Ka46.

^{58}Zn-%ε+%$β^+$ decay: %$β^+$p<3 (1998Jo18).

2005Ka46, 2000Oi04: ^{58}Zn produced and identified in Nb(p,X) E=1.4 GeV at ISOLDE at CERN using selective laser-ion source. Measured Eγ, Iγ, βγ coin, isotopic half-life. No delayed protons were observed from ^{58}Zn isotope. 2005Ka46 is a brief conference report and the authors state that analysis of β decay and experiment to detect protons from the decay of ^{58}Zn are in progress.

1998Jo18: mass-separated source of ^{58}Zn produced by Nb(p,X) at E(p)=1 GeV. Measured Eγ, Iγ, $β^+$p delayed protons. ISOLDE-CERN facility.

Additional information 1.

Except for the strong population of 203, 0^+ (isobar state), the other features of the decay scheme are poorly known.

^{58}Cu Levels

E(level)	J^{π} †	Comments
0.0	1^+	T=0 B(GT)≤0.31 (1998Jo18), <0.5 (quoted by 2005Ka46 as 'to be published').
203	0^+	T=1
1051	1^+	T=0 B(GT)=0.54 *26* (1998Jo18), 0.37 *10* (quoted by 2005Ka46 from their results to be published).

† From 'Adopted Levels'.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(8.31×10^3 *5*)	1051	10 *2*	0.016 *3*	4.1 *1*	10 *2*	av Eβ=3437 *25*; εK=0.00139 *3*; εL=0.000152 *4*; εM+=2.65×10^{-5} *6* I(ε+$β^+$): average of 8 *2* (2005Ka46) and 12 *6* (1998Jo18); possibly deduced from I(γ+ce)(203 level) and Iγ(848)/Iγ(203)=0.14 *6*.
(9.16×10^3 *5*)	203	72 *10*	0.082 *11*	3.486	72 *10*	av Eβ=3855 *25*; εK=0.001007 *19*; εL=0.0001096 *2*; εM+=1.91×10^{-5} *4* I(ε+$β^+$): evaluators' estimate from log *ft*=3.486 *4* (unweighted average of 13 best *ft* values of 0^+ to 0^+ superallowed β transitions as surveyed in 2009Ha12), $T_{1/2}$ and Q(ε). This value is essentially the same as (72 *7*) in 2005Ka46. Other: 74 *16* (1998Jo18) using log *ft*=3.48, $T_{1/2}$=86 ms *18*, Q(ε)=9370 *50*. Log *ft*: from analysis and survey of superallowed transitions for 13 best cases (2009Ha12).
(9.36×10^3‡ *5*)	0.0	18 *10*	0.019 *11*	4.1 *3*	18 *10*	av Eβ=3955 *25*; εK=0.000936 *17*; εL=0.0001019 *1*; εM+=1.78×10^{-5} *4* I(ε+$β^+$): deduced by the evaluators (100-feeding to 203 and 1051 states). others: ≤20 (2005Ka46), 14 *17* (1998Jo18). This feeding is uncertain since the feeding to higher levels is unknown.

Continued on next page (footnotes at end of table)

^{58}Zn ε decay (86 ms) 2005Ka46,1998Jo18 (continued)

ε,β+ radiations (continued)

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{58}Cu)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
203	100	203	0^+	0.0	1^+	
848	12 *2*	1051	1^+	203	0^+	I_γ: assigned by the evaluators from β feeding.

† For absolute intensity per 100 decays, multiply by ≈0.8.

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Decay Scheme

Intensities: Relative I_γ