

⁶³Ni - Comments on the Evaluation of Decay Data by K. B. Lee

1. Decay Scheme

⁶³Ni disintegrates by β^- emission (100%) to the ground state of the stable nuclide ⁶³Cu.

2. Nuclear Data

The Q value (66.980 (15) keV) is from the measured value of Holzschuh (1999Ho09). This value is in agreement with 66.975 (15) keV from the atomic mass table of Audi et al. (2003Au03).

The measured ⁶³Ni half-life values are given below.

Reference	Values (years)	Comments
Brosi (1951Br)	85 (20)	Omitted from analysis
Wilson (1950Wi)	61	Omitted from analysis
McMullen (1956Mc)	125 (6)	Omitted from analysis
Horrocks (1962Ho)	93.9 (20)	Revised by Collé (1996Co25)
Barnes (1971Ba89)	101.21 (20)	Revised by Collé (1996Co25)
Collé (1996Co25)	101.06 (197)	

The first three older and less precise historical values were omitted from the analysis. The Horrocks (1962Ho) and Barnes (1971Ba89) values were revised by Collé (1996Co25) using more accurate nuclear data and thereby more rigorously calculated liquid scintillator detection efficiencies. The weighted average for the last three values is 98.7 years; with an internal uncertainty of 1.1 years; an external uncertainty of 2.4 years and a reduced- χ^2 of 4.38.

The evaluator's recommended value is the weighted average : 98.7 (24) years.

2.1 β^- Transitions

The evaluator has calculated (using the LOGFT program) a *log ft* of 6.7 for this allowed transition.

The various measured β^- end-point energy values (or Q-values) are summarized below.

Reference	Values (keV)	comments
Preiss (1957Pr)	67.0 (5)	Omitted
Hsue (1966Hs01)	65.87 (15)	Omitted
Hetherington (1987He14)	66.946 (20)	Omitted
Kawakami (1992Ka29)	66.9451 (39)	Omitted
Ohshima (1993Oh2)	66.9459 (54)	Omitted
Ohshima (1993Oh2)	66.9433 (126)	Omitted
Holzschuh (1999Ho09)	66.980 (15)	Adopted value

Uncertainties given in 1993Oh2 include systematic values combined in quadrature with statistical uncertainties.

Holzschuh et al. (1990Ho09) pointed out that in the previous measurements of end-point energies the excitation of atomic electrons was not taken into account. That means that all the other values are biased by an amount of the order of the mean electron excitation energy (85 eV). Therefore the evaluator has recommended the value given in 1990Ho09. Besides, a second end-point energy given in 1993Oh2 was obtained under the assumption of the existence of a 17 keV neutrino.

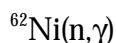
3. Atomic Data

The fluorescence yield is from the compilation of 1996Sc33.

4. Radiations

The mean energy of beta particles has been computed as 17.434 (4) keV using the LOGFT program.

4. Main Production Modes



6. References

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