
Contribution ID : **10** Type : **not specified**

# High Precision Q_EC Value Measurements of Superallowed beta decays

*Monday, 21 February 2011 17:30 (40)*

Precise measurements of beta decays between isobaric analog states of nuclear spin-parity 0+ and isospin T=1 provide important data for testing the electroweak interaction. These so-called superallowed beta decays provide the most precise value of V_ud, the up-down element of the Cabibbo-Kobayashi-Maskawa (CKM) quark-mixing matrix. The most stringent test of the CKM matrix is the top-row unitarity test, where V_ud contributes the most. Currently there are 13 superallowed transitions ranging from 10C to 74Rb that are determined accurately enough to contribute to the world average.

The three experimental quantities that are required to extract V_ud from a superallowed decay are the branching ratio (BR) of the superallowed 0+ to 0+ transition, the half-life (T_1/2) of the parent state and the decay energy (Q_EC). Additionally, a few theoretical correction terms are needed.

The JYFLTRAP Penning-trap setup at the University of Jyväskylä, Finland, has contributed to these studies mainly with high-precision Q-values. Since 2006, Q values of 15 different superallowed transitions, ranging from 10C to 62Ga, have been determined with high precision. Since JYFLTRAP is coupled to the IGISOL mass separator, any element is available. Simultaneus production enabled us to determine a Q_EC value by measuring the frequency ratio of the parent and daughter ions directly. Using this so-called doublet technique and utilizing state-of-the art methods, such as ion-motion excitation with time-separated oscillatory fields, we have reached precisions down to the 50-eV level.

In this contribution, the results and impact of the Q-value measurement program at JYFLTRAP will be presented.

## Summary

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**Session Classification :** Monday February 21st, 2011. 17:30 - 19:00