



Contribution ID: 1

Type: **Invited**

High-precision beta-decay studies to test the weak-interaction standard model

Wednesday, 2 December 2015 16:40 (30 minutes)

Nuclear beta decay transforms up quarks in down quarks and vice versa. Therefore, high-precision measurements of beta decay allows under certain conditions to test the standard model of weak interaction. In particular, the conserved vector current (CVC) hypothesis can be tested and the V_{ud} element of the CKM quark mixing matrix can be determined. For this purpose, high-precision data for $0^+ \rightarrow 0^+$ and mirror beta decays on the half-life, the branching ratios and the beta-decay Q value are required. These allow to determine the f_t values for each decay which, corrected for electromagnetic and strong interaction contributions, yield universal F_t values independent of the particular transition. These F_t values are used to test CVC and the average $\langle F_t \rangle$ value allows to determine the weak vector coupling constant and the V_{ud} matrix element.

After an introduction, the present status of these measurements is laid out and current experiments, in particular for new isotopes not yet included in the systematic will be described. For this purpose we will in particular present the efficiency calibration of a HP germanium detector which will serve to determine the branching ratios in beta decay. Finally, an outlook will close the presentation.

Primary author: BLANK, Bertram (CEN Bordeaux-Gradignan)

Presenter: BLANK, Bertram (CEN Bordeaux-Gradignan)

Session Classification: Fundamental Interactions & Beta Decay