Contribution ID: **54** Type: **oral with financial aid**

Limits on tensor-type weak currents obtained with beta-asymmetry measurements in nuclear decays.

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Precision beta decay experiments are a powerful tool to probe the structure of the weak interaction at low energies 1). For example, the beta-asymmetry parameter A for pure Gamov-Teller nuclear decays is sensitive to a possible tensor component in the weak interaction if determined at the 1 % precision level. Here we will present two measurements of this parameter. Our results are competitive with the best results available in literature and contain information on tensor type charged weak currents.
The low temperature nuclear orientation technique is used to create a polarized ensemble of radioactive nuclei by cooling them down to a few millikelvin in a strong magnetic field that is created either by hyperfine interactions or by an external magnet. The beta-particles are observed by semiconductor detectors operating at a temperature of about 10 K and facing directly to the sample. In previous measurements the accuracy of such an experiment was usually limited to several percent by the scattering of beta particles and the deflection of their trajectories by the magnetic field. We have developed a method based on GEANT4 Monte-Carlo simulations to gain control over these effects. The code was extensively tested by comparing simulations to experimental data taken under various well-controlled experimental conditions 2).
First results were obtained with the isotopes 114In and 60Co with a precision at the 1,5 % level; which is better then the current literature values 3). An extensive study of the recoil corrections on the Standard Model prediction value was done to interpret our results in terms of exotic currents.
The method is further being improved to push the precision and new data is under analysis. Our goal is to reach the 1% level or better, which would improve the sensitivity to tensor type weak currents by a factor of 2 to 3 compared to previous experiments in beta decay.

1) N. Severijns, M. Beck, and O. Naviliat-Cuncic, Rev.Mod. Phys. 78, 991 (2006).
2) F. Wauters et al,. Nucl. Instrum. Methods A 609, 156 (2009).
3) F. Wauters et al,. Phys. Rev. C 80, 062501 (2009).

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