Contribution ID: **96** Type: **Oral**

First results on 35Ar obtained at WITCH

Thursday, 24 May 2012 14:30 (20 minutes)

Low energy precision experiments for the search of exotic components in the weak interaction are complementary to the high energy experiments at the colliders dedicated to discover new particles. In the case of the WITCH experiment the beta neutrino angular correlation coefficient (a) in nuclear beta decay is studied. A deviation from the distribution predicted by the standard model will reveal the exotic interactions. Experimentally WITCH combines a Penning trap arrangement to provide a scattering free source of beta-decaying nuclides with a MAC-E filter setup to analyze the recoil energy distribution.
In the online experiments of last year it was finally possible to acquire the first sets of data, meaning recoil spectra with 35Ar ions [1]. The first measurement resulted in a recoil spectrum with about 5000 events recorded. This first spectrum has been analyzed with the help of simulation programs developed in the collaboration and under consideration of the charge state distribution of the daughter nuclei, which has been determined at LPCtrap/GANIL. The result is a value of a = 1.12(33) which is compatible with the literature value for 35Ar [1].
During the second online experiment in 2011 several more recoil spectra could be acquired, which were obtained using various spectrometer voltage sequences. These data are currently under analysis. A first estimation points for a statistical uncertainty on the value of a in the order of 2%. This will allow the investigation of systematic effects in the data as studied before by numerical simulations [2, 3].
[1] S. van Gorp et al., in preparation
[2] M.Tandecki, PhD thesis, University of Leuven, 2011.
[3] P. Friedag, Diploma thesis, University of Münster, 2008.

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Session Classification: Fundamental Interactions

Track Classification: Fundamental interactions