Contribution ID: **41** Type: **Oral**

Measurement of the beta-neutrino angular correlation in the decay of trapped $^6He^+$ ions

Wednesday, 13 October 2010 18:00 (20 minutes)

Within the frame of the Standard Model, the weak interaction is mediated by the W+, W-, and Z0 bosons, which can only involve vector and axial vector interactions. The precise measurement of the beta-neutrino angular correlation, $a_{\beta\nu}$, in nuclear beta decay is a direct and sensitive tool to search for other Lorentz invariant contributions, such as Tensor and Scalar couplings. Considering the pure Gamow-Teller transitions, the most precise measurement achieved so far [1] has given rise to a relative uncertainty of 1% on $a_{\beta\nu}$, limiting a possible Tensor contribution at the level of 10%. In that experiment, the $a_{\beta\nu}$ coefficient was inferred from the integrated recoil energy spectrum of the ^{6}He decay. The LPCTrap experiment [2] has been designed to perform a new measurement in ^{6}He with a better control of the potential sources of systematic errors and a higher precision on $a_{\beta\nu}$. In this second generation setup, the decaying $^6He^+$ ions are trapped nearly at rest in vacuum, and the beta particle is detected in coincidence with the recoiling daughter nucleus. The analysis of the first data taking period at GANIL has provided a new value of $a_{\beta\nu}$ with a total relative uncertainty of 3%. In a more recent experiment, which is currently under analysis, the statistics has been improved by nearly two orders of magnitude, and thus, a better constraint on the Tensor contribution is expected.
[1] C.H. Johnson, F. Pleasonton, and T.A. Carlson, Phys. Rev. 132 (1963) 1149.
[2] X. Fléchard et al., Phys. Rev. Lett. 101 (2008) 212504.

Primary author: Dr FLECHARD, Xavier (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France)

Co-authors: Dr MÉRY, Alain (CIMAP, CEA/CNRS/ENSICAEN, Université de Caen, Caen, France); Dr RODRIGUEZ, Daniel (Departamento de Fisica Atomica, Molecular y Nuclear, Universitad de Granada, 18071, Granada, Spain); Dr DURAND, Dominique (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); Dr LIÉNARD, Etienne (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); Prof. MAUGER, François (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); Prof. BAN, Gilles (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); Dr THOMAS, Jean-Charles (GANIL, CEA/DSM-CNRS/IN2P3, Caen, France); Prof. NAVILIAT-CUNCIC, Oscar (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France); Mr VELTEN, Philippe (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France)

Presenter: Dr FLECHARD, Xavier (LPC Caen, ENSICAEN, Université de Caen, CNRS/IN2P3, Caen, France)

Session Classification: Session We - 4

Track Classification: Low energy precision tests of the Standard Model