



Contribution ID: 132

Type: **Poster Session**

WISArD experiment: the precision frontier of BSM

Tuesday, 4 October 2022 21:44 (8 minutes)

In the standard electroweak model, the weak current with a Vector –Axial-vector (V-A) form explains the weak interaction in a phenomenological context. However, the Lee-Yang Hamiltonian conserving Lorentz symmetry allows right-handed (V+A) as well as scalar, and tensor currents. For decades there have been efforts searching for such exotic currents as a test of the standard model. In particular, beta decay has been a powerful tool since the exotic currents are related to its kinematics [Ja57]. Furthermore, its precision is comparable with high energy physics experiments [Go19].

The WISArD experiment, succeeding the WITCH experiment, has carried out the weak interaction studies at the ISOLDE facility. We employ the beta-delayed proton emission of ^{32}Ar to search for a scalar current in beta-neutrino correlations. The extent of the proton kinetic energy shift provides information indirectly on the kinematics of beta-decay recoil nuclei, which is different between scalar- and vector-type interactions.

In the WISArD setup, the 30-keV $^{32}\text{Ar}^+$ ions are implanted in the catcher foil at the center. The positrons emitted upwards are guided by the field of a superconducting magnet and detected by a scintillator. Silicon detectors surrounding the catcher foil measure the kinematic shift of the beta-delayed protons. A proof-of-principle campaign was executed in 2018 [Ar20] and reached the 3rd best value for the angular correlation coefficients of vector decays. After upgrading the apparatuses, the first part of a new experiment was done in October 2021. We present details of the experimental devices and recent technical development for the setup.

References

- [Ja57] J. D. Jackson, S. B. Treiman, and H. W. Wyld, Phys. Rev. 106, 517 (1957).
 [Go19] M. González-Alonso et al, Prog. Part. Nucl. Phys. 104, 165 (2019).
 [Ar20] V. Araujo-Escalona et al., Phys. Rev. C 101, 055501 (2020).

Primary authors: HA, Jeongsu (Instituut voor Kern- en Stralingsfysica, KU Leuven); Dr ALFAURT, Philippe (CENBG, Bordeaux); Dr ASCHER, Pauline (CENBG, Bordeaux); Dr ATANASOV, Dinko (CENBG, Bordeaux); Dr BLANK, Bertram (CENBG, Bordeaux); Ms CRESTO, Federica (LPC Caen); Dr DAUDIN, Laurent (CENBG, Bordeaux); Dr FLECHARD, Xavier (LPC Caen); Dr LETERRIER, Laurent (LPC Caen); Dr LICA, Razvan (CERN); Dr LIENARD, Etienne (LPC Caen); Dr GARCIA, Alejandro (University of Washington); Dr GERBAUX, Mathias (CENBG, Bordeaux); Dr GIOVINAZZO, Jerome (CENBG, Bordeaux); Dr GREVY, Stephane (CENBG, Bordeaux); Dr MELCONIAN, Dan (Texas A&M University); Mr NASSER, Morgan (Texas A&M University); Dr POMORSKI, Marcin (CENBG, Bordeaux); Dr ROCHE, Mathieu (CENBG, Bordeaux); Dr SEVERIJNS, Nathal (Instituut voor Kern- en Stralingsfysica, KU Leuven); Mr VANLANGENDONCK, Simon (Instituut voor Kern- en Stralingsfysica, KU Leuven); Dr ZAKOUCKY, Dalibor (Nuclear Physics Institute of the Czech Academy of Sciences)

Presenter: HA, Jeongsu (Instituut voor Kern- en Stralingsfysica, KU Leuven)

Session Classification: Poster Session