

Contribution ID: 285

Type: Oral

BRAND -search for exotic couplings in weak interactions using the transverse electron polarization in the decay of free neutrons

Wednesday, 19 October 2022 17:50 (20 minutes)

Neutron and nuclear beta decay correlation coefficients are sensitive to the exotic scalar and tensor interactions that are not included in the Standard Model (SM). The experiment BRAND will measure simultaneously seven neutron correlation coefficients: H, L, N, R, S, U and V that depend on the transverse electron polarization –a quantity which vanishes in the SM. Five of these correlations: H, L, S, U and V were never attempted experimentally before. The expected impact of this experiment is comparable to that of frequently measured "traditional" correlation coefficients (a, b, A, B, D) but offers completely different systematics and additional sensitivity to imaginary parts of the scalar and tensor couplings. In order to demonstrate the feasibility of the challenging techniques such as the event-by-event decay kinematics reconstruction together with the electron polarimetry a test program is ongoing on the PF1B beam line at the Laue-Langevin Institute, Grenoble, France (ILL), with simplified experimental setups. The strategy of the project assumes gradual increase of sensitivity by extending the fiducial volume and angular coverage of detectors.

In the contribution, the current status of R&D and demonstration experiments will be presented.

Primary author: BODEK, Kazimierz (Jagiellonian University, Institute of Physics)

Co-authors: Dr KOZELA, Adam (H. Niewodniczanski Institute of Nuclear Pgysics, Polish Academy of Sciences); Prof. YOUNG, Alerbert R. (North Caroline Sate University, Releigh, USA); Mr WLOCH, Boguslaw (H. Niewodniczanski Institute of Nuclear Pgysics, Polish Academy of Sciences); Dr ROZPEDZIK, Dagmara (Jagiellonian University, Institute of Physics); Prof. RIES, Dieter (J. Gutenberg University, Mainz, Germany); Mr GUPTA, Ghnashyam (Jagiellonian University, Institute of Physics); Dr ZEJMA, Jacek (Jagiellonian University, Institute of Physics); Dr CHOI, Jinj Ha (North Caroline Sate University, Releigh, USA); Ms DHANMEHER, Karishma (H. Niewodniczanski Institute of Nuclear Pgysics, Polish Academy of Sciences); Dr PYSZ, Krzysztof (H. Niewodniczanski Institute of Nuclear Pgysics, Polish Academy of Sciences); Mr DE KEUKELEERE, Lennert (Catholic University Leuven, Belgium); Mr ENGLER, Martin (J. Gutenberg University, Mainz, Germany); Prof. SEVERIJNS, Nathal (Catholic University Leuven, Belgium); Mr YAZDANDOOST KHOSRAVI, Noah G. (J. Gutenberg University, Mainz, Germany); Dr SOLDNER, Torsten (Institut Laue Langevin, Grenoble, France)

Presenter: BODEK, Kazimierz (Jagiellonian University, Institute of Physics)

Session Classification: Session