

Multi-Wire 3D Gas Tracker for Searching New Physics in Nuclear Beta Decay

Thursday, 31 May 2018 18:10 (20 minutes)

Searches of new physics beyond the Standard Model (SM) performed at low energy frontiers are complementary to experiments carried out at high energy colliders. Often used methods for testing the SM and beyond at low energies are precision spectrum shape and correlation coefficient measurements in nuclear and neutron beta decay.

In order to study tiny effects in beta spectrum shape, a special spectrometer was built. It consists of a 3D low pressure gas tracker (drift chamber with hexagonal cells, signal readout at both wire ends) and plastic scintillators for triggering a data acquisition and registration of the beta particle energy [1]. The results of the characterization process indicate the possibility of using such a gas tracker in a range of experiments with low energy electrons where beta particle tracking with minimal kinematics deterioration is beneficial. Application of this technique is also planned for a neutron decay correlation experiment [2]. In the presentation, the first application of this tracker in a high-precision beta spectrum shape study will be discussed. It is devoted to the determination of the weak magnetism term in nuclear beta decay [3,4].

[1] K. Lojek, D.Rozpedzik, K. Bodek, M. Perkowski, N. Severijns, NIM A 802 (2015) 38

[2] K. Bodek, Acta Phys. Pol. B, 47 (2016) 349

[3] N. Severijns, J. Phys. G: Nucl. Part. Phys. 41 (2014) 114006

[4] L. Hayen, N. Severijns, K. Bodek, D. Rozpedzik, X. Mougeot, Rev. Mod. Phys. 90 (2018) 015008

E-mail

dagmara.rozpedzik@uj.edu.pl

Primary author: Dr ROZPEDZIK, Dagmara (Jagiellonian University)

Co-authors: KOZELA, Adam (INP PAS); BODEK, Kazimierz (Jagiellonian University); LOJEK, Konrad (Jagiellonian University); HAYEN, Leendert (KU Leuven); DE KEUKELEERE, Lennert (KU Leuven); PERKOWSKI, Maciej (Jagiellonian University); SEVERIJNS, Nathal (KU Leuven)

Presenter: Dr ROZPEDZIK, Dagmara (Jagiellonian University)

Session Classification: Nuclear Forces and Structure, NN Correlations, and Medium Effects

Track Classification: NFS