



Contribution ID : 132

Type : **Poster**

Estimation of the influence of the electric field nonuniformity on the error of reconstructed coordinates of events in the ReD TPC

Tuesday, 29 November 2022 17:10 (120)

One of the most actual questions of particle physics and cosmology today is the nature of Dark Matter. Experiments on the direct search for dark matter particles are aimed to direct detection of Weakly Interaction Massive Particles (WIMP) or obtaining constraints on their space of mass parameters and spin-independent interaction cross sections.

For WIMPs (from a few GeV/c^2 to TeV/c^2) searches, the best results are shown by the noble liquid time projection chambers (TPCs). The signal in the LAr TPC is observed both from excitation, which results in a direct scintillation, and from ionization of argon. Electrons that have not recombined after ionization are drifted in the applied electric field towards the liquid surface, and after extracted into the gas phase. In the so-called gas pocket, electrons, further accelerated by a stronger electric field, excite the gas atoms and produce a secondary scintillation via electroluminescence. Interaction parameters and coordinates of the events inside TPC are reconstructed using both primary scintillation in liquid argon and electroluminescence scintillation in the gas pocket.

In this study simulations of electron drift and electron cloud diffusion were performed for the TPC of the ReD experiment, which aimed at nuclear recoil studies in a neutron beam at the INFN Laboratori Nazionali del Sud in Catania. The results of the evaluation of the influence of the electric field nonuniformity on the charge accumulation on the detector chamber walls and the error of the reconstructed coordinates of events are presented in the talk.

Primary author(s) : DOLGANOV, Grigory (NRC «Kurchatov Institute»)

Co-author(s) : FOR THE RED WORKING GROUP OF THE GLOBAL ARGON DARK MATTER COLLABORATION

Presenter(s) : DOLGANOV, Grigory (NRC «Kurchatov Institute»)

Session Classification : Poster Session

Track Classification : Facilities and advanced detector technologies