Contribution ID: **103** Type: **not specified**

Innovative devices for amplification of ionisation charge in liquid Argon Time Projection Chamber detectors

The groundbreaking idea we are proposing is the development of innovative devices to multiply and collect electron charge generated by ionising particles passing through liquid Argon (LAr) medium.

The primary motivation is to make single-phase Liquid Argon Time Projection Chamber detectors (LAr-TPCs) sensitive to events with energy deposition of the order of 10 keV or less, 100 times smaller than present state of the art. The concept is to seek the multiplication of ionisation electrons directly in LAr at the end of their drift path by dimensioning and realising a Micro Strip anodic plane capable of generating an electric field locally large enough (˜ 1 MV/cm) to trigger the proportional multiplication of charge carriers. The feasibility of the project is supported by the positive results of pioneering attempts to multiply charge in LAr in proximity of micrometric wires, yet too fragile to be exploited in TPC detectors.

The impact on Particle Physics of low energy rare events is potentially dramatic, mainly in searches for Dark Matter interactions and coherent neutrino scattering characterised by O(100 keV) experimental signature and a O(10E-40 cmˆ2) cross section. Beyond fundamental Physics researches, achievements of the project will have immediate and interdisciplinary applications in Gamma-ray telescopes for measuring polarization of Gamma-rays and in high resolution Compton spectrometers for medical imaging or identification of explosive devices.

Summary

LIQUID ARGON;
ELECTRON MULTIPLICATION;
MICROPATTERN DETECTORS;
LOW ENERGY RARE EVENTS PHYSICS;
DARK MATTER;
COHERENT NEUTRINO SCATTERING;
MEDICAL IMAGING;
GAMMA RAY TELESCOPES.

Author: FAVA, Angela (Fermi National Accelerator Lab. (US))

Presenter: FAVA, Angela (Fermi National Accelerator Lab. (US))