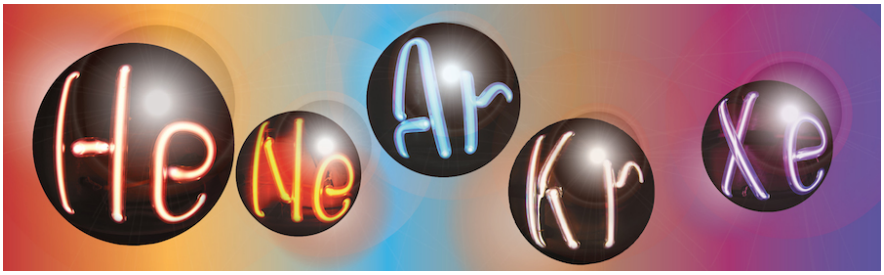

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Electric-Field Dependence of Liquid Argon Scintillation in ProtoDUNE

The Deep Underground Neutrino Experiment (DUNE) is a next-generation neutrino experiment designed to perform high-precision measurements of neutrino oscillation parameters, investigate leptonic CP violation, determine the neutrino mass ordering, detect neutrinos from core-collapse supernovae, and search for physics beyond the Standard Model. Its far detector modules will be based on liquid argon time projection chambers (LArTPCs), which detect both the ionization charge and the scintillation light produced by charged particles in liquid argon. The Photon Detection System (PDS) is a key component of this detection strategy. It collects scintillation light and provides precise event timing, enabling drift-coordinate reconstruction, contributing to triggering and background rejection, improving calorimetric energy reconstruction, and playing a crucial role in the detection of supernova neutrino signals. Two LArTPC technologies are currently being developed for DUNE: the horizontal-drift and vertical-drift designs, tested at CERN through the ProtoDUNE-HD and ProtoDUNE-VD prototypes. These prototypes provide a unique opportunity to study the response of liquid argon scintillation under different electric-field conditions. In this work, scintillation observables, including the light yield, are measured as a function of the electric field, varied from 0 to 0.5 kV/cm, using a selected sample of cosmic-muon events.

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