

Development of Ionization Laser Calibration System for DUNE

The Deep Underground Neutrino Experiment (DUNE) is a forthcoming neutrino oscillation experiment that will be the largest of its kind. Utilizing liquid argon time projection chamber (LArTPC) technology, DUNE's far detector will consist of four 17 kiloton modules and be located approximately 1,500 meters underground at Sanford Underground Research Facility (SURF). Due to its large size, improved calibration techniques are required to ensure accurate particle trajectory reconstruction. Small defects in anode-cathode alignment, electric field distortions, and wire response uniformity can negatively affect reconstruction. As DUNE is still under construction, prototype technologies for DUNE are developed and tested at ProtoDUNE, a 700 ton LArTPC located at CERN in Switzerland. At Los Alamos National Laboratory (LANL), prototype ionization laser systems are being developed for implementation in the second run cycle of ProtoDUNE. The ionization laser system (IoLaser) will allow for detector calibration by generating tracks with a known direction and energy throughout the detector volume. In this poster, I will discuss calibration challenges for DUNE and present an overview of the IoLaser system, including progress on current prototyping efforts for deployment in ProtoDUNE.

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