

Measuring the proton-argon cross-section at ProtoDUNE-SP

The Deep Underground Neutrino Experiment (DUNE) is a next generation long-baseline neutrino experiment hosted by the Fermilab. DUNE will be able to unambiguously determine the neutrino mass hierarchy and measure the value of the CP-violating phase. The single-phase liquid argon far-detector prototype (ProtoDUNE-SP) at the CERN neutrino platform serves as a prototype to validate the technology for the 10-kton fiducial mass liquid argon detectors for the DUNE experiment.

The primary physics goal of ProtoDUNE-SP is to measure the hadron-argon cross-sections to unprecedented precision. ProtoDUNE-SP was exposed to a variety of test-beam particles (protons, pions, kaons, muons, and electrons) in a broad range of momenta (from 0.3 - 7 GeV/c). ProtoDUNE-SP has successfully collected over 4 million high-quality beam events. This provides rich data to study the hadron-argon interactions in a liquid argon detector. In this talk, I will present our progress on the proton-argon cross-section measurement, including the selection of beam protons, energy calibration, and the preliminary result of the proton-argon cross-section.

Working group

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