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

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Recent neutrino oscillation experiments have ushered in a new era with precisionmeasurements employed in the search for CP violation and mass hierarchy. The Deep UndergroundNeutrino Experiment (DUNE) is a next generation long-baseline neutrino experiment hosted by the U.S. Department of Energy's Fermilab. The single-phase liquid argon far-detector prototype (ProtoDUNE-SP) at the CERN neutrino platform is a critical milestone for the DUNE experiment. It 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 at unprecedented precision. ProtoDUNE-SP was exposed to a varietyof test-beam particles (protons, pions, kaons, muons, and electrons) in a broad range of momenta, from 0.3 - 7 GeV/c. This provides rich data to study the hadron-argon interactions in a liquid argondetector. In this talk, I will present our progress on the proton-argon cross-section measurement, including the selection of beam protons, space charge calibration, calorimetric reconstruction, and the latest update of the analysis.

Collaboration name

DUNE

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