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Measuring the proton-argon cross section at ProtoDUNE-SP

Recent neutrino oscillation experiments have ushered in a new era with precision measurements employed in the search for CP violation and mass hierarchy. The Deep Underground Neutrino Experiment (DUNE) is a next generation long-baseline neutrino experiment in USA. The single-phase liquid argon far-detector prototype at CERN (ProtoDUNE-SP) is a critical milestone for the DUNE experiment. ProtoDUNE-SP utilizes the CERN H4 beam line with known particle type (hadrons and electrons) and incident energy. This provides a controlled environment for better understanding of the interactions taking place within a LArTPC detector. Protons are one of the final state particles in neutrino charged current interactions and hence they play an essential role in reconstructing the neutrino total energy in the interactions. I will present our progress on the proton-argon cross section, including the selection of beam protons, space charge calibration, calorimetric reconstruction, and calculation of cross section.

Mini-abstract

The proton-argon cross-section measurement with the ProtoDUNE-SP experiment.

Experiment/Collaboration

DUNE

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