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Pion candidate selection from a 2 GeV/c momentum test beam sample with the ProtoDUNE Liquid Argon detector

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DUNE is a long-baseline neutrino experiment that will use the new LBNF (Long-Baseline Neutrino Facility) neutrino beam sampled at the Near Detector complex (DUNE ND), 574 m downstream of the production target, and at the Far Detector complex, 1300 km away at the SURF laboratory at a depth of about 1.5 km. To assess the future performance of the DUNE Far Detector, full-scale prototypes of the DUNE FD modules have been implemented at the CERN Neutrino Platform facility, in Geneva, Switzerland. ProtoDUNE will help define the production and installation procedures for the DUNE Far Detector, and at the same time allow for physics measurements with the detector's response to different charged particles from CERN's H4-VLE Beam Line. The H4-VLE beam consists of tertiary electron, proton, muon, kaon, and pion beams with momentum ranging from 0.3 GeV/c to 7 GeV/c. Measurements of those particles can be exploited to determine the cross sections of interactions of charged particles in Liquid Argon. An initial run of ProtoDUNE was completed in 2018, with a second run being prepared for Summer 2024. In this poster, I will introduce the ProtoDUNE experimental setup and present pion candidate selection methods used for the 2 GeV/c beam momentum sample, which will enable future cross-section measurements in ProtoDUNE. Additionally, I will discuss results from fake data studies and comparisons of pion interactions using different event generators.

Poster prize

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