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Neutron Inelastic Cross Section Measurement on Argon with ProtoDUNE Single-Phase

Tuesday 15 November 2022 14:45 (15 minutes)

The Deep Underground Neutrino Experiment (DUNE) is a long baseline, neutrino oscillation experiment designed to measure Charge Parity Violation in the neutrino sector using liquid argon as the primary detector medium. DUNE's main physics program is centered around measuring the flavor profile of beams in neutrino and anti-neutrino modes, as a function of energy, both at the near and the far detector, and will rely on accurate event reconstruction to do so. Understanding the detector response to neutrons will be critical for performing neutrino oscillation analyses in DUNE because they can elude detection resulting in missing energy. In addition to the primary neutrons produced in neutrino interactions, subsequent interactions of any charged hadrons produced can result in secondary neutrons. ProtoDUNE Single-Phase sits in a testbeam and is a 770-ton prototype of the DUNE far detector designed to validate technology and measure charged hadron cross sections at the relevant energies for DUNE; therefore, it is ideal for studying the secondary neutron component. This talk presents a search for neutrons produced in 1 GeV/c pion interactions and then shows a neutron inelastic cross section measurement in liquid argon using a sample of selected neutrons.

Poster fallback option for rejected abstracts for parallel oral presentations

Yes

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Track Classification: Neutrino physics