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Neutron Generator Calibration System for DUNE

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The Deep Underground Neutrino Experiment (DUNE) is an international experiment dedicated to addressing some of the unanswered questions at the forefront of particle physics. DUNE will search for the Charge-Parity (CP) symmetry violation in the leptonic sector while measuring the oscillation probabilities of neutrinos and antineutrinos which will help us understand the preponderance of matter over antimatter in the universe, the dynamics of the supernovae and deliver world-leading results in solar neutrinos. One of the calibration systems proposed for DUNE is the neutron generator based Pulsed Neutron Source (PNS) system. Neutron captures provide a fixed energy deposition for calibrating the energy scale and energy resolution spatially and temporally across the tremendous DUNE volume. The first test for the PNS system was performed using a deuterium-deuterium neutron generator (DDG) at ProtoDUNE Single Phase detector in summer 2020, to test our neutron transport model and help develop neutron capture reconstruction algorithms. In this talk, I will discuss the motivation for such a calibration system for DUNE and present some preliminary results from the test.

Collaboration name

Deep Underground Neutrino Experiment (DUNE)

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