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Total neutron cross section measurement on CH with a novel 3D-projection scintillator detector

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Long-baseline neutrino oscillation experiments rely on detailed models of neutrino interactions on nuclei. These models constitute an important source of systematic uncertainty, partially because detectors to date have been blind to final state neutrons. Three-dimensional projection scintillator trackers comprise components of the near detector of the next generation long-baseline neutrino experiments. Due to the good timing resolution and fine granularity, this technology is capable of measuring neutrons in neutrino interactions on an event-by-event basis and will provide valuable data for refining neutrino interaction models and ways to reconstruct neutrino energy. Two prototypes have been exposed to the neutron beamline at Los Alamos National Laboratory (LANL) in both 2019 and 2020 with neutron energies between 0 and 800 MeV. In order to demonstrate the capability of neutron detection, the total neutron-scintillator cross section was measured with one of the prototypes using data taken in 2019 and compared to external measurements. Ongoing work includes updating this measurement with reduced systematic uncertainties using the 2020 data. The results and future prospects are presented in this talk.

Mini Symposia (Invited Talks Only)

Author: Mr ZHENG, Haowei (Stony Brook University)

Presenter: Mr ZHENG, Haowei (Stony Brook University)

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