



Contribution ID: 421

Type: **Parallel talk**

The 2x2 Demonstrator - A demonstrator for the DUNE ND-LAr Near Detector based on the ArgonCube Design

Tuesday 29 August 2023 14:30 (15 minutes)

The Deep Underground Neutrino Experiment (DUNE) is a next generation long-baseline neutrino oscillation experiment designed to observe neutrino and antineutrino oscillation patterns to precisely measure neutrino mixing parameters. DUNE near detectors will measure and constrain the neutrino flux and constrain the response for a near-far detector oscillation measurement. The 2x2 Demonstrator is a demonstrator for the DUNE ND-LAr near detector based on the ArgonCube design. The 2x2 Demonstrator will characterize neutrino-Argon interactions in the few-GeV regime. Composed of a 2x2 grid of four optically segmented LArTPC modules sandwiched between upstream and downstream repurposed MINERvA tracking planes, each TPC module has a footprint of 0.7 m by 0.7 m and is 1.4 m tall. The 2.6 metric ton LAr active mass is instrumented by 337k charge-sensitive pixels at 4 mm pitch and thin-profile scintillation traps for 25% optical coverage. The detector will acquire neutrino data in Fall 2023 in the NuMI beamline at Fermilab. Roughly 70k charged-current and 30k neutral-current active volume fiducialized neutrino vertex interactions are expected per week in NuMI medium energy RHC operation. In addition to copious GeV-scale neutrino interactions, physics data at the MeV-scale is possible, leveraging the near 100% uptime free-streaming, few hundred keV charge read-out pixel trigger thresholds. A system design overview and commissioning status will be reported in the presentation.

Submitted on behalf of a Collaboration?

Yes

Primary author: RUSSELL, Brooke (Lawrence Berkeley National Laboratory)

Presenter: RUSSELL, Brooke (Lawrence Berkeley National Laboratory)

Session Classification: Neutrino physics and astrophysics

Track Classification: Neutrino physics and astrophysics