Contribution ID: **28** Type: **Contributed Parallel Talk**

Overview of the 2 x 2 Demonstrator: A Pixel-Based LArTPC Prototype for the DUNE Near Detector

Tuesday, 24 October 2023 17:10 (20 minutes)

The Deep Underground Neutrino Experiment (DUNE) is a future long-baseline neutrino oscillation experiment featuring a far detector site at the Sanford Underground Research facility with 70 kT of liquid argon and a near detector site with multiple detector technologies used at the Fermi National Accelerator Laboratory (Fermilab). The near detector (ND) site includes a liquid argon detector (ND-LAr) that will use 35 modular detectors for a total of 70 time projection chambers that are optically isolated. The proposed 3 m x 7m x 5 m detector will use the pixel-based readout and optical separation to identify individual neutrino interactions in the high-intensity environment that could contain over 50 neutrino interactions per beam spill. The pixel-based readout gives it the unique advantage of fully native three-dimensional reconstruction, a feature not possible with wire readout arrays. DUNE has been building a prototype of ND-LAr with four modular prototypes in a 2 by 2 array, named the 2x2 Demonstrator. Construction has been ongoing since 2021 and coincided with the commissioning of the modules using cosmic-ray data taken at the University of Bern. All four completed modules are being installed in the NuMI neutrino beam at Fermilab in 2023. Upon the start of neutrino beam data-taking, the 2x2 Demonstrator will be the first neutrino experiment to use modular, pixel-based liquid argon time projection chambers. The talk will cover the detector concept and design, summarize the commissioning data-taking period, and discuss the neutrino physics goals of the 2x2 Demonstrator.

Primary author: DIURBA, Richard

Presenter: DIURBA, Richard

Session Classification: Data Science and Detector R&D

Track Classification: Data Science and Detector R&D