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First Physics Studies with DUNE Near Detector Prototype (2x2)

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The Near Detector (ND) of the Deep Underground Neutrino Experiment (DUNE) allows high-statistics characterization of the DUNE beam close to the source. It is important to understand the capabilities of DUNE ND at the prototyping stage. The DUNE ND Liquid Argon Time Projection Chamber (LArTPC) prototype, known as the "2x2 demonstrator", will begin data taking in the summer 2024, using the NuMi anti-neutrino beam. Initial analysis goals include the inclusive charged-current (CC) measurement of the number of all charged final state particle tracks (called "multiplicity"), and the mesonless CC cross-section measurement. These measurements will demonstrate the capabilities of the LArTPC of DUNE's ND and will help develop event simulation and reconstruction techniques for the first round of DUNE analysis.

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