Abstract Submitted
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Characterization of LArPix: low-power 3D pixelated charge readout for liquid argon time projection chambers[1] MADELEINE LEIBOVITCH, Barnard College, Columbia University, GAEL FLORES, University of California, Berkeley, THEOPHILUS HUMAN, University of California, San Diego, DARIO GNANI, CARL GRACE, Lawrence Berkeley National Laboratory, PETER MADIGAN, University of California, Berkeley, DANIEL DWYER, Lawrence Berkeley National Laboratory — Liquid argon time projection chambers (LArTPCs) have been proposed as a method for high-resolution 3D imaging of neutrino interactions for the Deep Underground Neutrino Experiment (DUNE). The LArPix system was developed and tested as a novel 3D pixelated readout system for use in the DUNE Near Detector LArTPC system. Detailed characterization measurements were made in order to refine the design for full-scale production. Electronic gain of the system was measured and analyzed both at room temperature and in liquid nitrogen to mimic the cryogenic conditions of the near detector site, and methods of calculating gain were compared for consistency. Package shielding methods were investigated for characterization and mitigation of digital-to-analog crosstalk on the LArPix v. 1 chip packaging, and suggestions for further shielding were made. Additionally, a novel 16 cm x 16 cm x 10 cm LArTPC was designed, fabricated, and constructed to provide a setup for testing current and future LArPix designs by imaging cosmic rays, simulating neutrino detection in DUNE.

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