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Design of a Shielding Plane for LArPix

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The Deep Underground Neutrino Experiment (DUNE) is a next-generation long-baseline neutrino oscillation experiment. A critical component of the DUNE Near Detector (ND) is a Liquid Argon Time Projection Chamber (LArTPC) called ND-LAr. A novel pixelated charge readout technology, LArPix, has been developed for use in ND-LAr and other LArTPCs. This technology has been implemented in the 2x2 Demonstrator, an array of four 600 kg liquid argon modules exposed to the NuMI beam in Fermilab that serves as a prototype for ND-LAr.

The pixelated anode consists of a collection plane without induction planes in front, unlike in a wire-based readout. This makes it susceptible to induction signals from the approaching ionization electrons. To reduce this effect, we developed a field response simulation to understand the behavior of the electronics and design a shielding plane, which is being considered for implementation in ND-LAr. In this talk, we will present our shielding plane design and discuss its impact based on cosmic-ray tests.

Primary author: YANG, Jiangmei (Hong Kong University of Science and Technology)

Presenter: YANG, Jiangmei (Hong Kong University of Science and Technology)

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