

A 3D field response simulation for pixelated charge readout in LArTPC

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 LArTPCs. We present a new 3D field response simulation for these pixelated anode designs used in the Module-0 Demonstrator, which is operated as a 600kg prototype for the DUNE ND-LAr. The field response model describes the electric currents induced in the anode planes when ionization electrons drift in the chamber. Field response is important for TPC readout simulation and charge reconstruction. In the prototype detector cosmic-ray run, evidence of LArPix retriggering by induced signal has been noticed. Thus, this field response simulation is also crucial in understanding electronic response and optimizing anode geometry to reduce the retrigger effect.

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