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The LArPix Pixelated Charge Readout System for Liquid Argon TPCs

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The LArPix charge readout system is designed to provide native 3D readout of ionization charge signals in liquid argon time projection chambers (LArTPCs) in a way that is scalable to instrument large volumes. The system is compatible with large-scale commercial fabrication techniques, which enables low-cost quick-turn production. At the heart of the system is the low-power, cryo-compatible, 64-channel LArPix ASIC responsible for reading out analog signals sensed by millimeter-sized pixel pads on large-format anode tiles. The digitization and readout of signals on the pixels is self-triggered with a tunable threshold for the analog voltage on the pixel, which allows for manageable data rates for detectors with O(100K) channels and above depending on the level of activity in the detector. The 2x2 demonstrator is the largest LArPix-based detector to date, contains over 300K pixel channels, and is currently being installed in Fermilab's NuMI beamline where it will image neutrino interaction in the GeV energy regime. This talk will provide an overview of the LArPix system design and its implementation in the 2x2 demonstrator.

Early Career

Yes

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