

## Demonstration of true 3D micro-power readout for liquid argon time projection chambers

We report the demonstration of a micro-power sensor designed for true three-dimensional ionization charge detection and digital readout of liquid argon time projection chambers (LArTPCs). True 3D readout is achieved using a custom-designed 32-channel system-on-a-chip ASIC (LArPix-v1), manufactured in 180 nm bulk CMOS, to uniquely instrument each pad in a charge-sensitive pad sensor array. Using a prototype sensor with 3 mm pitch, we demonstrate low-noise ( $<500\text{ e}^-$  equivalent) low-power ( $<100\text{ }\mu\text{W/ch}$ ) ionization signal detection and readout of cosmic ray interactions in a 1-liter LArTPC. This demonstration of true 3D micro-power readout overcomes a critical technical obstacle for operation of an LArTPCs in high-occupancy environments, such as the near detector site of the Deep Underground Neutrino Experiment (DUNE).

### Session and Location

Wednesday Session, Poster Wall #152 (Hölderlin-Room)

### Poster included in proceedings:

yes

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**Track Classification:** Poster (not participating in poster prize competition)