Contribution ID: **373** Type: **Poster**

Demonstration of 3D Micro-Power Readout for Liquid Argon Time Projection Chambers

Friday, 1 June 2018 18:30 (1 hour)

We report the demonstration of a micro-power sensor designed for three-dimensional ionization charge detection and digital readout of liquid argon time projection chambers (LArTPCs). 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 spacing between pads, we demonstrate low-noise ($< 500\ e^-$ equivalent) low-power ($< 100\ \mu$W/ch) ionization signal detection and readout of cosmic ray interactions in two LArTPCs with drift distances of 10 to 60 cm. This demonstration of 3D micro-power readout overcomes a critical technical obstacle for operation of LArTPCs in high-occupancy environments, such as the near detector site of the Deep Underground Neutrino Experiment (DUNE).

E-mail

dadwyer@lbl.gov

Funding source

DOE-OHEP contract number DE-AC02-05CH11231

Primary author: DWYER, Daniel

Presenter: DWYER, Daniel

Session Classification: Poster Session

Track Classification: NMNM