Contribution ID: **133** Type: **Parallel Presentation**

GAMPix - Electron Track Detection with a Dual Scale LArTPC System

Wednesday, November 20, 2024 3:05 PM (15 minutes)

We report on progress with GAMPix (Grid-Activated Multi-scale Pixel readout), a novel charge readout system for TPCs. GAMPix is designed to enhance electron track reconstruction accuracy to the sub-millimeter level while ensuring high energy reconstruction accuracy with low power consumption. The GAMPix system uses coarse induction electrodes paired with pixel planes. Signals from the induction electrode activate the pixel plane and the analog front end of a new, rapidly power-cycled ASIC. By comparing diffusion-independent coarse signals with diffusion-affected pixel signals, GAMPix provides a powerful measurement of drift distance. This is particularly useful in situations like pile-up, where time-based depth determination is not possible. Our initial analysis suggests GAMPix shows significant promise for the DUNE Phase 2 modules. It could improve both low-energy performance (MeV scale) and energy resolution for GeV-scale interactions. Additionally, GAMPix meets the stringent requirements for GammaTPC, a proposed MeV gamma ray detector instrument concept based on LArTPC technology. We present findings from a small-scale demonstration and simulation results.

Primary authors: PENA PEREZ, Aldo; DRAGONE, Angelo (SLAC National Accelerator Laboratory); TRBALIC, Bahrudin (Stanford University); TANAKA, Hirohisa; ROTA, Lorenzo (SLAC National Accelerator Laboratory); CONVERY, Mark; MOORE, Miriam; LUITZ, Steffen; SHUTT, Tom; TSAI, Yun-Tse

Presenter: TRBALIC, Bahrudin (Stanford University)

Session Classification: RDC 04 - Readout and ASICs Parallel Session

Track Classification: RDC Parallel Sessions: RDC4: Readout and ASICs