Contribution ID: **516** Type: **not specified**

Optimization of high resolution 3D charge reconstruction in gaseous TPCs with strip micromegas

Wednesday 15 May 2024 15:00 (15 minutes)

Detecting the detailed 3D topology of ionization in detectors is broadly desirable for enabling new techniques in nuclear and particle physics. One example is the directional detection of nuclear recoils from neutrinos or dark matter, which may prove critical for probing dark matter beneath the neutrino fog and affirming its galactic origin. Gaseous time projection chambers (TPCs) can enable the required low-energy directionality and x/y strip charge readout of such detectors has been proposed as the optimal balance between cost-efficiency and performance. We present an experimental study of nine distinct x/y strip configurations coupled to Micromegas amplification stages. The VMM3a ASIC is used with the Scalable Readout System (SRS) of the RD51 collaboration to read out individual strips, while the Micromegas avalanche charge is recorded with a pulse height analyzer system. These two complementary charge readout techniques are used with radioactive sources to characterize the gain, gain resolution, x/y charge sharing, and point resolution of each setup, in order to identify the optimal charge readout configuration.

Mini Symposia (Invited Talks Only)

Author: GHREAR, Majd

Presenter: GHREAR, Majd

Session Classification: Instrumentation

Track Classification: Instrumentation