Contribution ID: **87** Type: **Parallel session talk**

Electronics testing and development for high-pressure argon-based detectors

Wednesday 8 October 2025 14:20 (20 minutes)

High-pressure gaseous TPCs (HPgTPCs) offer the tracking capabilities of gaseous detectors combined with an increased target density, making them particularly suitable for high-precision neutrino interaction measurements. However, developing readout electronics for these detectors poses unique challenges distinct from collider-based systems. The low occupancy typical of neutrino detection requires lower channel density and power per channel, rendering conventional solutions unnecessarily complex and cost-prohibitive. This talk presents results from an FPGA-based readout system deployed at the TOAD pressure vessel at Fermilab, tested across a range of gas mixtures and pressures up to 4.5 barA. This experience helped identify critical areas for improvement, including the cooling scheme and noise mitigation strategies. Ongoing R&D efforts focus on adapting this electronics system to characterise gas electron multipliers (GEMs) under high-pressure conditions. This approach aims to support the optimisation of charge amplification structures, helping to establish scalable, cost-effective solutions for the next generation of HPgTPCs.

Authors: MARTÍNEZ LÓPEZ, Francisco (Indiana University); MOHAYAI, Tanaz (Indiana University)

Presenter: MARTÍNEZ LÓPEZ, Francisco (Indiana University)

Session Classification: RDC 6 Gaseous Detectors

Track Classification: RDC 6 Gaseous Detectors