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Triple-GEM Characterization for High-Pressure Gas Argon-Based Operation

Wednesday 8 October 2025 14:40 (20 minutes)

High-pressure gaseous TPCs provide increased target density while preserving fine charged-particle tracking. This combination can allow for low energy detection thresholds while maintaining event rates suitable for rare-event searches and neutrino experiments, from sub-MeV nuclear recoils to few-GeV neutrino interactions. In alignment with an RDC 6 priority—developing gas amplification structures for challenging environments—this talk presents experimental results from ongoing studies of triple-GEM performance in argon-based mixtures at the GORG (GEMs Over-pressured with Reference Gases) test stand at Fermilab. Measurements are being carried out over multiple gas admixtures and voltage configurations, with pressure scans taken in steps from 1 atm toward the upper range for which the test stand is rated, 10 atm. These measurements aim to help define viable design envelopes for charge amplification in conditions where higher voltages are required, and to inform future optimization of MPGDs in high-pressure gaseous detectors.

Author: MOHAYAI, Tanaz (Indiana University)

Presenter: MOHAYAI, Tanaz (Indiana University)

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