Contribution ID: **401** Type: **Poster**

Characterization of the Electronic Noise in the Readout of Resistive Micromegas in the High-Angle Time Projection Chambers of the T2K Experiment

T2K is a long-baseline neutrino oscillation experiment that utilizes a beam of muon neutrinos or antineutrinos produced at the Japan Particle Accelerator Research Centre (J-PARC). To fully capitalize on J-PARC's enhanced beam intensity, T2K's ND280 near detector has been upgraded with three new sub-detectors: a high-granularity detector composed of two million scintillating cubes, time-of-flight detectors, and two time-projection chambers.

The time-projection chamber readout employs innovative Micromegas resistive chamber technology, where the anode consists of a resistive layer that diffuses charge after amplification. The diffused charge is read via capacitive coupling through a layer of metal pads positioned beneath the resistive anode. These pads are connected to custom electronics based on AFTER chips.

A detailed physical model has been developed to describe the signal formation in resistive Micromegas, incorporating primary ionization, charge diffusion during drift, charge diffusion on the anode, and the response of the electronics. We will briefly introduce this model and highlight some of its key applications. In this context, we will present a thorough characterization of the readout chain noise and its modeling (arXiv:2504.07759). This modeling enables Monte Carlo simulations of noise to study systematic effects in signal processing. The developed model accurately reproduces the observed noise, and the resulting Monte Carlo simulations show excellent agreement with experimental data.

Secondary track

Authors: HENAFF, David (DPhP, CEA); CALVET, Denis (IRFU CEA Paris -Saclay); LAPORTE, Jean-Francois (CEA); SCHUNE, Philippe (CEA-Saclay, IRFU); JOSHI, Shivam (CEA Saclay / IRFU / DPhP); HASSANI, samira (IRFU-SPP/CEA Saclay)

Session Classification: T11

Track Classification: T11 - Detectors