Contribution ID: **25** Type: **not specified**

Multigap RPC detector development at LIP for timing-oriented muon detection: from cosmic-ray monitoring to simplified muography systems

Tuesday, 3 February 2026 09:30 (15 minutes)

Multigap glass Resistive Plate Chambers (RPC) developed at LIP Coimbra form the basis of an ongoing detector R&D programme focused on precise timing, robust operation, and scalable system architectures. These chambers are exploited in the miniTRASGO detector, a compact telescope operated in collaboration with Universidad Complutense de Madrid that measured continuously as a cosmic-ray muon monitor, which provides long-term validation of detector mechanics, high-voltage distribution, grounding and shielding strategies, and stability under environmental variations.

Building on this mature detector technology, parallel R&D efforts concentrate on simplifying RPC readout architectures while preserving timing and spatial performance. The current approach investigates thin multigap RPCs with narrow strips and signal merging or multiplexed codification as an alternative to more expensive single channel readout. Reference measurements with stacked systems identify operating regimes where timing performance remains competitive despite efficiency limitations in single-plane operation, motivating dedicated studies of high-voltage optimization, power delivery, and combined fast and slow signal shaping.

This simplified, timing-oriented RPC architecture is being developed as the basis for a compact muography detector planned for deployment at LIP, while remaining scalable to larger Time-of-Flight and tracking systems. The work highlights gaseous detector engineering and readout topology as key elements in detector R&D for both fundamental and applied muon detection.

Author: SONEIRA LANDÍN, Cayetano (GFN - Complutense University of Madrid)

Co-authors: BLANCO CASTRO, Alberto; UDIAS MOINELO, Jose Manuel; Prof. FRAILE, Luis M (Universidad Complutense (ES))

Presenter: SONEIRA LANDÍN, Cayetano (GFN - Complutense University of Madrid)

Session Classification: WG1 Gaseous Detectors

Track Classification: WG1 Gaseous Detectors