

RPC R&D 2024. Lines of work and Highlights

RPC-PET

- P. Fonte is currently in Korea. RPC-PET is ~standby.

Timing RPCs (tRPCs) and PS-tRPCs

- **HADES**. Two TOF detectors. Operation, calibration and maintenance.
- **R³B**: One TOF detector. Operation, calibration and maintenance.
- **PS-tRPCs**: **first results** on a **large area readout** capable of extracting both timing and spatial information (**< 100 ps** and **< 1 mm** respectively, together with > 98 % Eff) scalable in area without the need to incorporate new electronics channels. <https://www.doi.org/10.1016/j.nima.2025.170466>. This is one of the objectives of DRD1 WP7.

Autonomous RPCs

- Great progress in **Sealed RPCs**. Small portable systems for **SND@LHC** <https://www.doi.org/10.1016/j.nima.2025.170396>, **demonstrates the possibility to work stably for period of more than one year** and a **test** under strong irradiation **indicate the possibility to work for years** (publication under review).
- **Mini-Trago project**, which aims to implement a worldwide network of low-cost detectors capable of directional measurement of Cosmic Ray flux. Currently, we have stations in Madrid (ES), Warsaw (PL), Puebla (MX) and Monterrey (MX). **First visualization of a Forbush decrease**. <https://doi.org/10.1016/j.nima.2025.170511> also a great tool for advance training.

News

- A. Blanco is now part of the **director board**.
- Huge investment on **students**. 4X PhD, 1-2 MSc + 2 Undergraduate.
- 2x projects submitted. ExP + PRR.

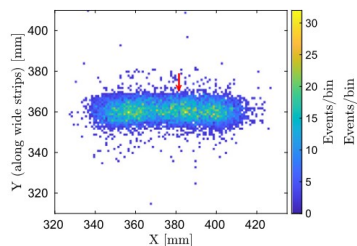
RPC R&D. Future 2025 (main lines) of work

- **RPC-BrainPET:** We expect to characterize the RPC-BrainPET and start the first human trials
- Consolidate and advance the **PS-tRPC readout** and continue the development within DRD1.
- Understand the **SHiP** new situation.
- Build prototypes for SHiP and SND.
- Continue with the evaluation of **Sealed RPCs** technology incorporating timing (< 100 ps) capability (apply for a specific expP) and continue operating the existing devices.
- Use **sealed RPCs in muon tomography**.
- Complete characterization of **RPCs operated in a pressure range from 1000mBar to 400 mBar** for **SWGO. Installation** onsite of prototypes.

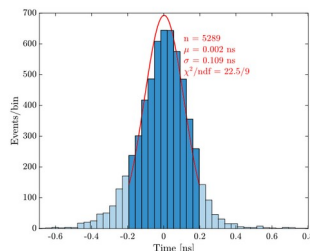
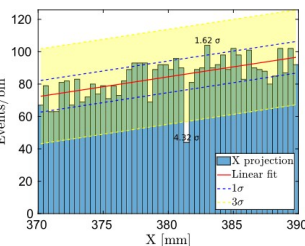
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Large area PS-TOF-MRPC

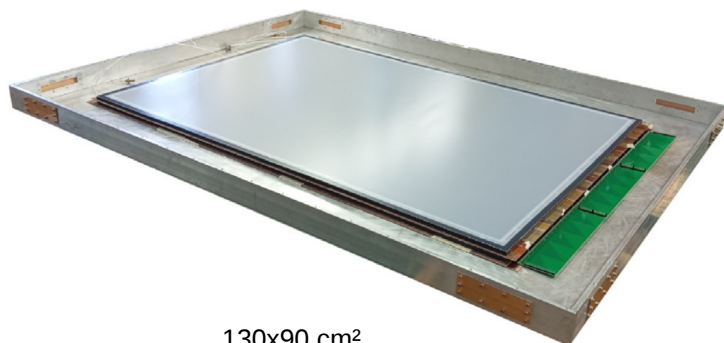
- < 100 ps, $> 98\%$, < 1 mm², > 1 m²
- Low FEE density
- Future PID systems and muon Tomography



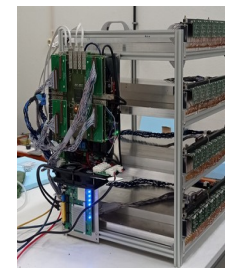
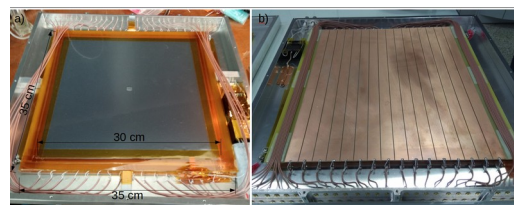
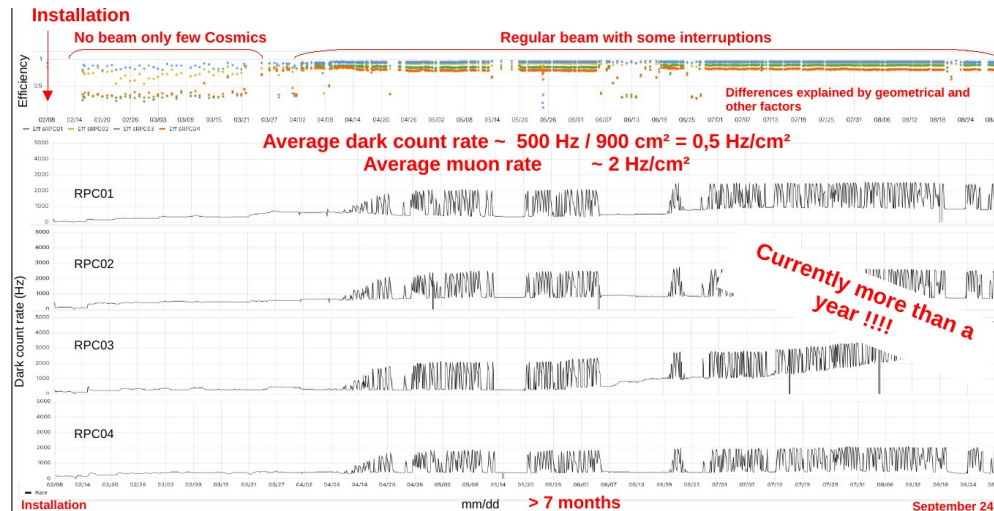
< 1 mm²



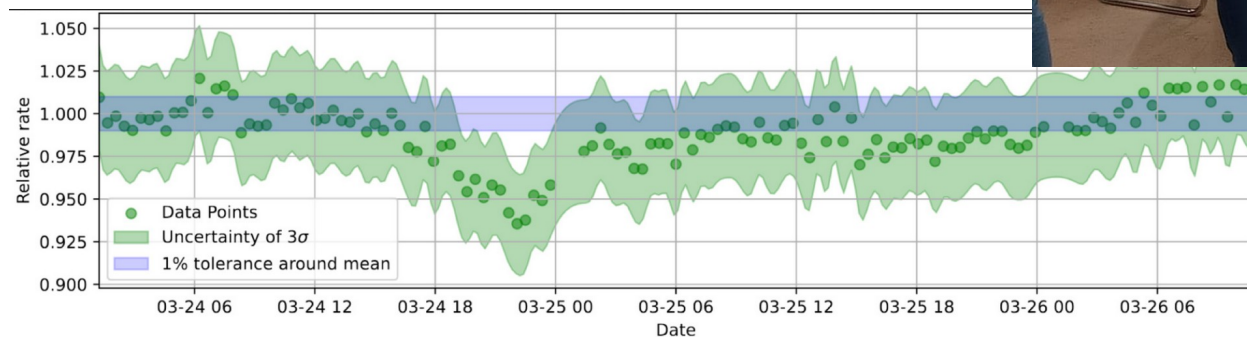
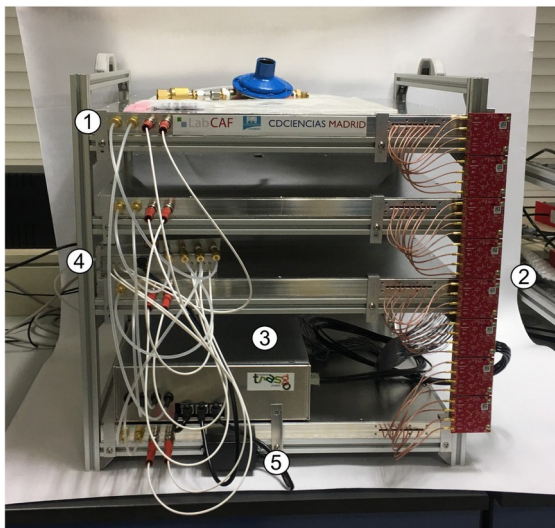
89 ps



130x90 cm²



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CERN DRD1 school