

TIMING AND HIGH RATE CAPABLE (THRAC) GAS DETECTOR

AREA OF EXPERTISE

- Detectors.

IP STATUS

- Patent filed.

TECHNOLOGY READINESS LEVEL

- Proof-of-concept.

CONTACT PERSON

rita.ferreira@cern.ch

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This technology merges the state of the art of Micro Pattern Gas Detector (MPGD) and Resistive Plate Chamber (RPC) technologies in to provide a new class of detectors able to provide high rate capability, exceeding $1\text{MHz}/\text{cm}^2$, and simultaneously providing sub nanosecond time resolution. Two classes of solutions are found.

One exploits new materials and techniques in MPGDs to improve by orders of magnitude the rate capability of RPCs, presently limited to $O(10)\text{kHz}/\text{cm}^2$ due to bulk resistivity of the “resistive plates”.

Another class consists of a very recent micro pattern, the Resistive WELL, where the electrodes for amplification stage are both resistive, thereby determining the full transparency of the produced signals from a series of consecutive amplification stages, yielding a much improved time resolution, which is presently limited to 3-5 ns, thanks to the competing processes on each WELL layer.

FEATURES

- Cost-effective and easy to build via standard industrial techniques.
- The use in portable instruments could be limited by the use of gas.

APPLICATIONS

- Triggering and Tracking Devices.
- Medical Imaging and digital radiography.
- Fast response Beam Monitoring.
- Small Animal PET scanning.
- Plasma Diagnostics.

