

Resistive High Granularity Micromegas for Future Detectors. Status and Perspectives

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The presented project aims to establish the use of single amplification stage resistive MPGD based on Micromegas technology, for a stable and efficient operation up to 10 MHz/cm² particle rate. Key challenges include the miniaturization of readout elements (small pads at mm² scale), the optimization of the spark protection system, and ensuring reliability and robustness during operation.

Various resistive patterns were implemented using different techniques, categorized into two families: one employing a pad-patterned configuration and the other utilizing a structure based on a double layer of DLC foils (Diamond Like Carbon structure).

The two categories implement different charge evacuation methods: embedded resistors using independent pads the first, and double DLC uniform resistive foils the latter, relying on a network of dot-connections to ground in the active area.

The presentation will include a comparative analysis of results obtained with different resistive layouts and configurations, emphasizing the response under high irradiation and high-rate exposure, as well as tracking performance at test-beams. The discussion will spotlight the advantages and performance of the solution featuring the double DLC layer.

Comprehensive results from a recently tested medium-sized detector (400 cm²) will be reported, accompanied by preliminary measurements conducted on the first built large area module (50x50 cm²), designed as a full size module for tiling in future experiments.

This overview encapsulates the current status, notable achievements, and readiness for the upcoming phase of R&D, positioning the project towards final development for large area high-rate detectors.

Collaboration

INFN - CSN5 RHUM

Role of Submitter

The presenter will be selected later by the Collaboration

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