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High granularity resistive Micromegas for future detectors

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The resistive Micromegas technology can stably operate up to O(10 MHz/cm^2) particle rate thanks to novel resistive spark-protection structures suitable for readout pads of a few mm^2 area. These structures are made by Diamond-Like-Carbon (DLC) in a double-layer configuration in most of the investigated detectors with active surfaces of $\sim 25\,\mathrm{cm}^2$ and in the new one with an active area of $\sim 400\,\mathrm{cm}^2$. Specifically, the DLC foils have a surface resistivity of $\sim 30\,\mathrm{M\Omega}/$
square in the last prototype. The results of the performance in terms of gain, rate capability, robustness, dependence on the irradiated area, and space-time dedicated studies will be presented. With the proven high performance of the medium size detector and the already-started construction of a high granularity resistive Micromegas with an even larger area, our R&D is reaching the goal of establishing the technology for future large-scale and high-rate employment in Particle Physics and other fields.

Your name

Maria Teresa Camerlingo

Institute

INFN Napoli Section

Email address

maria.teresa.camerlingo@cern.ch

Authors: CAMERLINGO, Maria Teresa (Universita Federico II e INFN Sezione di Napoli (IT)); BIGLIETTI, Michela (INFN Roma Tre)

Co-authors: ALVIGGI, Mariagrazia (Universita di Napoli Federico II (IT)); DELLA PIETRA, Massimo (Universita Federico II e INFN Sezione di Napoli (IT)); DI DONATO, Camilla (Universita Federico II e INFN Sezione di Napoli (IT)); DE ASMUNDIS, Riccardo (Universita Federico II e INFN Sezione di Napoli (IT)); DI NARDO, Roberto (Università e INFN Roma Tre (IT)); IENGO, Paolo (CERN); IODICE, Mauro (INFN - Sezione di Roma Tre); PETRUCCI, Fabrizio (Universita e INFN Roma Tre (IT)); SEKHNIAIDZE, Givi (Universita Federico II e INFN Sezione di Napoli (IT)); SESSA, Marco (INFN e Universita Roma Tor Vergata (IT))

Presenter: BIGLIETTI, Michela (INFN Roma Tre)

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