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Performance and stability of a High Granularity Resistive Micromegas at high particle rates.

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Nowadays Micromegas (MM) are being used as tracking detectors in HEP experiment upgrades as in ATLAS experiment at LHC. Nevertheless, next experiments at very high energy and intensity accelerators will demand stable and efficient operations up to particle fluxes of few orders of magnitude higher. To fulfill such requirements, we are developing the MM technology to increase its rate capability up to 10 MHz/cm2.
In resistive MM, the anodic readout elements are overlayed by a resistive protection layer to reduce the spark probability. We tested several MM prototypes with a high-granularity readout plane, with 1x3 mm2 size pads, and different resistive protection schemas exploiting a pad-patterned layer or two uniform DLC layers.
To cope with the high number of readout channels and allow for the size scalability of the detector avoiding dead areas, we are studying the integration of the readout electronics in the back of the detector.
Characterization and performance studies of many detectors have been carried out by means of radioactive sources, X-Rays, and test beam. A comparison of the performance obtained with the different resistive layout is presented, in particular focusing on the response under high irradiation and high-rate exposure

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