

Small-Pads Resistive Micromegas Prototype

Detectors at future accelerators will require operation at rates up to three orders of magnitude higher than 15 kHz/cm², the hit rates expected in the current upgrades forward muon detectors of LHC experiments. A resistive Micromegas detectors with modified readout system can achieve rate capability up to few MHz/cm² and low occupancy, thanks to few mm² readout pads. We present the development of small-pad Micromegas detectors built with the spark protection resistive layer realised with different techniques: a pad-patterned embedded resistor with screen printing, and a uniform DLC (Diamond Like Carbon structure) layer by sputtering. All detectors consist of a matrix of 48x16 rectangular pads, with 1 and 3 mm pitch. The active surface is 48x48 mm² with a total number of 768 channels, routed off-detector for readout. Characterization and performance studies of the detectors have been carried out by means of radioactive sources, X-Rays guns, cosmic rays and high energy particle beam. A comparison of performance with different resistivity values will be presented. A new prototype with integrated electronics readout is currently under assembly, the final configuration will guarantee full scalability to large size detectors, overcoming the challenging problem, unsolvable for large size, of routing off detector the pad readout lines. The design, the construction and preliminary data of this new detector, will also be reported.

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