

Studi di ottimizzazione dello strato resistivo di protezione dalle scariche in rivelatori Small-Pad MICROMEGAS

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Motivated mainly by future detector upgrades at HL-LHC and at future colliders, most of the HEP R&D collaborations have been focusing on the design of new prototypes of particle detectors for operation under very high particle flow. In the field of Micro-Pattern-Gaseous-Detectors, the Small-pad resistive MICROMEGAS prototypes were designed to overcome the actual limitations of more standard strip resistive MICROMEGAS. Indeed, in these new prototypes, small pads with a few mm^2 area replace the readout strips to reduce the occupancy, and the spark protection resistive layer has been redesigned and optimized with different techniques to permit a safe behaviour of the detector, without efficiency loss, at rates of the order of tenth MHz cm^{-2} over large surfaces.

The firstly-developed design exploits a pad-patterned embedded resistor layout by screen-printing while the most recent technique involves uniform sputtered DLC (Diamond Like Carbon structure) layers, where the current evacuates through vias to ground. Comparative studies have been conducted on the performances of the detectors with two resistive layouts, and between two (DLC) prototypes with different vias pitches and DLC resistivities. The preliminary results of the tests done with high-rate X-rays and with high energy charged particle beams will be presented.

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