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PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 06.11.2014, 16¹⁵ Uhr

Seminarraum 127, TUM, Physik II, Erdgeschoss/Nord
Treffen zum gemeinsamen Kaffee 16 Uhr

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Optimized Floating Strip Micromegas Detectors

Micromegas are micro-pattern gaseous detectors, suitable for particle tracking at highest rates and in environments with high-rate background. Recently, floating strip Micromegas have been developed and optimized, that are discharge tolerant without the need for resistive layers in the active volume. Optimization of the floating strip principle was enabled by dedicated measurements and a detailed simulation of the microscopic discharge behavior. The excellent discharge tolerance could be shown.

To demonstrate the versatility and superiority of the concept for tracking applications in high energy and medical physics, I will discuss the performance of different floating strip Micromegas in three demanding, complementary applications.

A large-area 48 cm x 50 cm floating strip Micromegas exhibits in 120 GeV pion beams an excellent spatial resolution of 50 μm . TPC-like reconstruction of particle track inclination in a single detector plane is possible, optimum angular resolutions below 5 degrees are observed.

The reconstruction capabilities for minimum ionizing muons are investigated in a floating strip Micromegas under intense background irradiation of the whole 6.4 cm x 6.4 cm active area with 20 MeV protons at a rate of 550 kHz. No indirect effects such as space charge are observed.

A 6.4 cm x 6.4 cm floating strip Micromegas doublet with low material budget is investigated in highly ionizing proton and carbon ion beams at particle fluxes between 2 MHz/1.4 cm² and 2 GHz/0.5cm². Stable operation up to the highest rates is observed. Preliminary results from an ion radiography system, consisting of two floating strip Micromegas and a scintillator based range telescope are presented.

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