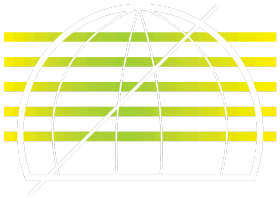

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Simulation of the avalanche creation in resitive circular chambers

Thursday, 29 September 2022 10:00 (20 minutes)

Resistive plate chambers (RPCs) are the ideal technology for the instrumentation of muon systems at high-energy particle colliders where excellent subnanosecond time resolution and reasonable spatial resolution of the order of 1 mm are required. Conventional RPCs with planar electrodes have the disadvantage that these cannot be operated at large overpressure. This limitation is overcome by the newly proposed so-called "resitive circular chambers" (RCC) where the planar gaps are replaced by gaps between two concentric cylinders. Another important advantage of an RCC is the fact that the electric field within the gap is not constant, but decreases slightly with increasing radius such that the avalanche creation is only suppressed due to shape of the electric field within the gap.
In order to optimize the geometrical dimension of an RCC and the gas mixture for an RCC a microscopic simulation of the avalanche creation within an RCC has been developed. The simulation programme uses the Garfield++ library with its interface to Magboltz for the electron atom cross sections. In this contribution the simulation programme, its predictions, and comparisons with measurements on RCC prototypes will be presented.

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