Contribution ID: **37** Type: **not specified**

The surface Resistive Plate Counter (sRPC): an MPGD technology based RPC

Wednesday 14 December 2022 09:20 (20 minutes)

The Surface Resistive Plate Counter (sRPC) is a novel RPC based on surface resistivity electrodes, a completely different concept with respect to traditional RPCs that use electrodes characterized by volume resistivity. The electrodes of the sRPC exploit the well-established industrial Diamond-Like-Carbon (DLC) sputtering technology on thin (50μm) polyimide foils, already introduced in the manufacturing of the resistive MPGDs such as μ-RWELL and MicroMegas. With this scalable and cost-effective DLC technology it should be possible to realize large area (up to 2x0.5 m2) electrodes with a resistivity spanning over several orders of magnitude (0.01÷10 GΩ/□). The DLC foil is then glued on a 2mm thick float-glass, characterized by excellent planarity. In the baseline detector layout the DLC is connected to the HV by a single dot connection outside the active area. With this layout we measured an efficiency of 95-97% and a time resolution of 1ns. Performance that are quite standard for 2mm gas gap RPCs. In addition, exploiting the concept of the high density current evacuation scheme, first introduced for the μ- RWELL, we realized the first prototypes of high-rate electrodes by screen printing a conductive grid onto the DLC film. With this high-rate layout, with 7GΩ/□ DLC resistivity and 10mm grounding-pitch, we measured a rate capability of about 1kHz/cm2 with X-ray, corresponding to a m.i.p. flux of about 3kHz/cm2. By lowering the DLC resistivity and optimizing the current evacuation scheme, a rate capability of the order of 10kHz/cm2 seems to be achievable. The sRPC, based on innovative technologies, open the way towards cost-effective high-performance muon devices for applications in large HEP experiments for the future generation of high luminosity colliders.

Presenter: GIOVANNETTI, Matteo (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Session 8