

Development of high performance μ RGroove detectors

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We will present a new type of MPGD: micro-resistive groove (μ RGroove). The μ RGroove is a single-stage MPGD, it has the similar stack structure with μ RWELL but a groove amplification pattern. The μ RGroove is almost compatible with all the techniques developed for μ RWELL, for example, it can be directly make the PEP fast grounding lines for high rate applications and the dead area is less than 2%. Benefit from the groove structures, the copper strips on top of groove can be directly used as the readout strips on one direction. By adding readout strips on the other direction under the bottom of groove, we can get a decoupled 2D readout strips without any charge-sharing problem. This kind of readout is able to provide much larger induce signal than the MPGDs using COMPASS readout when they have the same effective gas gain. In the application of large area tracking, low-capacitance design can be easily implemented into these decoupled readout strips to achieve higher S/N and improve the performance of the tracking system. Two 10cm \times 10cm μ RGroove prototypes have already been produced and tested. Compared to μ RWELL with the same size, the manufacture process of μ RGroove is much simpler thus the cost is much lower, and it is very easy to clean due to the quite open groove-structures. The test of these prototypes show they are able to stably work at $>10^4$ gas gain for a long time and the spatial resolution of them are better than 90 μ m. New prototypes are now being produced in CERN PCB workshop, include a large size (50cm \times 50cm) μ RGroove with 2D decoupled readout strips, and two cylindrical μ RGroove demonstrators for Super Tau Charm Facility (STCF) inner tracker. The progress of these detectors will also be presented.

Collaboration

DRD1 and RD51

Role of Submitter

I am the presenter

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