

Title: Beam test result of the sealed MRPC prototype for CEE-eTOF

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Abstract:

We report the beam test and result of the sealed Multigap Resistive Plate Chambers (MRPC) for the external Time of Flight (eTOF) wall of the Cooler-storage-ring External-target Experiment (CEE). The test stand detects the secondary charged particles produced from heavy ion collisions in the Heavy Ion Research Facility in Lanzhou (HIRFL), and it serves as a joint evaluation of the future CEE system, including the detectors, readout electronics, data acquisition, trigger system, etc. The collision is achieved by a Fe beam and a Fe target, with an estimated beam energy of 300 MeV/u. The sealed MRPC prototypes work stably during the test with a 20 sccm low gas flow. The whole test system is triggered from the channel multiplicity provided by the TOF detectors. A tracking method is implemented to the analysis in order to resolve the events with multiple tracks on the detectors. The result shows that the detectors reach 98% efficiency at their working point. With proper corrections, the time resolution is evaluated to be 60 ps, which fulfills the requirement to the eTOF wall.

Keywords:

MRPC, Time-of-flight system, time resolution, sealed MRPC, beam test