

Progress of R&D and production of timing RPC in Tsinghua University

Wednesday, 10 February 2010 11:30 (20 minutes)

Multi-gap resistive plate chambers (MRPCs) are planar gaseous detector made with resistive electrodes. Such detectors have good time resolution, high efficiency and low cost. These excellent characteristics, as well as the possible coverage of large areas, made MRPCs favorite detectors for high-granularity large-area time of flight (TOF) systems in modern nuclear and particle physics experiments, such as ALICE, FOPI, HADES, HARP and STAR. Department of Engineering Physics of Tsinghua University is the collaboration member of RHIC-STAR and FAIR-CBM. We started to study MRPC technology from 1999. We developed a kind of six-gap (with 0.2mm gap width) MRPC for STAR-TOF. Its time resolution is about 70ps and detection efficiency is larger than 95%. A MRPC workshop was established at the Miyun production facility of Tsinghua University and 3100 MRPC modules were fabricated in last two and half years. In order to meet the rate requirement of CBM-TOF, we developed a kind of silicate glass with resistivity in the order of $10^{10}\Omega\cdot\text{cm}$. High rate pad-and strip-readout MRPCs were also developed. The beam test results in GSI show that time resolutions below 85ps and efficiencies larger than 90% were obtained at counting rates up to 20 kHz/cm². Our high rate MRPC is a good candidate used to construct high rate CBM-TOF system.

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Session Classification: R & D in narrow-gap RPCs (I)