

A prototype of high rate MRPC for CBM-TOF

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The time-of-flight (TOF) system of CBM experiment is proposed to be assembled of multi-gap resistive plate chambers (MRPCs). This system should have a counting rate capability up to 20 kHz/cm². Usage of low-resistivity glass is a promising way of improving the MRPC rate capability. To address this issue, we produced special silicate glass with bulk resistivity in the order of $10^{10}\Omega\text{cm}$ and tested its long term stability. The thickness of the glass is 0.7mm and its largest dimension is 30cm×30cm. The 50cm×50cm glass will also be produced in about six months. A 10-gap (with 0.25mm gap width) MRPC prototype with silicate glass electrodes was developed for suitability in TOF applications at high rates. Beam tests at GSI have yielded inspiring results: Time resolutions below 85ps and efficiencies larger than 90% were obtained at counting rates up to 20 kHz/cm². It can be seen that this detector is a good candidate for constructing the high rate CBM-TOF system.

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