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Development of a Muon Chamber System at the CBM Experiment at FAIR

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The Compressed baryonic matter (CBM) experiment at the future accelerator facility for anti-proton and ion research (FAIR) in GSI Germany aims to explore the QCD phase diagram in the very high net-baryon density. The Muon Chamber (MuCh) system would facilitate detection of probes like charmonium (J/ψ) and low mass vector mesons (LMVM) via di-leptonic decay channel. The CBM experimental conditions require detectors to be high radiation tolerant and with high rate capability. Under these circumstances, the MuCh system will be based on segmented absorbers with detectors placed in between them. The first two stations of MuCh system will be based on gas electron multiplier (GEM) technology where the particle rate reaches up to about 1 MHz/cm² for minimum bias Au-Au collisions at SIS100 energy. On the other hand, the 3rd and 4th stations will be resistive plate chamber (RPC) based where particle rate reduces to 4 KH/cm². In the present presentation, we will discuss detail design parameters of the MuCh system. Prototype test results of two different subsystems (GEM and RPC) using self-triggered electronics custom-built for CBM will also be presented.

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