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Development of RPC for muon tracking in heavy ion experiment

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Single gap Resistive Plate Chamber (RPC) detectors are one of the options for the 3rd and 4th stations of Muon Chamber (MUCH) of the Compressed Baryonic Matter (CBM) experiment at future FAIR facility. From simulation it has been predicted that there will be a particle rate of 15 kHz/cm² and 5.6 kHz/cm² respectively on the 3rd and 4th stations for central Au-Au collisions at 8 AGeV. To handle such a rate, it is necessary to use plates with low bulk resistivity. It is also necessary to operate the detector at a lower gas gain such that the dead time fraction is lower.

For this study moderately resistive and commercially available bakelite plates has been used to build RPC module. The chamber has been tested with cosmic ray using 100% Tetrafluoroethane and premixed Argon/CO₂ gas in 70/30 ratio. Standard NIM electronics has been used for this study. Sharp breakdown in the I-V characteristics has been obtained with Ar/CO₂ at a lower potential difference compared to that with the Tetrafluoroethane. The efficiency and count rate are also compared for these two set of gases. The detailed method of measurement and the first test results will be presented.

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