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Test results of a real-size RPC for 3rd and 4th stations of Muon Chamber of the Compressed Baryonic Matter Experiment.

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A real-sized trapezoidal Resistive Plate Chamber (RPC) has been developed for the Muon Chamber (MuCh) detector set-up in the upcoming Compressed Baryonic Matter (CBM) experiment at the Facility for Antiproton and Ion Research (FAIR), Darmstadt, Germany. The detector has been tested for its performance with dedicated self-triggered electronics and DAQ chain in presence of a very harsh photon environment at GIF++ facility, CERN, Switzerland during November-2021 beamtime followed by particle rate handling capability test at the m-CBM set-up at GSI, Darmstadt, Germany. At GIF++, the detector was tested for its muon detection efficiency and other related properties in presence of different photon flux incident on it as a background ranging from 0 MHz/cm² to 2.72 MHz/cm². Voltage scan and threshold scan were performed at different locations of the incident muon beam on the detector. Previously the performance of the detector was tested in the local laboratory with cosmic rays to optimize its operational parameters. The various successful test results and future perspectives of the development will be presented.

Author: GANAI, Rajesh (University of Calcutta (IN))

Co-authors: BHATTACHARYYA, Abhijit (University of Calcutta); SAINI, Jogender (Department of Atomic Energy (IN)); Mr CHATTERJEE, Souvik (VECC); CHATTOPADHYAY, Subhasis (Department of Atomic Energy (IN)); AHAMMED, Zubayer (Department of Atomic Energy (IN))

Presenter: GANAI, Rajesh (University of Calcutta (IN))

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