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Status of the CBM Time-Of-Flight project

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In order to provide an excellent particle identification (PID) of charged hadrons at the future high-rate Compressed Baryonic Matter (CBM) experiment the CBM-TOF group has developed a concept of a 120 m² large Time-of-Flight (ToF) wall (about 90000 channels) with a system time resolution below 80 ps based on Multi-gap Resistive Plate Chambers (MRPC). Prior to its destined operation at the Facility for Antiproton and Ion Research (FAIR), a preproduction series of MRPCs is being used for physics research at two scientific pillars of the FAIR Phase0 program. At STAR, the fixed-target program of the Beam Energy Scan II (BES-II) relies on 108 CBM MRPC detectors enabling forward PID for center of mass energies in the range of 3 to 7.7 AGeV Au+Au collisions. At miniCBM, high-performance benchmark runs of Λ production at top SIS18 energies (1.5/1.9 AGeV for Au/Ni beams) and CBM design interaction rates of 10 MHz became feasible. Apart from the physics perspectives, these FAIR Phase-0 involvements allowed for high rate detector tests including aging studies and long term stability tests. The MRPC detectors of different granularities were extensively tested in several beam campaigns at particle fluxes of up to a 30 kHz/cm² and reached by now the final design so that for some MRPC types the mass production could be started recently.

Latest detector performance results and the status of the CBM TOF project including counter mass production, the infrastructure and time line will be discussed.

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