



Contribution ID: 29

Type: **Oral Contribution**

The FAIR Phase 0 program of the CBM Time-of-Flight project

Monday, 10 February 2020 16:30 (20 minutes)

In order to provide particle identification (PID) of charged hadrons at the future high-rate Compressed Baryonic Matter (CBM) experiment the TOF group has developed a large-area Time-of-Flight (ToF) wall equipped with high rate capable Multi-gap Resistive Plate Chambers (MRPC). Prior to its destined operation at the Facility for Antiproton and Ion Research (FAIR) - starting in 2025 - this high-rate timing MRPC technology will be used for physics research at two scientific pillars of the FAIR Phase-0 program: the end-cap TOF upgrade of the STAR experiment at RHIC and the mTOF wall of the mCBM experiment at SIS18. At STAR, the fixed-target program of the Beam Energy Scan II (BES-II) will rely on 108 CBM MRPC detectors for forward PID at trigger rates of up to 2 kHz. At mCBM, high-performance benchmark runs of Lambda-baryon production at top SIS18 energies and CBM design interaction rates of 10 MHz will become feasible with a PID backbone consisting of 25 CBM MRPC detectors. Apart from the physics perspective, these pre-FAIR involvements will help gathering experience in operating the final CBM TOF wall comprising about 1500 MRPC detectors and 110,000 readout channels. The status of the FAIR phase 0 program will be discussed.

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Session Classification: New Experiments