Contribution ID: **35** Type: **not specified**

mini-CBM data acquisition system - status and outlook

Wednesday 4 December 2019 12:15 (15 minutes)

The Compressed Baryonic Matter experiment (CBM) will be based at the new Facility for Antiproton and Ion Research (FAIR), which will deliver heavy-ion beams up to energies of 14 AGeV for N=Z beams. In nucleus-nucleus collisions at these beam energies strongly interacting matter with densities up to 10 times normal nuclear matter is expected to be produced. The key objective of CBM is to investigate the QCD phase diagram in the region of high baryon-densities, where a first order phase transition from hadronic to partonic matter as well as a chiral phase transition is expected to occur, representing a substantial discovery potential at FAIR energies. As a fixed-target experiment CBM is consequently designed to cope with very high interaction rates up to 10 MHz. This will allow to perform high precision measurements of extremely rare probes which have not been accessible by previous nucleus-nucleus experiments in this energy regime. To achieve the high rate capability CBM will be equipped with fast and radiation hard detectors employing free-streaming and self-triggered readout electronics.

The newly built mini-CBM (mCBM) setup at GSI serves as technology demonstrator for the full CBM experiment. A prototype high performance Data Acquisition (DAQ) system for mCBM was built in 2018. In spring 2019 mCBM took first beam for a high rate system test of the detector systems, the free-streaming readout chain, the online time-slice building and online data monitoring in the First Level Event Selector (FLES). We will report on the current status of the mCBM DAQ system, which is based on microTCA hardware.

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Session Classification: Session 2: Facility status reports