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The mCBM experiment at SIS18 of GSI/FAIR - a CBM precursor and demonstrator

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The Compressed Baryonic Matter experiment (CBM) at FAIR is designed to measure nucleus-nucleus collisions at an unprecedented interaction rate of up to 10MHz which will allow the study of extremely rare probes with high precision. To achieve this high rate capability, CBM will be equipped with fast and radiation-hard detectors, which are readout via a triggerless-streaming data acquisition system, transporting data with a bandwidth of up to 1 TB/s to a large scale computer farm for event reconstruction and first level event selection. In order to commission and optimize prototypes and pre-series productions of CBM detector systems with their triggerless-streaming read-out chains under realistic experiment conditions, a precursor experiment and demonstrator named mCBM@SIS18 (short “mCBM”) has been constructed 2017/18 at the SIS18 facility of GSI/FAIR, taking data within the FAIR phase-0 program since 2019. The primary aim of mCBM is to commission and optimize (i) the triggerless-streaming data acquisition system including data transport to a high performance computer farm, (ii) the online track and event reconstruction and event selection algorithms and (iii) the online data analysis as well as the controls software packages. mCBM comprises prototypes and pre-series components of all CBM detector subsystems and their read-out systems. During the mCBM beam campaign ‘21 high-rate tests with nucleus-nucleus collisions for various detector subsystems could be performed, furthermore first runs with the final DAQ / data transport configuration of CBM were taken in O+Ni collisions at 2.0AGeV kinetic bombarding energy, running at approx. 1MHz collision rate. First results of the 2021 campaign will be presented.

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