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Status of the CBM experiment at FAIR and results from the CBM demonstrator experiment

Monday 8 July 2024 17:15 (20 minutes)

The Compressed Baryonic Matter (CBM) experiment is under construction at the Facility for Antiproton and Ion Research (FAIR). It aims to explore the phase structure of strongly interacting (QCD) matter at large net-baryon densities and moderate temperatures by means of heavy-ion collisions in the energy range sqrt(s_NN) = 2.9 - 4.9 GeV. As fixed-target experiment, CBM is equipped with fast and radiation hard detector systems and an advanced triggerless data acquisition scheme. The CBM experiment will measure at interaction rates of up to 10 MHz by performing online 4D (space-time) reconstruction and even selection, thus allowing measurements of rare probes not studied so far such as multi-strange hadrons and their antiparticles, double-strange hypernuclei and di-leptons.

This contribution will be an overview of the CBM physics goals among which are the equation-of-state of compressed nuclear matter, the possible phase transition from hadronic to partonic phase, and chiral symmetry restoration. The CBM physics performance in terms of (multi-)strange particle production, dilepton spectroscopy, fluctuations, and collective phenomena will be discussed. In addition, the status of preparations towards CBM commissioning in 2027, including performance evaluation of the CBM components at FAIR Phase-0 experiments and the latest results of a CBM demonstrator test-setup operating with SIS18 beams (mCBM), will be presented.

session

G. Heavy Ion Physics

Primary authors: HOEHNE, Claudia (University Giessen, GSI); CBM COLLABORATION, for the

Presenter: HOEHNE, Claudia (University Giessen, GSI)

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