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The Compressed Baryonic Matter Experiment at FAIR - physics at SIS-100 and SIS-300

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The Compressed Baryonic Matter (CBM) Experiment will explore the phase diagram of strongly interacting matter in the region of high net baryon densities. The experiment is laid out to process nuclear collisions at rates up to 10 MHz, the highest in the field. A unique wide spectrum of observables will be accessible, including rarest probes like hadrons containing charm quarks, or multi-strange hyperons.

The realization of the full CBM physics programme requires heavy-ion beams of energies up to 45 GeV/nucleon. Those will be delivered by the SIS-300 synchrotron at the completed FAIR accelerator complex. Parts of the research programme can already be addressed with the SIS-100 synchrotron installed in the same machine tunnel for the start phase of FAIR. The initial energy range of up to 11 GeV/nucleon for heavy nuclei, 14 GeV/nucleon for light nuclei, and 29 GeV for protons, allows addressing the equation of state of compressed nuclear matter, the properties of hadrons in a dense medium, the production and propagation of charm near the production threshold, and exploring the third, strange dimension of the nuclide chart.

In the presentation we discuss the CBM physics programmes and the detector setup with focus on the first years of operation at FAIR, along with an outline of the recently begun construction of the accelerator facility.

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