

Di-lepton spectroscopy in CBM

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The Compressed Baryonic Matter (CBM) experiment at the future Facility for Antiproton and Ion Research (FAIR) at GSI in Darmstadt will be a dedicated heavy-ion experiment exploring the QCD phase diagram in the region of moderate temperatures but very high baryon densities with $A + A$ collisions from 10-45 AGeV beam energy. The CBM research program includes the search for the first order phase transition between hadronic and partonic matter, and for the onset of chiral symmetry restoration. One of the key observables are low-mass vector mesons and charmonium decaying into lepton pairs. As leptons leave the hot and dense fireball without further interactions, their study will provide information on the in-medium properties of vector mesons, and on charm production and propagation in hot and dense matter.

In CBM, we currently investigate both options of a dilepton measurement, i.e. the di-electron and the di-muon channel. Both methods have their specific advantages and disadvantages which have to be carefully investigated in simulations and during detector R&D. The main challenge for a di-electron measurement is the large background of electrons from physical sources, for di-muons its mainly the contribution from misidentified muons due to pion-decay in flight or track mismatches in the muon absorber. In this contribution we will discuss and compare both cases by showing detector simulations and detailed background and feasibility studies. Detector concepts and first steps in detector R&D will also be presented.