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Measurements of dileptons with the CBM-Experiment at FAIR

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The Compressed Baryonic Matter (CBM) experiment at the upcoming Facility for Antiproton and Ion Research (FAIR) will explore the phase diagram of nuclear matter at very high net-baryon densities and moderate temperatures in nucleus-nucleus collisions at beam energies up to 45 A GeV . One of the key diagnostic probes of strongly-interacting matter at extreme conditions are dileptons. Dilepton measurements performed so far in heavy-ion collisions at various energies have found that the major challenge is to subtract the combinatorial background which overwhelms the interesting signals such as the rho spectral distribution, direct radiation from the fireball at intermediate invariant masses, and charmonia. This background is of different physical origin for dielectron and dimuons, and differs as function of invariant mass. Therefore, the systematic and statistical errors of the extracted signals will be substantially minimized by measuring both electron and muon pairs. The CBM detector is designed as a multi-purpose device which will be able to measure hadrons, electrons and muons in heavy-ion collisions. Electrons will be measured using a Ring Imaging Cherenkov (RICH) detector in combination with a Transition Radiation Detector. For muon measurements, the RICH detector will be replaced by a large area Muon detection system consisting of alternating layers of hadron absorbers and tracking chambers. The results of performance studies and the status of the detector developments will be presented.

On behalf of collaboration:

CBM

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