

Feasibility study of muon chamber for CBM experiment at FAIR

The compressed baryonic matter (CBM) experiment at the future FAIR accelerator center in Darmstadt, Germany, aims at the investigation of baryonic matter at highest net baryon densities but moderate temperatures, by colliding heavy-ions at beam energies from 10 to 45 A GeV. The research program comprises the exploration of basic landmarks of the QCD phase diagram like transitions from hadronic to partonic phase, the region of first order de-confinement as well as chiral phase transition, and the critical end point. The proposed key observables include the measurement of low mass vector mesons and charmonia, which can be detected via their decay into the di-lepton channel. As the leptons leave the hot and dense fireball without further interactions, hence they provide almost unscathed information about the interior of the collision zone where they are being created. In this paper, we discuss the physics motivation, detector concepts, and the feasibility studies of the di-muon measurements for central Au + Au collisions, with a special reference to the detailed simulation activities performed by the CBM muon group.

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