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Performance for anisotropic flow measurements of the future CBM experiment at FAIR

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The Compressed Baryonic Matter experiment (CBM) at FAIR aims to study the area of the QCD phase diagram at high net baryon densities and moderate temperatures using collisions of heavy ions at center-of-mass energies of a few GeV per nucleon. Anisotropic transverse flow is among the key observables to study the properties of matter created in such collisions.

The CBM performance for anisotropic flow measurements is studied with Monte-Carlo simulations using gold ions at SIS-100 energies with lab momentum of 2-10 AGeV employing different heavy-ion event generators. Various combinations of CBM detector subsystems are used to investigate the possible systematic biases in flow measurement and to study effects of detector azimuthal non-uniformity. The resulting performance of CBM for flow measurements is demonstrated for different harmonics of identified charged hadron anisotropic flow as a function of rapidity and transverse momentum in different centrality classes.

The measurement techniques developed for CBM were also validated with the experimental data recently collected by the NA61/SHINE experiment at CERN SPS for Pb-Pb collisions at the beam momenta 13 and 30 AGeV (the first energy point is close to the top SIS-100 energy). This is also of importance for CBM performance studies, because both CBM and the NA61/SHINE are fixed target experiments and have a similar Projectile Spectators Detector (PSD) as a part of their setup.

Content type

Experiment

Collaboration

CBM

Centralised submission by Collaboration

Presenter name already specified

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