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Performance of the CBM experiment at FAIR for measurement of charged hadron anisotropic flow

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The Compressed Baryonic Matter experiment (CBM) at FAIR aims to investigate the high net baryon density and moderate temperature region of the QCD phase diagram, 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 charged hadron's anisotropic flow measurements is studied with Monte-Carlo simulations using gold ions at SIS-100 energies with lab momentum up to 12A GeV/c 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 the 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.

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