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CBM performance for anisotropic flow of charged hadrons and (multi)-strange hyperons in heavy-ion collisions

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Anisotropic flow of produced hadrons, in particular of multi-strange hyperons, is an important observable for understanding the dynamics and properties of the QCD matter created in heavy-ion collisions at high net baryon densities. The performance of the Compressed Baryonic Matter (CBM) experiment at FAIR is presented for anisotropic flow measurement relative to the projectile spectator plane for charged hadrons and rarely produced multi-strange hyperons. Multi-differential results for different flow harmonics are obtained as a function of rapidity and transverse momentum in different centrality classes.
The performance for collisions of gold ions for the FAIR energy range, $\sqrt{s_{NN}} = 2.9 - 4.9\ GeV$, is studied using various heavy-ion event generators in GEANT4 Monte-Carlo transport coupled to simulations of the CBM detector response. The evaluation of possible systematic biases in CBM, such as due to non-flow, detector anisotropies and inefficiencies, will be presented. It will be complemented with the comparison of various flow measurement techniques, including the scalar product method with multiple subevents and the invariant mass fit method for flow extraction of (multi-)strange decays, where large combinatorial background has to be subtracted. The application of the multi-particle correlation techniques and flow cumulants for low multiplicity collisions at CBM will also be presented.

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