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Performance studies for collective flow measurements with CBM at FAIR

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Measurements of the directed and elliptic flow of strange and multi-strange hadrons are an important part of the physics program of the Compressed Baryonic Matter experiment (CBM) at the future accelerator complex FAIR in Darmstadt, Germany. It was shown recently by studies from the RHIC BES program that $dv_1/dy|y = 0$ and the difference between v_2 of particles and antiparticles in the $\sqrt{s_{NN}}$ region of a few GeV are of great interest for understanding a pattern of the phase transition between quark-gluon and hadronic matter. Precision measurements of these observables in the CBM experiment will be a significant step forward in the exploration of the QCD phase diagram in the region of $\sqrt{s_{NN}} = 2 - 5$ GeV.

We will present recent results from CBM performance studies for measurements of the directed (v_1) and elliptic (v_2) flow of strange hadrons, Λ and K^0_s. Detailed comparison of these coefficients for different collision energies and event generators (UrQMD or DCM-QGSM models) will be presented. For the performance studies we use the CBMROOT environment for Monte-Carlo simulations and event reconstruction. The Kalman Filter Particle Finder (KFParticleFinder) package is used for hyperon reconstruction via their weak decays, and the Projectile Spectator Detector (PSD) for event plane determination. A status of the fast simulator implementation for the PSD calorimeter response, which is required for high statistics simulation, will be also presented.

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