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CBM performance for the measurement of Λ hyperon's directed flow in Au+Au collisions at FAIR SIS-100 energies

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The main goal of the CBM experiment is to study highly compressed baryonic matter produced in collisions of heavy ions. The SIS-100 accelerator at FAIR will give a possibility to investigate the QCD matter at temperatures up to about 120 MeV and net baryon densities 5-6 times the normal nuclear density. Hyperons produced during the dense phase of a heavy-ion collision provide information about the equation of state of the QCD matter. The measurement of their anisotropic flow is important for understanding the dynamics and evolution of the QCD matter created in the collision.
We will present the status of the performance studies for Λ hyperon directed flow measurement with the CBM experiment at FAIR. Λ hyperons decay within the CBM detector volume and are reconstructed via their decay topology. The Particle-Finder Simple package, which provides an interface to the Kalman Filter Particle (KFParticle) mathematics, is used to reconstruct $\Lambda \rightarrow p + \pi^-$ decay kinematics and to optimize criteria for Λ hyperon candidate selection. Directed flow of Λ hyperons calculated using different flow measurement techniques is studied as a function of rapidity, transverse momentum and collision centrality. The effects on flow measurement due to non-uniformity of the CBM detector response in the azimuthal angle, transverse momentum and rapidity are corrected using the QnTools analysis package.

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