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Reconstruction of particles produced at different stages of heavy ion collision in the CBM experiment at FAIR

One of the main purposes of the physics program of the future heavy ion experiment CBM (FAIR, Germany) is to understand the properties of strongly interacting matter at very high baryonic densities and to study the possibility of a phase transition to a deconfined and chirally restored phase of quark matter. The experiment will operate at high interaction rates up to 10 MHz, that requires a full event reconstruction in real time.

In order to make an efficient event selection online a clean sample of particles has to be provided by the reconstruction package called First Level Event Selection (FLES). The FLES package operates in two stages. First, particles registered in the CBM detector system are reconstructed. Then short-lived particles decayed before or inside the setup are searched based on their charged and neutral daughter particles. Since the FLES package is developed to run on many-core computer architectures, the reconstruction of particles is done in parallel that provides a possibility for a global competition between particle candidates. Such a global event topology reconstruction significantly improves suppression of a combinatorial background and provides for further physics analysis a very clean sample of particles produced at different stages of heavy ion collision.

The global event topology reconstruction procedure and the results of its application to simulated collisions in the CBM detector setup are presented and discussed in details.

Preferred Track

Future Experimental Facilities, Upgrades, and Instrumentation

Collaboration

Other

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