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Multi-differential analysis with KF Particle Finder in the CBM experiment

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The CBM experiment at FAIR is being designed for the study of the QCD phase diagram in the region of high baryon chemical potential at relatively moderate temperatures, where a complex structure is predicted by modern theories. The physics program of CBM is based, among others, on the precision measurements of a wide set of observables that contains extremely rare decays like, for example, charmed particles, dileptons, multi-strange particles and their antiparticles.

Such particles can be reconstructed and investigated only through their decay products. The KF Particle finder package was developed for solving the task of their reconstruction and selection. The package searches for more than 100 decay channels covering signals from most of the physics cases of the CBM experiment: strange particles, strange resonances, hypernuclei, low mass vector mesons, charmonium, and open-charm particles. Based on the Kalman filter mathematics, KF Particle Finder allows to estimate not only the parameters, but their errors as well.

The large multiplicity of the charged particles produced in heavy ion collisions leads to the combinatorial background in the reconstructed spectra of short-lived particles. The KF Particle Finder provides the machinery to describe the background and extract the signal spectra. Collecting the efficiency plots, the package contains tools for efficiency correction of the obtained spectra and their multi-differential analysis. Results obtained for strange particles are discussed. The rich functionality of KF Particle Finder makes it a universal platform for physics analysis.

Content type

Experiment

Collaboration

CBM

Centralised submission by Collaboration

Presenter name already specified

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