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Event-by-event extraction of kinetic and chemical freeze-out properties in the CBM experiment

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The future CBM experiment at FAIR is designed to study properties of strongly interacting matter produced in heavy-ion collisions at high baryon densities. It will employ high intensity beams and large acceptance detectors. One important task is to extract the thermal parameters of matter at stages of kinetic and chemical freeze-out from the observed data.

The extraction of thermal parameters is implemented as a package within the CBMROOT framework. The kinetic freeze-out temperature and the inverse slope of charged pions, kaons and protons are extracted from their measured momentum spectra with appropriate correction on acceptance and reconstruction efficiency. The longitudinal flow is taken into account in the framework of a Blast Wave model. The parameters of the chemical freeze-out are extracted by fitting the measured particle ratios in the framework of Hadron Resonance Gas model.

The described procedures can be performed both online and offline, on events selected with arbitrary criteria. The analysis can be done on event-by-event as well as on the inclusive spectra level.

On behalf of collaboration:

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