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Fast reconstruction of tracks in the inner tracker of the CBM experiment

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Typical central Au-Au collision in the CBM experiment (GSI, Germany) will produce up to 700 tracks in the inner tracker. Large track multiplicity together with presence of nonhomogeneous magnetic field make reconstruction of events complicated.

A cellular automaton method is used to reconstruct tracks in the inner tracker. The cellular automaton algorithm creates short track segments in neighbored detector planes and links them into tracks. Being essentially local and parallel the cellular automaton avoids exhaustive combinatorial search, even when implemented on conventional computers. Since the cellular automaton operates with highly structured information, the amount of data to be processed in the course of the track search is significantly reduced. The method employs a very simple track model which leads to utmost computational simplicity and fast algorithm.

Efficiency of track reconstruction for particles detected in at least three stations is presented. Tracks of high momentum particles are reconstructed very well with efficiency about 98%, while multiple scattering in detector material leads to lower reconstruction efficiency of slow particles.

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