

First Level Event Selection Package of the CBM Experiment

Thursday, March 26, 2009 6:10 PM (20 minutes)

The CBM Collaboration builds a dedicated heavy-ion experiment to investigate the properties of highly compressed baryonic matter as it is produced in nucleus-nucleus collisions at the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. This requires the collection of a huge number of events which can only be obtained by very high reaction rates and long data taking periods. Reaction rates are up to 10 MHz (minimum bias) which corresponds to a beam intensity of 10^9 beam particles per second on a 1% interaction target. The rare signals are embedded in a large background of charged particles. A typical central Au+Au collision in the CBM experiment will produce up to 700 tracks in the inner tracker. Large track density together with presence of non-homogeneous magnetic field make reconstruction and selection of events complicated. A chain of reconstruction procedures is developed for the first level event selection. It includes a cellular automaton based track finder, Kalman filter based track and decay particle fitters, and a procedure for selection of rare physics channels, like open charm. The most time consuming algorithms are parallelized using the SIMD instruction set. Having high efficiency and speed, the package is successfully used in the CBM experiment for feasibility studies and detector optimization.

Primary authors: Mr KULAKOV, Igor (University of Kiev); Dr VASSILIEV, Iouri (Kirchhoff Institute for Physics, University of Heidelberg); Ms ROSTOVTSEVA, Irina (Institute of Theoretical Physics, Moscow); Dr KISEL, Ivan (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt); Mr GORBUNOV, Sergey (Kirchhoff Institute for Physics, University of Heidelberg)

Presenter: Dr KISEL, Ivan (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt)

Session Classification: Online Computing

Track Classification: Online Computing