

Towards the realization of the CBM-Micro Vertex Detector: Technological challenges and detector response simulation

The future Compressed Baryonic Matter (CBM) experiment, to be operated at the FAIR facility at GSI, Darmstadt, aims at the exploration of the properties of dense baryonic matter. In particular, the search for in-medium modifications of hadrons, the study of the transition from hadronic to partonic degrees of freedom and the experimental search for a critical endpoint in the phase diagram of strongly interacting matter are among the principal physics goals of CBM.

A major challenge of CBM is to measure rare and penetrating probes such as open charm, which is produced close to kinematical threshold at FAIR energies. Open charm identification is based on distinguishing the displaced decay vertices from the nuclear collision vertex. This approach calls for a performant vertex detector.

The Micro Vertex Detector (MVD) proposed for CBM will consist of several layers of pixel detectors. Currently, the most promising candidates are Monolithic Active Pixel Sensors (MAPS) which provide high granularity, low material budget, good radiation hardness and relatively good readout time.

We will present the technological challenges of the MVD and approaches towards the realization of the detector. A new detector response model for simulating the MAPS sensors will be presented and related results will be shown.

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