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Prototyping the Micro Vertex Detector of the Compressed Baryonic Matter Experiment at FAIR.

The Compressed Baryonic Matter Experiment (CBM) is one of the core experiments of the future FAIR facility at Darmstadt/Germany. The fixed-target experiment will explore the phase diagram of strongly interacting matter in the regime of highest net baryon densities with numerous probes, among them open charm. Open charm reconstruction requires a vacuum compatible Micro Vertex Detector (MVD) with unprecedented properties. Its sensor technology has to feature a spatial resolution of <5µm, a non-ionizing radiation tolerance of >1013 neq/cm², an ionizing radiation tolerance of 3 Mrad and a readout time of few 10 µs/frame. Thinned Monolithic Active Pixels Sensors, developed at IPHC Strasbourg, are promising candidates, if integrated in an ultra-thin detector, employing high-performance materials such as thermal CVD-Diamond. The need of prototyping and characterizing the CBM-MVD motivated the construction of a ultra-low mass, high precision detector setup incorporating several prototype stations. Each station contains 2 (single-sided station) or 4 (double-sided station) identical 50 µm thick CMOS sensors. The sensors are glued to CVD diamond carriers which provide at the same time a mechanical support and an efficient heat evacuation.

This contribution will focus on mechanical integration and operation of the telescope as well as the concept of the customized DAQ system.

quote your primary experiment

CBM

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