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The MVD of the CBM experiment at FAIR: Selected Aspects of Mechanical Integration

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The Compressed Baryonic Matter experiment (CBM) at the future FAIR facility at Darmstadt (Germany) explores 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, arranged in (up to) four planar detector stations in close vicinity of the (fixed) target. The CBM-MVD requires sensors featuring a spatial resolution of < 5 µm, a non-ionizing radiation tolerance of > 10^{13} n_{eq}/cm^2, an ionizing radiation tolerance of 3 Mrad, a readout speed of few 10 s/frame, and the integration in detector planes with several per mille X0 material budget only.

In the pre-production phase we are constructing the precursor of the second MVD station. The project addresses a double-sided integration of 15 MIMOSA-26 sensors onto a 8x8 cm^2 CVD diamond carrier featuring a thickness of 150 µm. The sensors are arranged in ladders composed of 3 sensors each

This contribution summarizes the activities undertaken to construct a precursor of a quadrant of the second MVD station, in particular:

- Vacuum-compatible gluing procedures
- Positioning of ultra-thin sensors using dedicated jigs
- Development of low material budget, copper-based flex-print cables
- Thermal management studies in vacuum
- Sensor commissioning and bonding

Presenter: TISCHLER, Tobias Hubertus