

MIMOSIS, a CMOS sensor for the CBM Micro Vertex Detector

The Compressed Baryonic Matter Experiment (CBM) is one of the core experiments of the future FAIR facility at Darmstadt/Germany. This experiment will explore the phase diagram of strongly interacting matter in the regime of high net baryon densities with numerous rare probes. The Micro Vertex Detector (MVD) will determine the secondary decay vertex of open charm particles with $\sim 50 \mu\text{m}$ precision, contribute to the background rejection in di-electron spectroscopy and help to reconstruct neutral decay products of strange particles by means of missing mass identification.

The MVD will be placed between 5 and 20 cm downstream the target and inside vacuum and operate at average collision rates of 100 kHz Au-Au and of 10 MHz p-Au. It will be operated with a dedicated CMOS Monolithic Active Pixel Sensor named MIMOSIS. Its design relies on the pixel array read-out architecture of the ALPIDE sensor developed for the ALICE ITS upgrade and extends its rate capability by more than one order of magnitude. Moreover, the fixed target geometry of the MVD creates specific challenges including strong gradients in the track density and radiation load, a bombardment with direct beam ions and substantial beam intensity fluctuations.

We will discuss those challenges, introduce the requirements for the detector technology and show the solutions foreseen in the MIMOSIS sensor. Moreover, the status of the tests of the first sensor prototype MIMOSIS-0 will be given.

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