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Recent results from the MIMOSIS-1 CMOS MAPS

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The CMOS Sensor MIMOSIS is being designed to equip the Micro Vertex Detector (MVD) of the CBM experiment at FAIR in Darmstadt, Germany. It will feature 1024 × 504 pixels with 27 x 30µm pitch and combine a time resolution of 5 µs with a spatial resolution of ~ 5 µm. Moreover, it will have to handle a peak rate of 80 MHz/cm² and radiation doses of 5 MRad and up to 10^{14} n_{eq}/cm^2 per year. It is being developed within a joint R&D program of IPHC Strasbourg, Goethe University Frankfurt and GSI/FAIR.

The first full size sensor prototype MIMOSIS-1 was developed and tested intensely. It hosts conventional DC-coupled pixels and innovative AC-coupled pixels suited to fully deplete the sensing element with voltages of up to 20V. The detection performances of the device, its immunity to the above-mentioned radiation doses and heavy ion impacts was studied in the laboratory and in a series of beam tests at DESY, CERN, and GSI. In addition, the capability of the device to identify nuclear fragments by dE/dx was evaluated with a deuterium beam at COSY. The contribution will summarize the design considerations of MIMOSIS, discuss the results obtained and introduce our plans for the test of the consecutive MIMOSIS-2 prototype.

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