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CMOS pixels sensors for the ILC vertex detector

Tuesday 16 March 2021 11:00 (15 minutes)

A Monolithic CMOS Pixel Sensors (CPS), named MIMOSIS, is currently being developed by IPHC/IKF/GSI to equip the Micro-Vertex Detector (MVD) of the CBM heavy ion experiment at FAIR/GSI in the TJ 180nm technology. It features about 500 000 pixels with in-pixel discrimination and data driven read-out. The first full size prototype (MIMOSIS-1) has been fabricated in 2020 in different epitaxial variants. Functionnal tests are ongoing and a status of the first characterizations will be provided. Sensors adapted to the ILC requirements are expected to be directly derivable from this chip, with spatial resolution of about 4 mum, a time resolution of about 1-2 mus and an instantaneous data flow of about few GB/s.

A second part of the talk will evoke the newly available 65 nm process. This technology is expected to offer new perspectives and improvements in terms of granularity, time resolution, power consumption and possibly stitching to cover large area detectors. Several laboratories coordinated by CERN (ALICE ITS3 WP2 and CERN EP WP 1.2) realized a first joined submission in 2020. IPHC (supported by the CREMLIN+ WP7 program) has contributed to this effort concentrating on different test structures and several fully functionnal prototypes (CE_65) with analog output, offering the possibility to be tested in beam in order to explore the charge collection and the VFE performances of the technology for charged particle detection.

Finally, general perspectives on the way to achieve the ILC vertex detector requirements will be provided.

Time Zone

Europe/Africa/Middle East

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