

Contribution ID: 69

Type: Oral presentation using Zoom

CMOS pixels sensors R&D for the ILC vertex detector

Thursday 28 October 2021 16:10 (20 minutes)

A Monolithic CMOS Pixel Sensors (CPS), MIMOSIS, is currently being developed in the TJ-180nm technology by IPHC/IKF/GSI to equip the Micro-Vertex Detector (MVD) of the CBM heavy ion experiment at FAIR/GSI and within the CREMLIN+ program. Thanks to its targeted performances (5 microns spatial resolution/5 micro-second time resolution) MIMOSIS will reach a milestone for the ILC vertex detector requirements. The first full size prototype (MIMOSIS-1) has been fabricated in 2020, containing both AC and DC pixels, and reached a step forward concerning the data flow that CPS can handle in this technology with a pitch smaller than 30 microns. In 2021, Mimosis-1 has been tested extensively in lab and beam at DESY II test beam facility and CERN-SPS with different sensitive layers. Charged particle detection performances (Efficiency and spatial resolution) will be presented in different configurations. Preliminary results with irradiated chips will also be discussed. Sensors adapted to the ILC requirements are expected to be directly derivable from this chip, with spatial resolution of about 4 microns, a time resolution of about 1-2 micro-seconds and an instantaneous data flow of about few GB/s while keeping the Power consumption in a range compatible with air flow cooling.

A second part of the talk will adress the development of the 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 has contributed to this effort concentrating on different test structures and several functionnal small-size prototypes (CE_65) with analog output, offering the possibility to be tested in beam for charged particle detection. Preliminary results of the first tests of CE_65 will be presented.

1st preferred time slot for your oral presentation

15:30-17:30 JST (8:30-10:30 CEST, 2:30-4:30 EDT, 23:30-1:30 PDT)

2nd preferred time slot for your oral presentation

19:00-21:00 JST (12:00-14:00 CEST, 6:00-8:00 EDT, 3:00-5:00 PDT)

Primary author: BESSON, Auguste Guillaume (Centre National de la Recherche Scientifique (FR))
Presenter: BESSON, Auguste Guillaume (Centre National de la Recherche Scientifique (FR))
Session Classification: C-1: Tracking detectors

Track Classification: Parallel sessions: Detectors: Session C: Tracking detectors