3rd DRD3 week on Solid State Detectors R&D



Contribution ID: 41

Type: WG1 - Monolithic Sensors

## Status of the non amplified MiniCactus V2 chip in LF15A technology and first steps towards sensors with intrinsic amplification.

Monday 2 June 2025 17:00 (20 minutes)

The Cactus and MiniCactus chip series are demonstrator sensors optimized for precision time measurement of the time of arrival of charged particles. Their goal is to explore the performance that can be obtained from non amplified monolithic sensors, especially with the LFoundry LF15A 150 nm technology. The last iteration of MiniCactus, called MiniCactus V2, has been tested in beam in June-July 2024 at CERN. The best time resolution obtained so far is 60 ps on a 500 micron by 500 micron pixel, with a 175 micron thick sensor biased at -350 V. We will describe the limitations encountered in the testbeam, how they have been understood and overcome and how the performance of the front-end has been optimized to prepare the next test beam period, planned in July 2025 at CERN.

Since a possible path to improve on the time resolution of monolithic sensors is the addition of a buried PN junction, acting as a charge multiplicating layer, we will also show IV curves of such test structures that have been produced in LF15A technology. This characterization is a first step towards assessing the complete functionality and performance of this new type of sensor.

## Type of presentation (in-person/online)

online presentation (zoom)

## Type of presentation (I. scientific results or II. project proposal)

I. Presentation on scientific results

**Authors:** Mr HANLON, Archie (University of Liverpool); VILELLA FIGUERAS, Eva (University of Liverpool (GB)); GUILLOUX, Fabrice (Université Paris-Saclay (FR)); MEYER, Jean-Pierre (IRFU-CEA - Centre d'Etudes de Saclay (CEA)); Prof. SCHWEMLING, Philippe (Université Paris-Saclay (FR)); CASANOVA MOHR, Raimon (IFAE - Barcelona (ES)); ALEKSAN, Roy (Université Paris-Saclay (FR)); GRINSTEIN, Sebastian (IFAE - Barcelona (ES)); DEGERLI, Yavuz (CEA Saclay); GAN, Yujing

Presenters: Prof. SCHWEMLING, Philippe (Université Paris-Saclay (FR)); DEGERLI, Yavuz (CEA Saclay)

Session Classification: WG/WP1 - CMOS technologies