



Contribution ID: 171

Type: **Live Presentation**

## Development and characterization of a DMAPS chip in TowerJazz 180 nm technology for high radiation environments and its use case for the Belle II vertex detector upgrade

Thursday, February 24, 2022 12:15 PM (20 minutes)

The increasing availability of commercial CMOS processes with high-resistivity wafers has fueled the R&D of depleted monolithic active pixel sensors (DMAPS) for usage in high energy physics experiments. One of these developments is a series of monolithic pixel detectors with column-drain readout architecture and small collection electrode allowing for low-power designs (TJ-Monopix).

It is designed in a 180 nm TowerJazz CMOS process and features a pixel size of  $33\ \mu\text{m} \times 33\ \mu\text{m}$ . The efforts and improvements on the front-end electronics and sensor design of the current iteration TJ-Monopix2 increase the radiation hardness and efficiency while lowering the threshold and noise.

Results from laboratory measurements and test beam campaigns will be highlighted and discussed to evaluate its usage in high-radiation environments.

With its specifications and expected performance, TJ-Monopix2 will serve as a prototype chip for a future DMAPS chip (OBELIX) that will be investigated within the framework of the VTX collaboration for the upgrade of the Belle II detector at SuperKEKB.

### Primary experiment

**Primary author:** BESPIN, Christian (University of Bonn (DE))

**Co-authors:** BERDALOVIC, Ivan; CAICEDO SIERRA, Ivan Dario (University of Bonn (DE)); DINGFELDER, Jochen Christian (University of Bonn (DE)); HEMPEREK, Tomasz (University of Bonn (DE)); HIRONO, Toko (University of Bonn); HUEGGING, Fabian (University of Bonn); KRÜGER, Hans (University of Bonn); KUGATHASAN, Thanushan (CERN); MARIN TOBON, Cesar Augusto (University of the Witwatersrand (ZA)); MOUSTAKAS, Konstantinos (PSI - Paul Scherrer Institut); PERNEGGER, Heinz (CERN); SNOEYS, Walter (CERN); WANG, Tianyang (University of Bonn (DE)); WERMES, Norbert (University of Bonn (DE))

**Presenter:** BESPIN, Christian (University of Bonn (DE))

**Session Classification:** Semiconductor Detectors

**Track Classification:** Semiconductor Detectors