MATTER AND TECHNOLOGIES

Contribution ID: **34** Type: **Poster without speed talk**

MALTA: A monolithic active pixel sensor for radiation harsh environments

MALTA is a depleted monolithic active pixel sensor developed in the Tower 180 nm CMOS imaging process. Monolithic CMOS sensors offer advantages over current hybrid imaging sensors both in terms of increased tracking performance due to lower material budget but also in terms of ease of integration and construction costs due to the integration of read-out and active sensor into one chip. Current research and development efforts are aimed towards radiation hard designs up to 100 Mrad in Total Ionizing Dose (TID) and >1x1015 1 MeV neq/cm² in Non-Ionizing Energy Loss (NIEL). The design of the MALTA sensors was specifically chosen to achieve radiation hardness up to these requirements and satisfy current and future collider constraints. The current MALTA pixel architecture employs small electrodes which provide overall smaller noise, higher voltage signal and better power performance ratio. To counteract loss of efficiency in pixel corners, modifications to the Tower process have been implemented. The MALTA sensors have been tested during the 2021 SPS CERN Test Beam in the MALTA telescope. Additional characterization of MALTA2 samples will also take place during the 2022 campaign. The telescope ran for the whole duration of the beam and took data in order to characterize the novel MALTA2 variant and the performance of irradiated samples in terms of efficiency and cluster size. These campaigns aim to show that MALTA is an interesting prospect for HL-LHC and beyond collider experiments, providing both very good tracking capabilities and radiation hardness in harsh radiation environments.

Primary author: BERLEA, Vlad Dumitru (Z_DET (Detektorentwicklung))

Presenter: BERLEA, Vlad Dumitru (Z_DET (Detektorentwicklung))

Session Classification: Conference Dinner with Poster exhibit

Track Classification: Detector Technologies and Systems