Contribution ID: **115**   Type: **Oral**

Depletion depth studies with the MALTA2 sensor, a depleted monolithic active pixel sensor

Friday 8 December 2023 09:40 (20 minutes)

MALTA2 is a depleted monolithic active pixel sensor developed in the Tower Semiconductor 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 ASIC. Current research and development efforts are aimed towards radiation hard designs up to 100 Mrad in Total Ionizing Dose and 3×10^{15} $1\ MeV\ n_{eq}/cm^2$ in Non-Ionizing Energy Loss . One important property of a sensor's radiation hardness is the depletion depth at which efficient charge collection is made via drift movement. Grazing angle test beam data was taken during the 2023 SPS CERN Test Beam with the MALTA telescope and Edge Transient Current Technique studies were performed at DESY in order to develop a quantitative study of the depletion depth for both un-irradiated and irradiated MALTA2 samples. These measurements together with efficiency, cluster size and timing measurements before and after neutron irradiation show that MALTA2 is an interesting tracking sensor for HL-LHC and beyond collider experiments, providing both very good tracking capabilities and radiation hardness in harsh radiation environments.

Submission declaration

Original and unplublished

Primary author: BERLEA, Dumitru-Vlad (Deutsches Elektronen-Synchrotron Campus Zeuthen (DE))

Co-author: SOLANS SANCHEZ, Carlos (CERN)

Presenter: BERLEA, Dumitru-Vlad (Deutsches Elektronen-Synchrotron Campus Zeuthen (DE))

Session Classification: Day 5 - Session 1

Track Classification: Pixel sensors for tracking