Contribution ID: **389** Type: **Poster**

Recent results with MALTA, a radiation hard CMOS Monolithic Active Pixel sensor

Tuesday, 28 May 2024 16:00 (1 minute)

MALTA is a fully-depleted Monolithic Active Pixel sensor (MAPs) developed in the Tower 180nm CMOS image sensor process. Compared to conventional tracking sensors, MAPs offer the potential for improved tracking performance and also easier integration and reduced cost due to the merger of readout and sensor. The MALTA pixel architecture is designed for high-rate and fast response time, and employs a small charge collection electrode to minimise input capacitance; design choices which lead overall to lower noise, higher voltage signal and lower power consumption. The MALTA sensor has been developed with a small 34.4 x 34.4 μm^2 pixels to achieve excellent pointing resolution and the advantages of monolithic design, while at the same time maintaining performance in high radiation environments. Radiation-hard devices are shown to have excellent timing and signal performance after 1x10^15 1 MeV neq/cm^2 in non-ionizing energy loss and 100 Mrad in total ionizing dose, values that satisfy the requirements for future collider applications.

Second-generation MALTA2 sensors were developed on both epitaxial silicon and also high-resistivity Czochralski silicon, to ensure efficient charge collection and excellent timing after irradiation. Sensors have been tested in the SPS CERN Test Beam using the MALTA beam telescope, and also using a pulsed laser based Edge Transient Current Technique. Irradiated MALTA2 variants have been characterised for performance in terms of efficiency and cluster size, and the latest results will be presented. The tests show that MALTA is an interesting prospect for future collider experiments, providing both very good tracking capabilities and radiation hardness in harsh radiation environments. Finally, progress on the next generation of MALTA devices will be presented.

Collaboration

Role of Submitter

I am the presenter

Primary author: WORM, Steve (DESY / Universität zu Berlin)

Presenter: WORM, Steve (DESY / Universität zu Berlin)

Session Classification: Solid State Detectors - Poster session

Track Classification: T3 - Solid State Detectors