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Radiation hardness and timing performance of MALTA monolithic Pixel sensors in Tower 180 nm

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The MALTA family of Monolithic Active Pixel Sensors produced in Tower 180 nm CMOS imaging technology on high-resistivity epitaxial silicon and on Czochralski substrates with a pixel size of 36.4 um2, and a 3 um2 electrode size, feature an asynchronous read-out architecture. Several process modifications, and front-end improvements have been implented on several prototypes that have resulted in reduced RTS noise, increased gain, radiation hardness of 3e15 n/cm2, time resolution below 2 ns, and a uniform charge collection efficiency across the pixel. Results form the beam tests of MALTA2 at the SPS at CERN will be presented, together with the results in laboratory conditions of Edge Transient Current Technique measurements. 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. Preliminary results from the latest prototype, Mini-MALTA3, that includes an on-chip syncrhonization memory running at 1.28 GHz and on-board serialization will also be discussed.

Type of presentation (in-person/online)

in-person presentation

Type of presentation (scientific results or project proposal)

Presentation on scientific results

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