

12th Beam Telescopes and Test Beams Workshop



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Testbeam results of single event effect studies on prototype memory chips for the ALICE ITS3 upgrade

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The ITS3 (Inner Tracking System 3) is a new innovative vertex detector planned to be installed between 2026 and 2028 during the next Long Shutdown 3 to replace the three innermost layers of the current Inner Tracking System of the ALICE experiment at the LHC as from Run4. The detector will consist of wafer-scale ultra-thin silicon Monolithic Active Pixels Sensors sensors bent to half-cylindrical shape with radii corresponding to radial distances of 18, 24 and 30 mm from the beam axis.

Within the R&D efforts to characterize the 65 nm CMOS Imaging technology used for these prototype structures in terms of radiation tolerance, two dedicated memory chips (SEU) were designed to test the Single Event Effects (SEE) sensitivity of the prototypes. To observe SEE, we exposed the SEU chips to both heavy ion and proton beams to measure the latch-up and Single Event Upset sensitivity, respectively. This contribution will present the results of those tests and discuss their impact on future sensor designs.

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