

Characterization of Single Event Latchup Cross-Section for ALPIDE

We investigated the probability of latchup in a prototype of ALPIDE (ALICE Pixel DEtector), a silicon pixel detector proposed for use in the ALICE inner tracking system. This sensor uses MAPS (Monolithic Active Pixel Sensors) technology and features integrated electronics.

Single Event Latchups (SEs) are a common problem with CMOS technology. When a heavy ion travels through the detector, it can initiate a low impedance path, potentially shorting the circuit. Resultant uncontrolled increases in current can permanently damage the sensor. The parasitic structure exhibits positive feedback and will continue to exist unless disrupted by power-cycling the system. We measured the cross section for latchup by using beams of heavy ions from the LBNL 88 inch cyclotron to deposit energy in the sensor.

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