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Enhanced lateral drift sensors: Process development and expected performance

Thursday 28 May 2020 14:36 (18 minutes)

Future experiments in particle physics foresee few-micrometer single-point position resolution in their silicon vertex detectors, motivated by e.g. b- and light-quark-tagging capabilities. Instead of scaling down pitch sizes, our sensor concept seeks to improve the position resolution by using a dedicated charge sharing mechanism. In enhanced lateral drift (ELAD) sensors, this mechanism changes the drift path deep in the sensor bulk and enables optimal resolution at a given pitch size.

Test samples are analysed with spreading resistance profiling (SRP) and SIMS and are compared to TCAD simulations. Results of the SRP and SIMS measurements as well as the feasibility of "bulk engineering" through the combination of epitaxial growth and ion beam implantation is discussed. Additionally, we demonstrate the potential of ELAD sensors in comparison to conventional planar hybrids based on test beam simulation studies carried out with Allpix Squared.

Funding information

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