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## Improving resolution with enhanced lateral drift (ELAD) sensors

Silicon tracker sensors R&D is aiming at the improvement of the position and timing resolution. Instead of scaling down pitch sizes, which comes at a high price for an increased number of channels, our new sensor concept seeks to improve the position resolution by increasing the lateral size of the charge distribution already during the drift in the sensor material. To this end, it is necessary to carefully engineer the electric field in the bulk of this so-called enhanced lateral drift (ELAD) sensor. We intend to achieve this by implants deep inside the bulk which influence the charge carriers' drift paths. Adding a multiplication layer on top of these additional doping regions would allow a charge gain in the sensor and correspondently improves the timing resolution.

In order to find an optimal sensor design, detailed simulation studies were conducted using SYNOPSIS TCAD. The geometry of the implants and multiplication layer, their doping concentration and the position inside the sensor were optimised. To estimate the position resolution of an ELAD sensor, test beam simulations using the AllPix2 software have been performed. In result, a position resolution of a few micrometers is expected by using deep implants.

Along with the simulation results, a description of the multi-layer production process is presented. In addition, details of the first submission of the ELAD sensors without a multiplication layer will be discussed.

### Primary experiment

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**Track Classification:** Semiconductor Detectors