

Semiconductor device simulation of silicon radiation detectors

Abstract - Rainer Richter

The talk addresses the application of two- and three-dimensional device simulations on state of the art silicon radiation sensors. A few aspects of process simulation which is necessary to provide the doping profiles and the topology will be also discussed. While two dimensional tools are well established for the simulation of very complex processes and devices the use of three-dimensional simulation is still limited to simpler problems for instance diode like structures.

Selected examples on the simulations of different sensor devices e.g. strip detectors, irradiated pixels, CCDs, Depleted Field Effect Transistors (DEPFET) and Avalanche diodes are presented to give an idea about the potential and the limits of the tools currently available.

Simulations are not only performed to predict the electrical performance of detector devices but also to get an insight into their operation mechanisms as well as to discover their inherent potential and their limitations. While discussing the examples special emphasis is put on these important items.