Simulation of Pixel Silicon detectors for experiment at high luminosity colliders.

Friday 17 September 2021 10:35 (1 minute)

Silicon detectors are expected to suffer unprecedented radiation damage in future high-luminosity collider detectors. Device modelling is required for detailed understanding of the performance of silicon detectors over the lifetime of the detector and to set design rules to mitigate the detrimental effect provided by radiation damage.

In the present work, results of a comprehensive simulation of the silicon pixel detector, based on TCAD-Synopsys are presented. The simulation work focuses on the Pixel detector with a 25 micron pitch, the smallest pitch used for the main vertex detectors by the HL-LHC experiments.
A detailed simulation of the device has been implemented in order to study the operating conditions of the Pixel detector. This is done through the simulation of the leakage current and the total depletion voltage as well as to study the detection performance through the simulation of the charge collection efficiency and the point spatial resolution. Furthermore, the comparison of the results is carried out with measurement and simulation based on data published by TCAD-Silvaco.

Your name

Shubhi Parolia

email

shubhi.parolia@cern.ch

Title

Ms

Nationality

Institute

INFN and University of Pisa, Italy

Authors: Mr RASSO, A. M. (INFN and University of Pisa (IT)); Prof. MESSINEO, A. (INFN and University of Pisa (IT)); Ms PAROLIA, S. (Universita & INFN Pisa (IT))

Co-authors: Prof. BHARDWAJ, A. (University of Delhi (IN)); Dr JAIN, C. (University of Delhi (IN)); Ms JAIN, G. (University of Delhi (IN)); Dr ANDROSOV, K (Institute of Physics, Ecole Polytechnique Federale de Lausanne, Lausanne); Prof. RANJAN, K. (University of Delhi (IN)); Prof. CIOCCI, M. A. (INFN and University of Pisa (IT)); Dr GRIPPO, M.T. (currently at Frontiers Media SA)

Presenter: Ms PAROLIA, S. (Universita & INFN Pisa (IT))

Session Classification: Poster Session 7 (Detectors for High Radiation and Extreme Environments)

Track Classification: Detectors for High Radiation and Extreme Environments