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

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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.

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