

TCAD simulated surface damage in proton irradiated strip sensors: Investigation of interface traps vs non-uniform 3-level model

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Recent developments in the simulation work group suggest the possibility to reproduce the experimentally observed surface properties of proton irradiated silicon strip sensors by the implementation of interface traps at the Si/SiO₂ interface. This could offer an alternative for the non-uniform 3-level model applied in Synopsys Sentaurus package, where a shallow acceptor level is added to the two deep levels of the proton model (tuned by R. Eber from the PTI-model) exclusively close to the device surface (e.g. 2 μm). A study of the position dependency simulations of CCE, that also provide strip isolation information via observed charge sharing, and interstrip capacitance between the two approaches and measurements from test beam for the fluence range $3 \times 10^{14} - 1.4 \times 10^{15} \text{ n}_{\text{eq}} \text{ cm}^{-2}$ will be presented. Also first simulations of the hit position dependency of the signal in a 3D double-column sensor will be discussed.

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