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A method to model the accumulation of oxide charge with fluence in an irradiated MSSD

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Measurements have shown a significant position dependency of CCE for charged hadron irradiated MSSDs. When this is reproduced by Synopsys TCAD simulation using non-uniform 3-level defect model (R. Eber tuned proton model supplemented by shallow acceptor level close to detector surface) the phenomenon is seen to be dependent of the concentration of the shallow acceptors and the oxide charge at the SiO2/Si interface.
By monitoring the CCE loss between the strips for fluences 3e14 and 1.5e15 n_eq cm-2 in a real detector, the simulation opens up a possibility to model (at least qualitatively) the accumulation of the oxide charge as a function of fluence. If one of the two open parameters can be fixed, the simulation can also provide accurate quantitative information of the other.
Comparison of simulations with measurements from the Silicon Beam Telescope (SiBT) will be presented.

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