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Effective trapping probability of electrons in neutron irradiated Si detectors using Transient Current Technique simulations

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The Transient Current Technique (TCT) has been evolved as one of the principal tools for studying solid state particle detectors over the years. Si detectors are being exposed to intense radiation environment in collider experiments which affects their charge collection performance. The strength of the signal produces because of generation of charge carriers by traversing particles, gets reduced due to resulting radiation damage of detectors. In the present work, Silvaco TCAD tool is used to model the neutron irradiation effects in Si detectors. This model is then applied to study the effective trapping probability of electrons due to the traps generated by neutron irradiation in p-on-n Si detectors using TCT simulations. The model is found to be able to reproduce the corresponding measurements carried out on neutron irradiated Si detectors.

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