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Modelling and experimental investigations of irradiation effects in Si radiation detectors

Thursday, 21 May 2015 15:15 (30 minutes)

This talk is aimed at presenting an overview of Si radiation detectors. and how different types of radiation influence the short and long term electronic properties and detector performance. The scope of this work is under a Co-ordinated Research Project entitled "Utilization of ion accelerators for studying and modelling of radiation induced defects in semiconductors and insulators"funded by International Atomic Energy Agency. In particular, I will focus on the activities related to the following aspects:
1. Theoretical modeling and simulation of the device performance: Using commercial device simulation software entailing an electrostatic model using the Poisson and continuity equations. the device parameters such as doping profile, depletion voltage, plots, electric field and potential plots, C-V plots, leakage currents, effect of guard rings, are determined. Such simulation and intercomparison with experimental studies helps in failure assessment of radiation induced damage.
3. Optical protocols for characterization of ion-induced defects: Defects such as oxygen-related vacancies and self-interstitials are inherent in as-grown wafers and are also formed by material processing/irradiation/ and which impact device performance. The use of contactless optical probes to study the formation and annihilation of defects as a result of irradiation will be demonstrated.

The overall objective is to disseminate information on radiation effects in Si and other related materials, with a view of motivating undergraduate and Master's students projects/activities in related areas.

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