



Contribution ID: 224

Type: **Talk**

Investigating Radiation induced Bulk Defects and its Influence on Doping Profiles

Thursday 14 February 2013 10:15 (20 minutes)

In most High Energy Physics (HEP) experiments tracking and vertexing is realized by silicon detectors. Sensors, which are foreseen to be used at future collider experiments like the HL-LHC are exposed to a very challenging radiation environment. Due to radiation induced lattice defects the effective doping concentration of such sensors crucially changes and additional energy levels inside the band gap are created. Frequency dependent Capacitance Voltage (CV) methods are used to investigate deep-levels defects. The radiation influence on shallow-level defects in the bulk as well as in doping profiles is investigated with a Spreading Resistance Probe (SRP) technique. Therefore the doping profiles of neutron irradiated n-bulk samples were measured with SRP and a decreasing implantation depth with increasing fluences is determined. Additional CV measurements on electrical structures of the same samples were done. The results contain effects not considered in literature and are of special interest concerning the problems of type inversion and double junction.

quote your primary experiment

CMS

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Session Classification: Semiconductor Detectors 3