



Sample Project: Characterizing radiation damage in silicon sensors

Code	PH2442
Programme	FCT
Department	PH
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Title
Characterizing radiation damage in silicon sensors

Description
<p>=== Context ==</p> <p>Silicon detectors are the key devices for the reconstruction of charged particle tracks in the experiments at the CERN Large Hadron Collider. In order to distinguish between primary and secondary vertices and in order to achieve a good track resolution these devices have to be placed very close to the interaction points. There they have to operate in extremely intense radiation fields causing appreciable deterioration of the detector performance. In fact the radiation induced change of the detector depletion voltage - which is closely linked to the charge collection efficiency - is the limiting factor for the detector lifetime in the experiments. Therefore the radiation tolerance is of prime interest and had led to a broad line of investigations worldwide. The CERN-RD50 collaboration "Radiation hard semiconductor devices for very high luminosity colliders" (http://cern.ch/RD50) has been formed to develop radiation harder detectors. One approach is the use of detectors with intrinsic gain to overcome the charge loss induced by radiation damage. So-called LGAD (Low Gain Avalanche Detectors) have been developed and are presently under test and this Student project would be part of these investigations.</p> <p>== The project =====</p> <p>Detectors with intrinsic charge multiplication have been produced by the RD50 collaboration and are now under study. They are investigated before and after exposing them to proton and neutron irradiation.</p> <p>The trainee will be in charge to set-up and commission a new measurement system that will allow to measure the electric properties of the microscopic defects produced by the radiation in the sensor. The set-up is comprised of a closed-cycle helium cryostat a picosecond pulsed laser system and a high resolution electrometer. A Labview based software will have to be written to control the system and obtain the relevant data. The obtained data will be presented to the RD50 collaboration by the trainee.</p> <p>== About the supervisor ==</p> <p>Michael Moll (michael.moll@cern.ch) - Leader of the Detector Development Section PH-DT-DD - Deputy Spokesperson of the CERN-RD50 collaboration.</p> <p>== Discipline ==</p> <p>The discipline of the work is a mix of Electronics Engineering, Applied Physics and Material Science.</p>

Skills

Disciplines
Applied Physics, Experimental Applied Physics, Material Science

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