

Radiation hardness of Low Gain Amplification Detectors (LGAD)

Friday 13 June 2014 09:00 (20 minutes)

Silicon n-p diodes with heavily doped p layer underneath the n implant were designed to benefit from charge multiplication process already before irradiation (Low Gain Amplification Detectors). Two different sets of such detectors with different gains were characterized before and after irradiation by reactor neutrons and recently also by 800 MeV protons to equivalent fluences of up to 1016 cm⁻². The devices were studied by different techniques; CV, IV, TCT and signal measurements from 90Sr source. The gain, which was initially up to 10, was found to decrease with neutron fluence. The main reason for this seems to be the decrease of effective doping concentration in the highly doped p layer leading to decrease of electric field strength. The conclusions drawn from the measurements were also reproduced in simulation.

Author: KRAMBERGER, Gregor (Jozef Stefan Institute (SI))

Co-authors: PELLEGRINI, Giulio (Universidad de Valencia (ES)); SADROZINSKI, Hartmut (SCIPP, UC Santa Cruz); MANDIC, Igor (Jozef Stefan Institute (SI)); MIKUZ, Marko (Jozef Stefan Institute (SI)); Dr ZAVRTANIK, Marko (Jozef Stefan Institute (SI)); BASELGA BACARDIT, Marta (Instituto de Fisica Corpuscular (ES)); HIDALGO VILLENA, Salvador (Universidad de Valencia (ES)); FADEYEV, Vitaliy (University of California, Santa Cruz (US)); CINDRO, Vladimir (Jozef Stefan Institute (SI))

Presenter: KRAMBERGER, Gregor (Jozef Stefan Institute (SI))

Session Classification: Session 4 - Sensors with intrinsic gain - LGAD