Contribution ID: **161** Type: **Oral**

Defect spectroscopy studies on irradiated LGADs

Thursday 3 March 2022 09:30 (20 minutes)

Si-based sensors, like Low Gain Avalanche Detectors (LGAD), operated in the high radiation environment of the CERN-LHC, undergo a degradation in performance that is significantly determined by defects formed during particle-interaction with the Si-crystal. In p-type Si a deactivation of active boron is observed –the so-called "acceptor removal effect"(ARE). One explanation of the ARE is the radiation induced formation of boron-interstitial oxygen-interstitial (BiOi) defects, that create donor-type energy levels which induce positive space charge. In the highly boron-doped LGAD multiplication layer the ARE can result in a complete disappearance of the gain at fluences higher than 2E+15 cm-2. However, assuming BiOi being the major ARE relevant defect cannot fully explain the boron-deactivation in LGADs. Therefore, to investigate the defect formation in LGAD gain-layers we performed defects spectroscopy studies using Deep Level Transient Spectroscopy (DLTS) and Thermally Stimulated Current technique (TSC) that we will present and discuss in comparison to defect studies made on irradiated standard p-type Si-diodes.

Primary authors: HIMMERLICH, Anja (CERN); LIAO, Chuan (Hamburg University (DE)); FRETWURST, Eckhart (Hamburg University (DE)); CURRAS RIVERA, Esteban (CERN); PINTILIE, Ioana; SCHWANDT, Joern (Hamburg University (DE)); MAKARENKO, Leonid (Byelorussian State University (BY)); MOLL, Michael (CERN); CASTELLO-MOR, Nuria (Universidad de Cantabria, CSIC, Instituto de Fisica de Cantabria IFCA, (ES)); SUBERT, Vendula (Hamburg University (DE)); GURIMSKAYA, Yana (Universite de Geneve (CH))

Presenter: HIMMERLICH, Anja (CERN)

Session Classification: LGAD

Track Classification: LGAD