

Studies of the acceptor removal mechanism in UFSD irradiated with neutrons and protons

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The radiation hardness of the gain layer is a main topic in the development of UFSD. The second UFSD production (UFSD2) by Fondazione Bruno Kessler (FBK) in Trento, in collaboration with University of Trento and National Institute of Nuclear Physics (INFN) in Torino, demonstrated a radiation hardness improvement in gain layer with co-implantation of Carbon.

In the third UFSD production (UFSD3) by FBK the Carbon implanted into the gain layer has been split in four doses with the aim to optimize the radiation hardness.

In this contribution I will report the measurement of acceptor removal performed on UFSD3 sensors irradiated with Neutron at fluences $4E14$, $8E14$ and $1,5E15$ neq/cm².

We will also report on the acceptor removal rate in UFSD induced by protons: UFSD sensors by FBK and Hamamatsu Photonics (HPK) have been irradiated with protons at four energies –24 MeV (KIT), 70 MeV (CYRIC), 800MeV (Los Alamos), 24 GeV (IRRAD) –and the results will be compared with the standard NIEL factor.

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