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Development in Radiation hardness study on the third FBK production of Ultra fast silicon Detectors

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A new Ultra Fast Silicon Detectors production (UFSD3) has been produced by Fondazione Bruno Kessler (FBK) in Trento, in collaboration with University of Trento and National Institute of Nuclear Physics in Turin (INFN). This new UFSD batch has been produced on Silicon-on-Silicon Epitaxial and Float Zone wafers, with an active thickness of 50μm.
One of the target of the UFSD3 production is the improvement of the radiation hardness and the investigation of the initial acceptor removal mechanism in the multiplication layer (gain layer).
The previous Ultra Fast Silicon Detector production (UFSD2) demonstrated an improvement of the radiation hardness in UFSD sensors with Carbon co-implantation in gain layer; In UFSD3, 4 splits in Carbon dose have been used to investigate the acceptor removal mechanism.
We will report on electrical characterization of not-irradiated and irradiated devices, measurements of acceptor removal on sensors with four different Carbon doses co-implantation and preliminary comparison on irradiated UFSD3 and UFSD2 sensors.

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