Contribution ID: **70** Type: **Oral**

Observation of bias-dependent position flipping of the electric field maximumin in neutron irradiated SiC diodes

Tuesday 4 February 2025 12:35 (15 minutes)

Pristine and neutron-irradiated silicon carbide (SiC) detectors were systematically characterized using the Two-Photon Absorption Transient Current Technique (TPA-TCT) at the laser facility of the University of the Basque Country (UPV/EHU). The investigated SiC detectors are p-in-n diodes, fabricated at IMB-CNM, with an active thickness of 50 microns.

Our study reveals a radiation-induced signal multiplication effect, attributed to modifications in the diode's electric field caused by radiation. This results in enhanced charge carrier generation post-irradiation. A comparison of the electric field distributions in pristine and irradiated diodes highlights these changes. These findings shed light on the radiation hardness and performance of SiC detectors, confirming their potential for use in high-radiation environments.

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Session Classification: Wide bandgap semiconductor detectors

Track Classification: Wide bandgap semiconductor detectors