Contribution ID: **23** Type: **not specified**

Radiation hardness and radiation-induced charge multiplication in neutron-irradiated SiC p-in-n diodes characterized by TPA-TCT

Wednesday 26 November 2025 13:00 (15 minutes)

Pristine and neutron-irradiated silicon carbide (SiC) p-in-n diodes, fabricated at IMB-CNM with a 50-µm active thickness, were systematically characterized using the Two-Photon Absorption Transient Current Technique (TPA-TCT) at the University of the Basque Country (UPV/EHU) laser facility. The study evaluates radiation-related performance metrics—charge-collection efficiency, transient response, carrier transit characteristics, and bias-dependent stability—before and after irradiation. Following neutron exposure, we observe a marked enhancement of the induced signal consistent with radiation-triggered charge multiplication. Analysis of the transient waveforms and their voltage evolution constrains plausible gain scenarios linked to irradiation-induced defect populations and local field enhancements. Beyond the characterization of sensor properties as function of fluence and bias, the emergence of post-irradiation multiplication reveals a previously unexploited operating regime for SiC detectors and underscores the need for further dedicated studies.

Authors: QUINTANA SAN EMETERIO, Cristian (Instituto de Física de Cantabria - IFCA PhD student); ROSICH VELARDE, Diego (Universidad de Cantabria and CSIC (ES)); Prof. VILA ALVAREZ, Ivan (Instituto de Física de Cantabria (CSIC-UC)); Dr DUARTE CAMPDERROS, Jordi (IFCA (UC-CSIC)); FERNANDEZ GARCIA, Marcos (Universidad de Cantabria and CSIC (ES)); MONTERO SANTOS, Raúl (UPV)

Co-authors: JIMENEZ RAMOS, Carmen; TORRES MUÑOZ, Carmen (US)

Presenter: QUINTANA SAN EMETERIO, Cristian (Instituto de Física de Cantabria - IFCA PhD student)

Session Classification: Parallel HEP