



Contribution ID: 38

Type: **not specified**

The gain reduction mechanism in Low Gain Avalanche Detectors investigated with the TPA-TCT

Thursday, 23 June 2022 14:20 (20 minutes)

The Two Photon Absorption –Transient Current Technique (TPA-TCT) setup at CERN uses fs pulse infrared fiber lasers, with a wavelength of 1550nm. Highly focusing optics are used to mainly generate excess charge carriers in a small volume (approximately $1\mu\text{m} \times 1\mu\text{m} \times 20\mu\text{m}$) around the focal point of the laser beam, which enables a resolution in all three spatial directions. The setup was used to study plasma effects in a PIN sensor, and the gain reduction mechanism in a $300\mu\text{m}$ thick LGAD sensor. Furthermore, the impact of diffusion on the gain reduction mechanism was modeled and employed towards the data.

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Session Classification: Low Gain Avalanche Detectors