

# Donor removal and Global Gain Quenching (GGQ) in nLGAD detectors

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nLGAD detectors are specifically designed for detecting shallow-penetrating radiation. In our previous work, we tested these devices using low-wavelength lasers and achieved reasonable detectability down to 200 nm. In this work, we explore the potential of nLGADs for the detection of shallow-penetrating ions, aiming to evaluate their gain and response to induced damage. Using Ion Beam Induced Charge (IBIC) technique, the nLGAD detector was probed with 1.285 MeV gallium ions, showing clear gain suppression. Additionally, local damage was induced with the same ion type at a low fluence of  $4 \times 10^9$  ions/cm<sup>2</sup>, revealing two effects: first, the donor removal mechanism occurs much faster than the acceptor removal, making nLGADs more prone to damage; and second, the local damage affected the gain across the entire device. This effect was termed Global Gain Quenching (GGQ). Finally, we present the first attempt to microscopically evaluate the donor removal mechanism using Thermally Stimulated Current (TSC) measurements and hypothesize the defect mechanism responsible for such pronounced vulnerability.

## Type of presentation (in-person/online)

in-person presentation

## Type of presentation (I. scientific results or II. project proposal)

I. Presentation on scientific results

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