Contribution ID: **69** Type: **WG6 - Wide bandgap materials**

SiC LGAD Edge Termination via Controlled Ion-Implantation Damage

Thursday, 13 November 2025 15:00 (20 minutes)

We investigate a novel approach for edge termination in SiC Low-Gain Avalanche Diodes (LGADs), based on controlled ion-implantation-induced damage in mesa-etched structures. TCAD simulations and preliminary experimental results indicate that this method provides efficient high-voltage termination through helium implantation performed near the mesa edge, without consequent thermal annealing. The implantation locally reduces the effective doping concentration in the gain layer by excess carrier removal, thereby relaxing the edge-enhanced electric field. This significantly improves the breakdown voltage and enables operation at higher gain and depletion depth, leading to enhanced detector performance, as verified by UV transient-current measurements. The process utilizes standard silicon implantation tools and processes, while also relaxing bevel-angle constraints typically encountered in high-voltage mesa structures, offering simplified and more robust fabrication of SiC LGADs.

Type of presentation (in-person/online)

online presentation (zoom)

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

I. Presentation on scientific results

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