

# Development of TI-LGAD technology towards 4D Tracking

*Tuesday 18 June 2024 16:30 (10 minutes)*

Institutes interested to join: CERN, FBK, IFIC, IJClab, LPNHE, JSI, UHH, UZH  
The project is open to other interested groups.

Two consecutive productions of TI-LGAD at FBK (Trento, Italy), in the framework of RD50 and AIDAInnova WP6, have proven the potential of this technology for the implementation of 4D tracking. Trench-isolated LGADs (TI-LGADs) are a strong candidate for solving the fill-factor problem, as the p-stop termination structure is replaced by isolated trenches etched in the silicon itself. Different design combinations related to the trenches have been studied to determine their inter-pixel distance.

In this project, a systematic testing campaign is proposed, to determine the radiation hardness of a new run of devices after Carbon co-implantation, possibly optimizing the implantation parameters with respect to the past productions. Since one of the possible applications of these devices could be the Phase-3 upgrade of ATLAS and CMS outer pixel layers, the radiation hardness requirement is in the range of  $1-5 \times 10^{15}$  neq/cm<sup>2</sup>. The sensors will be characterized both at test-structure level, by connecting them by wire bonding to pre-amplifiers and by bump-bonding them to prototype timing chips that are being developed at the moment.

**Type of presentation (scientific results or project proposal)**

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

**Presenter:** MACCHIOLO, Anna (University of Zurich (CH))

**Session Classification:** WG/WP2 - Hybrid silicon technologies