

## Performance of irradiated TI-LGADs at 120 GeV SPS pion beams

Trench-isolated (TI) LGADs, developed at FBK, are pixelated LGAD implementations where pads are separated by physical trenches etched within the silicon substrate and filled with a dielectric. Developed as an alternative approach to implant-based inter-pad separation (JTEs), this technology promises a dramatic reduction to dead regions, mitigating fill factor issues inherent to small-pitch pixelated LGAD matrices. Through a dedicated 120 GeV SPS pion test beam campaign, the time resolution, efficiency and inter-pad distance of Carbon Infused irradiated TI-LGADs is presented in MIP conditions. Fluences up to  $2.5 \times 10^{15} \text{ n}_{eq}/\text{cm}^2$  are evaluated, for single trench implementations with varied trench width. The combined timing and tracking readout used in this study, integrating ROI triggering, sub- $\mu\text{m}$  multi-object alignment, multi-channel waveform digitization and achieving a 5-7  $\mu\text{m}$  spatial resolution through a MIMOSA26 telescope, is also reviewed. Preliminary results are discussed for temperatures of  $-25^\circ\text{C}$ .

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

in-person presentation

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

I. Presentation on scientific results

**Authors:** HENNESSY, Alexandre (University of Zurich (CH)); VELKOVSKA, Iskra (Jozef Stefan Institute (SI)); Dr VILA ALVAREZ, Ivan (Instituto de Física de Cantabria (CSIC-UC)); DUARTE CAMPDERROS, Jordi (IFCA); FERNANDEZ GARCIA, Marcos (Universidad de Cantabria and CSIC (ES)); REZAEI MIANROODI, Parisa; Dr GKOUKOUSIS, Vagelis (University of Zurich)

**Co-authors:** MACCHIOLO, Anna (University of Zurich (CH)); GEMME, Claudia (INFN Genova (IT)); KRAMBERGER, Gregor (Jozef Stefan Institute (SI))

**Presenter:** Dr GKOUKOUSIS, Vagelis (University of Zurich)

**Session Classification:** WG2 - Hybrid silicon technologies