

## Performance of irradiated TI-LGADs at 160 GeV SPS pion beams

*Tuesday 4 February 2025 16:12 (1 minute)*

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 160 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  $-25^\circ\text{C}$ .

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**Session Classification:** Poster Session

**Track Classification:** LGAD