

Laboratory measurements of FBK Trench-Isolated LGADs in Torino

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Trench-Isolated Low-Gain Avalanche Diodes (TI-LGAD) are a recent development of LGAD, in which the standard isolation structures are replaced by narrow trenches that are etched in the Silicon substrate. Trenches allow reducing the inactive region between pixels from the 30-40 microns of the standard technology down to a few microns, significantly improving the fill factor of TI-LGADs with respect to traditional LGADs.

The first production of TI-LGAD produced by Fondazione Bruno Kessler (FBK, Italy) was completed in summer 2019, featuring a wide range of 2x1 pixel arrays.

In this contribution, I will present several laboratory measurements performed on this production, including TCT characterization, showing gain and inactive area width (interpad) measurements, and time-resolution measurements obtained with a Sr90 beta source.

The comparison of TI-LGAD inactive area width with previous measurements performed on standard LGADs is particularly interesting as it quantifies their improvement on the fill factor.

All measurements were done in the Laboratory of Innovative Silicon Detectors of Torino University / INFN.

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