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Time and space characterization of novel TI-LGAD structures

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A spacial and temporal characterization of the novel Trench Isolated LGAD (TI-LGAD) production at FBK from the RD50 collaboration is presented. This technology is promising for the implementation of the so called 4D-pixels aiming to combine in one device position tracking functionality together with a precise timing determination. In the TI-LGAD technology, each pixel is an individual LGAD and they are separated by physical trenches etched in the silicon, thus eliminating the need of the standard gain termination. This technology has the potential to reduce the interpixel dead area, mitigating the fill factor problem. This FBK-RD50 production is the first production of pixelated TI-LGADs. A comprehensive study of the spacial characteristics of the different design patterns (number of trenches, depth of trenches, etc.), as well as the timing performance, is presented in this talk. For a subsample of the structures the measurements will be repeated after irradiation with neutrons and protons. The characterization is performed using a scanning Transient Current Technique (TCT) setup with an infrared laser.

Primary experiment

RD50

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