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Characterization of Trench-Isolated LGADs before and after irradiation

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Low Gain Avalanche Diodes (LGADs) are state-of-the-art silicon sensors for 4D tracking in high energy physics applications. A limitation of LGAD technology is the no-gain area (50-100μm) between adjacent pixels, which reduces the fill-factor (active area/total area) of the sensor. FBK proposed a novel strategy of LGAD-segmentation based on narrow trenches, that could potentially reduce the width of the inter-pixel region to 10μm or less. FBK produced within the RD50 collaboration a batch of Trench-Isolated LGADs (TI_LGADs), where a wide variety of trenches and fabrication parameters have been explored.
In this work, we will present the pixel-isolation tests performed with DC electrical characterization and TCT measurements. Moreover, for the first time, TI-LGADs irradiated with neutrons (up to 1.5E15 neq) and X-rays (up to 10 Mrad) have been tested, and we will present the preliminary results on their characterization.

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