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Timing with iLGADs

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Low Gain Avalanche Diodes provide excellent timing capabilities with moderate radiation resistance for HL-LHC applications. Segmented LGADs (microstrips or pixels) implement the amplification layer below the electrodes, leading to non-uniform gain across the surface of the detector. This is the so-called “filling factor” problem. A possible way to achieve uniform amplification is by moving the multiplication layer away from the segmented electrodes. The device becomes a pad-like LGAD in the backside with segmented front side. Such device is called iLGAD. The signal development is characterized by a first drift of electrons towards the backside LGAD, amplification and final drift of holes towards the segmented electrodes.

We have investigated, using TCT, the timing performance of unirradiated iLGADs, by means of a Constant Fraction Discrimination Method triggered on either the electron or hole part of the signal. We have also compared these figures to PiN diodes of the same run.

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