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Inverse-LGAD: Solving the LGAD fill factor problem

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An in-deep study of a p-in-p LGAD prototype (dubbed as I-LGAD) is presented. Contrary to the conventional LGAD devices, currently proposed for the HL-LHC mip timing detectors, the I-LGAD has a non-segmented deep p-well (the multiplication layer). Therefore, I-LGADs should idealy present a constant gain value over all the sensitive region of the device without gain drops between the signal collecting electrodes; in other words, I-LGADs should have a 100% fill factor by design. We have experimentally confirmed this feature on a strip-like segmented i-LGAD and compare it agaist a conventional strip-like LGAD and PIN devices.

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