

# Optimization of gain layer doping, profile and carbon levels on HPK and FBK sensors

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Low Gain Avalanche Detectors (LGADs) are thin silicon detectors with moderate internal signal amplification. LGADs are capable of providing measurements of minimum-ionizing particles with time resolution as good as 17 pico-seconds. The first implementation of this technology will be with the high luminosity upgrade at the Large Hadron Collider (HL-LHC). Past publications have proven the vast improvement in term of radiation hardness of deep gain layer and carbon implantation in LGAD designs. In this contribution a study will be shown on the tuning of the doping concentration in the deep gain layer of HPK sensors to optimize the performance before and after radiation damage. Furthermore the effect of the combination of a deep gain layer and carbon implantation in FBK sensors will be shown alongside an optimization of the carbon concentration level. Results on electrical properties and charge collection will be shown on pre and post irradiation.

## TIPP2020 abstract resubmission?

No, this is an entirely new submission.

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