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Performance of FBK/INFN/LPNHE thin active edge n-on-p pixel detectors for the upgrade of the ATLAS Inner Tracker

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In view of the LHC upgrade phases towards the High Luminosity LHC (HL-LHC), the ATLAS experiment plans to upgrade the Inner Detector with an all-silicon system.

The n-on-p silicon technology is a promising candidate to achieve a large area instrumented with pixel sensors, since it is radiation hard and cost effective.

The paper reports on the performance of thin (100 and 130 μm thick) and edgeless n-on-p planar pixel sensors produced by FBK-CMM. The production featured standard $50\ \mu\text{m} \times 250\ \mu\text{m}$ pixel pitch modules, compatible with the ATLAS FEI4B readout chip, and small $50\ \mu\text{m} \times 50\ \mu\text{m}$ and $25\ \mu\text{m} \times 100\ \mu\text{m}$ pixel pitch modules, compatible with the RD53A readout chip prototype.

After discussing the sensor technology an overview of 2018 testbeam results of the produced devices will be given, before and after irradiation, including charge collection and hit efficiency, with a special focus on the hit efficiency at the detector edge.

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