

SINTEF 3D pixel sensor pre-production for the ATLAS ITk.

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SINTEF MiNaLab recently completed its sixth fabrication run of 3D pixel detectors as pre-production for the ATLAS ITk upgrade. The common sensor layout for RD53B sensors in 50x50 (1E) configuration was used. In addition, sensors compatible with RD53A readout as well as 3D diodes and 3D strips were included in the wafer layout. In this iteration of the technology, the active-edge was removed and replaced with the standard slim-edge termination with ohmic columns. Sensors were fabricated on 6", Si-Si bonded wafers, with a device layer thickness of 150µm, using a single-sided processing approach. The temporary metal layer was deposited, and the electrical characterisation was completed in December 2021. In this presentation, we will focus on the measurement results from standard planar test structures, 3D diodes and 3D pixel detectors. The fabrication process and its challenges will be discussed together with some numerical simulation results.

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