

ATLAS ITk HL-LHC upgrade sensor prototyping at ADVACAM

The ATLAS Inner Tracker (ITk) will be installed for the High Luminosity upgrade of the LHC (HL-LHC) as replacement for the existing Inner Detector. The total supply comprises about 14,800 high-quality, radiation tolerant Si planar n-on-p pixel sensors modules. The sensors will be flip chip bonded against new ATLAS read-out chips made with 65 nm CMOS technology. The pixel pitch is either 50x50 or 25x100 μm^2 .

The presentation describes the Si planar n-on-p sensor and flip chip bonding prototype processes at ADVACAM. A number of high-quality 1x1, 1x2 and 2x2 sensors with 150 and 100 μm thickness were delivered for evaluation. Carrier wafers were used throughout the thin sensor wafer fabrication process to avoid wafer breakages. A number of flip chip bonded RD39 modules were delivered for the beam line tests.

The presentation unveils the electrical measurements and process yield of the sensor process batch and beam line test results of the unirradiated and irradiated sensor modules.

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