

Design of the first full size ATLAS ITk Strip sensor for the endcap region

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The ATLAS collaboration is designing the full silicon tracker (ITk) that will operate in the HL-LHC replacing the current design. The silicon microstrip sensors for the barrel and the endcap regions in the ITk are fabricated in 6 inch, p-type, float-zone wafers, where large-area strip sensor designs are laid out together with a number of miniature sensors. The radiation tolerance and specific system issues like the need for slim edge of 450 μm have been tested with square shaped sensors intended for the barrel part of the tracker. This work presents the design of the first full size silicon microstrip sensor for the endcap region with a slim edge of 450 μm . The strip endcaps will consist of several wheels with two layers of silicon strip sensors each. The strips have to lie along the azimuthal direction, apart from a small stereo angle rotation (20 mrad on each side, giving 40 mrad total) for measuring the second coordinate of tracks. This stereo angle is built into the strip layout of the sensor and, in order to avoid orphan strips, the sensor edges are inclined by the stereo angle. On top of this, the top and bottom edges are designed as arcs to have equal length strips. Together with the design of this new "Stereo Annulus" sensor, we will report on the initial measurements of the leakage current as a function of bias voltage, after dicing, and the resistivity of the wafers.

Carlos Lacasta, Nigel Hessey* and Yoshinobu Unno
on behalf of the ATLAS ITk Strip Sensor Working Group

*Now at TRIUMPF, Vancouver, Canada

Primary authors: LACASTA LLACER, Carlos (IFIC-Valencia); Dr HESSEY, Nigel (TRIUMF); UNNO, Yoshinobu (High Energy Accelerator Research Organization (JP)); ATLAS ITK STRIP SENSOR WORKING GROUP

Presenter: LACASTA LLACER, Carlos (IFIC-Valencia)

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