



Contribution ID: 24

Type: **not specified**

Pixel detector for ATLAS upgrade

In order to meet the requirements at the High-Luminosity LHC, the ATLAS inner detector will be upgraded to an all silicon tracker, the Inner Tracker ITk, until 2025. The ITk will consist of a five layer pixel detector and a four layer strip detector.

Due to the harsh environment at the High-Luminosity LHC, the ITk pixel detector will consist of newly developed front-end electronics and sensors, namely the RD53 chip and thin n-in-p sensors. The dense tracking environment requires a higher granularity compared to the currently used pixel detector, significantly higher data transmission rates and low mass global and local supports. An overview on the resulting challenges for the mechanical design and layout, the powering and data transmission schemes, testing and operation will be given, and the current status of the ongoing developments to meet these challenges will be presented.

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