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ATLAS ITk Pixel Detector Overview

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In the high-luminosity era of the Large Hadron Collider, the instantaneous luminosity is expected to reach unprecedented values, resulting in up to 200 proton-proton interactions in a typical bunch crossing. To cope with the resulting increase in occupancy, bandwidth and radiation damage, the ATLAS Inner Detector will be replaced by an all-silicon system, the Inner Tracker (ITk). The innermost part of the ITk will consist of a pixel detector, with an active area of about 13 m^2 . To deal with the changing requirements in terms of radiation hardness, power dissipation and production yield, several silicon sensor technologies equipped with novel ASICs connecting by bump-bonding technique will be employed in the five barrel and endcap layers. As a timeline, it is facing to pre-production of components, sensor, building modules, mechanical structures and services.

This contribution presents the status of the ITk-pixel project focusing on the lessons learned and the biggest challenges towards production, from mechanics structures to sensors, and it will summarize the latest results on closest-to-real demonstrators built using module, electric and cooling services prototypes.

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