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Results of larger structures prototyping for the Phase-II upgrade of the pixel detector of the ATLAS experiment

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The current inner tracker of the ATLAS experiment is foreseen to be replaced at the High Luminosity era of the LHC to cope with the occurring increase in occupancy, bandwidth and radiation damage. It will be replaced by an all-silicon system, the Inner Tracker (ITk). This new tracker will have both silicon pixel and silicon strip sub-systems aiming to provide tracking coverage up to $|\eta| < 4$.

For a high tracking performance are radiation hard and high-rate capable silicon sensors and readout electronics important. Moreover, services and stable, low mass mechanical structures are essential and give challenges to the system design.

Currently a large prototyping programme is ongoing within the ITk pixel detector community. Components for larger structures with multiple modules based on the FE-i4 front-end chips were produced and are in assembly and evaluation.

By this the system integration and design is prototyped and validated.

In the presentation, the latest evaluation and results of thermo-mechanical prototypes and fully electrical prototypes are presented. Important system relevant aspects and their application will be discussed.

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