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[B08] Performance of the ATLAS ITK Pixel detector prototype

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A new all-silicon Inner Tracker (ITk) has been designed for the ATLAS experiment at the HL-LHC. As part of this, a new pixel detector consisting of a total area of approximately 12m^2 , will be constructed with planar and 3D pixel modules, mounted onto ring and stave shaped low mass carbon-fibre support structures. The data will be transmitted optically to the off-detector readout system. To save material in the servicing cables, serial powering is employed for the supply voltage of the readout ASICs. Together, these structures are arranged on larger structures to provide tracking up to a pseudo rapidity of 4.0.

In order to validate the design choices of the pixel detector concept, prototypes of realistic, large-scale detector structures have been built and loaded with detector modules. These prototypes are evaluated with respect to the module performance after the full loading procedure. Beyond that also system level aspects, like the thermal performance, serial powering, and global monitoring capabilities of these structures are investigated.

This contribution will summarize the key results of the design validation of these loaded local supports.

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