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Overview of the production preparations for the ATLAS ITk strip end-cap detector at DESY

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The ATLAS Inner Tracker (ITk) of the phase-II upgrade of the current ATLAS tracking detector and is designed to meet the challenges at the high-luminosity LHC. The ITk silicon strip end-caps will cover the forward directions of the detector and consist of six disks populated with wedge-shaped silicon micro-strip sensors, divided in modules containing the readout, power and control electronics. The modules are directly glued on likewise wedge-shaped local support structures called petal cores, consisting of carbon fiber-based sandwich structures with embedded titanium cooling pipes as well as data and power buses. The petals are the fully loaded structures with in total 18 sensor modules in six different shapes and each end-cap disk will be constituted of 32 instances, requiring overall 384 petals.

After finalizing in most areas the R&D phase of the ITk strip detector, the project is in the transition phase towards production. In the currently ongoing pre-production, the multi-stage assembly process of the various components is trained, the worldwide distributed construction sites are qualified for production and the complex logistics chain is validated.

In this contribution, an overview of the production preparations of the petal cores up to the loaded petal at DESY will be given. The production chain starts with the machining of components for the petal core, goes on with the actual core assembly by an industry partner and the following quality control tests performed on the local support structures before being ready for module-on-core loading to have the final petal object.

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