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ATLAS ITk Strip Detector for High-Luminosity LHC

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The ATLAS experiment is currently preparing for an upgrade of the tracking system in the course of the High-Luminosity LHC that is scheduled for 2026. The expected peak instantaneous luminosity up to 7.5E34 per second and cm2 corresponding to approximately 200 inelastic proton-proton interactions per beam crossing, radiation damage at an integrated luminosity of 3000/fb and hadron fluencies over 1E16 1 MeV neutron equivalent per cm2, as well as fast hardware tracking capability that will bring Level-0 trigger rate of a few MHz down to a Level-1 trigger rate below 1 MHz require a replacement of existing Inner Detector by an all-silicon Inner Tracker (ITk) with a pixel detector surrounded by a strip detector. The current prototyping phase, that is working with ITk Strip Detector consisting of a four-layer barrel and a forward region composed of six discs on each side of the barrel, has resulted in the ATLAS ITk Strip Detector Technical Design Report (TDR), which starts the pre-production readiness phase at the involved institutes. In this contribution we present the design of the ITk Strip Detector and current status of R&D of various detector components.

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