

Operational Experience and Performance with the ATLAS Pixel detector at the Large Hadron Collider at CERN

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The tracking performance of the ATLAS detector at the Large Hadron Collider (LHC) at CERN relies critically on its 4-layer Pixel Detector, consisting of four barrel layers at 33, 50.5, 88.5, and 122.5 mm from the geometric center of the ATLAS detector and a total of six disk layers, three at each end of the barrel region. It has undergone significant hardware and readout upgrades to meet the challenges imposed by the higher collision energy, pileup and luminosity that are delivered by the LHC, with record breaking instantaneous luminosities of $2 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$.

By the end of the proton-proton collision runs in 2018, the innermost layer IBL had received an integrated fluence of $\Phi = 9 \times 10^{14} \text{ MeV neq/cm}^2$. The key status and performance metrics of the ATLAS Pixel Detector are summarised, and the operational experience and requirements to ensure optimum data quality and data taking efficiency will be described, with special emphasis to radiation damage experience.

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