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Operation and Radiation Damage studies of the ATLAS Pixel Detector

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Abstract : The ATLAS pixel detector has been exposed to considerable levels of radiation during its operation at the LHC, up to 2×10^{14} neq /cm². By the end of run3 in 2023, the integrated luminosity and fluence will have further increased by an order of magnitude. Radiation damage effects are already visible, and they will increasingly affect the detector performance in the coming future. Therefore it is of utmost importance to prepare suitable simulation that models the radiation damage and understand how these effects impact the performance of the whole detector. The contribution presents a summary of the performances of the Pixel Detector during operation in run2. A model to describe the radiation damage effects in MonteCarlo simulation is discussed, and the predictions are compared with data. Projections for higher integrated luminosity are also shown

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