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Modeling Radiation Damage to Pixel Sensors in the ATLAS Detector

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Silicon Pixel detectors are at the core of the current and planned upgrade of the ATLAS detector. As the detector in closest proximity to the interaction point, these detectors will be subjected to a significant amount of radiation over their lifetime: prior to the HL-LHC, the innermost layers will receive a fluence in excess of 10^{15} 1 MeV n_{eq}/cm^2 and the HL-LHC detector upgrades must cope with an order of magnitude higher fluence integrated over their lifetimes. This talk presents a digitization model that includes radiation damage effects to the ATLAS Pixel sensors for the first time. After a thorough description of the setup, predictions for basic Pixel cluster properties are presented alongside first validation studies with Run 2 collision data.

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