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Radiation damage effects in ATLAS Pixels and their simulations: status, results and and perspectives.

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Signal reduction is the most important radiation damage effect on performance of silicon tracking detectors. Adjusting sensor bias voltage and detection threshold can help in mitigating the effects, but it is important to have simulated data that reproduce the evolution of performance with the accumulation of luminosity, hence fluence.
The two innermost pixel layers of ATLAS (Insertable B-Layer and B-Layer), consisting in both planar and 3D sensors, have already integrated fluences in excess of 1x10^15 n_eq/cm^2 and show significant charge collection loss and cluster modification.
ATLAS collaboration developed and implemented an algorithm that reproduces signal loss, cluster modification and changes in Lorentz angle due to radiation damage. This algorithm is now the default for Run3 simulated events. In this talk the algorithm will be
presented and results compared to Run3 collision data, with emphasis on cluster properties and higher level objects performance.

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