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Simulation for the New Inner Tracker for the ATLAS Detector at the LHC¹ IRIA WANG, GABRIELLA SCIOLLA, Brandeis Univ, ATLAS COLLABORATION — For the High-Luminosity LHC program, the ATLAS experiment will be upgraded with a new tracking detector, the Inner Tracker (ITk). The ITk is the innermost detector of the ATLAS experiment and is composed of concentric cylindrical layers of silicon detectors: five layers of pixel detectors surrounded by four layers of strip detectors. To validate the design of the ITk and quantify its expected performance, a detailed simulation of the new detector needs to be created. The simulation is built with a C++ framework that allows for a simple description of the detector elements and its properties using flexible XML markup language. The geometry of the detector will be virtually created using the "GeoModelXML" software package by building up each component in a hierarchical manner. This then allows us to simulate particles passing through sensors, providing a detailed estimation of the signals induced on the readout electronics as well as the particles' interaction with the passive detector material. A portion of the ITk is already described in this framework. Before the ITk detector simulation can be used in the mainstream ATLAS software release, the framework must be extended to include the full detector. The Brandeis team has built a portion of the ITk geometry through GeoModel.

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