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Simulation studies for the ATLAS upgrade Strip tracker

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ATLAS is making extensive efforts towards preparing a detector upgrade for the High luminosity operations of the LHC (HL-LHC), which will commence operation in ˜10 years. The current ATLAS Inner Detector will be replaced by a all-silicon tracker (comprising an inner Pixel tracker and outer Strip tracker). The software currently used for the new silicon tracker is broadly inherited from that used for the LHC Run 1 and 2, but many new developments have been made to better fulfil the future detector and operation requirements. One aspect in particular which will be highlighted is the simulation software for the Strip tracker. The available geometry description software (including the detailed description for all the sensitive elements, the services, etc.) did not allow for accurate modelling of the planned detector design. A range of sensors/layouts for the Strip tracker are being considered and must be studied in detailed simulations in order to assess the performance and ascertain that requirements are met. For this, highly flexibility geometry building is required from the simulation software. A new Xml-based detector description framework has been developed to meet the aforementioned challenges. We will present the design of the framework and its validation results.

Summary

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