

Commissioning the ATLAS Inner Detector Trigger

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The ATLAS experiment is one of two general-purpose experiments at the Large Hadron Collider (LHC). It has a three-level trigger, designed to reduce the 40MHz bunch-crossing rate to about 200Hz for recording. Online track

reconstruction, an essential ingredient to achieve this design goal, is performed at the software-based second (L2) and third levels (Event Filter, EF), running on farms of commercial PCs. The L2, designed to provide about a 50-fold reduction in the event rate with an average execution time of about 40ms, uses custom fast tracking algorithms, doing complementary pattern recognition on data either from the Si detectors or from the transition-radiation tracker. The EF uses offline software components and has been designed to give about a further 10-fold rate reduction with an average execution time of about 4s.

We report on the commissioning of the tracking algorithms during the first operation of the LHC and their performance with cosmic-ray data collected recently in the first combined running with the whole detector fully assembled. We describe customizations to the algorithms to have close to 100% efficiency for cosmic tracks that are used for the alignment of the trackers, since they are normally tuned for tracks originating from around the beampipe.

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oral

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