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The performance and development of the Inner Detector Trigger at ATLAS for LHC Run 2

A description of the design and performance of the newly reimplemented tracking algorithms for the ATLAS trigger for LHC Run 2, to commence in spring 2015, is provided. The ATLAS High Level Trigger (HLT) has been restructured to run as a more flexible single stage process, rather than the two separate Level 2 and Event Filter stages used during Run 1. To make optimal use of this new scenario, a new tracking strategy has been implemented for Run 2 for the HLT. This new strategy will use a Fast Track Finder (FTF) algorithm to directly seed the subsequent Precision Tracking, and will result in improved track parameter resolution and significantly faster execution times than achieved during Run 1 but with no significant reduction in efficiency. The performance and timing of the algorithms for numerous physics signatures in the trigger are presented. The profiling infrastructure, constructed to provide prompt feedback from the optimisation, is described, including the methods used to monitor the relative perfor- mance improvements as the code evolves. The online deployment and commissioning, together with the first measurements with the Run 2 data are also discussed.

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