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Tracking and flavour tagging selection in the ATLAS High Level Trigger

In high-energy physics experiments, track based selection in the online environment is crucial for the detection of physics processes of interest for further study. This is of particular importance at the Large Hadron Collider (LHC), where the increasingly harsh collision environment is challenging participating experiments to improve the performance of their online selection. Principle among these challenges is the increasing number of interactions per bunch crossing, known as pileup. In the ATLAS experiment the challenge has been addressed with multiple strategies. Firstly, individual trigger groups focusing on specific physics objects have implemented novel algorithms which make use of the detailed tracking and vertexing performed within the trigger to improve rejection without losing efficiency. Secondly, since 2015 all trigger areas have also benefited from a new high performance inner detector software tracking system implemented in the High Level Trigger. Finally, performance will be further enhanced in future by the installation and commissioning of a hardware based Fast TracKer (FTK) throughout 2017.

This presentation will focus on the performance of the ID tracking software as well as well as looking ahead to projected improvements from FTK. Specific focus will be given to the case of flavour tagging of b-jets, as an example of the implementation of novel algorithms to improve vertexing and light jet rejection in real time.

Experimental Collaboration

ATLAS

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