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Real time data analysis with the ATLAS trigger at the LHC in Run-2

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The trigger selection capabilities of the ATLAS detector have been significantly enhanced for the LHC Run-2 in order to cope with the higher event rates and with the large number of simultaneous interactions (pile-up) per proton-proton bunch crossing. A new hardware system, designed to analyse real time event-topologies at Level-1 came to full use in 2017. A hardware-based track reconstruction system, expected to be used real-time in 2018, is designed to provide track information to the high-level software trigger at its full input rate. The high-level trigger selections are largely relying on offline-like reconstruction techniques, and in some cases multi-variate analysis methods. Despite the sudden change in LHC operations during the second half of 2017, which caused an increase in pile-up and therefore also in CPU usage of the trigger algorithms, the set of triggers (so called trigger menu) running online has undergone only minor modifications thanks to the robustness and redundancy of the trigger system, and the use of a levelling luminosity scheme in agreement with LHC and other experiments.

This presentation gives a brief yet comprehensive review of the real-time performance of the ATLAS trigger system in 2017. Considerations will be presented on the most relevant parameters of the trigger (efficiency to collect signal, CPU usage and output data rate) as well as details on some aspects of the algorithms which are run real-time on the High Level Trigger CPU farm.

Minioral

Yes

Description

RT analysis

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