

The ATLAS Trigger in 2017 - improvements, performance and challenges

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The ATLAS Trigger system has been operating successfully during 2017, its excellent performance has been vital for the ATLAS physics program.

The trigger selection capabilities of the ATLAS detector have been significantly enhanced for Run-2 compared to Run-1, in order to cope with the higher event rates and with the large number of simultaneous interactions (pile-up). The improvements at Level-1 resulted in more pile-up-robust selection efficiencies and event rates. A new hardware system, designed to analyse event-topologies at Level-1, came to full use in 2017. A hardware-based track reconstruction system, expected to be inaugurated in early 2018, is designed to provide track information to the high-level software trigger at its full input rate. The high-level trigger selections were replaced with more offline-like reconstruction techniques. In the middle of 2017 an unexpected change in the LHC operating conditions resulted in much higher pile-up and a much-increased CPU usage of the software trigger and required adaptation of the software and the general trigger design.

This presentation gives a brief yet comprehensive review of the dramatic improvements of the ATLAS trigger system in 2017. Special focus will be put on the significant CPU usage improvements that were made in response to the high pileup conditions at the LHC.

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