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The ATLAS Trigger System: Ready for Run 2

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The ATLAS trigger system has been used successfully for data collection in the 2009-2013 Run 1 operation cycle of the CERN Large Hadron Collider (LHC) at center-of-mass energies of up to 8 TeV. With the restart of the LHC for the new Run 2 data-taking period at 13 TeV, the trigger rates are expected to rise by approximately a factor of 5. The trigger system consists of a hardware-based first level (L1) and a software-based high-level trigger (HLT) that reduces the event rate from the design bunch-crossing rate of 40 MHz to an average recording rate of ~ 1 kHz.

This presentation will give an overview of the upgrades to the ATLAS trigger system that have been implemented during the LHC shutdown period in order to deal with the increased trigger rates while efficiently selecting the physics processes of interest. These upgrades include changes to the L1 calorimeter trigger, the introduction of a new L1 topological trigger module, improvements in the L1 muon system, and the merging of the previously two-level HLT system into a single event filter processing farm. At hand of a few examples the impressive performance improvements of the upgraded system will be demonstrated and the trigger selection strategy for maximal physics coverage in Run-2 will be discussed. Finally the commissioning status of the overall trigger system and its performance in the initial phase of the 2015 data taking campaign will be summarized.

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