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Performance of the ATLAS Muon Trigger in Run I and Upgrades for Run II

The ATLAS experiment at the Large Hadron Collider (LHC) has taken data at a centre-of-mass energy between 900 GeV and 8 TeV during Run I (2009-2013). The LHC delivered an integrated luminosity of about 20 fb^{-1} in 2012, which required dedicated strategies to guard the highest possible physics output while reducing effectively the event rate. The Muon High Level Trigger has successfully adapted to the changing environment of a low luminosity in 2010 to the luminosities encountered in 2012. The selection strategy has been optimized for the various physics analyses involving muons in the final state. We will present the excellent performance achieved during Run I.

In preparation for the next data taking period (Run II) several hardware and software upgrades to the ATLAS Muon Trigger have been performed to deal with the increased trigger rate expected at higher center of mass energy and increased instantaneous luminosity. We will highlight the development of novel algorithms that have been developed to maintain a highly efficient event selection while reducing the processing time by a factor of three. In addition, the two stages of the high level trigger that was deployed in Run I will be merged for Run II. We will discuss novel approaches that are being developed to further improve the trigger algorithms for Run II and beyond.

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