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Triggering on leptons, hadronic taus and photons in ATLAS

Lepton and photon triggers covering transverse energies from a few GeV to several TeV are essential for signal selection in a wide variety of ATLAS physics analyses studying Standard Model processes and searching for new phenomena. Final states including leptons and photons had, for example, an important role in the discovery and measurement of the Higgs boson. In ATLAS, dedicated triggers are also used to collect data for calibration, efficiency and fake rate measurements. The ATLAS trigger system is divided in a hardware-based Level 1 and a software based High Level Trigger, which feature dedicated components to improve lepton and photon selection. In LHC Run 2 the increasing instantaneous luminosity, higher collision centre-of-mass energy and larger number of interactions per bunch crossing (pileup) required the optimisation of the trigger selections at each level to control rates and keep efficiencies high. These improvements included new and enhanced selections in hardware at Level-1, as well as advanced multivariate techniques in the High Level Trigger.

In this presentation the ATLAS trigger implementations for electrons, muons, taus and photon triggers will be presented, alongside performance in Run 2 so far and planned improvements for the future.

Experimental Collaboration

ATLAS

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