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The ATLAS Muon Trigger –Experiences and Performances in the first 3 years of LHC pp runs

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The ATLAS experiment at CERN's Large Hadron Collider (LHC) deploys three-levels processing scheme for the trigger system. The level-1 muon trigger system gets its input from fast muon trigger detectors. Fast sector logic boards select muon candidates, which are passed via an interface board to the central trigger processor and then to the High Level Trigger (HLT). The muon HLT is purely software based and encompasses a level-2 trigger followed by an event filter for a staged trigger approach. It has access to the data of the precision muon detectors and other detector elements to refine the muon hypothesis.

The ATLAS experiment has taken data with high efficiency continuously over entire running periods from 2010 to 2012, for which sophisticated triggers to guard the highest physics output while reducing effectively the event rate were mandatory.

The ATLAS Muon trigger has successfully adapted to this changing environment. The selection strategy has been optimized for the various physics analysis involving muons in the final state. This includes for example the combined trigger signatures with electron and jet trigger objects, and so-called full-scan triggers, which make use of the full event information to search for di-lepton signatures, seeded by single lepton objects.

This presentation summarizes these 3 years experiences in ATLAS muon trigger and reports about efficiency, resolution, and general performance of the muon trigger.

quote your primary experiment

ATLAS

Primary author: VENTURA, Andrea (Univ. + INFN)

Presenter: VENTURA, Andrea (Univ. + INFN)

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