Contribution ID: **425** Type: **Poster presentation**

Overview and performance of the ATLAS Level-1 Topological Trigger

Tuesday 12 June 2018 15:55 (15 minutes)

In 2017 the LHC provided proton-proton collisions to the ATLAS experiment with high luminosity (up to 2.06x10ˆ34), placing stringent operational and physical requirements on the ATLAS trigger system in order to reduce the 40 MHz collision rate to a manageable event storage rate of 1 kHz, while not rejecting interesting physics events. The Level-1 trigger is the first rate-reducing step in the ATLAS trigger system with an output rate of 100 kHz and decision latency of less than 2.5 µs. An important role is played by its newly commissioned component: the L1 topological trigger (L1Topo). This innovative system consists of two blades designed in AdvancedTCA form factor, mounting four individual state-of-the-art processors, and providing high input bandwidth and low latency data processing. Up to 128 topological trigger algorithms can be implemented to select interesting events by applying kinematic and angular requirements on electromagnetic clusters, jets, muons and total energy. This results in a significantly improved background event rejection and improved acceptance of physics signal events, despite the increasing luminosity. This is becoming more and more important for analyses making use of low pT objects, like the Heavy Flavour and Higgs physics programme. In this talk, an overview of the L1Topo architecture, simulation and performance results in physics analyses is presented.

Minioral

Yes

Description

system trigger

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Session Classification: Poster 1

Track Classification: Trigger Systems