Contribution ID: **441** Type: **Oral presentation**

The Phase-1 Upgrade of the ATLAS Level-1 Endcap Muon Trigger

Monday 11 June 2018 14:00 (20 minutes)

The LHC is expected to increase its instantaneous luminosity to 3.0 × 10ˆ34
cmˆ(-2)sˆ(-1) after the 'Phase-1' upgrade scheduled from 2019 to 2020. In order to cope with the high luminosity, an upgrade of the ATLAS trigger system is required. The level-1 Endcap Muon trigger system identifies muons with high transverse momentum by combining data from a fast muon trigger detector, TGC, and some inner station detectors. In the Phase-1 upgrade, a new detector called the New-Small-Wheel (NSW) will be installed in the inner station region. Finer track information from the NSW can be used as part of the muon trigger logic to enhance performance significantly.
In order to handle data from both TGC and NSW, some new electronics have been developed, including the trigger processor board known as Sector Logic (SL). The SL board has a modern FPGA to make use of Multi-Gigabit transceiver technology, which will be used to receive data from the NSW. The readout system for trigger data has also been re-designed, with the data transfer implemented with TCP/IP instead of a dedicated ASIC. This makes it possible to minimise the use of custom readout electronics and instead use some commercial PCs and network switches to collect, format and send the data.
This paper describes the aforementioned upgrades of the level-1 Endcap Muon trigger system. Particular emphasis is given to the electronics and its firmware.

Minioral

Yes

Description

L1 trigger

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Session Classification: Large Experiments 3