21st International Conference on Computing in High Energy and Nuclear Physics **CHEP2015** Okinawa Japan: April 13 - 17, 2015

Contribution ID: **31** Type: **oral presentation**

Operation of the upgraded ATLAS Level-1 Central Trigger System

Monday, 13 April 2015 14:30 (15 minutes)

The ATLAS Level-1 Central Trigger (L1CT) system is a central part of ATLAS data-taking and is configured, controlled, and monitored by a software framework with emphasis on reliability and flexibility. The hardware has undergone a major upgrade for Run 2 of the LHC, in order to cope with the expected increase of instantaneous luminosity of a factor of 2 with respect to Run 1. It offers more flexibility in the trigger decisions due to the double amount of trigger inputs and usable trigger channels. It also provides an interface to the new topological trigger system. Operationally - particularly useful for commissioning, calibration and test runs - it allows concurrent, independent triggering of up to 3 different sub-detector combinations.

In this contribution, we give an overview of the fully operational software framework of the L1CT system with particular emphasis on the configuration, controls and monitoring aspects. The software framework allows the L1CT system to be configured consistently with the ATLAS experiment and the LHC machine, upstream and downstream trigger processors, and the data acquisition. Trigger and dead-time rates are monitored coherently at all stages of processing and are logged by the online computing system for physics analysis, data quality assurance and operation debugging. In addition, the synchronisation of trigger inputs is watched based on bunch-by-bunch trigger information. Several software tools allow to efficiently display the relevant information in the control room in a way useful for shifters and experts. The design of the framework aims at reliability, flexiblity, and robustness of the system and takes into account the operational experience gained during Run 1. We present the overall performance during cosmic-ray data taking with the full ATLAS detector and the experience with first beams in 2015.

Primary author: GLATZER, Julian (CERN)

Presenter: GLATZER, Julian (CERN)

Session Classification: Track 1 Session

Track Classification: Track1: Online computing