Contribution ID: **437** Type: **Poster**

Level 1 muon triggers algorithms for the CMS upgrade at the HL-LHC

Thursday, May 27, 2021 5:12 AM (18 minutes)

In view of the HL-LHC, the Phase-2 CMS upgrade will replace the trigger and data acquisition system. The detector readout electronics will be upgraded to allow a maximum L1 rate of 750 kHz and 12.5 μs latency. The upgraded system will be entirely running on FPGAs and should greatly extend the capabilities of the current system to maintain trigger thresholds despite the harsh environment. The function of the muon trigger is to identify muon tracks and measure their momenta and other parameters for use in the global trigger menu. In addition to the muon detector upgrades that include improved electronics and new sub-detectors, the presence of a L1 track finder in CMS will bring some of the offline reconstruction capability to the L1 trigger, delivering unprecedented reconstruction and identification performance. We review the current status of the algorithm developments for a highly efficient L1 muon trigger and the measured performance on emulators and firmware demonstrators.

TIPP2020 abstract resubmission?

Funding information

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Session Classification: Posters: Trigger and DAQ

Track Classification: Readout and Data Processing: Readout: Trigger and DAQ