



Contribution ID: 47

Type: **Oral**

## The CMS Trigger upgrade for the HL-LHC

*Thursday 7 November 2019 15:00 (15 minutes)*

The CMS experiment has been designed with a two-level trigger system: the Level 1 Trigger, implemented on custom-designed electronics, and the High Level Trigger, a streamlined version of the CMS offline reconstruction software running on a computer farm. During its “Phase 2” the LHC will reach a luminosity of  $7 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$  with a pileup of 200 collisions, integrating over  $3000 \text{ fb}^{-1}$  over the full experimental run. To fully exploit the higher luminosity, the CMS experiment will introduce a more advanced Level 1 Trigger and increase the full readout rate from 100 kHz to 750 kHz. CMS is designing an efficient data-processing hardware trigger (Level-1) that will include tracking information and high-granularity calorimeter information. The current conceptual system design is expected to take full advantage of advances in FPGA and link technologies over the coming years, providing a high-performance, low-latency computing platform for large throughput and sophisticated data correlation across diverse sources. The higher luminosity, event complexity and input rate present an unprecedented challenge to the High Level Trigger, that aims to achieve a similar efficiency and rejection factor as today despite the higher pileup and more pure preselection. In this presentation we will discuss the ongoing studies and prospects for the online reconstruction and selection algorithms for the high-luminosity era.

### Consider for promotion

No

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**Session Classification:** Track 1 –Online and Real-time Computing

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