Contribution ID: **211** Type: **Parallel Talk**

The CMS trigger in Run 2

Thursday 6 July 2017 09:00 (15 minutes)

During its second run of operation (Run 2) which started in 2015, the LHC will deliver a peak instantaneous luminosity that may reach $2 \cdot 10^{34} cm^{-2} s^{-1}$ with an average pile-up of about 55, far larger than the design value. Under these conditions, the online event selection is a very challenging task. In CMS, it is realized by a two-level trigger system: the Level-1 (L1) Trigger, implemented in custom-designed electronics, and the High Level Trigger (HLT), a streamlined version of the offline reconstruction software running on a computer farm. In order to face this challenge, the L1 trigger has been through a major upgrade compared to Run 1, whereby all electronic boards of the system have been replaced, allowing more sophisticated algorithms to be run online. Its last stage, the global trigger, is now able to perform complex selections and to compute high-level quantities, like invariant masses. Likewise, the algorithms that run in the HLT go through big improvements; in particular, new approaches for the online track reconstruction lead to a drastic reduction of the computing time, and to much improved performances. This presentation will describe the performance of the upgraded trigger system in Run 2.

Experimental Collaboration

CMS

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Session Classification: Detectors and data handling

Track Classification: Detector R&D and Data Handling