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Triggering on electrons and photons in CMS in Phase2 and its physics implications

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The trigger systems of the LHC detectors play a crucial role in determining the physics capabilities of the experiments. The CMS experiment implements a sophisticated two-level triggering system composed of the Level-1(L1), instrumented by custom-design hardware boards, and the High Level Trigger(HLT), a streamlined version of the offline reconstruction software running on a computer farm. For Phase2 of the LHC, the increase in the instantaneous luminosity and pile-up will raise the event rate to a level which is extremely challenging for the trigger algorithms. New approaches and optimizations have been studied to keep the trigger rate manageable while maintaining thresholds low enough to cover the needs of physics analyses. We will show the optimizations and improvements that are being done for Phase2 electron and photon triggers to allow pileup mitigation exploiting the highly granular calorimeter in endcap(HGCAL). Moreover, the addition of the tracker information at L1 and the enhanced computing resources at HLT will also help to maintain the trigger efficiency and thresholds in Phase2 at a similar level as Run2.

Summary

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