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Triggering on electrons, photons, tau leptons, Jets and energy sums with the CMS Level-1 Trigger

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The Compact Muon Solenoid (CMS) experiment implements a sophisticated two-level triggering system composed of the Level-1, instrumented by custom-design hardware boards, and a software High Level Trigger. A new Level-1 trigger architecture with improved performance is now being used to maintain high physics efficiency for the more challenging conditions experienced during Run II. In this presentation, we present the upgraded CMS calorimeter trigger algorithms. The calorimeter trigger system plays a central role in achieving the ambitious physics program of Run II. The upgraded electronics architecture benefits from an enhanced granularity of the calorimeters to optimally reconstruct the trigger objects. Dedicated pile-up mitigation techniques are implemented for the lepton isolation, the jets and the missing transverse energy to keep the rate under control in the intense running conditions of the LHC. The performance of the new calorimeter trigger will be presented, based on proton-proton collision data collected in Run II. The selection techniques used to trigger efficiently on benchmark analyses will be presented, along with the strategies employed to guarantee efficient triggering for new resonances and other new physics signals.

Secondary topics

Applications

Experience with current calorimeter at the energy frontier

Primary topic

Front-end readout and trigger

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