Abstract Submitted
for the APR17 Meeting of
The American Physical Society

The CMS Level-1 Calorimeter Trigger for LHC Run II TUTANON SINTHUPRASITH, University of Virginia — The phase-1 upgrades of the CMS Level-1 calorimeter trigger have been completed. The Level-1 trigger has been fully commissioned and it will be used by CMS to collect data starting from the 2016 data run. The new trigger has been designed to improve the performance at high luminosity and large number of simultaneous inelastic collisions per crossing (pile-up). For this purpose it uses a novel design, the Time Multiplexed Design, which enables the data from an event to be processed by a single trigger processor at full granularity over several bunch crossings. The TMT design is a modular design based on the uTCA standard. The architecture is flexible and the number of trigger processors can be expanded according to the physics needs of CMS. Intelligent, more complex, and innovative algorithms are now the core of the first decision layer of CMS: the upgraded trigger system implements pattern recognition and MVA (Boosted Decision Tree) regression techniques in the trigger processors for pT assignment, pile up subtraction, and isolation requirements for electrons, and taus. The performance of the TMT design and the latency measurements and the algorithm performance which has been measured using data is also presented here.

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Date submitted: 28 Sep 2016 Electronic form version 1.4