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Design and Testing of Combined GEM+CSC Trigger Algorithm Firmware for the CMS Muon Endcap System

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With the forthcoming High Luminosity LHC accelerator upgrade, the CMS Endcap Muon system will require more complex trigger algorithms to handle the increased data rate while maintaining high data collection efficiency. Higher performance trigger electronics have already been deployed in the front-end, and advanced trigger logic is under development to take advantage of the capabilities in the new system. We report on the progress in development and simulation of the new CSC trigger algorithm, as well as plans for a combined GEM+CSC trigger proposed for phase 2 LHC operations.

Summary

With the forthcoming High Luminosity LHC accelerator upgrade, the CMS Endcap Muon system will require more complex trigger algorithms to handle the increased data rate while maintaining high data collection efficiency. Higher performance trigger electronics have already been deployed in the front-end, and advanced trigger logic is under development to take advantage of the capabilities in the new system. We report on the progress in development and simulation of the new CSC trigger algorithm, as well as plans for a combined GEM+CSC trigger proposed for phase 2 LHC operations. We also discuss efficiency studies using our high-rate trigger emulator teststand to investigate the performance of new trigger algorithms under the stress of realistic front-end signal inputs.

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