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# The CMS ME0 Upgrade: Enhancing Forward Muon Reconstruction at the HL-LHC

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The CMS muon system is undergoing substantial upgrades to meet the challenges of the High-Luminosity LHC (HL-LHC), including the installation of the new Muon Endcap 0 (ME0) detector. Large-scale production started in 2024. ME0 is a six-layer station designed to extend pseudo-rapidity coverage to |\eta| = 2.8 from the previous maximum of |\eta| = 2.4, enhancing sensitivity to forward physics processes. Each endcap will host 18 ME0 stacks, with each stack comprising six triple-layer gas electron multiplier (GEM) chambers. The system adds up to six additional hits per track, which significantly improves muon identification, spatial resolution, and robust track reconstruction at the first trigger level. Chamber production and quality control across multiple international sites ensures scalability and timely delivery. The ME0 design incorporates lessons learned from earlier GEM deployments, with improvements in electronics robustness, grounding, and segmentation to withstand high background rates and minimize damage from discharges. This contribution provides a comprehensive overview of the ME0 detector concept, assembly strategy, quality assurance procedures, current production status, and its pivotal role in strengthening CMS muon reconstruction during HL-LHC operations.

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