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Status of the installation and commissioning of the first GEM station at the CMS experiment

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The foreseen upgrade of the Large Hadron Collider (LHC) will lead to an increase of its luminosity up to $5-7 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$, five times more than the original design value. The CMS muon system must be able to sustain a physics program after the increase of luminosity and maintain sensitivity for electroweak physics for TeV scale searches achieved during Run 2. To cope with the corresponding increase in background rates and trigger requirements, the installation of additional sets of muon detectors based on Gas Electron Multiplier (GEM) technology, referred to as GE1/1, GE2/1 and ME0, has been planned. The installation and commissioning of the GE1/1 detectors in the CMS experiment have been scheduled in two separate phases: the first 72 detectors have been already installed together with their services (gas, cooling, low voltage and high voltage) in 2019 and they are undergoing the commissioning phase, while the completion of the station is foreseen in autumn 2020. The author will describe the detector design, the quality assurance and certification path, as well as will present the status of the installation and commissioning, worth its preliminary results and an overview for the complete integration of the GE1/1 project on the CMS experiment.

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