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Upgrades of the CMS muon system in preparation of HL-LHC

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The present CMS muon system operates three different detector types: in the barrel drift tubes (DT) and resistive plate chambers (RPC), cathode strip chambers (CSC) and RPCs in the forward regions. In order to cope with the challenging conditions of increasing luminosity, several upgrades are planned to the trigger and muon systems. For the existing DT and CSC detectors, the electronics will be upgraded to handle higher rates. Accelerated ageing tests are being performed to study the behaviour of these detectors under conditions which are one order of magitude beyond the design values. New micro-pattern gas detectors will be added to improve the performance in the critical forward region. Those detectors - large-area triple-foil gas electron multiplier (GEM) detectors - will already be installed in upcoming long shutdown in the pseudo-rapidity region 1.6 < eta < 2.4. Only with those additional high resolution detectors, the rate of background triggers can be controlled while maintaining high trigger efficiency for low transverse momentum muons. For the HL-LHC operation the muon forward region should be enhanced with another large area GEM based station, called GE2/1, and with two new generation RPC stations, called RE3/1 and RE4/1, having low resistivity electrodes. These detectors will combine tracking and triggering capabilities and can stand particle rates up to few kHz/cm2. In addition to take advantage of the pixel tracking coverage extension a new detector, ME0 station, behind the new forward calorimeter, covering up to $|\eta| = 3$.

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