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The phase 1 extension of the CMS endcap Resistive Plate Chamber system

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During the first two long shutdowns of the Large Hadron Collider which are presently scheduled for 2013/2014 and 2017/2018, several detector upgrades are foreseen by the CMS Collaboration to prepare for the ultimate luminosity of more than $10^{34}/\text{cm}^2/\text{s}$ at 14 TeV that should be achieved during the first 10 year period of the accelerator (LHC Phase 1). In particular, the present Resistive Plate Chamber (RPC) detector, which serves as a dedicated muon triggering system, will be enlarged with the addition of a fourth layer in the endcap region, on either side of the CMS detector. Such an extension is required to be able to preserve a low Pt threshold for the Level 1 Muon Trigger at the expected high instantaneous luminosity. During the first long shutdown, these new endcap stations will be equipped in the region $|\eta| < 1.6$ with 144 High Pressure Laminate (HPL) double-gap RPCs operating in avalanche mode, with a similar design as the existing CMS endcap chambers.

The present phase 1 upgrade plans for the CMS RPC system will be presented, including trigger simulation studies for the extended system, and details on the new HPL production, and the chamber assembly and quality control procedures.

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