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Upgrade of the CSC Muon System for the CMS Detector at the HL-LHC

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The Large Hadron Collider (LHC) will be upgraded in several phases to significantly expand its physics program. After the current long shutdown from 2018-2021 (LS2) the accelerator luminosity will be increased to $2 - 3 \cdot 10^{34} \text{cm}^{-2}\text{s}^{-1}$ exceeding the design value of $1 \cdot 10^{34} \text{cm}^{-2}\text{s}^{-1}$ allowing the CMS experiment to collect approximately 100 fb⁻¹/year. A subsequent upgrade in 2022-23 will increase the luminosity up to $5 \cdot 10^{34} \text{cm}^{-2}\text{s}^{-1}$. The CMS muon system must be able to sustain a physics program after the LS2 shutdown that maintains sensitivity to electroweak scale physics and for TeV scale searches similar to what was achieved up to now for the Cathode Strip Chamber (CSC) muon detectors. The on chamber front-end readout electronics portion of the CSC electronics upgrade has now been completed. The design of the upgraded CSC electronics will be discussed as well as the status of the commissioning of the upgraded CSC system. In view of the operating conditions at HL-LHC, it is vital to assess the detector performance for high luminosity. Accelerated aging tests are being performed to study the behavior of the CSC detectors under conditions which are nearly an order of magnitude beyond the original design values. The status of this irradiation campaign and results will be presented.

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Collaboration / Activity

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