

Upgrade of the CMS Cathode Strip Chambers for the HL-LHC

Tuesday, 28 July 2020 20:00 (15 minutes)

The Large Hadron Collider (LHC) will be upgraded in several phases to significantly expand its physics program, and these upgrades present major challenges to the operations of the CMS cathode-strip-chamber muon system. After the current long shutdown from 2018-2020 (LS2) the accelerator luminosity will be increased to $2 - 3 \cdot 10^{34} \text{cm}^{-2}\text{s}^{-1}$, exceeding the design value of $10^{34} \text{cm}^{-2}\text{s}^{-1}$, allowing the CMS experiment to collect approximately $100 \text{fb}^{-1}/\text{year}$. 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 electronics will be upgraded to handle the expected higher data rates. The design of the upgraded CSC electronics will be discussed as well as the status of the first phase of the electronics installation. In addition, accelerated irradiation tests are being performed to study the behavior of the CSC electronics under conditions which are nearly an order of magnitude beyond the original design values. Studies have also been performed of chamber gas mixtures to reduce greenhouse-gas impacts. The status of this irradiation campaign and results will be presented.

I read the instructions

Secondary track (number)

12.

Primary author: DILDICK, Sven (Rice Univ.)

Presenter: DILDICK, Sven (Rice Univ.)

Session Classification: Detectors for Future Facilities (incl. HL-LHC), R&D, Novel Techniques

Track Classification: 13. Detectors for Future Facilities (incl. HL-LHC), R&D, Novel Techniques