

CMS Cathode Strip Chamber ageing monitoring

540 Cathode Strip Chambers (CSC), a type of multi-wire promotional chamber, provide precise measurements of muon track coordinates in the CMS endcap region (pseudorapidity: 0.9-2.4) In the HL-LHC lifespan the CSC performance might degrade, in a process often called “ageing”, due to the unprecedented high radiation dose. To this end, the CSC group has been conducting irradiation tests at the CERN Gamma Irradiation Facility (GIF++) with full-scale CSC chambers. In addition, accurate measurements and monitoring of the CSC gas gain in-situ is crucial to detect any possible early signs of ageing. In this presentation, CSC gas gain studies using muon induced charges on cathodes in the 2017, 2018 and 2022 data (corresponding to 148 fb-1 integrated luminosity) are presented. Ageing effects are assessed by monitoring gas gain as a function of the integrated luminosity. The impact of atmospheric pressure, instantaneous luminosity, and changes in detector settings (HV, gas mixture, etc.) is taken into account.

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