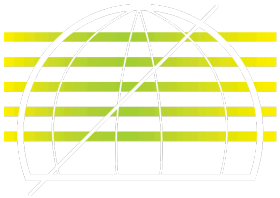

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RPC background studies at CMS experiment

Friday, 30 September 2022 12:00 (15 minutes)

The Compact Muon Solenoid (CMS) is a general purpose experiment to explore the physics of the TeV scale in pp-collisions provided by the CERN LHC. Muons constitute an important signature of new physics and their detection, triggering, reconstruction and identification is guaranteed by various sub-detectors using different detection systems: Drift Tubes (DT) and Resistive Plate Chambers (RPC) in the central region and Cathode Strip Chambers (CSC) and RPC in the endcap. During Run 2 the higher instantaneous luminosity lead to a substantial background in the muon system. In this contribution we will describe the method used to measure these backgrounds in the RPC detectors. The analysis is based on data collected in 2018 pp collisions at 13 TeV with instantaneous luminosities up to 2.2 E34 cm-2s-1. Thorough understanding of the background rates provides the base for the upgrade of the muon detectors for the High-Luminosity LHC, where the instantaneous luminosity will reach 5-7.5 E34 cm-2s-1, resulting in 140-200 simultaneous pp-collisions. We will discuss in detail the origin and characteristics of the background introduced by the pp-collisions, we will analyze the response of the RPC detectors and illustrate the dependence of the background on the instantaneous luminosity and the LHC fill scheme. We will show it is possible to estimate the contribution from long-lived background rates separately from the promptly induced background.

Presenter: CARNEVALI, Francesco (Universita e INFN sezione di Napoli (IT))

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