

# Radiation environment simulation studies on CMS RPC muon detectors

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## Summary

A muon telescope prototype using the CMS Resistive Plate Chambers (RPC) technology will be the first spin-off for muography.

The High-Luminosity Large Hadron Collider (HL-LHC) upgrade aims to increase its luminosity by a factor of 5 beyond the LHC's design value, increasing the potential for discoveries after 2025. The increased collision rate of particles will be a challenge for the CMS systems as higher levels of radiation could degrade them and affect their performance. It is therefore important to understand the expected radiation environment and its impact on the different sub-detectors. In this study we use simulations to reproduce the radiation environment during CMS Run-2 and to estimate its impact on the RPC detectors. Results are compared with measurements collected by the RPC system during 2018 and reasonable agreement is observed. This study serves as a benchmark for future simulations with a Phase-2 (HL-LHC) configuration.

**Primary author(s) :** Mr. CARPINTEYRO BERNARDINO, Severiano (Facultad de Ciencias Físico Matemáticas de la BUAP); Prof. URIBE ESTRADA, Ceculia (Benemerita Universidad Autonoma de Puebla, Puebla, Mexico.); Prof. CASTAÑEDA HERNANDEZ, Alfredo (Universidad de Sonora. Apartado Postal: 5-88, Hermosillo, Sonora, Mexico); Mr. DEL RIO VIERA, Manuel Alejandro (Benemerita Universidad Autonoma de Puebla, Puebla, Mexico.)

**Presenter(s) :** Mr. CARPINTEYRO BERNARDINO, Severiano (Facultad de Ciencias Físico Matemáticas de la BUAP)