

Radiation Background estimation for the GE1/1 Triple-GEM detector in the CMS endcap

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The Compact Muon Solenoid (CMS) is a general-purpose particle detector at the Large Hadron Collider (LHC) designed to study a wide range of particles produced in high energy collisions. These particles interact with the beam pipe, shielding and detector supporting materials to produce neutrons, gammas, electrons and positrons, forming a common background radiation field for CMS. A Monte-Carlo simulation is used to predict the change in the background due to the evolution of the CMS detector geometry expected for the Phase-2 upgrade. In the forward region, the upgrade includes Gas Electron Multiplier (GEM) detectors called GE1/1. In this study, an estimate of the GE1/1 detector response to the background radiation is presented. The flux of background radiation is predicted using the FLUKA framework and the response of the detector is predicted using the GEANT4 framework. A comparison of the prediction and GEM Slice Test data is done for validation of the technique.

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Author: KUMAR, Sunil (Panjab University (IN))

Co-author: COLLABORATION, CMS

Presenter: KUMAR, Sunil (Panjab University (IN))

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