Contribution ID: **203** Type: **Poster presentation only**

High rate capability studies of triple-GEM detectors for the ME0 upgrade of the CMS Muon Spectrometer

The high-luminosity LHC (HL-LHC) upgrade is setting a new challenge for particle detector technologies. In the CMS Muon System gaseous detectors, the increase in luminosity will produce a particle background ten times higher than at the LHC. To cope with the high rate environment and maintain performance, triple Gas Electron Multiplier technology is a promising candidate for high-rate capable detectors for the CMS-ME0 upgrade project in the innermost region of the forward Muon Spectrometer of the CMS experiment. An intense R&D and prototype phase is ongoing in order to prove that such technology meets the stringent performance requirements of highly efficient particle detection in the harsh background environment expected in the innermost ME0 region. The authors will describe the recent rate capability studies on triple-GEM detectors operated with an Ar/CO_2 $(70/30)$ gas mixture at an effective gas gain of 2×10^4 by using a high intensity $22keV$ X-ray generator. Moreover, we will present the novel foils design based on double-sided segmented GEM-foils, high voltage distribution powering and filtering and their impact on the performance of the detector in light of new rate capability studies, with a summary of the ongoing R&D activities.

Author: Dr FALLAVOLLITA, Francesco (CERN)

Co-authors: PELLECCHIA, Antonello (Universita e INFN, Bari (IT)); FIORINA, Davide (Universita & INFN Pavia); RAMIREZ GARCIA, Luis Felipe (Universidad de Antioquia (CO)); BIANCO, Michele (CERN); ROSI, Nicole (Universita & INFN Pavia)

Presenter: Dr FALLAVOLLITA, Francesco (CERN)

Session Classification: Poster session 2

Track Classification: Sensor Materials, Device Processing & Technologies