

# Aging Studies of the triple-GEM detectors for future upgrades of the CMS muon high rate region at the HL-LHC

*Friday, July 6, 2018 8:15 PM (15 minutes)*

The high-luminosity LHC (HL-LHC) upgrade is setting a new challenge for particle detection technologies. In the CMS muon system based on gas detectors, the increased luminosity will yield a ten times higher particle background compared to the present LHC conditions. To cope with the high-rate environment and to maintain the actual performance, new Gas Electron Multiplier (GEM) detectors will be installed in the innermost region of the forward CMS muon spectrometer,  $2 < \eta < 2.8$  (ME0 project). The detailed knowledge of the detector performance in the presence of such a high background is crucial for an optimized design and efficient operation at the HL-LHC. A precise understanding of possible aging effects of detector materials and gases is of extreme importance. For this reason, aging tests of full sized triple-GEM detector operated with an AR/CO<sub>2</sub> (70:30) gas mixture at an effective gas gain of  $2 \times 10^4$ , are in course at GIF++, the CERN Gamma Irradiation Facility. One detector is irradiated with 662 keV gamma – rays from a 14 TBq <sup>137</sup>Cs source and, in parallel, a second similar detector with 22 keV X - rays at the quality control lab. This contribution describes the performance of triple-GEM detectors during the irradiation test and reports on their state-of-the art.

**Primary authors:** MEYER, Arnd (Rheinisch Westfaelische Tech. Hoch. (DE)); LEE, Yong Hoon (Sungkyunkwan University (KR)); FALLAVOLLITA, Francesco (Università e INFN Pavia)

**Presenter:** LEE, Yong Hoon (Sungkyunkwan University (KR))

**Session Classification:** POSTER

**Track Classification:** Posters