Contribution ID: **358** Type: **Poster**

Triple-GEM detectors for the ME0 system of the CMS Phase-2 Upgrade

The High-Luminosity LHC will increase proton-proton collision rates to 5-7.5 times the nominal LHC luminosity, resulting in 140-200 pp-interactions per bunch crossing. To ensure effective muon triggering and reconstruction in this high-rate environment, the forward Muon spectrometer of the CMS experiment will be upgraded with Gas Electron Multiplier (GEM) detectors.

The ME0 station will consist of six-layer stacks of triple-GEM detectors, designed to extend the muon system's pseudorapidity coverage up to $|\eta| < 2.8$. The operating environment for ME0 will be characterized by extremely high rates, with simulations predicting approximately 150 kHz/cm². To guarantee optimal performance in this challenging setting, a thorough study of its rate capability and timing performance is essential.

This talk provides an overview of the ME0 project and its current progress. Specifically, we present the integration of a final-design prototype for a six-layer ME0 stack and share performance measurements related to muon segment reconstruction efficiency and timing. We discuss results from cosmic ray measurements as well as rate capability tests conducted under high-rate gamma background conditions at the CERN Gamma Irradiation Facility (GIF++). Our findings confirm that the ME0 design meets the Phase-2 CMS muon system upgrade requirements.

Secondary track

Author: COLLABORATION, CMS

Presenter: COLLABORATION, CMS

Session Classification: Poster T11

Track Classification: T11 - Detectors