Contribution ID: **63** Type: **Invited Topical Talk**

An introduction to gas electron multipliers and their time to shine during the CMS phase 2 upgrade

Tuesday 1 April 2025 13:45 (30 minutes)

Gas electron multipliers (GEMs) are a sub-class of micro-pattern gaseous detectors in which passing charged particles ionize the gas inside to create an electronic avalanche through multiple stages of amplification. Each GEM foil is copper-cladded Kapton with a chemically etched micro-pattern of holes allowing electrons to pass through and be amplified. Each amplification stage allows a moderate amplification gain per GEM foil to be achieved, yielding an overall gain of O(105).

The CMS GEM project makes use of the largest area GEM chambers up to now. GEMs were first installed in the first muon station of the CMS end caps during the last long shutdown (LS2) in 2021 and 2022. These chambers compliment the existing cathode strip chamber system improving the transverse momentum measurement of muons traversing the CMS end caps. A new addition to the GEM system, so-called ME0, will be installed adjacent to the planned high-granularity hadron calorimeter (HGCAL) in the nose of the CMS end caps. This will extend the pseudorapidity reach of the muon system from 2.4 to 2.8. The ME0 stacks, sets of six triple GEM chambers are planned to be installed during the next LHC long shutdown (LS3). Production of the ME0 stacks is currently underway and the first stacks are already undergoing quality control (QC) checks to test detector readiness. The production status and initial QC results will be presented.

Presenter: ZALESKI, Shawn

Session Classification: Invited Topical Talks 1 / Eingeladene Vorträge 1