The 22nd International Conference on
Strangeness in Quark Matter
22-27 March, 2026, Los Angeles, CA

Contribution ID: **137** Type: **Poster Presentation**

The first energy-dependent measurement of coherent ρ^0 photoproduction in PbPb UPCs with CMS

Tuesday, 24 March 2026 19:12 (1 minute)

Coherent vector meson photoproduction in ultraperipheral heavy-ion collisions (UPCs) provides a powerful probe of the nuclear gluon structure at small Bjorken-x. Vector mesons with different masses exhibit varying sensitivities to nonlinear QCD dynamics: lighter mesons probe lower energy scales and are therefore more sensitive to gluon saturation and nuclear shadowing effects. Among them, ρ^0-the lightest vector meson-serves as one of the most sensitive probes of these nonlinear phenomena in coherent photoproduction, despite the inherent challenges associated with non-perturbative QCD calculations. In this talk, we present the measurement of coherent ρ^0 photoproduction in Pb+Pb UPCs at $\sqrt{s_{NN}} = 5.36$ TeV with the CMS detector. The differential cross section is reported as a function of rapidity over a broad kinematic range $|y| < 2$. A two-fold ambiguity in the photon direction, intrinsic to symmetric nucleus–nucleus UPCs, has traditionally limited access to the photon–nucleus center-of-mass energy and the corresponding small-x region. We will present the measurement that resolves this ambiguity, enabling the first extraction of the coherent ρ^0 photoproduction cross section as a function of the photon–nucleon center-of-mass energy up to about 160 GeV, corresponding to x values down to $\sim 1.9 \times 10^{-5}$. These results provide new constraints on nuclear shadowing and gluon saturation effects in the small-x regime.

Authors: CMS COLLABORATION; Ms VERMA, Pranjal (Indian Inst. of Tech. Madras)

Presenter: Ms VERMA, Pranjal (Indian Inst. of Tech. Madras)

Session Classification: Poster Session