

Contribution ID : **53** Type : **Poster**

Coherent photoproduction of 4π states in Run 3 with ALICE experiment

Thursday, 22 October 2026 17:00 (2:00)

Abstract

Ultraperipheral collisions at the LHC provide a unique environment to study photonuclear interactions through quasi-real photons generated by the intense electromagnetic fields of relativistic nuclei. Coherent vector-meson photoproduction is a sensitive probe of the structure of nuclei at high energies, and it allows nuclear effects to be studied in the transition region between the perturbative and non-perturbative regimes of QCD. Following the $\rho^0 \to \pi^+\pi^-$ measurements, the $\pi^+\pi^-\pi^+\pi^-$ final state extends this programme towards higher invariant masses, providing access to excited ρ states such as the $\rho(1450)$ and $\rho(1700)$. ALICE performed the first LHC measurement of coherent four-pion photoproduction in Pb–Pb UPCs at $\sqrt{s_{NN}} = 5.02$ TeV using Run 2 data. The measured cross section is $d\sigma/dy \times \mathrm{BR} = 47.8 \pm 2.3$ (stat.) ± 7.7 (syst.) mb. The invariant-mass distribution is described by the contributions of the $\rho(1450)$ and $\rho(1700)$ together with their interference or by a single resonance plus a constant interference term. During the LHC Long Shutdown 2, ALICE introduced streaming readout and other detector upgrades that substantially enhance its data-taking capabilities in Run 3. In addition, the new light-ion OO and asymmetric pO systems allow the dependence of the production on nuclear size and photon-flux configuration to be explored. This poster presents the performance of four-pion state reconstruction in these systems, illustrating the potential of Run 3 data to extend this measurement to light-ion collisions.

Primary author(s) : RAMÍREZ ÁLVAREZ, César Omar (Benemérita Universidad Autónoma de Puebla)

Presenter(s) : RAMÍREZ ÁLVAREZ, César Omar (Benemérita Universidad Autónoma de Puebla)

Session Classification : Poster Session