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Exclusive four pion photoproduction in ultra-peripheral Pb–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV at ALICE

The intense photon fluxes of relativistic nuclei provide an opportunity to study photonuclear interactions in ultra-peripheral collisions. Exclusive final states of vector mesons can be studied in the process $\gamma + A \rightarrow \text{meson} + A$. The measurement of photoproduced $\pi^+\pi^-\pi^+\pi^-$ final states in ultra-peripheral Pb–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV is presented for the first time. The cross section, $d\sigma/dy$, times the branching ratio is measured in the rapidity interval $|y| < 0.5$ and compared to recent theoretical predictions. The invariant mass distribution is not well described with a single Breit-Wigner resonance, so the production of two independent excited resonances, $\rho(1450)$ and $\rho(1700)$, and their interference is considered. The values of the masses and widths of the resonances are found to be in a good agreement with the PDG values. The mixing angle between the two resonances is also extracted from the fits to the invariant mass spectra.

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