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Exclusive photoproduction of ρ^0 mesons in ultra-peripheral Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV

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The strong electromagnetic fields generated in the collision of Pb ions at the LHC allow photon-photon and photonuclear interactions to be studied in a kinematic regime unexplored so far. The exclusive photoproduction of vector mesons was studied with the ALICE detector in ultra-peripheral PbPb collisions, where the impact parameter is larger than the sum of the nuclear radii and hadronic interactions are strongly suppressed.

A data sample corresponding to about 3.6 mb^{-1} was collected during the 2010 LHC heavy-ion run at an energy $\sqrt{s_{NN}} = 2.76$ TeV using triggers that select ultra-peripheral collisions.

In this data sample, ρ^0 photoproduction at mid-rapidity corresponds to a photon-nucleon center of mass energy of 45 GeV, about 4 times higher than in previous experiments. The cross section for exclusive ρ^0 production was measured, and the relative contributions to the invariant mass distribution from resonant and non-resonant processes was evaluated.

The results are compared to calculations with different theoretical models.

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