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ALICE measurements on ρ^0 photoproduction in Pb-Pb ultra-peripheral collisions

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The intense photon fluxes of relativistic nuclei provide a possibility to study photonuclear and two-photon interactions in ultra-peripheral collisions (UPC) where the nuclei do not overlap and no strong nuclear interactions occur.

Within the Vector-meson Dominance Model (VDM), the ρ^0 contribution prevails in the QCD photon structure function and the $\gamma+A \rightarrow \rho^0+A$ process in heavy-ion UPC is a tool to test the, so-called, black disk regime where the target nuclei appears like a black disk and the total ρ^0+A cross section reaches its limit. RHIC and first LHC results have deviated from some Glauber+VDM calculations, which thus call for new data.

ALICE reports measurements on ρ^0 photoproduction cross sections in Pb-Pb UPC with data taken at $\sqrt{s_{NN}}=2.76$ TeV and new measurements with the data taken at $\sqrt{s_{NN}}=5.02$ TeV. The mid-rapidity cross section of coherent ρ^0 photoproduction is measured, and it is compared to theoretical models.

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