

UPC 2023: International workshop on the physics of Ultra Peripheral Collisions

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Four-pion state in UPC

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We study the production of $2\pi^+2\pi^-$ in ultraperipheral heavy-ion collisions at RHIC and LHC energies. The recent H1 preliminary data [1] are utilized to improve the description of the poorly known $\gamma p \rightarrow 4\pi^\pm p$ process. Predictions for photon-nucleus interactions were calculated for various excited states of ρ meson. We will present an agreement of theory with the available STAR data at RHIC [2]. The comparison of $2\pi^+2\pi^-$ invariant mass spectrum and nuclear total cross section shows that $\rho(1570)$ plays a crucial role [3] in correctly describing existing experimental data. STAR data for the four-pion state were interpreted as the decay of $\rho(1700)$ resonance. New H1 data allows us to verify this reasoning. Nuclear predictions will also be given for LHC energy at the central and forward regions of rapidities.

[1] H1 Collaboration, S. Schmitt, 26th International Workshop on Deep Inelastic Scattering and Related Subjects (DIS 2018): Port Island, Kobe, Japan, April 16-20, 2018,

[2] STAR Collaboration, B.I. Abelev et al., Phys. Rev. C81 (2010) 044901,

[3] M. Klusek-Gawenda and J. Daniel Tapia Takaki, Acta Phys. Polon. B51 (2020) 6, 1393.

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