Contribution ID : **26** Type : **parallel talk**

Photoproduction of vector mesons: from ultraperipheral to semi-central heavy ion collisions

Monday, 6 June 2016 15:00 (0:25)

Collaboration

Abstract content

We shall present nuclear cross section for $AA \to AAV$ and $AA \to AAVV$ processes where A means a nucleus (lead or gold) and V denotes ρ^0 or J/ψ vector meson. Analysis is done in the impact parameter space equivalent photon approximation. This approach allows to consider a particular process taking into account distance between colliding nuclei. We consider both ultraperipheral and for the first time semi-central collisions.

We get very good description of the latest ALICE data [1] for single J/ψ photoproduction for different centrality bins. We are first group which undertook a study of this process. We show that a correct interpretation of data needs to use a modification of a photon flux. Finally, we obtained reasonable results but we will try to discuss ''open questions".

Next, total and differential cross section for double-scattering mechanism in the exclusive $AA \to AAVV$ reaction in ultrarelativistic ultraperipheral heavy ion collisions will be presented. In this context we shall consider double photoproduction and photon-photon processes. Simultaneously, we will present very good agreement of our results with STAR [2] (RHIC), CMS [3] and ALICE [4,5] (LHC) experimental data for single ρ^0 and J/ψ vector meson production. The cross section for $\gamma A \to VA$ is parametrized based on an existing model. Our analysis includes a smearing of ρ^0 mass using a parametrization of the ALICE Collaboration.

We will show importance of $\rho^0(770)$ and $\rho^0(1450)$ decay into $\pi^+\pi^-$ channel. Additionally, we shall present a comparison of our predictions for exclusive four charged pions production.

In our calculations we use so-called realistic form factor which is a Fourier transform of the charge distribution in nuclei. This talk will be based mainly on analyses which were studied in Ref. [6] and [7].

References:

[1] ALICE Collaboration, J. Adam et al., arXiv: nucl-ex/1509.08802

[2] STAR Collaboration, B. I. Abelev et al., Phys. Rev. \textbf{C77} (2008) 034910

[3] CMS Collaboration, CMS-PAS-HIN-12-009 (2014)

[4] ALICE Collaboration, B. Abelev et al., Phys. Lett. B718 (2013) 1273

[5] ALICE Collaboration, E. Abbas et al., Eur. Phys. J. C73 (2013) 2617

[6] M. Kłusek-Gawenda and A. Szczurek, Phys. Rev. C89 (2014) 024912

[7] M. Kłusek-Gawenda and A. Szczurek, arXiv: nucl-th/1509.03173

Primary author(s) : KŁUSEK-GAWENDA, Mariola (Institute of Nuclear Physics PAN,)

Co-author(s) : SZCZUREK, Antoni (Institute of Nuclear Physics PAN, Krakow and Rzeszow University, Rzeszow)

Presenter(s) : KŁUSEK-GAWENDA, Mariola (Institute of Nuclear Physics PAN,)

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