

XXIV International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS16)



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Light-by-light scattering in UPC at the LHC

Wednesday, April 13, 2016 9:00 AM (15 minutes)

We will discuss diphoton semi(exclusive) production in ultraperipheral $PbPb$ collisions at energy of $\sqrt{s_{NN}} = 5.5$ TeV (LHC). The calculation is based on equivalent photon approximation in the impact parameter space.

The cross sections for elementary $\gamma\gamma \rightarrow \gamma\gamma$ subprocesses are calculated including two different mechanisms:

- \begin{itemize}
- \item box diagrams with leptons and quarks in the loops and
- \item a vector-meson dominance (VDM-Regge) contribution with virtual intermediate hadronic (vector-like) excitations of the photons.
- \end{itemize}

We get much higher cross sections in $PbPb$ collisions (310 nb) than in earlier calculation from the literature 35 ± 7 nb\footnote{D. d'Enterria and G.G. da Silveira, Phys. Rev. Lett. \textbf{111} (2013) 080405}.

This opens a possibility to study the $\gamma\gamma \rightarrow \gamma\gamma$ (quasi)elastic scattering at the LHC.

We will present many interesting differential distributions which could be measured by the ALICE, CMS or ATLAS Collaborations.

We will show the range of energy $W_{\gamma\gamma}$ where elastic $\gamma\gamma$ scattering could be measured in the heavy-ion collisions.

\vspace{2cm}

This talk will be based on our recent paper:\

- M. K{\l}usek-Gawenda, P. Lebiedowicz and A. Szczurek, arXiv/nucl-th:1601.07001.

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