



Contribution ID: 734

Type: Oral presentation

Exclusive J/Psi production in ultraperipheral Pb+Pb collisions to NLO pQCD

Thursday, 7 April 2022 12:50 (20 minutes)

Coherent exclusive J/Psi photoproduction in ultraperipheral heavy-ion collisions (UPCs) at the LHC, $Pb+Pb \rightarrow Pb+J/\Psi+Pb$, has traditionally been suggested as an efficient probe of nuclear gluon distributions. While in the leading order pQCD this is so, we show that the situation changes rather dramatically at NLO. We present the first NLO study of this process in heavy-ion collisions [1], building our numerical code on the NLO calculation of Ref. [2]. Approximating the generalized parton distributions involved in this process with collinear PDFs, we quantify the NLO contributions in the cross section, show that the real part of the amplitude must not be neglected, study the nuclear quark-PDF contributions, and chart the uncertainties due to the scale choice and PDFs. We compare our calculations with ALICE, CMS and LHCb J/Psi data in Pb+Pb UPCs, exclusive J/Psi photoproduction data from HERA, and LHCb data in p+p. We show that for the y -differential cross sections the scale dependence is significant but a scale choice can be found which reproduces the UPC data both at 2.76 and 5.02 TeV collision energies. In particular, we show that the NLO gluon contribution partly cancels against the LO one in the amplitude, making the process clearly more sensitive to the nuclear quark PDFs than thought before.

[1] K.J. Eskola, C.A. Flett, V. Guzey, T. Loytainen and H. Paukkunen, work in progress.

[2] D.Yu. Ivanov, A. Schafer, L. Szymanowski, G. Krasnikov, Eur. Phys. J. C 34 (2004) 297.

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Session Classification: Parallel Session T09: Ultra-peripheral collisions

Track Classification: Ultra-peripheral collisions