

Modeling the Impact Parameter Dependence of the nPDFs With EKS98 and EPS09 Parametrizations

The knowledge of the parton distribution functions (PDFs) is essential for interpreting any hard-process results from hadronic collisions. For the free proton, the PDFs have been determined with good accuracy from experimental data and DGLAP evolution. However, when colliding heavy ions where the protons are bound to a nuclei, the free proton PDFs cannot be used anymore but the nuclear PDFs (nPDFs) are required. The nuclear modifications of PDFs have been successfully determined through a global DGLAP analysis by our URHIC theory group, first in the EKS98 and more lately EPS09 nPDF sets.

So far these nPDFs are taken to be spatially independent. However, it is reasonable to assume that the nuclear modification varies when going from the dense center of a nucleus to its more dilute edge. Now we have developed a model framework where the nuclear modifications become a function of the nuclear thickness. In my presentation, I will introduce the key concepts and assumptions of our model and show the outcome. Also, as an application example, I present the central-to-peripheral ratio (R_{CP}) calculation of primary jet production in heavy ion collisions at RHIC and LHC to illustrate the effect arising from our model.

Author: Mr HELENIUS, Ilkka (Department of Physics, University of Jyväskylä)

Co-authors: Mr SALGADO, Carlos A. (Universidade de Santiago de Compostela); Ms HONKANEN, Heli (University of Jyväskylä); Prof. ESKOLA, Kari J. (University of Jyväskylä)

Presenter: Mr HELENIUS, Ilkka (Department of Physics, University of Jyväskylä)