



Contribution ID: 70

Type: Oral presentation

## Dipole amplitude with uncertainty estimate from HERA data and applications in Color Glass Condensate phenomenology

*Thursday 1 May 2014 09:10 (20 minutes)*

The Color Class Condensate offers a consistent framework to describe high-energy (small- $x$ ) data from various experiments. The non-perturbative input for these calculations, the dipole-target amplitude at initial Bjorken- $x$ , can be obtained by performing a fit to electron-proton deep inelastic scattering data.

We determine the initial condition for the small- $x$  evolution equation (rcBK) from the HERA DIS data using a new parametrization that also keeps the unintegrated gluon distribution positive. We also obtain error sets that can be used to compute uncertainty estimates for any observable that depends on the dipole amplitude.

As an application we compute single inclusive particle production in proton-proton and proton-nucleus collisions with uncertainty estimates. We show that the LHC data can be used to further constrain the initial dipole amplitude. In order to compute proton-nucleus collisions we generalize our dipole-proton amplitude to nuclear targets using only input from HERA and standard nuclear geometry. We obtain a good description with the available LHC nuclear suppression factor data.

References:

T. Lappi, H. Mäntysaari, in progress

T. Lappi, H. Mäntysaari, Phys.Rev. D88 (2013) 114020

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**Session Classification:** WG2: Small- $x$ , Diffraction and Vector Mesons

**Track Classification:** WG2: Small- $x$ , Diffraction and Vector Mesons