Contribution ID : **29** Type : **not specified**

Proton structure functions at small x

Abstract content

Proton structure functions are measured in electron-proton collsision through inelastic scattering of virtual photons with virtuality Q on protons; x denotes the momentum fraction carried by the struck parton. Proton structure functions are currently described with excellent accuracy in terms of scale dependent parton distribution functions, defined in terms of collinear factorization and DGLAP evolution in Q. With decreasing x however, parton densities increase and are ultimately expected to saturate. In this regime DGLAP evolution will finally break down and non-linear evolution equations w.r.t x are expected to take over.

In the first part of the talk we present recent result on an implementation of physical DGLAP evolution. Unlike the conventional description in terms of parton distribution functions, the former describes directly the Q dependence of the measured structure functions. It is therefore physical insensitive to factorization scheme and scale ambiguities. It therefore provides a more stringent test of DGLAP evolution and eases the manifestation of (non-linear) small x effects. It however requires a precise measurement of both structure functions F2 and FL, which will be only possible at future facilities, such as an Electron Ion Collider. In the second part we present a recent analysis of the small x region of the combined HERA data on the structure function F2. We demonstrate that (linear) next-to-leading order BFKL evolution describes the effective Pomeron intercept, determined from the combined HERA data, once a resummation of collinear enhanced terms is included and the renormalization scale is fixed using the BLM optimal scale setting procedure. We also provide a detailed description of the Q and x dependence of the full structure functions F2 in the small x region, as measured at HERA. Predictions for the structure function FL are found to be in agreement with the existing HERA data.

Summary

Primary author(s) : Dr. HENTSCHINSKI, Martin (BNL)

Presenter(s) : Dr. HENTSCHINSKI, Martin (BNL)