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NLP resummation and the endpoint divergent contribution in DIS

The off-diagonal parton-scattering channels $g+\gamma^*$ and $q+\phi^*$ in deep-inelastic scattering are power-suppressed near threshold $x \to 1$. In my talk I will discuss the next- to-leading power (NLP) resummation of large double logarithms of $1-x$ to all orders in the strong coupling, which are present even in the off-diagonal DGLAP splitting kernels. The appearance of divergent convolutions prevents the application of factorization methods known from leading power resummation. Employing d-dimensional consistency relations from requiring $1/\epsilon$ pole cancellations in dimensional regularization between momentum regions, I will show that the resummation of the off-diagonal parton-scattering channels at the leading logarithmic order can be bootstrapped from the recently conjectured exponentiation of NLP soft-quark Sudakov logarithms. In particular, I will illustrate how the result for the DGLAP kernel in terms of the series of Bernoulli numbers found previously by Vogt can be derived directly from algebraic all-order expressions. I will show that the off-diagonal DGLAP splitting functions and soft-quark Sudakov logarithms can be identified as inherent two-scale quantities in the large-x limit. I will conclude by showing that the conjectured soft-quark Sudakov exponentiation formula can be derived in the context of a refactorization of these scales and renormalization group methods inspired by soft-collinear effective theory.

Authors: VERNAZZA, Leonardo (INFN, Torino); BENEKE, Martin (Technische Universitaet Muenchen (DE)); GARNY, Mathias (Technische Universitaet Muenchen (DE)); JASKIEWICZ, Sebastian (Technical University of Munich); SZAFRON, Robert (Brookhaven National Laboratory); Prof. WANG, Jian (Shandong University)

Presenter: VERNAZZA, Leonardo (INFN, Torino)

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