

Parton distribution functions from lattice QCD

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Parton Distribution Functions (PDFs) are the fundamental objects containing information on the flavour structure of hadrons, and on how the hadron spin and momentum are distributed among its constituents, quarks and gluons. Because they are non-perturbation quantities, we must rely on non-perturbative methods for their computation. Lattice QCD (LQCD) is the most successful method to access the non-perturbative physics. Even so, in the case of PDFs LQCD is, essentially, not useful because PDFs are given by light-cone correlations, while LQCD is applicable to real-time correlations. However, several years ago Ji proposed a new method to compute PDFs in LQCD based on Large Momentum Effective Theory. Within this method, one computes purely spatial correlations, accessible to LQCD, which can be related, upon a suitable perturbative calculation, to the light-cone correlations. The Fourier transform of the purely spatial matrix elements are called quasi-PDFs. In this talk, we will give an overview of the quasi-PDF approach, showing how to obtain light-cone PDFs from quasi-PDFs. We will present the state-of-art of the lattice computations of PDFs as well as discussing future directions to this field.

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