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Parton distribution functions from Lattice QCD

Tuesday 20 November 2018 09:00 (35 minutes)

In this talk, I will start by generally introducing the non-perturbative formulation of QCD on a Euclidean lattice. Then, I will present a state-of-the-art computation of unpolarized, helicity and transversity parton distribution functions (PDFs) calculated using the so-called quasi-PDF approach introduced by Xiangdong Ji in 2013 and intensively developed thereafter. We employed lattice QCD simulations in the twisted mass formulation with light quark mass set to its physical value. The relevant matrix elements obtained on the lattice were non-perturbatively renormalized and converted to the \overline{MS} scheme at the scale of 2 GeV. A matching process was applied together with target mass corrections, leading to the reconstruction of light-cone parton distribution functions. We find a similar behavior between the lattice and phenomenological data, and for both types of polarized PDFs a nice overlap for a range of Bjorken- x values. This presents a major success for the emerging field of direct calculations of quark distributions using lattice QCD.

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