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Ioffe time behavior of PDFs and GPDs

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Ioffe time essentially quantifies the distance along the lightcone that the quark fields that enter the correlator describing the Parton Distribution Function (PDF) are separated by. In this sense, it is a natural candidate for clearly separating the short distance physics from the long distance physics. We study how the behavior of the parton distribution in Ioffe time can be mapped out given its Mellin moments and a Regge fit parameter. Pseudo PDFs describe nucleon matrix elements of quark field operators separated by a space like distance z . These are calculable in lattice QCD and as z^2 approaches zero, pseudo PDFs approach the actual PDFs. Complimentary to the lattice efforts, we study the behavior pseudo PDFs as a function of z^2 in a diquark model. We also extend the study to pseudo Generalized Parton Distributions (GPDs) which essentially involves taking into account an extra degree of freedom because of the non diagonal nature of the hadronic matrix element in the case of GPDs.

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