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Reconstructing PDFs at large x

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PDFs are nonperturbative objects defined by nonlocal light-cone correlations. They cannot be computed directly from QCD. Using a standard lattice QCD approach, it is possible to compute moments of PDFs, which are matrix elements of local operators. Recently, an alternative approach has been proposed, based on the introduction of quasi-PDFs, which are matrix elements of equal-time spatial correlations and hence calculable on lattice. Quasi-PDFs approach standard PDFs in the limit of very large longitudinal proton momenta P^z . This limit is not attainable in lattice simulations, and quasi-PDFs fail to reproduce PDFs at high x. Here, we propose a method to improve the reconstruction of PDFs by combining information from quasi-PDFs and from the Mellin moments of regular PDFs. We test our method using the diquark spectator model for up and down valence distributions of both unpolarized and helicity PDFs. In the future, the method can be used to produce PDFs entirely based on lattice QCD results.

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