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x-dependence of nucleon PDFs from two-current matrix elements

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We use the operator product expansion (OPE) to relate hadronic Euclidean two current matrix elements to parton distribution functions (PDFs) resolving the dependence on the parton momentum fraction x. We are following the ansatz proposed by [arXiv:1709.03018]. In our calculation, we consider the valence quark PDFs for the proton. This requires the evaluation of a connected proton four-point function for small quark distances. Our simulation is performed on $n_f = 2+1$ CLS gauge ensemble with extension $32^3 \times 96$, coupling $\beta = 3.4$, and pseudo-scalar masses $m_\pi = 355\,\mathrm{MeV}$ and $m_K = 441\,\mathrm{MeV}$, where we include proton momenta up to $|\vec{p}| = 1.57\,\mathrm{GeV}$. The results are converted to the $\overline{\mathrm{MS}}$-scheme at the scale $\mu = 2\,\mathrm{GeV}$. In order to extract the PDF, the data is fitted in Fourier space based on a standard parameterization of the PDF.

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