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Nucleon valence quark distributions from Lattice QCD using distillation

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We present results on the nucleon valence quark distribution extracted from Lattice QCD simulations, using a gauge ensemble of $N_f = 2 + 1$ Wilson-Clover fermions with a pion mass of $m_{\pi} = 350$ MeV and lattice spacing of about a = 0.093 fm. We obtain reduced Ioffe Time Distributions (rITDs) by computing appropriate matrix elements on the lattice, and elaborate on the extraction of the desired quark distributions from the rITDs following the pseudo-PDF approach. In our evaluation, the so-called "distillation" smearing method is employed, which allows for improved statistical precision over other methods, among other benefits. A number of techniques in order to ensure ground state dominance are further considered. Theoretical and experimental implications of our calculation are discussed.

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