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Polarized Gluon Helicity Distribution of the Nucleon from Lattice QCD in the Continuum Limit

Monday, 6 July 2026 10:00 (30 minutes)

We present a state-of-the-art lattice QCD calculation of the proton's gluon helicity parton distribution function (PDF) using the large-momentum effective theory (LaMET). The analysis is based on 2+1-flavor CLQCD gauge ensembles at three lattice spacings down to 0.0775 fm and a pion mass of ~300 MeV, with nucleon momenta up to 3.0 GeV. Distillation with momentum smearing is employed to enhance the signal of two-point correlators. A hybrid renormalization scheme is adopted, where self-renormalization is applied to the purely imaginary and antisymmetric matrix elements for the first time. After one-loop perturbative matching, a simultaneous extrapolation to the continuum and infinite-momentum limits is performed. The resulting gluon helicity PDF is compared with global analysis results.

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