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The nucleon structure from an AdS/QCD model in the Veneziano limit

We employ the VQCD model, a holographic approach that dynamically simulates essential QCD characteristics, including linear mass spectra, confinement, asymptotic freedom, and magnetic charge screening, while incorporating quark flavor effects. Using this model, we first calculate the proton mass spectrum and the wave function, incorporating anomalous dimensions to refine our
results. Next, we compute the proton structure functions across a range of Bjorken x values using consistent parameters. Furthermore, we derive the proton electromagnetic form factor by solving the equation of motion for electromagnetic field, accounting for background effects, and demonstrate
qualitative consistency with results from free electromagnetic fields coupled to fermions. Finally, we calculate the gravitational form factors by introducing an effective graviton mass m arising from
chiral symmetry breaking and the proton energy-momentum tensor. Our calculations yield results that are in excellent agreement with experimental data and lattice QCD computations, validating the VQCD model as a robust tool for studying proton properties.

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