Contribution ID: **7** Type: **not specified**

String-based parametrization of nucleon GPDs at any skewness: a comparison to lattice QCD

Friday, 31 May 2024 11:30 (30 minutes)

We introduce a string-based parametrization for nucleon quark and gluon generalized parton distributions (GPDs) that effectively handles all skewness values. Our approach leverages conformal moments, representing them as the sum of spin-j nucleon A-form and skewness-dependent spin-j nucleon D-form factor, derived from t-channel string exchange in AdS spaces. This model-independent framework, satisfying the polynomiality condition, uses Mellin moments of empirical parton distribution functions (PDFs) to estimate these form factors. With just five Regge slope parameters, our method accurately produces various nucleon quark GPD types and symmetric nucleon gluon GPDs through Mellin-Barnes integrals. Our isovector nucleon quark GPD aligns with existing lattice data, promising to improve the empirical extraction and global analysis of nucleon GPDs in exclusive processes by avoiding the de-convolution challenge.

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Session Classification: Friday