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Definite Orbital Angular Momentum Nucleon GPD Contributions via Light Front Wave Function Overlap

While hadronic structure is experimentally probed by processes such as DIS and DVCS, both lattice and continuum techniques are employed to corroborate such results from a theoretical perspective. On the continuum side, the Fadeev equations provide a fully covariant approach to three body interactions convenient for describing three quark hadronic states. However, the four-spacetime-dimensional nature of the corresponding Fadeev wave functions precludes a probabilistic interpretation, encouraging our use of their 3-spacetime-dimensional light cone projections, Light Front Wave Functions (LFWFs). An intuitional advantage of LFWFs is their role as coefficients in Fock expansions of hadronic states. We first define nucleon Fadeev wave functions in terms of off-diagonal nucleon matrix elements, and subsequently express the corresponding definite orbital angular momentum (OAM) nucleon LFWFs. With these definite quark helicity LFWFs in hand we calculate GPDs as linear combinations of their overlaps, and isolate definite OAM contributions to nucleon GPDs, PDFs, Form Factors (FFs) and the electric nucleon radius. Looking forward, this work will allow us to map dynamical effects underlying the computation of Fadeev wave functions to the multimensional structure of the nucleon.

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