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three dimension imaging of proton from BLFQ

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Basis Light-front Quantization (BLFQ) is a non-perturbative method for solving bound state problems in the light-front Hamiltonian formalism. It has already been used to study QED and QCD systems like the positronium and quarkonium. In this work, we apply BLFQ to investigate the baryon system. We restrict ourselves to the valence sector and adopt an effective Hamiltonian which contains the confining potential in both the longitudinal and the transverse directions as well as a one-gluon exchange interaction. Through diagonalizing the effective light-front Hamiltonian we obtain the light-front wave function in the valence sector. I will present various observables of the proton such as the electromagnetic form factors, PDFs, and GPDs calculated from the obtained light-front wavefunction. We find a reasonable agreement between our results and the experimental data.

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