

Glue and sea inside proton: A light-front Hamiltonian approach

mardi 19 septembre 2023 11:00 (30 minutes)

Basis Light-Front Quantization (BLFQ) provides a nonperturbative framework to solve relativistic many-body bound state problems in quantum field theories. We report our recent progress in applying BLFQ to reveal structure of the nucleon going beyond to its leading Fock sector. We produce the light-front wave functions of the nucleon from the light-front QCD Hamiltonian, determined for its constituent $|qqq\rangle$, $|qqqg\rangle$, and $|qqq\bar{q}\rangle$ Fock components. The eigenvectors of the light-front QCD Hamiltonian have been successfully employed to compute a wide class of different and related nucleon observables. We discuss the generalized parton distributions functions (GPDs) and the transverse momentum dependent distribution functions (TMDs) of the gluon and sea quarks inside the nucleon.

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Classification de Session: Plenary