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Towards ab initio hadronic physics with basis light-front quantization

Basis light-front quantization (BLFQ) is designed as a non-perturbative Hamiltonian approach to solving quantum chromodynamics (QCD) as a quantum many-body problem. In this talk, I will introduce the basic ideas of BLFQ and show how this method, starting from a semiclassical approximation to QCD, leads to a reasonable description of hadron spectrum and wave functions. The latter is used to compute observables including decay constants, elastic and transition form factors, parton distributions and amplitudes from high energy scattering. I will also mention the challenges and the emerging opportunities in BLFQ and related methods.

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