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Basis function approach to Hamiltonian light front gauge theory[1]

HELI HONKANEN, JUN LI, PIETER MARIS, JAMES VARY, Iowa State University, STAN BRODSKY, SLAC National Accelerator Laboratory, Stanford University, AVAROTH HARINDRANATH, Saha Institute of Nuclear Physics, 1/AF, Bidhannagar, Kolkata, India, GUY DE TERAMOND, Universidad de Costa Rica, San José, Costa Rica — Hamiltonian light-front quantum field theory constitutes a framework for the non-perturbative solution of invariant masses and correlated parton amplitudes of self-bound systems. By choosing the light-front gauge and adopting a basis function representation, we obtain a large, sparse, Hamiltonian matrix for mass eigenstates of gauge theories that is solvable by adapting the *ab initio* no-core methods of nuclear many-body theory. Full covariance is recovered in the continuum limit, the infinite matrix limit. There is considerable freedom in the choice of the orthonormal and complete set of basis functions with convenience and convergence rates providing key considerations. Here, we use a two-dimensional harmonic oscillator basis for transverse modes that corresponds with eigensolutions of the soft-wall AdS/QCD model obtained from light-front holography. We outline our approach, present illustrative features of some systems in a cavity.

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