

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Light unflavored mesons in a light-front Hamiltonian approach

WENYANG QIAN, SHAOYANG JIA, Iowa State Univ, YANG LI, College of William Mary, JAMES VARY, Iowa State Univ — We study the light unflavored mesons as relativistic bound states of a valence quark and anti-quark pair in the effective Hamiltonian framework of the Basis Light-Front Quantization (BLFQ) approach. The light-front holography and one-gluon exchange effective Hamiltonian [Phys. Rev. D 96, 016022] is supplemented with a pseudoscalar interaction term such that effects of dynamical chiral symmetry breaking on the pion valence quarks are simulated. The effective Hamiltonian is then diagonalized to obtain the meson light-front wave functions for the valence quarks. In this model, we present the mass spectroscopy, decay constants, the r.m.s. radii, and the parton distribution amplitudes calculated from the valence wave functions. This formalism serves as an initial step in our investigation of the light meson phenomenology.

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Date submitted: 10 Jan 2018

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