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Improvement on Mass Spectrum Calculations for Ground State Pseudoscalar and Vector Mesons in Light Front Quark Model ZIYUE LI, Department of Physics, North Carolina State University, Raleigh, North Carolina 27695-8202, HO-MEOYNG CHOI, Department of Physics, Teachers College, Kyungpook National University, Daegu, Korea 702-701, CHUENG-RYONG JI, Department of Physics, North Carolina State University, Raleigh, North Carolina 27695-8202 — We improved the meson mass spectra calculation done with the light-front quark model constrained by the variational principle for the QCD-motivated effective Hamiltonian. By smearing out the dirac delta function in the hyperfine interaction, we were able to avoid the negative infinity one encounters when using variational principle for the entire hamiltonian. We obtained a better fitting for the mass spectrum of ground state pseudoscalar and vector mesons from π to Υ, compared to the already very good results from previous calculation that didn't include hyperfine interaction in the parameterization process. Our new parameters are further tested in decay constant calculation. We showed that by including higher order Harmonic Oscillator (HO) basis in our trial wave funciton, the decay constants calculated from our model can be improved to agree reasonably well with the experiments.

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