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Effective Light Front QCD Hamiltonian and spectral equation for quark-antiquark states

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Light Front (LF) QCD Hamiltonian in LF gauge is used semiphenomenologically to describe quark-antiquark bound states. Quarks and gluons are considered as constituent particles and the Hamiltonian is projected onto the Fock space of these constituent particles. Quark and antiquark in these states are separated in transverse coordinates in gauge invariant way by the "string" constracted with zero mode transverse component of gluon field. Also we add to this Hamiltonian new term which takes into account the contribution of LF zero mode fields semiphenomenologically. We obtain the spectral equation for meson mass squared and solve this equation analitically at large quark masses and discuss possible comparison with experimental spectrum. Also we discuss the generalization for states which can contain in the string one gluon corresponding a nonzero mode of transverse gluon field.

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