

Abstract Submitted
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Higher Fock-State Effect to the Bound-State in Light-Front Dynamics¹ YUKIHISA TOKUNAGA, North Carolina State University — Solving the relativistic bound-state problem is an important task in nuclear physics. Even the two-body bound-state problem has been solved only under a certain approximation due to the nonperturbative nature. The two-body Bethe-Salpeter equation in the Wick-Cutkosky model was often solved in the ladder approximation without including the cross-ladder contribution, although many different and more accurate treatments of the numerical method to solve the bound-state problem have been developed nowadays. In this presentation, we use the light-front dynamics (LFD) to solve the two-body bound-state problem and extend the light-front ladder approximation to include the cross-ladder contribution. In particular, we include the particle and antiparticle effect to the cross-ladder contribution and show the attractive nature of this effect. To find the bound-state system where this effect is significant, we discuss the case with different masses of two scalar particles and also with the exchange particle of non-zero mass to compare the effect in the Coulomb potential vs. the Yukawa potential.

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