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Particle and Anti-particle Effect to the Bound-State in Light-Front Dynamics[1] YUKIHISA TOKUNAGA, CHUENG JI, NCSU — 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. Using the variational principle, we present the numerical result of the binding energy versus the coupling constant and discuss the effect from the particle and antiparticle intermediate state.

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