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Self-Energy Effect to Two-Body Bound-State in Light-Front Dynamics YUKIHISA TOKUNAGA, CHUENG-RYONG JI, North Carolina State University — Solving the relativistic bound-state problem is an important task in hadronic 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 self-energy, 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 self-energy correction and associate counter-terms. Using the variational principle, we present the numerical result of the binding energy versus the coupling constant of the ladder graph with or without the self-energy correction and compare with the available previous results obtained either analytically or numerically. We also discuss the full LFD kernel including ladder, cross-ladder, stretched-box and self-energy graphs.

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