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A new viewpoint to Faddeev equations¹ MOHAMMADREZA HADIZADEH, Central State University Ohio University, MAHDI RADIN, K. N. Toosi University of Technology — The inputs for the Faddeev equations, in three-body bound and scattering calculations, are two-body transition operators $t(\epsilon)$. The Lippmann-Schwinger equation should be solved to obtain the matrix elements of $t(\epsilon)$ for negative or positive two-body subsystem energies ϵ , where the values of ϵ are dictated by the magnitude of Jacobi momentum of the third particle. The solution of the Lippmann-Schwinger equation is challenging, mainly for positive energies where the singularities occur. In this talk, we propose a new form of Faddeev equations for three-body bound state calculations by working directly with two-body interactions and avoiding calculating the matrix elements of two-body t -matrices. We test the new formalism in both nonrelativistic and relativistic descriptions of three-body bound states in a three-dimensional approach, without using a partial wave decomposition. The calculated nonrelativistic and relativistic three-body binding energies in the proposed novel Faddeev scheme are in excellent agreement with the results of traditional Faddeev formalism.

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