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The Exchange Force in a System of Three Non-identical Particles[1]

ROMAN KEZERASHVILI, The Graduate Center, City University of New York, IGOR FILIKHIN, SUSLOV VLADIMIR, BRANISLAV VLAHOVIC, North Carolina Central University — We study the bosonic $K^0K^+K^-$ system by using the isospin independent nuclear potentials [1]. The $K^0K^+K^-$ represents ACB or AAB particle models with or without Coulomb potential. For the latter case if one neglects the AA interaction, V_{AA}=0, the system can be described by the Faddeev equation as $(H_0 + V_{AB} - E)W = -V_{AB}PW$, where P is the permutation operator. The term on the r. h. side of the equation is the exchange term, which has a clear physical interpretation (see, for example, [2]). This term adds negative energy to the two-body energy E_2 defined by the l. h. side of the equation and $E = E_3 < E_2$, where E_3 is the three-body energy. We evaluate the mass polarization term related to the distribution of mass: $E_3(V_{AB} = 0) - 2E_2$ for the AAB model. For the ACB model, when the Coulomb force violates the exchange symmetry and the Faddeev equation is split into a set of two equations, we analyze the effect of the Coulomb force by using a scaling factor. We compare the exchange term or its analogy for AAB and ACB models, respectively, and discuss the exchange force in three-body systems. [1] I. Filikhin, R. Ya. Kezerashvili, V. M. Suslov, Sh. M. Tsiklauri, B. Vlahovic, PRD 102, 094027 (2020). [2] T. Yamazaki, Y. Akaishi, PRC 76, 045201 (2007).

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