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Accuracy of the Born-Oppenheimer approximation and universality in a one-dimensional three-body system

Monday, 2 September 2019 14:30 (20 minutes)

We study a three-body system confined to one space dimension, consisting of two identical, non-interacting, heavy particles and a light particle with arbitrary mass ratio interacting with the two heavy particles. In this talk we focus on a contact heavy-light interaction, and therefore apply the exact integral equations of Skorniakov and Ter-Martirosian, in order to obtain the three-body energy spectrum together with the corresponding wave functions. The accuracy of the Born-Oppenheimer approximation is then studied by comparing both spectrum and wave functions to the exact results. In addition, we present a proof showing that the results of the contact interaction are universal, if the underlying two-body system is tuned on resonance.

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