

Potential splitting approach for scattering problem for few-body quantum systems

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Scattering problem for few-body quantum systems is of great importance for various fields of modern quantum physics. The complicated boundary conditions at large distances, especially for slowly decreasing potentials, represent the main difficulty for this problem [1]. While several methods have been developed for constructing solutions to the scattering problem, mathematically sound and computationally effective approaches are still in demand.

We present an approach based on splitting the reaction potential into a finite range part and a long range tail part to describe scattering in the case of the Coulomb interaction [2,3]. The solution to the Schrödinger equation for the long range tail is used as an incoming wave. The scattering problem is then reformulated into an inhomogeneous Schrödinger equation with asymptotic outgoing waves. This equation is solved with the exterior complex scaling technique. The developed approach has been illustrated with calculations of scattering processes in few atomic and molecular systems.

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2. M.V. Volkov, E.A. Yarevsky, S.L. Yakovlev, *Europhys. Lett.* 2015. V. 110. 30006.
3. E. Yarevsky, S.L. Yakovlev, N. Elander, *J. Phys. B: At. Mol. Opt. Phys.* 2017. V. 50. 055001.

The speaker is a student or young scientist

No

Section

1. Nuclear structure: theory and experiment

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