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Asymptotic behavior of the eigenfunctions of the many-particle Schrödinger operator. I: One-dimensional particles. (English) [Zbl 1160.81476](#)

Suslina, T. (ed.) et al., Spectral theory of differential operators. M. Sh. Birman 80th anniversary collection. Providence, RI: American Mathematical Society (AMS) (ISBN 978-0-8218-4738-1/hbk). Translations. Series 2. American Mathematical Society 225; Advances in the Mathematical Sciences 62, 55-71 (2008).

Summary: We study the three-body nonrelativistic quantum scattering problem with rapidly decreasing at infinity pair potentials for the case of one-dimensional particles. We consider the solution $\chi(z, q)$ of the corresponding Schrödinger equation that can be interpreted as the scattered plane wave $e^{i(z, q)}$ and find its asymptotic behavior as $|z| \rightarrow \infty$. More precisely, we explicitly construct a function $\chi_0(z, q)$ that determines the asymptotic behavior of the solution up to a diverging circle wave with a smooth amplitude coefficient. The method is based on analogies between the quantum scattering problem and the diffraction of the plane wave by a system of half-transparent infinite screens. We believe that the formalism can be useful also for studying many-dimensional particle scattering and for the case of long range pair potentials.

For the entire collection see [\[Zbl 1152.47002\]](#).

MSC:

[81U10](#) *n*-body potential quantum scattering theory

[81Q10](#) Selfadjoint operator theory in quantum theory, including spectral analysis

Cited in 1 Review
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