Nonlinear Sciences > Exactly Solvable and Integrable Systems

Scattering on two Aharonov-Bohm vortices with opposite fluxes

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The scattering of an incident plane wave on two Aharonov-Bohm vortices with opposite fluxes is considered in detail. The presence of the vortices imposes non-trivial boundary conditions for the partial waves on a cut joining the two vortices. These conditions result in an infinite system of equations for scattering amplitudes between incoming and outgoing partial waves, which can be solved numerically. The main focus of the paper is the analytic determination of the scattering amplitude in two limits, the small flux limit and the limit of small vortex separation. In the latter limit the dominant contribution comes from the S-wave amplitude. Calculating it, however, still requires solving an infinite system of equations, which is achieved by the Riemann-Hilbert method. The results agree well with the numerical calculations.

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