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Perturbation theory for isotropic velocity-dependent potentials: scattering case MAHMOUD JAGHOUB, Physics Department, University of Jordan, Amman 11942 Jordan — The time-independent Schrödinger equation with an isotropic velocity-dependent potential is considered. Treating the velocity-dependent interaction as a small perturbation we develop analytical formulae for the changes in the scattering phase shifts and wave functions. It is shown that only the zeroth order solution and the perturbing potential are needed to determine the phase shift and wave function corrections. No prior knowledge of the unperturbed scattering states continuum is required. In order to test the validity of our approach we applied it to an exactly solvable model for nucleon-nucleon scattering. The results of the perturbation formalism compare quite well with the those of the exactly solvable model. The developed formalism can be applied in problems concerning pion-nucleon, nucleon-nucleon and electron-atom scattering. It may also be useful in studying the scattering of electrons in semiconductor heterostructures.

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