Isotopic and Symmetry Effects in the Collision of Atomic Helium

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The thermophysical properties of a helium dilute gas at low and high temperatures are revisited with new potential data points. The second virial coefficients are computed in order to assess the accuracy of the constructed He-He potentials. The results, mainly at high temperatures, are in a good agreement with the published values. The isotopic effects due to the presence of ^{4}He and ^{3}He atoms are also examined, and the calculations of various transport parameters, namely diffusion, viscosity, and thermal conductivity, are extended to include the nuclear spins and the symmetry effects, which arise from the identity and indistinguishability of the colliding atoms.