Calculations of thermal conductivity of fully ionized hydrogen plasma with dynamical screening and degeneracy in electron-electron scattering

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Thermal conductivity is one of the important transport properties of plasma. For the warm dense plasma, experimental data are very scarce. For instance, the first experiments for aluminium plasma were performed relatively recently.

Theoretical approaches have lately been based on methods of quantum statistics, numerical DFT-MD simulations and their combination.

It is believed that numerical methods are more acceptable for warm dense plasma. Theoretical approaches are well developed for asymptotic, and are used to test numerical calculations.

Recently, a method has been developed for calculating electron-electron correlation functions while taking into account arbitrary degeneracy and dynamical screening. This may allow the calculations to be extended to the region of warm dense matter. In this paper, calculations are performed for thermal conductivity of fully ionized hydrogen plasma with the linear response theory in the formulation of Zubarev. The results are compared with the data calculated in other approximations.