

TRANSPORT PROPERTIES OF HOT DENSE PLASMA

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Investigation of transport properties in dense plasmas is one of the key issues in the physics of inertial confinement fusion (ICF), warm dense matter driven by heavy ion beams [1]. Calculation of parameters of inertial fusion drivers of heavy ion beams requires adequate quantitative description of the interaction of heavy ion beams with dense plasma in a wide range of parameters. Consequently, knowledge of transport properties in the plasma will enable us to calculate the design of thermonuclear target more accurately. These properties of plasma have to be calculated accurately taking into account both quantum and collective effects in plasmas. One of the important values that describing the transport coefficients of deuterium-tritium plasma is the Coulomb logarithm [2]. The Coulomb logarithm was obtained on the basis of effective potentials. These interaction potentials take into consideration long-range many particle screening effects as well as short-range quantum-mechanical effects [3]. For inertial confinement fusion applications, we have calculated of the viscosity, diffusion, thermal conductivity, and electrical conductivity of dense plasma in a wide range of densities and temperatures. The results obtained for viscosity, diffusion, thermal conductivity, and electrical conductivity are compared with the available experimental data [4] and the results of quantum molecular-dynamics simulation [5].

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