

Abstract Submitted
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Dynamic Conductivity of Dense Hydrogen in Wigner Formulation of Quantum Mechanics VLADIMIR FILINOV, PAVEL LEVASHOV, Joint Institute for High Temperatures RAS, Moscow, Russia, MICHAEL BONITZ, Institut für Theoretische Physik und Astrophysik, Kiel, Germany, VLADIMIR FORTOV, Joint Institute for High Temperatures RAS, Moscow, Russia — Combining both molecular dynamics and Monte Carlo methods for solving the integral Wigner-Liouville equation we calculate the temporal momentum-momentum correlation functions, their frequency-domain Fourier transforms and dynamic electrical conductivity by the Kubo formula. Alternatively, at low temperature we use the density functional theory and the Greenwood formula to obtain frequency-dependent electrical conductivity. In the canonical ensemble at finite temperature for weakly coupled plasmas the obtained numerical results agree well with the Drude approximation. The growth of coupling parameter results in strong deviation of the frequency dependent conductivity and permittivity from low density and high temperature approximations. In particular, slowly-damping oscillations on the momentum-momentum temporary correlation functions can be observed, and the transparency window appears on the dependencies of electrical conductivity on frequency. We compare our results with experimental data and other theories.

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