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Simulation of protons energy relaxation in electron gas by molecular dynamics method[1] ANDREY BOBROV, SERGEY BRONIN, SERGEY MAIOROV, EDUARD MANYKIN, BORIS B. ZELENER, BORIS V. ZELENER, Joint Institute for High Temperatures of the Russian Academy of Sciences — Our work is concerned with simulation of heavy charged particles energy relaxation in electron gas. The research was stimulated by antihydrogen experiments that are held in conditions far from conditions of well studied nuclear fusion or gas discharge experiments. We used numerical simulation as a tool to test existing theoretical approaches to classical Coulomb system kinetics. By means of molecular dynamics method we calculated dynamics of energy relaxation of protons in ultracold electron gas. We considered non neutral plasma when number of electrons is much greater than the number of protons. We have shown that boundary conditions have significant influence on simulation results. Two types of boundary conditions were considered periodic boundary conditions and reflecting walls. The influence of number of particles in the simulation cell was studied. The problem of Coulomb potential modification on small distances was also considered. Simulations were performed for electron densities 10^8 cm^{-3}, initial temperatures for electrons is equal 10 K and for protons 100 K.

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