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Molecular Dynamics Simulation of Temperature Relaxation in Dense Hydrogen Plasma ZENGXIU ZHAO, QIAN MA, JIAYU DAI, DONG-DONG KANG, JIANMIN YUAN, National University of Defense Technology — Temperature relaxation between electrons and ions in dense plasma is regarded as an essential factor in understanding the physics process in laser-plasma interactions. Here, we perform molecular dynamics (MD) simulation to investigate the electron-ion temperature relaxation with semi-classical potentials in fully ionized dense hydrogen plasma. We compare the results of different potentials such as HM potential, Yukawa potential and Coulomb potential with an appropriate cutoff, in addition, a simplified scattering model is used in the MD simulation to overcome the negative effect called Coulomb Catastrophe. The MD simulation is performed with a code using velocity Verlet integration in a box cell with periodic boundary and the electron number density changes from to. The tested particle number N is ranging from N=500 to as many as N=4000, the results reported here use N=1372. Statistical uncertainty for each case is estimated by performing the code from 6 samples of the ensemble and then taking the average and standard deviation. Furthermore, the results of theoretical models, such as LS, GMS and BPS, are also used to compare with the MD results.

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