

Electron capture in the dense semiclassical plasma

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Investigation of the interaction between particles and plasma properties is of great interest in many areas of physics such as atomic and plasma physics. It is important for the development of the plasma technologies. One of the elementary processes in plasma is the electron capture process. In this work the electron capture processes by the hydrogen atom and proton were investigated. The motion of the electron in the field of the motionless atom or proton was considered on the basis of the perturbation theory and the solving of the equation of motion. The interaction potentials between the electron and the hydrogen atom and also proton were presented in works [1-2]. These effective potentials, taking into account the quantum-mechanical effect of diffraction and plasma screening effects, have finite values at the distances close to zero. In this work the electron capture radius, which was determined by equating the kinetic energy of impacting electron and the interaction energy between the electron and the hydrogen atom or proton, was presented. The trajectories of the electron in the field of the atom and proton were simulated. Obtained results of the electron capture by the atom and proton were compared. Using the electron capture probability, the electron capture cross section was calculated.

References

- [1] T. S. Ramazanov, K. N. Dzhumagulova, *Phys. Plasmas* 2002, 9, 3758.
- [2] T. S. Ramazanov, K. N. Dzhumagulova, Y. A. Omarbakiyeva, *Phys. Plasmas* 2005, 12, 092702.