Generation of the bunch of electrons at interaction of the ultrashort laser pulse with long preplasma

K. S. Nazarov, I. V. Glazyrin, O. G. Kotova

Russian Federal Nuclear Center – Zababkhin All-Russia Research Institute of Technical Physics, Russia, Snezhinsk

Solid-state targets are used for acceleration of electrons to the relativistic energies by a ultrashort laser pulse (LP)[1]. In a real LP with finite contrast the target material scatters and by that the profile of density at the moment of arrival of the basic laser pulse [2] changes.

In this report results of modelling of formation of a bunch of electrons from the preplasma are presented. The profiles of density, temperature and average charge of the preplasma calculates by gas-dynamics code [3] for various level of contrast of the LP. Dependence of scale of scattering preplasma from intensity of the prepulse is obtained.

The calculated distributions of density are transmitted in 3D PIC a code [4] in which acceleration of electrons by the basic LP calculated. It is gained, that in a case of long preplasma with scale of tens micron the bunch of electrons for the LP intensity $I \sim 10^{18}$ W/cm$^2$ reaches energies of the order 27 MeV.

References