An extended Brunel model of hot electron generation in nonrelativistic laser–plasma interactions

Kostenko O F

Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia

olegkost@ihed.ras.ru

In this work, an extended Brunel model of hot electron generation in nonrelativistic laser–plasma interactions is considered [1]. The model takes into account the permittivity of the surface plasma and the energy absorbed by electrons accelerated by the electric field components perpendicular and parallel to the target. A model for the generation of x-ray bremsstrahlung in the case of a Gaussian laser beam is presented. It is shown that the influence of electron motion parallel to the plasma surface on the absorbed intensity becomes distinguishable only at relatively low absolute values of the permittivity. Calculations of the dependences of the yield of hard bremsstrahlung x-rays on the angle of incidence of laser radiation and on the energy interval in which the yield of bremsstrahlung is measured are in qualitative agreement with the experimental data, if we assume that the electron concentration in the skin layer is relatively low (approximately 5–7 times the critical concentration).

[1] Kostenko O F 2023 *Laser Phys.* **34** 016002