Abstract

We present the results of experimental research of laser-plasma interaction at an intensity around 10^{18} W/cm^2 in an undercritical pre-plasma, formed by additional nanosecond laser pulse with controlled parameters onto the surface of solid targets. Dependence of The X-ray and 3/2w yield on delay between pulses and focus position is obtained. The measured electron temperature was around 7 MeV when optimal conditions were archived in experiments. Numerical simulation and experimental results show that relativistic self-focusing lead to electric field increasing, then laser pulse energy transferred into the plasma waves due to forward Raman scattering. Longitudinal plasma wave field captures and accelerates electrons created in plasma wave breaking. As a result electrons acquire an energy of several MeV.