

Annotation

A number of research groups are experimenting with the production of electron beams when a laser pulse hitting a target. Numerical simulations of that process was conducted using a PIC (based on Particle-in-cell method) code. Those simulations have shown that intersection of electron trajectories causes the electron concentration to have sharp peaks. If the moving peaks fall into suitable conditions over the field, then they manage to leave from the plasma with high energy. A two-step model was constructed in order to describe these processes: some laser-accelerated electrons are able to leave the plasma in a narrow phase window of the moving wave interference pattern; then these electrons propagate perpendicular to the target driven by the ponderomotive forces of the field. In this work, the main physical processes responsible for electron acceleration are exposed and the correspondence between theory and experiment is checked. In addition, the optimum parameters of the system were selected (by the maximum of the energy output of hot electrons). Further, a pattern was obtained based on the available data from the simulation of the distribution of the electrons that left the target. In order to do this, the program-processor for the existing code was written, outputting the corresponding distributions based on the data available in the simulation. This distribution was analyzed for a number of conclusion to achieve.