GENERATION OF SURFACE WAVES BY A DRAG CURRENT

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The excitation and propagation of surface waves in the conductors are studied for a long time. A significant number of experimental and theoretical papers are devoted to the study of the features of wave excitation on the conductor surface containing various types of nonuniformities. In the case of smooth conductor surface the excitation of surface waves is possible if nonlinear polarization of the conductor in the localized field of laser pulse is taken into account. The present Communication is devoted to the consideration of the new nonlinear optical phenomenon—generation of surface waves by a drag current appearing at an inclined incidence of a femtosecond laser pulse which is focused by a cylindrical lens. Since the effective frequencies of electron collisions for typical metals at room and higher temperatures are relatively high, the above mentioned mechanism of terahertz surface wave excitation is more efficient than the ponderomotive mechanism. The spectral and energy parameters of the excited surface waves are studied. The total energy of surface waves is calculated and its dependencies on the pulse duration and the focal spot size, as well as the parameters of the conductor, are studied. It is shown that the energy of surface waves is maximal in the case of laser radiation incident almost along the surface of the conductor. The generated waves have terahertz frequencies and their total energy increases with an increase in the effective frequency of electron collisions.