Nickel and aluminum as materials for the multilayer ablation: Electron thermal conductivity in solid and liquid phases in two-temperature states

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We investigate the ablation of multilayer targets under the influence of ultrashort laser pulses. The structure of strictly alternating layers of nickel and aluminum was taken as such a target. A short pulse duration leads to the appearance of a two-temperature states in metals with differing temperatures of electrons and ions and to the need to know the kinetic coefficients in this state for numerical simulation of ablation. Analytical expressions for the electronic thermal conductivity of nickel and aluminum are presented. The thermal conductivity coefficient depends on the electronic and ionic temperatures, density and phase of the substance (solid or liquid). The expressions obtained can be used in hydrodynamic calculations of the ablation of these metals or multilayer targets from them under the influence of ultrashort laser pulses.