DYNAMICS OF WAVE PROCESSES OF COMPRESSION AND EXPANSION IN PALLADIUM UNDER HIGH-INTENSITY PICOSECOND LASER IRRADIATION

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In this work, processes in a flat palladium target irradiated by an intense laser pulse with duration of 70 ps are studied [1]. In the experiment, the parameters of the irradiating pulse, as well as the depth of the spall cavity formed as a result of the complex flow of compression and expansion waves through the substance are determined. The interaction dynamics of these waves are modeled using a new equation of state for palladium over a wide range of densities and pressures. The temperature of electrons in the heated layer of the target at the moment after which the sound wave begins to overdrive the thermal wave and the corresponding time of electron-ion relaxation in energy are estimated. Based on the results of the experiment and numerical simulation, the maximum tensile stress in the spall plane at a high tensile rate is determined.

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