# RADIATION, HEAT AND SHOCK-WAVE PROCESSES IN THE SYSTEM «HIGH POWER ON BEAM – METAL»

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Active research in physics of shock waves resulted in the development of a wide range of ways of excitement and registration of shock load pulses in condensed media. High energy concentration, which is achieved by the corpuscular and laser beams exposure of sub-microsecond duration at the condensed beam stop, determines their increasingly wide use both for scientific investigations and when solving different practical tasks. Modern systems of pulse beam generation of charged particles allow receiving concentrated energy fluxes in a wide range of intensities $W=10^5–10^{14}$ W/cm$^2$, at pulse duration $10^{-9}–10^{-5}$ sec. In the present range of parameters high power ion beams (HPIB) are a versatile tool for solution of a variety of technological and scientific problems, including the problems of radiation material and inertial thermonuclear process. In the power density range of $10^7–10^{10}$ W/cm$^2$ interaction of HPIB with metals is accompanied by simultaneous thermal, mechanical and radiation effects. The generalized physics-mathematical model of the elastoplastic medium, describing the behavior of the metallic beam stop under the external high-power energy exposure, was formulated in the course of the research conducted.

The paper presents the results of the simulation of radiation, heat and shock-wave processes occurring in the system «HPIB-metal». The influence of each of them on the formation of modified layers in the irradiated volume of the metal target is investigated.

***Keywords:** high power ion beam, impulse of mechanical load, shock-wave.*