INVESTIGATION OF THE SHOCK WAVE PROPAGATION GENERATED BY A HIGH-CURRENT ELECTRON BEAM IN A SOLID-STATE TARGET AT THE INTERFACE [[1]](#footnote-1)\*)

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The propagation of shock waves in condensed media under the action of powerful impulse loads has been studied for more than 50 years [1, 2]. However, in most studies, mechanical impactors or high-power laser radiation are mainly used to create pressure on the sample surface. At the same time, the formation of a shock wave by the action of a high-current electron beam has its own features. Experimental and theoretical studies of recent years have shown, with such an impact, effects can be observed that have not been described previously [3-5]. In part, this may be due to the capabilities of modern diagnostic equipment, but in some cases this is undoubtedly due to the peculiarity of the energy contribution to the sample during the interaction of a high-current electron beam with a condensed target.

Previously, in [3], a method was proposed for visualizing the propagation of a shock wave in transparent materials based on the streak-camera registration of laser radiation passing through a sample. In this paper, we present the results of an experimental study of the passage of a shock wave that arises under the action of a high-current electron beam of the Kalmar facility (current up to 40 kA, electron energy up to 350 keV, pulse duration at half maximum 100 ns) with different sets of multilayer targets. Sandwiches made of materials with similar and significantly different mechanical properties are considered.

An important application of this study is to provide the possibility of studying the attenuation of a shock wave in porous composite materials and determining the speed of sound in them, which is very difficult when using traditional methods. The use of an optimized optical scheme [6] makes it possible to investigate the relationship between the features of the dynamics of a plasma emitted from the surface of a sample with the formation and propagation of shock waves.

Such studies are extremely important for the development of protective screen coatings that minimize the consequences of man-made disasters, as well as for special applications.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Pt/ru/HJ-Kazakov.docx) [↑](#footnote-ref-1)