Measurement of the dynamics of the ejection of wolfram microparticles by the SR and PDV methods

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Studies of the shockwave loading effects on various materials have revealed an effect known as ejection. The essence of this effect is the formation of a flux (cloud) of micro- and nanoparticles when a strong shock wave emerges on a free surface. When the rarefaction wave interacts with the roughness of the material surface, instabilities develop, leading to the formation of microjets that decay into an ejecta flow. Experimental studies of a rarefied high-speed ejecta flow represent a complex scientific and technical problem.
The paper presents the results of an experimental study of an ejecta flow from tungsten microparticles accelerated by a shock wave. Using the synchrotron radiation technique, the intensity distributions of the X-ray shadow from the particle cloud were obtained. Calibration was carried out and the calculation of the mass distribution of tungsten ejection was calculated using the obtained data. Simultaneously in experiments that employ PDV method, the velocity of the microparticles cloud and the velocity of the tantalum foil were measured with the indicator foil method. The measured foil velocity was used to calculate the mass distribution of the incident dust cloud. Differences in the data obtained are presented in this paper.