## RESULTS OF SHOCK WAVE MEASUREMENTS IN LITHIUM FLUORIDE BARRIER INTERACTING WITH ACCELERATED AUSTENITIC STEEL PLATE, PERFORMED BY TWO INDEPENDENT MEASUREMENT METHODS

D. T. Yusupov, A. V. Petrovtsev, V. D. Buguev, K. S. Sidorov, A. I. Klenov, D. P. Kuchko, E. B. Smirnov

FSUE «RFNC - VNIITF named after Academ. E. I. Zababakhin», Snezhinsk, Russia

The purpose of the work is to study material properties in high-intensity processes.

At present the so-called "window" materials such as quartz, sapphire, lithium fluoride, etc. are commonly used to study shock compression phenomena, particularly, with laser interferometry. A wide application of lithium fluoride is due to its relatively simple processing technology, availability, and ability to retain its optical properties (transparency) under a wide range of loading conditions. This justifies the use of lithium fluoride is the work.

The paper presents the experimental setup and results obtained using a 44-mm gas gun with simultaneous recording of signals from the manganin gauge and three-channel laser interferometric velocimeter (PDV).

In the experiments, targets (samples) made of lithium fluoride with integrated low-resistance manganin gauge were used. The samples were loaded using impactors made of 12Kh18N10T austenitic steel accelerated up to velocities of 682 and 1073 m/s with longitudinal stresses of 7.5 and 14.1 GPa, correspondingly, achieved in lithium fluoride.

The proposed and implemented experimental technology allowed to obtain longitudinal stress profiles for lithium fluoride,  $\sigma_{xx}(t)$ , under shock loading by austenitic steel plate. Concurrently plate approach velocity was recorded, as well as the velocity history profile, u(t), in lithium fluoride bulk.

The comparison of optical (PDV) and analogous piezoresistive measurements to each other and to calculation show a good agreement. Based on the measurement results, the speed of sound,  $C_L$ , and the Poisson's ratio,  $\mu$ , in lithium fluoride were obtained for the achieved pressures.