

One-dimensional model of the indirect compression of targets under conditions close to the National Ignition Facility

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Within the framework of a one-dimensional model [1], which allows the analysis of experimental results, calculations of the compression of indirect targets were carried out, experiments with which are carried out at the NIF facility. The model is based on the RADIANT code. Spectral radiation transfer is considered in the multi-group approximation. In particular, the availability of an optical database makes it possible to use this program for analyzing processes in thermonuclear targets in which radiation is essential. The spectral absorption coefficients of radiation were calculated using the THERMOS program [2] (IPM RAS). Numerical simulation of target compression was carried out, experiments with which were carried out at the NIF installation in 2011-2018 in various modes of a laser pulse, targets, hohlraum, as well as targets for the total laser energy NIF 1.8 MJ [3]. The model reproduces the data known from the literature on measuring the value of the radiation temperature in the cavity and on the velocity of the shells. The results of simulations using the 1D RADIANT code are in the range of experimental results and LLNL calculations. The one-dimensional model correctly describes the process of compression of the target capsule and shows trends in changing the parameters of the target and laser pulse.