

Design of an indirect target for reaching ignition at the NIF laser taking into account the effect of absorption spectral coefficients in the ablator

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The design of an indirect target capsule intended to reach the ignition at the NIF facility is proposed and discussed. The choice of the capsule parameters (quanta energy range, 1-5 keV) is based on the necessity to partially absorb the hohlraum spectral radiation. One can achieve the result (the absorption) by choosing the ablator composition with an essential content of heavy elements under additional condition that the mass and size of the layers are not changed in order to preserve the main hydrodynamic parameters under the implosion. If such absorption is absent (a “transparent” ablator), the hohlraum radiation additionally heats the layers, which contain deuterium and tritium, the hot spot is compressed to a larger size (smaller density), and no ignition takes place. The analysis of the 2D and 3D effects in the implosion remains topical. However, to explain the observed results in case of a “transparent” ablator one can use in the calculation smaller values of the initial deviation from 1D symmetry that corresponds to the experiments. Spectral behavior of the radiation absorption coefficients is based on the code THERMOS [1], the analysis of the influence of different processes on the ignition under the implosion in 1D RADIANT model is given in [2].

References

- [1] A. F. Nikiforov, V. G. Novikov, and V. B. Uvarov, *Quantum Statistical Models of High Temperature Plasma* (Fizmatlit, Moscow, 2000) [in Russian].
- [2] V. B. Rosanov and G. A. Vergunova, *J. Exp. Theor. Phys.* 124, 182 (2017).