Progress on radiation hydrodynamics simulations of ICF at NUDT

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Some recent progress on radiation hydrodynamics simulations at National University of Defense Technology (NUDT) has been made. Some new code modules have been developed to improve the applications of the code MULTI. A reflection and refraction module was added into the Multi-2D for the simulations of inertial confinement fusion (ICF) driven by laser. Some modules were also added into the Multi-2D for the simulations of inertial confinement fusion (ICF) driven by Z-pinch. Physical models describing the formation of Z-pinch dynamic hohlraums were established. The magneto-hydrodynamic models were implemented as packages for the open-source code MULTI-IFE (1D) and MULTI-2D, which were initially designed for the simulations of inertial confinement fusion driven by laser or heavy ion.

Z-pinch dynamic hohlraum is one of the competitive ways to drive inertial confinement fusion due to the excellent properties, such as high radiation conversion efficiency, low cost of X-ray energy and larger fusion energy gain. In order to increase the radiation conversion efficiency and improve the radiation uniformity in the dynamic hohlraum and suppress the fluid instability at the process of capsule implosion， the related factors affecting radiation temperature in dynamic hohlraum were analyzed, and the reasons of radiation non-uniformity around the surface of fusion capsule were discussed, and the fluid instabilities at the inner and outer surfaces of ablator were explored through both theoretical analysis and radiation hydrodynamics simulations.Text of the contribution.

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