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Ignition conditions relaxation for central hot-spot ignition with an ion-electron non-equilibrium model ZHENGFENG FAN, JIE LIU, Institute of Applied Physics and Computational Mathematics — We present an ion-electron non-equilibrium model, in which the hot-spot ion temperature is higher than its electron temperature so that the hot-spot nuclear reactions are enhanced while energy leaks are considerably reduced. Theoretical analysis shows that the ignition region would be significantly enlarged in the hot-spot rhoR-T space as compared with the commonly used equilibrium model. Simulations show that shocks could be utilized to create and maintain non-equilibrium conditions within the hot spot, and the hot-spot rhoR requirement is remarkably reduced for achieving self-heating. In NIF high-foot implosions, it is observed that the x-ray enhancement factors are less than unity, which is not self-consistent and is caused by assuming Te=Ti. And from this non-consistency, we could infer that ion-electron non-equilibrium exists in the high-foot implosions and the ion temperature could be ˜9% larger than the equilibrium temperature.

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