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Experimental research on indirectly-driven fast ignition in the research center of laser fusion WEIMIN ZHOU, LIANQIANG SHAN, HONGJIE LIU, YUQIU GU, YONGKUN DING, BAOHAN ZHANG, Research Center of Laser Fusion, China Academy of Engineering Physics — Compared with central ignition of laser fusion, fast ignition separates compression and ignition thus it can relax the requirements on the implosion symmetry and the driven energy. Since 2008, the Research Center of Laser Fusion has begun the experimental researches on fast ignition based on Shenguang and SILEX-I laser facilities. The small scale cone-in-shell target for fast ignition was pre-compressed by the Shenguang II eight 260J/2ns/3ω laser beams indirectly since beam smoothing was not available currently. The maximum density of the compressed cone-in-shell target 1.3 ns after the lasers' irradiation on the inside wall of hohlraum is about 4.8 g/cm^3, and the implosion velocity is close to 1.9*10^7 cm/s, which are well consistent with the simulation results with two-dimensional radiation hydrodynamic code. Experiments on the production and the transport of hot electrons were performed on SILEX-I 200TW femtosecond laser facility. The laser-hot electrons conversion efficiency of metal film target was measured to be 10%$\sim$20% with various laser parameters. The transport of hot electrons over hundreds of microns was carried out successfully in experiment by the use of axially symmetrical two-layer target.

Weimin Zhou
Research Center of Laser Fusion, China Academy of Engineering Physics

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