EXPERIMENTAL OBSERVATION OF LASER SPOT MOVEMENT INSIDE SPHERICAL HOHLRAUM

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According to the ignition experiments performed at the National Ignition Facility (NIF), the radiation asymmetry is still a serious problem to be solved in indirect drive ICF [1,2,3]. In order to obtain good radiation symmetry, Lan *et al.* proposed the "octahedral spherical hohlraum" [4] which is a spherical radiation case with six laser entrance holes (LEHs) located at the vertices of a octahedron. It is proved that the octahedral spherical hohlraum has the natural superiority in radiation symmetry compared to the cylindrical hohlraum. However, one potential problem of the spherical hohlraum is that the laser beams are close to the hohlraum wall. Thus, the wall blow-off may cause the LEH to close faster and result in strong absorption of laser energy by the plasma ablated from LEH. Aimed at alleviating the problem, Lan and Zheng proposed a novel octahedral hohlraum with cylindrical LEHs [5]. In this work, we observe the laser spot movement in a spherical hohlraum at the SGIII-prototype laser facility. Although there are plasmas ablated from the LEH enters the laser path when the laser pulse is about to be turned off, the laser energies are mainly absorbed in the initial region of the laser spot during the whole laser pulse. Moreover, the laser beam is refracted by the thin plasmas ablated from the LEH at the early stage of laser pulse. We also demonstrate the proposal that the cylindrical LEH could improve the laser propagation inside spherical hohlraum. However, the laser spot movement inside a cylindrical hohlraum is quite different to that of the spherical hohlraum. When the laser pulse is to be turned off, the laser energies are mainly absorbed in the LEH region.

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