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Gas-filled hohlraum study on Shenguang-III prototype DONG YANG, SANWEI LI, ZHICHAO LI, RONGQING YI, LIANG GUO, XIAOHUA JIANG, SHENYE LIU, JIAMIN YANG, SHAOEN JIANG, YONGKUN DING, Research Center of Laser Fusion, China Academy of Engineering Physics, LIANG HAO, HUASEN ZHANG, YIQING ZHAO, SHIYANG ZOU, WENYI HUO, XIN LI, Institute of Applied Physics and Computational Mathematics — Experimental studies on gas-filled hohlraum were performed extensively in recent years on Shenguang-III prototype laser facility. These experiments employed Au hohlraums within C₅H₁₂ gas fill heated by smoothing beams. In the first round of experiments, although the low-Z gas fill impeded the blow-off plasma ablated from hohlraum wall, the x-ray flux from the LEH decreased dramatically compared with the vacuum hohlraum. Further analysis of several ways of energy deposition including heating the gas-fill, extra scattered light and ablating the LEH membrane, revealed that too much laser energy were wasted in exploding the LEH membrane if we use a 1 ns square pulse. After we introduced a low power prepulse to intentionally exploding the membrane, the behavior of the x-ray flux from the gas-filled hohlraum is identical with the vacuum hohlraum. In subsequent studies, the motion of x-ray spot and corona plasma has also been studied using the gas-filled hohlraum. We obtained high quality data of the gas/wall interface and the boundary of the ablated wall near the LEH. The result agrees with that in simulation. However, there is a discrepancy between the experiment and the simulation in the spatial feature of the ablated wall near the LEH extracted from M-band x-ray image.

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