

Abstract Submitted
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First Experimental Comparisons of Laser-Plasma Interactions between Spherical and Cylindrical Hohlräume at the SGIII Laser Facility KE LAN, Institute of Applied Physics and Computational Mathematics — We report the first experimental comparisons of laser-plasma interactions (LPI) between the spherical hohlraums and the cylindrical hohlraums at SGIII laser facility. The sphere is 1.8 mm in radius, and the cylinder is 1.2 mm in radius and 4.3 mm in length. Three kinds of fillings are considered for the hohlraums: vacuum, gas-filling without or with a capsule inside. A flat-top laser pulse of up to 92.73 kJ energy with 3 ns duration is used. As observed, the LPI level of the laser beams inside the gas-filled spherical hohlraums, with or without capsule, is very close to that of the outer laser beams inside the cylindrical hohlraums with the same filling while much lower than that of inner beams. These results provide important experimental references for the choice between the octahedral spherical hohlraum and the cylindrical hohlraum of an ignition target design, which decides quite different configuration of an ignition facility. Our 2D simulations with post-process calculations have evident differences from the data, and it indicates that the development of a 3D radiation hydrodynamic code, with more accurate physics models, is mandatory for spherical hohlraum study.

Wenyi Huo
Institute of Applied Physics and Computational Mathematics

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