



3rd Asia-Pacific Conference on Plasma Physics, 4-8,11.2019, Hefei, China

Laser repointing scheme for spherical hohlraum with 6 laser entrance holes on the SG Facility and the National Ignition Facility

Ke Lan¹, Xufei Xie², Zhurong Cao², Hui Cao¹

¹ Institute of Applied Physics and Computational Mathematics, Beijing 100088, China

² Research Center of Laser Fusion, Chinese Academy of Engineering Physics, Mianyang 621900, China

e-mail (speaker): cao_hui@iapcm.ac.cn

A recent proposed novel octahedral spherical hohlraum having 6 cylindrical laser entrance holes (LEHs) with a single laser injection angle at 50 to 60 degree has the potential to provide a robust inherent high radiation symmetry and an efficient energy coupling to the capsule for ignition research with indirect drive [1-4]. In this work, an optimum laser repointing scheme with all laser injection angles in the range of 49.5 to 62 degree is proposed to conduct the 6-LEH spherical hohlraum experiments on the SG Facility originally designed for the 2-LEH cylindrical hohlraums. This repointing scheme is demonstrated successfully by experiment on the SG facility. Furthermore, a laser repointing scheme is proposed to carry a 6-LEH spherical hohlraum experiment on the National Ignition Facility (NIF), which uses 32 quads of the laser beams and can create a radiation drive peaked at 250 eV inside a 6-LEH spherical hohlraum on the NIF. Finally, an ignition beryllium capsule under a 250 eV radiation drive is proposed.

References

- [1]. Ke Lan, Jie Liu, Dongxian Lai, Wudi Zheng, and Xian-Tu He, High flux symmetry of the spherical hohlraum with octahedral 6LEHs at the hohlraum-to-capsule radius ratio of 5.14, *Phys. Plasmas* **21**, 010704 (2014).
- [2]. Ke Lan, Xian-Tu He, Wudi Zheng, and Dongxian Lai, Octahedral spherical hohlraum and its laser arrangement for inertial fusion, *Phys. Plasmas* **21**, 052704 (2014).
- [3]. Ke Lan, and Wudi Zheng, Novel spherical hohlraum with cylindrical laser entrance holes and shields, *Phys. Plasmas* **21**, 090704 (2014).
- [4]. Ke Lan, Jie Liu, Zhichao Li, Xufei Xie, Wenyi Huo, Yaohua Chen, Guoli Ren, Chunyang Zheng, Dong Yang, Sanwei Li, *et al.*, Progress in octahedral spherical hohlraum study *Matter and Radiation at Extremes* **1**, 2 (2015).
- [5]. Wen Yi Huo, Zhichao Li, Yao-Hua Chen, Xufei Xie, Guoli Ren, Hui Cao, Shu Li, Ke Lan, Jie Liu, Yongsheng Li, *et al.*, First Octahedral Spherical Hohlraum Energetics Experiment at the SGIII Laser Facility, *Phys. Rev. Lett.* **120**, 165001 (2018).