Progress in spherical hohlraum studies and experimental campaign on high energy laser facilities in China

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We have made both theoretical and experimental progresses in spherical hohlraum study since we began to study the octahedral hohlraum in 2013. In the theoretical studies, we gave the configuration, the concept and the design of octahedral spherical hohlraum, compared the robustness of the octahedral spherical hohlraum with that of the cylindrical hohlraum and the rugby hohlraum, proposed a novel octahedral spherical hohlraum with cylindrical Laser Entrance Holes (LEH) and LEH shields, and gave a design triangle for determining the geometrical sizes of octahedral spherical hohlraum for ignition target design. Presently, we are developing LARED-3D, a 3D radiation hydrodynamic code to simulate the octahedral hohlraum physics. In experimental study, we have accomplished eight disintegration experiments in Spherical Hohlraum Campaign (SHC) on the SG laser facilities since 2014, including (1) improvement of laser transport by using the cylindrical LEH, (2) comparisons of LPI between the spherical hohlraum and the cylindrical hohlraum, (3) first demonstration of low LPI in the gas-filled capsule-located spherical hohlraums under high intensity laser, (4) determination of LEH size for ignition spherical hohlraum, (5) energetics of 2 LEH spherical hohlraum, (6) energetics of 6 LEH spherical hohlraum, (7) Thomson scattering diagnostic of plasma status inside the 6LEH spherical hohlraum, (8) determination of laser injection scheme for 6LEH spherical hohlraum at SGIII laser facility. As a result of our theoretical study and SPHC, the octahedral spherical hohlraum has advantages in a natural and robust high symmetry without supplementary technology, a high energy coupling efficiency, and a low LPI. Finally, we proposed to use 4ω - 2ω laser as ignition driven for future ignition facility with a configuration designed for the octahedral hohlraums.