Experimental investigation on spherical hohlraum energetics at the SG laser facilities

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The integrated experiments at the National Ignition Facility indicate that the radiation asymmetry control in the cylindrical hohlraums is an extremely challenging problem in achieving ignition by using indirect drive. Recently, Lan *et al.* have proposed the octahedral spherical hohlraum which has the natural superiority in providing high radiation symmetry. As new and promising hohlraums, the octahedral spherical hohlraum attracts much research interests. In indirect drive inertial confinement studies, hohlraum energetics is one of the fundamental problems. In this presentation, we report on the spherical hohlraum experiments performed at the SG series laser facilities. At the SGIII-prototype laser facility, we performed the first spherical hohlraum energetics experiment. In this experiment, we used the vacuum spherical hohlraum with 2 laser entrance holes. The radiation temperature is measured by using an array of flat-response x-ray detectors (FXRDs) through a laser entrance hole at different angles. The radiation temperature and M-band fraction inside the hohlraum are determined by the shock wave technique. The experimental results show that there is no intrinsic difference in energetics between spherical hohlraums and cylindrical hohlraums. At the SGIII laser facility, we performed the first octahedral spherical hohlraum energetics experiment. The 32 of 48 laser beams enter the hohlraum through six laser entrance holes. We used 5 FXRDs to measure the radiation flux emitted from different regions inside the octahedral spherical hohlraum. The radiation temperature inside the hohlraum is determined by the shock wave technique. In this experiment, some interesting phenomena are observed in the backscatter light induced by SRS.