

O3.202 Octahedral spherical hohlraum for Rev. 6 NIF Beryllium capsule

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See the full abstract here <http://ocs.ciemat.es/EPS2019ABS/pdf/O3.202.pdf>

We design an octahedral spherical hohlraum with 6 laser entrance holes (LEHs) for the Rev. 6 Be ignition capsule [A. N. Simakov et al., Phys. Plasmas 21, 022701 (2014)]. With an Au spherical hohlraum of 4400 μm in radius and six LEHs of 1200 μm in radius, a laser pulse of 2.15 MJ energy and 630 TW power is required to deliver the radiation drive for the Rev. 6 Be ignition capsule. Both our 1D and 2D simulations show that the expansion of Be capsule is slightly slower than that of the CH capsule under the same radiation drive in the spherical hohlraum, in spite of the higher ablation rate of Be. The reason is that the CH capsule has a higher opacity which causes a hotter ablated plasma and then a faster expansion of the CH ablated plasmas. The large volume of spherical hohlraum, together with the incident angle of 55° in its laser arrangement, leaves enough room for the laser transportation, thus avoiding the laser being absorbed by the Be capsule plasma and consequently the high risk of laser plasma instabilities (LPI). That means the higher mass ablation rate of Be does not affect the hohlraum energetics and symmetries inside the spherical hohlraum. With the high radiation drive symmetry and low risk of LPI of the octahedral spherical hohlraum, the superior ablation properties of Be capsule can be fully exploited and will have a higher opportunity to achieve ignition.

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