Overview of the performance and anomalies of the 100Gbar campaign on the Shenguang Laser Facility

S.Y. Zou[1], F.J. Ge[1], Y.D. Pu[2], X. Li[1], L. Hao[1], T. Gong[2], C.K. Sun[2], J.F. Gu[1], C.Y. Li[1], C.S. Wu[1], D.G. Kang[1], Z.S. Dai[1], J.W. Li[1], Z. Chen[1], C. Zhang[1], B. Du[1], H. Cao[1], Z.C. Li[2], Y.S. Dong[2], D. Yang[2], L.F. Wang[1], H.B. Cai[1], Z.Q. Zhao[2], Y.K. Ding[1], S.P. Zhu[1]

[1]*Institute of Applied Physics and Computational Mathematics, Beijing, China*
[2]*Research Center of Laser Fusion, China Academy of Engineering Physics, Mianyang, China*

In this talk, we present an overview of the performance and anomalies of a series DT- layered implosion experiments on the Shenguang (SG) laser facility in the last two years. The ultimate goal of these experiments is to optimize the target design in order to achieve the hot spot pressure ~100Gbar. The laser-hohlraum coupling efficiency is higher than 95% for both the low- and medium-density gas-filled hohlraums. The experiment shows that the P4 driven asymmetry can be largely reduced by placing the laser spots on the optimized positions and the P2 asymmetry can be controlled by through cross beam energy transfer (CBET) with the adjusting of the inner/outer cone laser wavelengths. In the first phase of the campaign, a two-step laser pulse was used to driven the DD-layered implosions and the fuel adiabat was set to ~5. The highest yield is 3×10^{11} with the YOC (experimental measured yield over that of 1D simulation) being ~30%, in which the convergence ratio is of ~25 and the hot-spot pressure is about 35 Gbar. Simulations show that the performance drops quickly with the increasing of P2 asymmetry and the uniformity of DD ice layer. The experiment shows that the yield of DD-layered implosion driven by DU hohlraum is about twice of that of Au hohlraum. The relative low fraction of high energy photons in the DU hohlraum results in the better compression both the fuel and ablator layers and also the better stability at the fuel/ablator interface. We may thus expect that a high performance can be achieved in coming DT-layered implosion of the Shenguang Laser Facility.