Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Direct-drive laser imprint experiment measuring shock velocity perturbations at Nike[*1] JAECHUL OH, ANDREW J. SCHMITT, MAX KARASIK, STEPHEN P. OBENSCHAIN, Plasma Physics Division, U.S. Naval Research Laboratory — Using a high resolution 2D VISAR[a,b], we have performed a laser imprint experiment measuring velocity modulations in shock wave produced by the Nike laser. The 2D VISAR takes snapshot images of the velocity field across the shock front that is imprinted and then decouples from the ablation surface before the target gets accelerated. Hence the VISAR experiment measures imprint effects without relying on Rayleigh-Taylor amplification during the acceleration providing a complementary means to study laser imprint. In this campaign, the measurements were made on shocks driven in planar CH targets by various numbers of overlapped Nike beams to deliver a broad range of illumination uniformities. Each Nike beam utilizes 1 THz bandwidth ISI beam smoothing to achieve a more uniform illumination than any other ICF laser. We also made measurements on shocks driven in high-Z coated CH targets to explore the high-Z imprint-reduction strategy pioneered in radiography experiments on Nike. The current experiment has observed the multibeam irradiation effect on imprinting when varying the number of overlapping beams and confirmed less velocity perturbations in the shock when using a high-Z overcoat. [a] Celliers et al, Rev Sci Instr 81, 035101 (2010). [b] Oh et al., APS DPP, GP11.119 (2018).

[1*] Work supported by DoE/NNSA and performed at Naval Research Laboratory.

Jaechul Oh
Plasma Physics Division, U.S. Naval Research Laboratory

Date submitted: 03 Jul 2019 Electronic form version 1.4