Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Design and Follow-on from ˜50 kJ Fusion Yield using High-Density Carbon Capsules at the National Ignition Facility[1] L. BERZAK HOPKINS, S. LEPAPE, L. DIVOL, A. PAK, C. GOYON, E. DEWALD, D. D. HO, S. F. KHAN, C. WEBER, N. B. MEEZAN, J. BIENER, G. GRIM, T. MA, J. L. MILOVICH, A. S. MOORE, A. NIKROO, J. S. ROSS, M. STADERMANN, LLNL, P. VOLEGOV, LANL, C. WILD, Diamond Materials GmbH, D. A. CALLAHAN, O. A. HURRICANE, W. W. HSING, R. P. J. TOWN, M. J. EDWARDS, LLNL — We have demonstrated nearly 3x alpha-heating at the National Ignition Facility by using tungsten-doped High-Density Carbon (HDC) capsules in low gas-fill, unlined, uranium (DU) hohlraums. Shot N170601 achieved a primary neutron yield of 1.5 x 10^{16} neutrons with a Deuterium-Tritium ion temperature of 4.7 keV. Predecessor experiments demonstrated high-performing, efficient performance, as noted through high neutron yield production per laser energy input. Building on these 'subscale' results, follow-on experiments utilize an 8% larger target than the predecessor campaign, to increase the capsule surface area and absorbed energy. The capsule fill tube has been reduced in size from 10 to 5 micron diameter, and the laser design implements a new, "drooping" technique for the end of the pulse, to reduce the time between laser shut-off and capsule peak emission while still maintaining capsule mass remaining. Design of the current platform as well as avenues to potentially improve performance based on these experiments will be discussed.

[1]Work performed under the auspices of the U.S. D.O.E. by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344.

Laura Berzak Hopkins
LLNL

Date submitted: 14 Jul 2017 Electronic form version 1.4