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Experimental measurements of the conditions of implosion reaching ~50 KJ of fusion yield using High Density Carbon on the National Ignition Facility S. LE PAPE, L. BERZAK HOPKINS, L. DIVOL, C. GOYON, C. WEBER, N. MEEZAN, E. DEWALD, D. HO, T. MA, S. KHAN, A. MOORE, A. PAK, R. BENNEDETTI, S. ROSS, S. NAGEL, G. GRIM, Lawrence Livermore Natl Lab, P. VOLEGOV, los alamos national laboratory, M. STADERMAN, JUERGUEN BIENER, A. NIKRO, Lawrence Livermore Natl Lab, D.E. HOOVER, general atomic, C. WILD, W. HSING, D. CALLAHAN, M.J. EDWARDS, Lawrence Livermore Natl Lab — Building on our experimental and modelling effort over the last three years, we have found a capsule/hohlraum combination enabling us to drive a symmetrical implosion to convergence 27 with minimal Laser Plasma Interaction (LPI). The experimental platform consists of a low gas fill unlined DU hohlraum driving a W-doped High-Density Carbon (HDC) capsule. With the symmetry in control, the campaign is now moving forward on increasing the neutron yield by increasing the energy absorbed by the capsule. A series of experiments have been carried out first to test how the symmetry of the implosion was preserved at larger capsule and hohlraum scale and then to test the performance of the high convergence cryogenic DT-layered implosion. Using this platform, a record primary neutron yield of 1.47e16, with a DSR of 3.29% an ion temperature of 4.7 keV at 1.55 MJ was achieved (shot N170601). Details of the implosion conditions of the high performer shot will be presented. This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344

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