Abstract Submitted
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Adiabat shape Laser Pulses for ablation front instability control and high fuel compression[1] JOSE MILOVICH, O.S. JONES, L. BERZAK-HOPKINS, D.S. CLARK, K.L. BAKER, D.T. CASEY, A.G. MACPHEE, J.L. PETERSON, H.F. ROBEY, V.A. SMALYUK, C.R. WEBER, LLNL — At the end of the NIC campaign a large body of experimental evidence showed that the point-design implosions driven by low-adiabat pulses had a high degree of mix [1]. To reduce instability a high-adiabat (∼3x higher picket drive) design was fielded in the National Ignition Facility (NIF). The experimental results from this campaign [2] have shown considerable improvement in performance (10x neutron yields) over the point design with little evidence of mix. However, the adiabat of the implosions may be too high to achieve ignition for the available laser energy. To overcome this difficulty, and to take advantage of the high-picket drives, we have developed hybrid laser pulses that combined the virtue of both designs. These pulses can be thought of achieving adiabat shaping, where the ablator is set in a higher adiabat for instability control, while the fuel is maintained at a lower adiabat favoring higher fuel compression. Using these pulses, recent experiments at the NIF have indeed shown reduced growth rates. In this talk we will present the design of high-yield low-growth DT ignition experiments using these adiabat-shaped pulses.

[1] T. Ma, et al., Phys. Rev. Let. 111 085004
[2] O. Hurricane, et al., Phys. Plasmas 21, 056314 (2014)

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