Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Using X-Ray Images and Secondary DT Neutrons to Diagnose Convergence and hot-spot asymmetries in implosions at the NIF B. LAHMANN, J. A. FRENJE, M. GATU JOHNSON, F. H. SEGUIN, C. K. LI, R. D. PETRASSO, MIT, E. HARTOUNI, C. YEAMANS, H. RINDERKNECHT, D. SAYRE, G. GRIM, K. BAKER, D. T. CASEY, E. DEWALD, C. GOYON, L.C. JARROTT, S. KHAN, LLNL, S. LEPAPE, MIT, T. MA, L. PICKWORTH, R. SHAH, A. ZYLSTRA, LLNL, J.L. KLINE, T. PERRY, S.A. YI, LANL — An important figure of merit for the performance of an ICF (Inertial Confinement Fusion) implosion is the implosion convergence; the ratio of the final and initial capsule radii. At the NIF, this is routinely inferred from images of self-emitted x-rays during peak compression. Convergence is also inferred from the yield ratio of secondary DT neutrons to primary DD neutrons. While these independent analysis methods track one another, there are clear differences dictated by the underlying physics. Understanding the nature of these differences could potentially offer interesting insights on the sensitivities of both methods to effects of high-Z mix and hot-spot asymmetries. Spectral measurements of the secondary DT neutron spectra, along different lines of sight, provide additional information about the impact of these physics phenomena. Here, we present our experiments at the NIF, supported by a large set of hydro simulations. This work was supported in part by the DOE and LLNL.

Irving Doeg
MIT

Date submitted: 03 Jul 2019 Electronic form version 1.4