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Measuring the stagnation phase of NIF implosions: reproducibility and intentional asymmetry BRIAN SPEARS, R. BENEDETTI, D. CALLAHAN, D. CASEY, D. EDER, J. GAFFNEY, T. MA, D. MUNRO, Lawrence Livermore Natl Lab, J. KNAUER, Laboratory for Laser Energetics, J. KILKENNY, General Atomics — We report here data from a 5-shot sequence of cryogenic DT layered implosions designed to measure NIF implosion stagnation, the reproducibility of stagnation, and the response of the stagnation phase to intentional perturbation. We emphasize new analysis of the neutron spectral moments. These features provide an experimental measurement of hot spot thermal (temperature) and fluid (residual flow) processes. They also provide strong constraints for code validation. In implosions that were intentionally perturbed by laser drive and DT layer asymmetry, the experimental measurements show clear signs of the damaged stagnation. These signatures also match well our expectations from simulation, reproducing the variation of apparent temperature with line of sight and the down scattered neutron ratio, among others. The suite of implosions provides a demonstration of our ability to measure stagnated flow performance and highlights the several precision diagnostic signatures that are correctly captured by radhydro codes. This work was performed by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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