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Recent results from measurements of ICF implosions with the neutron imaging diagnostic at NIF FRANK MERRILL, LANL, OWEN DRURY, DAVID FITTINGHOFF, LLNL, GARY GRIM, NEVZAT GULER, PETR VOLEGOV, DOUGLAS WILSON, LANL — A neutron imaging diagnostic has recently been commissioned at the National Ignition Facility (NIF). This new system is an important diagnostic tool for inertial fusion studies at the NIF for measuring the size and shape of the burning DT plasma during the ignition stage of ICF implosions. The imaging technique utilizes a "pinhole" neutron aperture, placed between the neutron source and a neutron detector. The detection system measures the two dimensional distribution of neutrons passing through the "pinhole." This diagnostic has been designed to collect two images at two times. The long flight path for this diagnostic, 28 m, results in a chromatic separation of the neutrons, allowing the independently timed images to measure the source distribution for two neutron energies. Typically the first image measures the distribution of the 14 MeV neutrons and the second image of the 10-12 MeV neutrons. The combination of these two images has provided data on the size and shape of the burning plasma within the compressed capsule, as well as a measure of the quantity and spatial distribution of the cold fuel surrounding this core. The analysis of the data collected at NIF in June, 2011will be presented along with comparisons to hydrodynamic simulations of these implosions.

Frank Merrill
LANL

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