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Low-Mode Variations of the Cold-Fuel Distribution in Cryogenic DT Implosions on OMEGA C.J. FORREST, K.S. ANDERSON, V.YU. GLEBOV, V.N. GONCHAROV, O.M. MANNION, P.B. RADHA, S.P. REGAN, T.C. SANGSTER, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester — The neutron energy spectrum generated from cryogenic DT direct-drive implosions in inertial confinement fusion experiments is used to interpret the cold-fuel distribution at peak compression. At the Omega Laser Facility, measurements are used to extract the neutron spectrum utilizing a high-dynamic-range neutron time-of-flight spectrometer. The shape of the energy spectrum is fully determined by the neutron elastic scattering cross section for spherically symmetric target configurations. Significant differences from the expected shape have been measured for some recent implosions, which indicate a deviation from a spherically symmetric fuel assembly. Neutron scattering in the DT cold-fuel assembly has been modeled in radiation–hydrodynamic codes. The experimental data show reasonable agreement with the model when the mass distribution of the compressed DT shell has low-mode perturbations. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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