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**Inferring Low-Mode Asymmetries from the Elastically Scattered Neutron Spectrum in Layered Cryogenic DT Implosions on OMEGA** C.J. FORREST, V.YU. GLEBOV, V.N. GONCHAROV, T.C. SANGSTER, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, M. GATU JOHNSON, PSFC, MIT — High-resolution neutron spectroscopy is used to probe the areal density of layered cryogenic DT direct-drive implosions in inertial confinement fusion experiments on OMEGA. Advanced scintillation detectors record the neutron spectrum using time-of-flight techniques. 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 with low-mode perturbations in the DT fuel assembly have been simulated in the Monte Carlo n-particle transport code. The experimental data shows good agreement with the model when the mass distribution of the compressed DT shell is highly asymmetric with one side having a factor-of-2 higher areal density. 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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