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Inferring Areal Density in OMEGA-DT Cryogenic Implosions P.B. RADHA, V.YU. GLEBOV, V.N. GONCHAROV, D.D. MEYERHOFER, T.C. SANGSTER, S. SKUPSKY, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, R.D. PETRASSO, PSFC, MIT — Neutron and charged-particle observables have been traditionally used to infer areal density (ρR) in ICF implosions. Inferring moderate ρR (<200 mg/cm²) in OMEGA cryogenic deuterium-tritium (DT) targets, however, is challenging for several reasons. The elastically scattered deuteron peak is distorted due to significant energy loss in the cryogenic shell requiring a model-dependent interpretation. Limited detector sensitivity requires much higher tertiary neutron yields to diagnose ρR than expected in these implosions. Down-scattered neutrons and neutrons from the deuteron break-up reaction are among other observables that depend on ρR , although also with significant model dependence. Other options include the addition of ³He or H dopant gases that would produce energetic protons that could be used to diagnose ρR . A study of all observables from cryogenic-DT targets will be presented with the view of consistently describing the compressed core. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-92SF19460.

> R. Bahukumbi Laboratory for Laser Energetics, U. of Rochester

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