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Improving Implosion Velocity in Cryogenic Deuterium–Tritium Implosions on OMEGA V.N. GONCHAROV, T.C. SANGSTER, R. EPSTEIN, S.X. HU, I.V. IGUMENSHCHEV, D.H. FROULA, R.L. MCCRORY, D.D. MEYERHOFER, P.B. RADHA, W. SEKA, S. SKUPSKY, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, D.T. CASEY, J.A. FRENJE, M. GATU-JOHNSON, PSFC, MIT — This talk will summarize the results on improving performance and the progress in theoretical understanding of cryogenic deuterium–tritium implosions on OMEGA. To increase the implosion velocity, cryogenic layer thickness was reduced over the last year from 65 μm (which corresponds to $V_{imp} \sim 2.7 \times 10^7$ cm/s) down to 40 μm ($V_{imp} \sim 3.1$ to 3.5×10^7 cm/s, depending on ablator thickness). The ablator thickness was varied from 9.2 to 13 μm. The shell is driven keeping fuel adiabat at $\alpha = 1.5$ to 3. The experiments have demonstrated that the target yield relative to the 1-D predictions has not changed when the ice thickness is reduced to 55 μm ($V_{imp} \sim 3 \times 10^7$ cm/s), but degradation occurs for thinner ice. This degradation is more pronounced for designs with thicker ablator layers, indicating an enhanced ablator–pusher mix for these designs. Mix-mitigation strategies including high-Z dopants in the ablator materials will be discussed. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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