Abstract Submitted
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Validating kinetic models in a fluid code using data from high-Knudsen-number capsule implosions[1] N. HOFFMAN, K. MOLVIG, E. DODD, B. ALBRIGHT, A. SIMAKOV, LANL, G. ZIMMERMAN, LLNL, M. ROSENBERG, H. RINDERKNECHT, H. SIO, A. ZYLSTRA, N. SINENIAN, M. GATU JOHNSON, F. SEGUIN, J. FRENJE, C.K. LI, R. PETRASSO, MIT PSFC, V. GLEBOV, C. STOECKL, W. SEKA, C. SANGSTER, UR LLE — We validate models of (a) ion diffusion and (b) fusion reactivity decrease from modified ion-distribution tails [Molvig et al., PRL 109, 095001 (2012)], implemented in a rad-hydro code, using data for five quantities (DD-n yield, D^3He-p yield, DD burn temperature, bang time, and absorbed energy) from recent thin-shell D^3He-filled capsules at OMEGA [Boehly et al., Opt. Commun. 133, 495 (1997)]. Four inputs (laser source fraction, electron thermal flux limiter, Knudsen number multiplier, and ion flux multiplier) are varied to find the best fit to the ten observables from two implosions (8-atm fill and 23-atm fill). The calibrated input values can explain the data from a set of other D^3He implosions with fill pressures from 1 atm to 17 atm (Knudsen numbers from 0.5 to $\sim$6). Using a new transport model for ion loss, we will develop a model of wide validity for OMEGA direct-drive implosions.

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