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Preheat Studies Using Low-Adiabat Plastic-Shell Implosions with Triple-Picket Pulses on OMEGA C. STOECKL, P.B. RADHA, R.E. BAHR, J.A. DELETTREZ, D.H. EDGELL, V.YU. GLEBOV, V.N. GONCHAROV, I.V. IGUMENSHCHEV, T.C. SANGSTER, W. SEKA, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, R.D. PETRASSO, PSFC, MIT — The effect of laser–plasma interactions in the underdense coronal plasma on direct-drive target performance has been systematically studied on OMEGA. Room-temperature D_2-filled, 27-μm-thick plastic shells were irradiated using triple-picket laser pulse shapes. The intensity on the main pulse is varied between 3.5×10^{14} W/cm^2 and 1.1×10^{15} W/cm^2, while picket energies are kept nominally the same to maintain similar shell adiabat in all designs. Time-resolved reflected light and its spectrum, neutron-rate histories, areal densities, ion temperatures, neutron yield, and time-resolved hard x-ray signals have been simultaneously measured on these implosions. At lower intensities below the two-plasmon-decay (TPD) threshold, only cross-beam transfer induced by laser–plasma interactions influences target performance, whereas both affect target performance at higher intensities. In particular, fast-electrons generated by TPD can potentially preheat the shell reducing compression at high intensities ($\sim 1 \times 10^{15}$ W/cm^2). This work was supported by the U.S. Department of Energy under Cooperative Agreement Nos. DE-FC02-04ER54789 and DE-FC52-08NA28302.

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