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Experimental Investigation of Thermal-Transport Models in Direct-Drive Targets Using X-Ray Absorption Spectroscopy H. SAWADA, S.P. REGAN, V.N. GONCHAROV, P.B. RADHA, D. LI, S.X. HU, R. EPSTEIN, D.D. MEYERHOFER, V.A. SMALYUK, T.C. SANGSTER, B. YAAKOBI, Laboratory for Laser Energetics, U. of Rochester, R.C. MANCINI, UNR — Shock-wave heating and heat-front penetration in direct-drive planar targets were measured using time-resolved Al $1s$–$2p$ absorption spectroscopy to validate thermal-transport models in the 1-D hydrocode *LILAC*. A CH foil with a buried Al layer was irradiated with peak intensities of 10^{14} to 10^{15} W/cm^2. The measured spectra were modeled with an atomic physics code to infer T_e and ρ ($T_e \sim 10$ to 40 eV and $\rho \sim$ 3 to 11 g/cm^3) in the Al layer. Strong shock waves and isentropic compression were studied. Nonlocal and flux-limited ($f = 0.06$) models accurately predict the measurements while the shock transits the foil. T_e was lower than predicted at late times of the drive and was attributed to reduced radiative heating caused by lateral heat flow in the corona. Evidence of energetic electron preheat was masked by these 2-D effects. 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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