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Time-Resolved Measurements of the Hot-Electron Equilibration Dynamics in High-Intensity Laser Interactions with Thin-Foil Solid Targets P.M. NILSON, J.R. DAVIES, W. THEOBALD, P.A. JAANIMAGI, C. MILEHAM, R. JUNGQUIST, C. STOECKL, I.A. BEGISHEV, A.A. SOLODOV, J.F. MYATT, J.D. ZUEGEL, T.C. SANGSTER, R. BETTI, D.D. MEYERHOFER, Laboratory for Laser Energetics and Fusion Science Center for Extreme States of Matter, U. of Rochester — High-intensity laser interactions with solid targets generate extreme states of matter with unique energy-transport properties. Understanding the energy partition and its evolution in these highly nonequilibrium plasmas is important for generating high-peak-power xray sources and for evaluating advanced ignition concepts, including fast ignition. To test intense-energy coupling and temperature equilibration models, thin-foil targets were irradiated with 1-ps pulses focused to more than 10^{18}W/cm^2, and the hot-electron stopping time measured with time-resolved K_α spectroscopy. The data show few picosecond stopping times, increasing linearly with laser intensity. A collisional energy-transfer model shows that the stopping time is proportional to the mean electron energy, varying weakly with energy distribution. 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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