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Modeling the Dynamics of Reduced Mass Targets Heated by Ultra-Intense Lasers S.J. MOON, S.C. WILKS, LLNL, R.I. KLEIN, LLNL, UC Berkeley Dept of Astonomy, A.J. MACKINNON, R. TOWN, P.K. PATEL, H-K CHUNG, B.A. REMINGTON, D.D. RYUTOV, R. SHEPHERD, LLNL — We present simulations of the time-dependent behavior of a novel target design that allows high temperature solid density plasmas to be created using ultra-intense laser pulses. Simulations and experiments using targets composed of copper and tamped with aluminum showed that decreasing the target size led to a significant increase in temperature, compared to standard foil targets. In a recent paper (G. Gregori, et. al., CPP 2005.) analysis of time-integrated Cu K-alpha emission showed a maximum temperature of 220 eV in solid density Cu. The radiation-hydo code LASNEX is used to model the time-dependent behavior from a 100J 10ps high-intensity laser with a 7 μm FWHM focal spot. We discuss the time-dependent Cu K-alpha signal and time-integrated XUV emission. Future comparison of these predictions with recent experimental results obtained from the Rutherford Appleton Laboratory Petawatt laser will give us an indication of the behavior of the energy coupling of ultra-intense lasers, and the ability to heat solid-density matter to $\sim$keV temperatures. This work was performed under the auspice of the Department of Energy under Contract No. W-7405-Eng-48. This project was also funded by the Laboratory Directed Research and Development (LDRD) Program 04-ERD-028.

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