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Experimental and Radiation-Hydrodynamics Modeling Studies of Isochoric Heating at the Texas Petawatt Laser REBECCA ROYCROFT, Los Alamos National Laboratory, BRANT BOWERS, HERBIE SMITH, EDWARD MCCARY, FRANCES AYMOND, University of Texas at Austin, GILLISS DYER, SLAC National Accelerator Laboratory, HERNAN QUEVEDO, University of Texas at Austin, ERIK VOLD, PAUL BRADLEY, BRIAN ALBRIGHT, LIN YIN, Los Alamos National Laboratory, BJORN MANUEL HEGELICH, University of Texas at Austin — We present experimental and simulation studies of warm dense matter produced by isochoric heating at the Texas Petawatt Laser Facility. Experimental studies of warm dense matter can provide measurements of equation of state, thermal conductivity, and other physical quantities, with the goal of more accurate modeling. This work presents results of experiments in which aluminum foils and carbon foams are isochorically heated with a laser accelerated TNSA proton beam, as well as radiation-hydrodynamics simulations of the heated targets. The brightness temperature over time of the heated target is measured by a streaked optical pyrometer. We have observed peak brightness temperatures from 1-20eV. We model the cooling and expansion of the heated target in xRAGE, an Eulerian radiation-hydrodynamics code. We find good agreement between experiment and simulation results when we include time dependence to the energy source, which we place at the rear surface of the aluminum foil.

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