Abstract Submitted
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**Experiment and Simulations of Ablatively Driven Shock Waves in Gadolinium Metal** RICHARD KRAUS, University of Nevada, Reno, ERIC LOOMIS, SHENGNIAN LUO, Los Alamos National Laboratory, ACHIM SEIFTER, Los Alamos Natinal Laboratory, DAMIAN SWIFT, Los Alamos National Laboratory — Lanthanides are fascinating metals to study because they exhibit physical properties that vary with 4f occupancy. Specifically Gadolinium is interesting because there are multiple structural phase transitions accessible below 100 GPa. Experiments were performed on Gadolinium metal in which shock waves were driven in Gadolinium foils through direct laser ablation. The velocity at the opposite surface of the drive beam was measured with line-imaging laser Doppler velocimetry of the Velocity Interferometer System for Any Reflector (VISAR) type. Simulations of the experiment were done using a radiation hydrodynamic model which takes the measured irradiance history of the laser and predicts the pressure history at the ablation surface; this pressure history is then used as a time-dependant boundary condition for a continuum mechanics simulation. From this we obtain a simulated free surface velocity profile, which we then compare with the velocity profile obtained by the line VISAR diagnostic technique to validate the simulations. With this experimental series we were able to achieve shock pressures up to six gigapascals; specific experimental and simulated results to be presented.

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