Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Measuring preheat in laser-drive aluminum using VISAR HUA SHU, Shanghai Institute of Laser Plasma — In this paper, we systematically study preheating in laser-direct-drive shocks by using a velocity interferometer system for any reflector (VISAR). Using the VISAR we measured free surface velocity histories of Al samples over time, 10–70 μm thick, driven directly by a laser at different frequencies (2ω - 3ω). Analyzing our experimental results, we concluded that the dominant preheating source was X-ray radiation. We also discussed how preheating affected the material initial density and the measurement of Hugoniot data for high-Z materials (such as Au) using impedance matching. To reduce preheating, we proposed and tested three kinds of targets.

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Date submitted: 13 Jan 2015 Electronic form version 1.4