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Time Shaping of Laser-Generated Drive Waves Using Layered Metal Targets CYNTHIA BOLME, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA 02139 USA, DAVID FUNK, DAVID MOORE, SHAWN MCGRANE, Materials Dynamics Group, Los Alamos National Laboratory, Los Alamos, NM 87545 USA — Temporally-shaped ultrafast laser pulses have been used to drive sustained (longer than 200 ps) pressure pulses (tens to hundreds of GPa) with ca. 5 ps rise time through vapor plated aluminum films on thin glass substrates. A similar rise time was obtained (after shock runs of 0.25 to 2 microns) using 100 fs duration drive pulses. Similar rise times were also measured in vapor plated nickel films. However, these same drive pulses produce much slower rise time (ramp) waves in vapor plated gold films. The rise time and shape of these pressure pulses is determined by a combination of the complex index of refraction and electron-phonon coupling time of the metal, in addition to the drive pulse temporal characteristics. The ability to produce arbitrary drive wave shapes (such as ramps, steps, or square waves) using combinations of laser pulse shaping and multiple layer metal targets would be useful in ultrafast studies of material properties. Initial experiments have involved layered targets of gold on chromium (on glass). The results from these experiments and their implications will be presented.

David Moore
Los Alamos National Laboratory

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