

Abstract Submitted
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The elastic-plastic response of metal films subjected to ultrafast laser-generated shocks VON WHITLEY, SHAWN MCGRANE, CYNTHIA BOLME, DAVID MOORE, Los Alamos National Laboratory — We have measured the free-surface response of metal films with nominal thicknesses ranging from 500 nm to 8 μm to shocks generated from chirped ultrafast lasers. We launch a single laser generated stress wave into the metal film, but measure two stress waves on the free surface separated in time. The two waves correspond to the elastic and plastic response of the thin metal films. Using ultrafast dynamic ellipsometry, we have measured the separation of the elastic and plastic waves to times as short as 20 picoseconds and measured peak elastic free surface velocities as high as 1.4 km/s in aluminum. We will discuss the experimental results we have measured for aluminum, copper and other metals.

Von Whitley
Los Alamos National Laboratory

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