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Dynamic loading with confined laser ablation: An experimental study SHENG-NIAN LUO, DENNIS PAISLEY, ERIC LOOMIS, SCOTT GREENFIELD, RANDALL JOHNSON, Los Alamos National Lab — We investigated dynamic response of solids with the confined laser ablation technique. A disk-shaped specimen was sandwiched between and in tight contact with a window material and a transparent substrate; an absorbing coating (e.g., Al or graphite) was applied to the substrate surface in contact with the sample in most cases. The materials examined included Cu, Be and Ta. The laser pulse durations ranged from about 100 ns to 2 μs (wavelength of 1054 nm), and its shapes, from Gaussian, ramping, and Taylor-release pulses (the latter two were the first and second half of a full Gaussian pulse, respectively). The point- and line-VISARs and a two-dimensional displacement interferometer were utilized for time-resolved measurements. Some targets and substrates were recovered and examined. Our experiments demonstrate the potential of the confined laser ablation technique for investigating the mechanical properties (plasticity and spall), equation of state and phase transitions under various controlled loading−unloading histories.

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