Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Rayleigh-Taylor stabilization by material strength at Mbar pressures[1] BRUCE REMINGTON, HYE-SOOK PARK, THOMAS LORENZ, ROBERT CAVALLO, STEPHEN POLLAINE, SHON PRISBREY, ROBERT RUDD, RICHARD BECKER, JOEL BERNIER, LLNL — We present experiments on the Rayleigh-Taylor (RT) instability in the plastic flow regime of solid-state vanadium (V) foils at 1 Mbar pressures and strain rates of 1.e6-1.e8 1/s, using a laser based, ramped-pressure acceleration technique. High pressure material strength causes strong stabilization of the RT instability at short wavelengths. Comparisons with 2D simulations utilizing models of high pressure strength show that the V strength increases by factors of 3-4 at peak pressure, compared to its ambient strength. An effective lattice viscosity of 400 poise would have a similar effect. [1] Constitutive models, and theoretical implications of these experiments will be discussed. [1] H.S. Park, B.A. Remington et al., submitted for publication (July, 2009).

[1]This work was performed under the auspices of the Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344.

Bruce Remington
Lawrence Livermore National Laboratory

Date submitted: 17 Jul 2009 Electronic form version 1.4