Abstract Submitted for the DPP06 Meeting of The American Physical Society

Perturbation Growth Resulting from Shock Interaction with Density Gradients and Density Non-Uniformities in Shocked Materials¹ A.L. VELIKOVICH, A.J. SCHMITT, S.T. ZALESAK, Plasma Physics Division, NRL, N. METZLER, SAIC and Physics Department, NRCN, Israel — Theoretical work has shown that a short sub-ns laser pulse (spike) and a rarefaction wave behind it shape a density/adiabat gradient in the target that suppresses laser imprint, reduces the RT seeding due to the surface roughness, delays the onset [1] and reduces the rate [2] of the RT perturbation growth in the target. At the same time, the decaying shock from the spike produces strong areal mass oscillations in the target [3], which the subsequent shock from the foot of the main laser pulse can amplify, thus increasing the contribution of the early-time RM-like growth to the overall perturbation growth in the target. We present the results of analytical and numerical studies of perturbation growth resulting from shock interaction with density gradients and density non-uniformities in previously shocked targets. Although the density/adiabat tailoring with a spike adds some new sources of perturbation growth, its net stabilizing effect is large and robust. [1] N. Metzler et al., Phys. Plasmas 8; 3283 (1999); 9, 5050 (2002); 10, 1897 (2003). [2] V. N. Goncharov et al., Phys. Plasmas 10, 1906 (2003); R. Betti et al., Phys. Plasmas 12, 042703 (2005). [3] A. L. Velikovich *et al.*, Phys. Plasmas **10**, 3270 (2003).

¹Work supported by the U. S. Department of Energy.

Alexander Velikovich Naval Research Laboratory

Date submitted: 22 Jul 2006

Electronic form version 1.4