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Laser-driven compression of samples in the solid-state for high strain rate measurements of strength D.D.-M. HO, B.A. REMINGTON, K.T. LORENZ, H.-S. PARK, S.M. POLLAINE, LLNL — We are investigating new regimes of solid-state material science at extreme pressures, using high power lasers.

1. To study solid-state dynamics at high strain rates ($> 10^6$ s^{-1}) and at high pressures ($>$ 10 Mbar), the compression of the sample must be nearly isentropic so that the sample can remain at solid state. We present laser-driven rad- hydro-code target designs for the NIF laser using a reservoir-gap-sample configuration. The novel feature employed here is that the reservoir has a graded-density on the back (gap) side. RT instability calculations indicate that the difference between the growth rates with different material strength models is sufficiently large that models of high pressure material strength can be tested by such measurements.

2. Target designs for the Omega laser for testing the long laser pulse ($>$ 10 ns) drive required for the configuration described in part (1). Hydrodynamic characteristics of these designs will be compared with experimental results.

3. Target designs for high strain rate strength measurements in high Z material using Richtmyer-Meshkov instability will be presented

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