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Ramp loading by shock release of foam reservoirs for the NIF[1]

SHON T. PRISBREY, BRUCE REMINGTON, HYE-SOOK PARK, ROBERT CAVALOO, STEPHEN POLLAINE, MARK MAY, Lawrence Livermore National Laboratory — Previous work has shown that a ramped pressure wave created by the stagnation of an unloading, shocked reservoir can drive a quasi-isentropic compression experiment (ICE) [Edwards et al., **92** PRL 2004; Lorenz et al., **2** HEDP 2006]. The size of the shock at the back of the reservoir, the reservoir materials, the size of the gap between the reservoir and the sample, and the sample's sound speed places limits on (1) the thickness of the sample that can be studied before the ramp wave steepens into a shock that would impart significant shock heating into the sample, and (2) the size of the planar drive region. We present simulation and experimental data from a series of CRF foam laser shots done on the Omega Laser Facility to show that the presence of lower density materials in an ICE reservoir reduces the needed gap size between the reservoir and the sample, tailors the ramp drive, and can be simulated using the radiation-hydrodynamics code LASNEX. The combination of these factors have allowed for a compact design suitable for a laser-driven hohlraum that can reach 5 Mbar pressures and beyond on the National Ignition Facility.

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