Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Design for LTE EOS and opacity experiments using supersonic radiation waves[1] T.E. TIERNEY, R.R. PETERSON, H.E. TIERNEY, Los Alamos National Laboratory — Opacity and EOS at 100-200 eV are important physical parameters in ICF experiments. We describe an experiment design that uses the supersonic propagation of hohlraum radiation in foams to isochorically heat samples. Laser and Z-pinch experiments frequently use 150 to 220-eV quasi-blackbody emission from hohlraums to drive physics experiments. A foam target encapsulated in a gold-wall cylinder is placed next to the hohlraum. The low density and opacity foam captures some hohlraum emission and generates a supersonically-propagating radiation wave. The material heated by the wave is cooler towards the high-albedo gold wall. Modeling and past measurements show that core regions of the foam have small thermal gradients. We place a small, thin sample (e.g., Al, Si, or Fe) in the thermally-uniform region. X-ray emission of tracers and the sample as well as quasi-continuum x-ray absorption will be measured using time-resolved x-ray spectroscopy. The foam's EOS can be measured to ±5% by blast waves with a well characterized drive. This experiment could use the OMEGA, Z-Beamlet, and/or ZR facilities to explore temperature-dependent conditions.

[1]This work is support under the auspices of the US DOE.

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Date submitted: 24 Jul 2007 Electronic form version 1.4