Abstract Submitted
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Physical effects on visible temperature measurements of shocked foams[1] J. BENAGE, K. FALK, C. FRYER, C. GREEF, J. WILLIAMS, D. SCHMIDT, Los Alamos National Laboratory, C. MCCOY, T. BOEHLY, LLE, University of Rochester — We have conducted a series of experiments measuring the temperature of shock compressed foams at pressures from ~ 50 to > 300 GPA. These experiments were carried out at the OMEGA laser facility and utilized the streaked optical pyrometer (SOP) to measure the optical emission from the shocked foam targets and infer the temperature. A comparison of our results to both standard equation of state (EOS) tables and to quantum molecular dynamics (QMD) simulations result in temperatures that are below these theoretical predictions, especially at the higher pressures. This indicates either an error in these models or a limitation with this type of measurement technique. In order to estimate whether the emission from the shock front is consistent with the bulk temperature of the shocked material, a series of high-resolution hydrodynamic simulations were performed. We find these simulations predict emission more consistent with the measurements at high pressures, similar to previous results for shocked Silicon [1]. The effect of specific physics issues at the shock front, including temperature relaxation, electron thermal conduction, and radiation transport are evaluated to determine the magnitude of their affect on the emission. Both experimental and simulations results will be presented.

[1] A. Ng, P. Celliers, G. Xu, and A. Forsman, Phys. Rev. E., **52**, 4299 (1995).

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