Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Does laser-driven heat front propagation depend on material microstructure?[1] J.D. COLVIN, F. PÉREZ, K.B. FOURNIER, M.J. MAY, LLNL, T.E. FELTER, SNL-CA, M. BAGGE-HANSEN, S. KUCHEYEV, LLNL — We showed earlier that the laser-driven heat front propagation velocity in low-density Ti-silica aerogel and TiO_2 foam targets was slower than that simulated with a 2D radiation-hydrodynamics code incorporating an atomic kinetics model in non-LTE and assuming initially homogeneous material (F. Pérez, et al., Physics of Plasmas 21, 023102, 2014). Some theoretical models suggest that the heat front is slowed over what it would be in a homogeneous medium by the microstructure of the foam. In more recent experiments with Cu-loaded carbon nanotube foam, however, we find the opposite behavior; that is, the simulations under-predict the measured heat-front velocity. We present details of the Cu foam experiments and comparisons with simulations, and then discuss implications for models of heat-front slowing in foams of a more-recent gas vs. foam comparison experiment. F. Pérez presents the design and results of this comparison experiment in a companion presentation.

[1]This work was performed under the auspices of the U.S. Department of Energy by LLNL under Contract No. DE-AC52-07NA27344, with partial support from a DTRA Basic Research grant.

J. D. Colvin
LLNL

Date submitted: 10 Jul 2014 Electronic form version 1.4