Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Does laser-driven heat front propagation depend on material microstructure?[1] J. D. COLVIN, LLNL, H. MATSUKUMA, ILE, Osaka Univ., K. B. FOURNIER, LLNL, A. YOGA, ILE, Osaka Univ., G. E. KEMP, LLNL, N. TANAKA, Z. ZHANG, K. KOTA, S. TOSAKI, T. IKENOUCHI, H. NISHIMURA, ILE, Osaka Univ. — 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 order to test this hypothesis we designed and conducted a comparison experiment on the GEKKO laser to measure heat front propagation velocity in two targets, one an Ar/CO_2 gas mixture and the other a TiO_2 foam, that had identical initial densities and average ionization states. We found that the heat front traveled about ten times faster in the gas than in the foam. We present the details of the experiment design and a comparison of the data with the simulations.

[1]This work was performed under the auspices of the U.S. Department of Energy by LLNL under Contract No. DE-AC52-07NA27344, and the joint research project of ILE Osaka U. (contract Nos. 2014A1-04 and 2015A1-02).

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Date submitted: 06 Jul 2016 Electronic form version 1.4