Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Study of transport phenomena in laser-driven, non- equilibrium plasmas in the presence of external magnetic fields[1] G. ELIJAH KEMP, D.A. MARISCAL, G.J. WILLIAMS, B.E. BLUE, J.D. COLVIN, T.M. FEARS, S.M. KERR, M.J. MAY, J.D. MOODY, D.J. STROZZI, LLNL, H.J. LEFEVRE, S.R. KLEIN, C.C. KURANZ, Univ. Michigan, M.J.-E. MANUEL, General Atomics, D.C. GAUTIER, D.S. MONTGOMERY, LANL — We present experimental and simulation results from a study of thermal transport inhibition in laser-driven, mid-Z, non-equilibrium plasmas in the presence external magnetic fields. The experiments were performed at the Jupiter Laser Facility at LLNL, where x-ray spectroscopy, proton radiography, and Brillouin backscatter data were simultaneously acquired from sub-critical-density, Ti-doped silica aerogel foams driven by a 2ω laser at $\sim 5 \times 10^{14}\, W/cm^2$. External B-field strengths up to $\sim 20\, T$ (aligned antiparallel to the laser propagation axis) were provided by a capacitor-bank-driven Helmholtz coil. Pre-shot simulations with Hydra, a radiation-magnetohydrodyanmics code, showed increasing electron plasma temperature with increasing B-field strength – the result of thermal transport inhibition perpendicular to the B-field. The influence of this thermal transport inhibition on the experimental observables as a function of external field strength and target density will be shown and compared with simulations.

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344 and funded by LDRD project 17-ERD-027.

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Date submitted: 14 Jul 2017 Electronic form version 1.4