Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Magnetic signatures of radiation-driven double ablation fronts[1]
PAUL T. CAMPBELL, University of Michigan, CHRISTOPHER A. WALSH, Lawrence Livermore National Laboratory, AIDAN CRILLY, JEREMY P. CHITTENDEN, Imperial College London, PHILIP M. NILSON, University of Rochester, GENNADY FIKSEL, BRANDON K. RUSSELL, ALEXANDER G. R. THOMAS, KARL KRUSHELNICK, LOUISE WILLINGALE, University of Michigan — In experiments performed with the OMEGA EP laser system, magnetic field generation in double ablation fronts was observed. Proton radiography measured the strength, spatial profile, and temporal dynamics of self-generated magnetic fields as the target material was varied between plastic (CH), aluminum, copper, and gold. Two distinct regions of magnetic field are generated in mid-Z targets – one produced by gradients from electron thermal transport and the second from radiation-driven gradients. Extended magnetohydrodynamic simulations including radiation transport reproduced key aspects of the experiment, including field generation and double ablation front formation.

[1]This material is based upon work supported by the Department of Energy / NNSA under Award Numbers DE-NA0003606 and DE-NA0003764. PTC is supported by the U.S. Department of Energy Fusion Energy Sciences Postdoctoral Research Program administered by the Oak Ridge Institute for Science and Education (ORISE) for the DOE. ORISE is managed by Oak Ridge Associated Universities (ORAU) under DOE contract number DE-SC0014664.

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Date submitted: 29 Jun 2020 Electronic form version 1.4