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Scaling Arguments for Magnetically Affected Shock Experiments
R. P. YOUNG, C. C. KURANZ, University of Michigan, C. K. LI, Massachusetts Institute of Technology, P. HARTIGAN, A. LIAO, Rice University, D. FROULA, Laboratory for Laser Energetics, G. FIKSEL, University of Michigan, J. S. ROSS, Lawrence Livermore National Laboratory, P.-Y. CHANG, Laboratory for Laser Energetics, M. J.-E. MANUEL, General Atomics, J. M. LEVESQUE, S. KLEIN, University of Michigan, A. ZYLSTRA, Los Alamos National Laboratory, H. W. SIO, Massachusetts Institute of Technology, D. BARNAK, Laboratory for Laser Energetics — In this talk we will discuss general scaling arguments applicable to magnetically affected shock experiments and their inherent challenges. This genre of experiments is rapidly growing and holds enormous promise for the field of laboratory astrophysics, but universally faces two basic constraints. First, the conditions must be right for a shock to form, and, second, the magnetic field strength must be strong enough to affect the structure and/or evolution of the shock. We will present the ramifications of these constraints, their effect on recent experiments we fielded, and current efforts underway to overcome them. This work is funded by the U.S. Department of Energy, through the NNSA-DS and SC-OFES Joint Program in High-Energy-Density Laboratory Plasmas, grant number DE-NA0002956, and the National Laser User Facility Program, grant number DE-NA0002719, and through the Laboratory for Laser Energetics, University of Rochester by the NNSA/OICF under Cooperative Agreement No. DE-NA0001944.

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