Abstract Submitted
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Dynamics of magnetic fields in high-energy-density plasmas for fusion and astrophysics[1] LAN GAO, H. JI, W. FOX, K. HILL, P. EFTHIMION, PPPL, P. NILSON, I. IGUMENSHCHEV, D. FROULA, R. BETTI, D. MEYERHOFER, G. FIKSEL, E. BLACKMAN, LLE, M. SCHNEIDER, H. CHEN, V. SMALYUK, LLNL, H. LI, LANL, A. CASNER, CEA — An overview of our recent experimental and theoretical work on the dynamics of magnetic fields in high-energy-density plasmas will be presented. This includes: (1) precision mapping of the self-generated magnetic fields in the coronal plasma and the Nernst effect on their evolution [1], (2) characterizing the strong magnetic field generated by a laser-driven capacitor-coil target using ultrafast proton radiography [2], and (3) creating MHD turbulence in Rayleigh-Taylor unstable plasmas. The experimental results are compared with resistive MHD simulations providing a stringent test for their predictions. Applications in relevance to ignition target designs in inertial confinement fusion, material strength studies in high-energy-density physics, and astrophysical systems such as plasma dynamos and magnetic reconnection will be discussed. Future experiments proposed on the National Ignition Facility will be described.

[1] L. Gao et al., Phys. Rev. Lett. 114, 215003 (2015).
[2] L. Gao et al., submitted.

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