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Optical diagnostics in turbulent, laser-driven shockwave experiments with self-generated magnetic fields W.C. WAN, M.J. MACDONALD, C.C. KURANZ, C.M. KRAULAND, E.J. GAMBOA, C.A. DI STEFANO, R.P. DRAKE, University of Michigan, ACSEL TEAM[1], COSMOLAB TEAM — The existence of magnetic fields on a cosmological scale is still poorly understood. Magnetic fields as large as a few μG have been observed in galaxy clusters, filaments, and voids. Recent experiments at the Vulcan and Titan laser facilities produced scaled models to investigate the generation and amplification of seed magnetic fields through induced turbulence. The study of magnetogenesis and amplification due to turbulence will contribute to our understanding of the dynamics of the early universe. These experiments were performed by focusing lasers on carbon rods and foils, resulting in a blast wave propagating through argon gas. Several grids with varied mesh spacing provided control over the level of turbulence. Here we discuss the results of the Schlieren and interferometry optical diagnostics obtained in these recent campaigns. This work was supported by many sponsors to be acknowledged in the presentation.

[1]Astrophysical Collisionless Shock Experiments with Lasers

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