Abstract Submitted
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A platform to study magnetic field amplification of laser driven shocks due to induced turbulence JENA MEINECKE, HUGO DOYLE, A.R. BELL, University of Oxford, ROBERT CROWSTON, University of York, PAUL DRAKE, University of Michigan, M. FATENEJAD, University of Chicago, NICK HARTLEY, University of Oxford, MICHEL KOENIG, Ecole Polytechnique, Y. KURAMITSU, Osaka University, CAROLYN KURANZ, University of Michigan, DON LAMB, University of Chicago, MIKE MACDONALD, University of Michigan, F. MINIATI, ETH, Zurich, CHRIS MURPHY, University of Edinburgh, ALEX PELKA, ALESSANDRA RAVASIO, Ecole Polytechnique, BRIAN REVILLE, University of Oxford, Y. SAKAWA, Osaka University, A.A. SCHEKOCHIHIN, University of Oxford, ANTHONY SCOPATZ, PETROS TZEFERACOS, University of Chicago, WESLEY WAN, University of Michigan, NIGEL WOOLSEY, University of York, GIANLUCA GREGORI, University of Oxford — Misaligned pressure and temperature gradients associated with asymmetrical shock waves generate currents which seed magnetic fields (Biermann battery process). These fields could then be further amplified by increasing particle gyration driven by vorticity and turbulence. Studies of such phenomena have been conducted at the Rutherford Appleton Laboratory and scaled to astrophysical conditions (e.g., protogalacitc structure formation) using magnetohydrodynamic scaling techniques. Shock waves were driven in a 1 mbar Argon gas filled chamber from ablation of 500 micron Carbon rods using 300 J of 527 nm, 1 ns pulse light. A plastic grid was positioned 1 cm from the target to drive turbulence with outer scale $\sim$1 mm (the size of the grid opening). An induction coil, located 2 cm from the grid, was used to measure the magnetic field while optical diagnostics were used to track the fluid flow. Preliminary results and comparisons with hydrodynamic codes will be shown.

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