Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Effect of magnetic field to improve energy deposition of relativistic electrons[1] F.N. BEG, D. KAWAHITO, M. DOZIRES, P. FORESTIER-COLLEONI, C. MCGUFFEY, UC San Diego, S. HANSEN, Sandia National Laboratories, M. BAILLY-GRANDVAUX, K. BHUTWALA, UC San Diego, M. WEI, Laboratory for Laser Energetics, C. KRAULAND, General Atomics, P. GOURDAIN, University of Rochester, J. DAVIES, Laboratory for Laser Energetics, K. MATSUO, S. FUJIOKA, University of Osaka, M. CAMPBELL, J. PEEBLES, Laboratory for Laser Energetics, J. SANTOS, D. BATANI, Universit de Bordeaux, S. ZHANG, UC San Diego — A systematic study of relativistic electrons' propagation and energy deposition in a pre-assembled cylindrical plasma under controlled conditions of density and temperature with and without external magnetic field, has been carried out. Understanding the role of magnetic field in relativistic electrons' transport is important for several applications including fast ignition inertial confinement fusion. The OMEGA-60 laser with 36 beams (0.3 TW/beam, 1.5 ns square pulse) was used to compress a CH cylinder filled with Cl-doped CH foam to reach density of about 8 g/cm^3 with an initial density of 0.1 g/cm^3. OMEGA EP (1 kJ, 10 ps) produced a relativistic electron beam for transport studies. Modeling shows that both the rapidly growing self-generated and compressed external magnetic fields significantly improved the energy coupling to the compressed plasmas, in agreement with experiment.

[1]This material is based upon work supported by the Department of Energy, National Nuclear Security Administration under the NLUF program with an award number DE-FOA-0001568.

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Date submitted: 03 Jul 2019 Electronic form version 1.4