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Exploring the effects of externally imposed B- field on shock-driven implosions A. BOSE, J. A. J. A. FRENJE, G. F. SUTCLIFFE, M. M. GATU JOHNSON, N. V. KABADI, P. J. ADRIAN, H. SIO, B. LAHMANN, R. SIMPSON, C. K. LI, F. H. SEGUIN, R. D. PETRASSO, MIT, J. PEEBLES, J. R. DAVIES, R. BETTI, E. M. CAMPBELL , LLE, C. WALSH, B. D. B. D. APPELBE, J. P. CHITTENDEN , Imperial College London, S. ATZENI, Sapienza, University of Rome — The effect of externally imposed magnetic fields on shock driven inertial confinement fusion implosions are studied both experimentally and theoretically. The studies address kinetic effects in magnetized plasmas, and suppression of electron and ion Braginskii thermal conduction. In the experiments, where a 25T (0.25MG) external initial B-field is compressed to tens of MG, electrons are strongly magnetized, leading to suppression of thermal losses. These shock-driven implosions provide plasma conditions, with low ion density (10^{22}-10^{23} /cm3) and high ion temperatures (>10 keV), enabling studies of ion magnetization. As the ion gyro-radius is shorter than the ion mean free path, there is a Knudsen-number reduction for the ion species which is now determined by the former length scale. The results from 1D and 2D simulations and from the first exploratory experiments will be presented. The work was supported by DOE, NLUF, LLE, EPSRC grant EP/P010288/1, and Eurofusion Enabling Research ENR-IFE19.CEA-01.

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