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Use of External Magnetic Fields in Hohlraum Plasmas to Improve Laser-Coupling[1] D.S. MONTGOMERY, B.J. ALBRIGHT, J.L. KLINE, L. YIN, Los Alamos National Laboratory, P.Y. CHANG, J.R. DAVIES, G. FIKSEL, D.H. FROULA, R. BETTI, Laboratory for Laser Energetics, University of Rochester, M.J. MACDONALD, University of Michigan — Controlling laser plasma instabilities and beam propagation in hohlraum plasmas is important for achieving high-gain inertial fusion using indirect drive. Experiments at the National Ignition Facility (NIF) suggest that coronal electron temperatures in NIF hohlraums may be cooler than initially thought due to efficient thermal conduction from the under dense low-Z plasma to the dense high-Z hohlraum wall [1]. This leads to weaker Landau damping and stronger growth of stimulated Raman scatter, and poorer laser transmission due to absorption in the cooler plasma. Magnetic insulation of the heat conducting electrons can occur when the Hall parameter $\omega_{ce}\tau_{ei} \gg 1$, where ω_{ce} is the electron-cyclotron frequency, and τ_{ei} is the electron-ion collision time. For NIF laser-plasma conditions, it is shown that a 10-T external magnetic field may substantially reduce cross-field transport and may increase coronal plasma temperatures, thus increasing linear Landau damping and mitigating SRS. We will present calculations and simulations supporting this concept, and will present initial results from Omega experiments using gas-filled hohlraums with external B-fields up to 10-T.

[1] M.D. Rosen et al., High Energy Density Phys. **7**, 180 (2011).

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