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Mitigating Laser-Plasma Instabilities in Hohlraum Laser-Plasmas Using Magnetic Insulation[1] D.S. MONTGOMERY, A. SIMAKOV, B.J. ALBRIGHT, L. YIN, Los Alamos National Laboratory, J.R. DAVIES, G. FIKSEL, D.H. FROULA, R. BETTI, Laboratory for Laser Energetics, Univ. Rochester — Controlling laser-plasma instabilities 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 parametric instabilities. For NIF laser-plasma conditions, it is shown that a 10-T external magnetic field may substantially reduce cross-field transport and may increase plasma temperatures, thus increasing linear Landau damping and mitigating parametric instabilities. Additional benefits may be realized since the hot electrons will be strongly magnetized and may be prevented from reaching the capsule or hohlraum walls. We will present calculations and simulations supporting this concept, and describe experimental plans to test the concept using gas-filled hohlraums at the Omega Laser Facility.

[1] M.D. Rosen et al., High Eng. Dens. Phys. 7, 180 (2011).

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