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Effects of self-generated magnetic fields on hohlraum simulation at NIF[1] W. A. FARMER, D. J. STROZZI, D. E. HINKEL, M. D. ROSEN, O. S. JONES, J. M. KONING, M. M. MARINAK, LLNL — Non-parallel density and pressure gradients that develop during matter ablation on a laser irradiated target lead to self-generated magnetic fields through the well-known Biermann-battery effect. For laser intensities present during ICF relevant scenarios on NIF, megagauss fields can develop. The presence of large magnetic fields leads to a non-negligible Hall parameter, defined as the product of the electron cyclotron frequency and the electrion-ion collision time. When the Hall parameter is of order unity or greater, a significant reduction in the cross-field heat flux occurs. Large magnetic fields are limited by the inclusion of the Nernst term, which advects the magnetic fields in the direction of the heat flux (or from the ablation front into the denser wall). This advection combined with resistive diffusion of the magnetic field limits the strength of the self-generated field within the hohlraum. We report changes in simulation results obtained when using the MHD package in the radiation-hydrodynamics code, HYDRA, which models the evolutions of the magnetic fields.

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