Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Self-Generated Magnetic Field Effect Simulations of a National Ignition Facility Capsule[1] JOSEPH KONING, LLNL — Self-generated magnetic fields are simulated in 2D for the National Ignition Facility tritium-hydrogen-deuterium (THD) capsule design using the multiphysics code HYDRA. In HYDRA's MHD package the magnetic field is generated through currents driven by the electron pressure gradient initiated through the Rayleigh-Taylor instability and evolved due to magnetic diffusion, and advection. Magnetic field effects in the simulation include anisotropic thermal electron and ion conduction as well as effects on the alpha particles in the burn phase. Transport coefficients are calculated using the Epperlein-Haines coefficients with Lee-More degeneracy corrections. We compare results of simulations with perturbations on the CH ablator/DT ice layers and radiation source with and without magnetic fields. Initial simulations show maximum field magnitudes in excess of 70 MG and 5% increase in yield for the capsule with perturbations on the CH ablator/DT ice layers and radiation source.

[1]This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Joseph Koning
LLNL

Date submitted: 12 Jul 2013 Electronic form version 1.4