Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

An empirical target discharging model for direct-drive implosions on OMEGA N. SINENIAN, M.J.-E. MANUEL, J.A. FRENJE, F.H. SEGUIN, C.K. LI, R.D. PETRASSO, MIT, V. GONCHAROV, J. DELETTREZ, C. STOECKL, T.C. SANGSTER, LLE, J. COBBLE, LANL — Capsule charging of inertial confinement fusion (ICF) targets, observed previously on OMEGA, is detrimental to achieving the high areal densities (ρR) required for ignition and gain. This is because the target potential traps energetic electrons that can preheat the fuel, raise the adiabat and degrade compression. The decay-time of this potential is therefore an important parameter for preheat calculations. A non-linear model of the electrical discharging of ICF capsules has been developed. The empirical model, which captures the essential dynamics of the target voltage decay, incorporates previous charged-particle spectroscopic and radiographic measurements of the fields. It is shown that return currents through the target support fiber have a profound effect on the voltage-decay time. Implications of these findings for inertial fusion energy (IFE) are considered. This work was supported in part by DOE, LLE and LLNL.

F. Seguin
MIT

Date submitted: 13 Jul 2012 Electronic form version 1.4