Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Thermonuclear Burn in Ignition-Scale ICF Targets under Highly Compressed Magnetic Fields L. JOHN PERKINS, B. GRANT LOGAN, GEORGE ZIMMERMAN, JOHN MOODY, DARWIN HO, DAVID STROZZI, MARK RHODES, GEORGE CAPORASO, CHRISTOPHER WERNER, Lawrence Livermore National Laboratory — We report for the first time on full 2-D radiation-hydrodynamic implosion simulations that demonstrate the impact of highly compressed magnetic fields on the ignition and burn of spherically-converging ICF targets with application to the National Ignition Facility indirect-drive ignition capsule [L.J.Perkins et al, *Phys. Plasmas*, to be published Aug 2013]. Initial seed fields of 20-100T (potentially attainable using present experimental methods) that compress to greater than 10^4 T (100 MG) under implosion can relax hotspot areal densities and pressures required for ignition and propagating burn by ~50% in targets degraded by lower-mode perturbations compared to those with no applied field. This accrues from range shortening and magnetic mirror trapping of fusion alpha particles, suppression of electron heat conduction and potential reduction of hydrodynamic instability growth. This may permit the recovery of ignition, or at least significant alpha particle heating, in submarginal capsules that would otherwise fail because of adverse hydrodynamic instabilities. The field may also ameliorate adverse hohlraum plasma conditions such as stimulated Raman scattering. We also discuss experimental concepts for a potential NIF hohlraum coil driven by a co-located pulsed power supply that may be capable of detectable alpha particle heating and fusion yield through magnetized volumetric burn in a high pressure DT gas capsule.

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Date submitted: 11 Jul 2013 Electronic form version 1.4