Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Yield Enhancement in Magnetized ICF Targets Using Low-Adiabat Pulse Shapes on OMEGA P.-Y. CHANG, G. FIKSEL, D.H. BARNAK, J.R. DAVIES, R. BETTI, Laboratory for Laser Energetics and Fusion Science Center, U. of Rochester — We present the latest experimental data of neutron yield and ion-temperature enhancements obtained by magnetizing the hot spot of inertial confinement fusion (ICF) implosions. The capsules are 23-μm plastic shells filled with 11 atm of D_2 gas. The laser pulse is shaped to drive the shell on an adiabat of $\sim$2 and the $\sim$7-T seed magnetic field is produced using a single coil. The initial seed is predicted to be compressed to $\sim$20 MG—enough to magnetize the electrons in the hot spot and reduce the heat conductivity. Six null shots (without field) and six shots with B-fields were conducted. Four of the B-field shots show a yield and temperature enhancement of about $\sim$23% and $\sim$10%, respectively, in agreement with the predictions of 1.5-D and 2-D magnetohydrodynamic simulations. Those results are similar to previous experiments reported in.[1] Two of the B-field shots produced an anomalously high yield enhancement of 80% and 200%. Additional experiments are required to verify these anomalous results. Compressed field measurements using a high-energy proton backlighter are proposed and preliminary data from one field-measurement experiment will be presented. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944 and DE-FC02-04ER54789 (Fusion Science Center).

[1]P. Y. Chang *et al.*, Phys. Rev. Lett. **107**, 035006 (2011).

P.-Y. Chang
Laboratory for Laser Energetics and Fusion Science Center,
U. of Rochester

Date submitted: 12 Jul 2013 Electronic form version 1.4