Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

**Direct-Drive–Ignition Designs with Moderate-$Z$ Ablators** M. LAFON, R. BETTI, R. NORA, Laboratory for Laser Energetics and Fusion Science Center, U. of Rochester, K.S. ANDERSON, T.J.B. COLLINS, P.W. MCKENTY, Laboratory for Laser Energetics, U. of Rochester — Mitigation of laser–plasma and hydrodynamic instabilities is crucial for the ultimate goal of ignition in inertial confinement fusion. Moderate-$Z$ (MZ) materials ($6 < Z < 10$) are expected to reduce both energy loss and hot-electron preheat due to the laser–plasma interaction. High-gain ignition designs for the National Ignition Facility (NIF) with MZ ablators are described and compared with a pure-plastic design. The NIF beam quads are split to irradiate the target with smaller laser focal spots during the main drive to reduce the losses caused by cross-beam energy transfer. Two-dimensional hydrodynamic simulations assess the robustness of these designs to the NIF specifications for target and laser nonuniformities including beam geometry, laser imprint, and ice and outer-surface roughness. Results indicate that MZ-ablator designs can achieve ignition for direct-drive implosions on the NIF. This material is based upon work supported by the Department of Energy National Nuclear Security Administration DE-NA0001944 and the Office of Science under DE-FC02-04ER54789.

P.W. McKenty
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 12 Jul 2013 Electronic form version 1.4