Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Validation of Thermal Transport Modeling in Direct-Drive Targets Using PlanarFoil Experiments on OMEGA S.X. HU, V.A. SMALYUK, V.N. GONCHAROV, P.B. RADHA, J.P. KNAUER, T.C. SANGSTER, D.D. MEYERHOFER, I.V. IGUMENSHCHEV, J.A. MAROZAS, S. SKUPSKY, Laboratory for Laser Energetics, U. of Rochester — Ignition target designs for the direct-drive inertial confinement fusion rely on accurate modeling of thermal transport. Planarfoil OMEGA experiments were used to validate physics models used in 2-D hydrodynamic simulations. The acceleration experiments with 20-μm-thick CH foil were conducted at laser intensities varying from $\sim 2 \times 10^{14}$ W/cm^2 to $\sim 1 \times 10^{15}$ W/cm^2. The acceleration was measured using side-on, streaked x-ray radiography. At low laser intensities of $\sim 2 \times 10^{14}$ W/cm^2, the 2-D simulations with a constant flux limiter of 0.06 agree very well with the experimental measurements, while at high laser intensities up to $\sim 1 \times 10^{15}$ W/cm^2, a nonlocal thermal transport model or time-dependent flux limiter is necessary to explain experiments. Results of simulations and comparison with the OMEGA experiments will be presented. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement DE-FC52-92SF19460.

S.X. Hu
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 18 Jul 2007 Electronic form version 1.4