Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Two-Plasmon-Decay Electron-Divergence Measurements in Direct-Drive Implosions on OMEGA D.H. FROULA, B. YAAKOBI, A.A. SOLODOV, M.J. BONINO, J.F. MYATT, Laboratory for Laser Energetics, U. of Rochester, J. FOOKS, General Atomics — The divergence of electrons generated by two-plasmon decay in the coronal plasma created in direct-drive experiments on OMEGA was shown to be isotropic. These experiments show that the total hot-electron energy that reaches the fuel ("preheat") is reduced by a factor of 5. Varying-diameter molybdenum (Mo) spheres (200 μm to 860 μm diameter) were mounted inside 50-μm-wall-thickness, 860-μm-diam CH shells containing 1 atm of N_2 gas. Sixty laser beams with an on-target overlapped intensity of 10^{15} W/cm^2 generate hot electrons that penetrate through the CH shell. The electrons that intercept the Mo ball are stopped. The associated Mo K_α yield is measured using an absolutely calibrated x-ray spectrometer. The K_α yield is shown to scale with the surface area of the Mo balls indicating that the electron divergence is isotropic. Monte Carlo simulations are used to determine the total energy in hot electrons. The simulations indicate that the effect of scattering in the cold CH shell is small. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

D.H. Froula
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 11 Jul 2012 Electronic form version 1.4