Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Ray-Trace Simulations for the Optical 4ω Probe Diagnostic on OMEGA EP S. IVANCIC, W. THEOBALD, D.H. FROULA, R. BONI, S.X. HU, Laboratory for Laser Energetics, U. of Rochester — Characterization of the density and temperature of long-scale-length plasmas provides important information for inertial confinement fusion applications. This is required to better understand laser–plasma instabilities at approximately quarter-critical density and to study the channeling of a high-intensity, short-pulse laser through large plasmas for fast ignition. A short-pulse (10-ps) UV optical probe operating at $\lambda = 263$ nm has been developed to diagnose long-scale-length plasmas on OMEGA EP. The diagnostic includes schlieren and shadowgraphy imaging and will provide quantitative measurements of the plasma density. Simulations of the optical diagnostics for the channeling experiments have been performed. A 3-D ray-trace code (*FRED*) was used to simulate the optical system and take the refraction and diffraction of the probe light into account when propagating through plasma. Simulations show that the diagnostics are capable of measuring the density profile over several mm field of view and resolving a channel over a range of tens of μm diameter. Implications on spatial resolution and peak density measurements with the diagnostics are considered. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

S. Ivancic
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 13 Jul 2012 Electronic form version 1.4