## Abstract Submitted for the DPP05 Meeting of The American Physical Society

Calibration of the Cryogenic Target Optical Shadowgraphic Characterization System at LLE D.H. EDGELL, R.S. CRAXTON, L.M. ELASKY, D.R. HARDING, L.S. IWAN, R.L. KECK, L.D. LUND, S.J. VER-BRIDGE, M.D. WITTMAN, W. SEKA, Laboratory for Laser Energetics, U. of Rochester — Reflection and refraction of light by a cryogenic target produce rings on a shadowgraph image that characterize the ice surface position. Many different views give a 3-D ice-layer representation and the global ice-layer roughness. Calibration of the image resolution and accuracy is needed to measure the 1- $\mu$ m rms ice layers required for ignition. The position of the outer edge and bright ring can be resolved to ~0.1-pixel rms (just over 0.1  $\mu$ m) in LLE shadowgraphs. Pincushion distortion because of lens aberration can add a several tenths of a micron n = 2artifact to the measurements. Using precision patterns to align the system minimizes the optical distortion and characterizes it for image correction. Comparison between shadowgraphic and high-precision atomic force microscopy 3-D characterizations of a sapphire sphere shows the accuracy of the 3-D analysis. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-92SF19460.

> D.H. Edgell Laboratory for Laser Energetics, U. of Rochester

Date submitted: 20 Jul 2005

Electronic form version 1.4