

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Testing Talbot–Lau X-Ray Moiré Fringe Deflectometry with a Laser Backlighter¹ D. STUTMAN, M.P. VALDIVIA, M. FINKENTHAL, Johns Hopkins University, S.P. REGAN, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, B. STOECKL, Monroe Community College, Rochester NY — Moiré fringe deflectometry is a simple and robust density diagnostic method, based on light refraction caused by electron density gradients. The Talbot-Lau (TL) grating interferometer could make it possible to apply this method for density diagnostics in high-energy-density plasmas using hard x rays from conventional backlighters. When compared to conventional radiography, the TL interferometer offers more sensitivity to refraction and is therefore less dependent on modeling. We adapted the TL interferometer to the high-energy-density-physics requirements by extending its operation to high magnification, 8 to 17 keV x-ray energy, and single-shot phase retrieval. The next step of development is to test its operation close to a high power laser backlighter. We designed an experiment on the Multi-Terawatt laser aimed at studying grating survival as a function of distance from the backlighter as well as demonstrating Moiré fringe production with 8-keV x rays. The possibility of directly using a microperiodic backlighter instead of a “source” grating is also discussed.

¹Work supported by DoE Awards DE-NA0001B35 and DE-NA0001944.

Dan Stutman
Johns Hopkins University

Date submitted: 09 Jul 2014

Electronic form version 1.4