Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

**X-ray backlit Talbot-Lau Moiré deflectometry** MARIA PIA VALDIVIA LEIVA, DAN STUTMAN, Johns Hopkins University, CHRISTIAN STOECKL, CHAD MILEHAM, ILDAR BEGISCHEV, WOLFGANG THEOBALD, JAKE BROMAGE, SEAN REGAN, Laboratory for Laser Energetics — Talbot-Lau interferometer is a refraction-based diagnostic capable of characterizing highly localized electron density gradients in High Energy Density (HED) plasma through phase shift measurements. Talbot-Lau X-ray Deflectometry (TXD) allows for simultaneous acquisition of attenuation, refraction, elemental composition, and scatter information from a single x-ray image. The TXD diagnostic, previously benchmarked in the laboratory using continuous x-ray illumination [M. P. Valdivia, et al., Rev. Sci. Instrum. 85, 073702 (2014)], was tested using a pulsed x-ray source at the Multi-TeraWatt (MTW) facility at LLE for future applications as a HED diagnostic. A Talbot-Lau interferometer composed of free standing and ultrathin gratings, used the copper K-shell emission at 8 keV from a 30 J, 8 ps laser pulse focused on a 500 x 500 $\mu m^2$ Cu target of 20 $\mu$m thickness. The spatial resolution achieved was limited by the x-ray source size. Future experiments will use smaller x-ray sources (1-10 $\mu$m). These experiments demonstrated that the source grating can survive and high contrast images can be recorded. TXD images from test objects, as well as the electron density profiles retrieved from the interferograms with a 10% accuracy, will be shown.

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Date submitted: 20 Jul 2015

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