Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Phase-contrast imaging of irradiated foils through Talbot-Lau X-ray Deflectometry on OMEGA EP[1] M. P. VALDIVIA, D. STUTMAN, M. K. SCHNEIDER, Johns Hopkins University, C. STOECKL, W. THEOBALD, C. MILEHAM, I. A. BEGISHEV, J. ZOU, C. SORCE, S. P. REGAN, LLE, S. MULLER, GA, S. R. KLEIN, M. TRANTHAM, R. MELEAN, C. C. KURANZ, R. P. DRAKE, U. of Michigan, P. A. KEITER, LANL, J. R. FEIN, SNL, V. BOUFFETIER, A. CASNER, Universite de Bordeaux, K. MATSUO, M. BAILLY GRANDVAUX, F.N. BEG, UCSD CER — Talbot-Lau X-ray Deflectometry (TXD) diagnostics for OMEGA EP can measure electron density gradients to characterize HED plasmas through phase-contrast. To optimize TXD, a suite of backlighter targets were studied on MTW considering source size and spectral quality within the 8 keV interferometer contrast curve. The EP-TXD diagnostic mapped the ablation front of a foil irradiated by 150 J, 1 ns laser pulse ($>2.4 \times 10^{17}$ W/cm^2). For the first time, a Moiré fringe pattern was recorded at 5 ns detecting refraction angles <150 radians, equivalent to line-integrated electron density gradients of $<1.8 \times 10^{25}$ cm^{-3}. Additional Moiré images can help benchmark MHD codes and simulations by mapping the evolution of the ablation front near critical density. Further developments to the TXD platform will include monochromatic backlighting to improve fringe contrast and spatial resolution so that foils can be irradiated at higher intensities.

[1]Work supported by DOE FES DE-SC0020005: LaserNetUS, and NNSA DE-NA0001835, 2955, 3882: HEDLP and DE-NA0003526, 3941: NLUF

Maria Pia Valdivia Leiva
Johns Hopkins University

Date submitted: 26 Oct 2020 Electronic form version 1.4