Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Single pass density diagnostic for expanded warm dense plasmas[1]
THOMAS SCHMIDT, JOSH COLEMAN, Los Alamos National Laboratory, SALVADOR PORTILLO, University of New Mexico, ECE Dept. , LOS ALAMOS NATIONAL LABS TEAM, UNIVERSITY OF NEW MEXICO, ECE DEPT. TEAM
— Warm dense plasmas are opaque to visible light. However, the density gradient of the expanded, less dense plasma surrounding the warm dense matter (WDM) can be optically accessed. This paper describes the development and implementation of Moiré deflectometry and Nomarski interferometry techniques for analysis of the expanded WDM produced from an intense electron beam on a thin foil. The 20 MeV beam incident on copper or titanium targets produce plasmas where the densities are $<8 \times 10^{22}\,\mathrm{cm}^{-3}$. The measurements rely on a probe laser of wavelength 405 nm in which the critical density is ~$7 \times 10^{21}\ \mathrm{cm}^{-3}$, meaning a large portion of the plasma is accessible. Preliminary maps of the density gradient obtained by Moiré deflectometry and the density by Nomarski interferometry will be presented. In addition, the characterization, development, and implementation of these techniques are applied to atmospheric plasma sources.

[1]This work was supported by the National Nuclear Security Administration of the U.S. Department of Energy under Contract No. DE-AC52-06NA25396.

Thomas Schmidt
Los Alamos National Laboratory

Date submitted: 18 Jul 2017 Electronic form version 1.4