Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Progress in LPI Experiments at the NikeLaser[1] J. WEAVER, D. KEHNE, S. OBENSCHAIN, A. SCHMITT, V. SERLIN, (NRL), J. OH, R. LEHMBERG, (RSI), F. TSUNG, (UCLA), P. MCKENTY, (LLE), J. SEELY, (BRA) — The experimental program at the Nike laser facility at NRL is studying laser plasma instabilities (LPI) in the quarter critical region and cross-beam energy transport (CBET). The Nike krypton-fluorine (KrF) laser has unique characteristics that allow parametric studies of LPI. These features include short wavelength (248 nm), large bandwidth ($\sim$ 2-3 THz), beam smoothing by induced spatial incoherence (ISI), and full aperture focal spot zooming during the laser pulse. Nike also has a unique beam geometry that combines two widely separated beam arrays (145° in azimuth) with close beam-beam spacing (as low as 3.5°) within the main drive array. Particularly relevant for the CBET studies, recent campaigns have demonstrated the capability to alter the laser bandwidth by a factor of $\sim$ 10 as well as shifts in the peak laser wavelength. An extensive LPI diagnostic suite is available for observation of stimulated Raman scattering, two-plasmon decay, stimulated Brillouin scattering, the parametric decay instability, and hard x-ray emission due to hot electrons. An overview of the observations of scattered laser light made during the previous studies of instabilities in the quarter critical region will be presented. Ongoing analysis of observed LPI emission from rotated targets will also be included. Plans for upcoming experiments related to quarter critical instabilities and CBET will be discussed.

[1]Work supported by DoE/NNSA.

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Date submitted: 11 Jul 2014 Electronic form version 1.4