Abstract Submitted
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Measurements of Electron Temperature and Density Profiles of Plasmas Produced by Nike KrF Laser for Laser Plasma Instability (LPI) Research[1] JAECHUL OH, Research Support Instruments, J.L. WEAVER, S.P. OBENSCHAIN, A.J. SCHMITT, D.M. KEHNE, M. KARASIK, L-Y. CHAN, V. SERLIN, Plasma Physics Division, Naval Research Laboratory, L. PHILLIPS, Alogus Research Corporation — Experiments[2,3] using Nike KrF laser observed LPI signatures from CH plasmas at the laser intensities above $\sim 1 \times 10^{15} W/cm^2$. Knowing spatial profiles of temperature (T_e) and density (n_e) in the underdense coronal region ($0 < n < n_c/4$) of the plasma is essential to understanding the LPI observation. However, numerical simulation was the only way to access the profiles for the previous experiments. In the current Nike LPI experiment, a side-on grid imaging refractometer (GIR)[4] is being deployed for measuring the underdense plasma profiles. The GIR will resolve T_e and n_e in space taking a 2D snapshot of probe laser ($\lambda = 263nm$, $\Delta t = 10psec$) beamlets ($50\mu m$ spacing) refracted by the plasma at a selected time during the laser illumination. Time-resolved spectrometers with an absolute-intensity-calibrated photodiode array and a streak camera will simultaneously monitor light emission from the plasma in spectral ranges relevant to Raman (SRS) and two plasmon decay (TDP) instabilities. The experimental study of effects of the plasma profiles on the LPI initiation will be presented.

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[2]J. Oh, et al, GO5.4, APS DPP (2010).
[3]J. L. Weaver, et al, GO5.3, APS DPP (2010).
[4]R. S. Craxton, et al, Phys. Fluids B 5, 4419 (1993).

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