Abstract Submitted
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Studies of bandwidth dependence of laser plasma instabilities driven by the Nike laser[1] J. WEAVER, D. KEHNE, S. OBENSCHAIN, V. SERLIN, A.J. SCHMITT, NRL, J. OH, R.H. LEHMBERG, RSI, Inc., C.M. BROWN, NRL, J. SEELY, U. FELDMAN, Berk. Res. Assoc. — Experiments at the Nike laser facility of the Naval Research Laboratory are exploring the influence of laser bandwidth on laser plasma instabilities (LPI) driven by a deep ultraviolet pump (248 nm) that incorporates beam smoothing by induced spatial incoherence (ISI). In early ISI studies with longer wavelength Nd:glass lasers (1054 nm and 527 nm),[2] stimulated Raman scattering, stimulated Brillouin scattering, and the two plasmon decay instability were reduced when wide bandwidth ISI ($\delta\nu/\nu$ ∼0.03-0.19%) pulses irradiated targets at moderate to high intensities ($10^{14} - 10^{15} W/cm^2$). The current studies will compare the emission signatures of LPI from planar CH targets during Nike operation at large bandwidth ($\delta\nu$ ∼1THz) to observations for narrower bandwidth operation ($\delta\nu$ ∼0.1-0.3THz). These studies will help clarify the relative importance of the short wavelength and wide bandwidth to the increased LPI intensity thresholds observed at Nike. New pulse shapes are being used to generate plasmas with larger electron density scale-lengths that are closer to conditions during pellet implosions for direct drive inertial confinement fusion.

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[2]Obenschain, PRL 62(1989);Mostovych, PRL 62(1987);Peyser, Phys. Fluids B 3(1991).

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