Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

High Sensitivity Imprint Measurements on Nike Laser MAX KARASIK, YEFIM AGLITSKIY[1], V. SERLIN, J.W. BATES, Plasma Physics Division, Naval Research Laboratory, Washington, DC — Hydrodynamic instability seeded by laser non-uniformity (laser imprint) is an important factor in performance of direct-drive ICF targets. Most of the imprint occurs during the initial low-intensity ("foot") part of the pulse, necessary to compress the target to achieve high gain. Experiments are carried out on Nike KrF laser with induced spatial incoherence (ISI) smoothing. The amount of imprint is varied by changing the uniformity the foot of the pulse. The resulting Raleigh-Taylor (RT) amplified areal mass non-uniformity is measured by face-on x-ray radiography using Bragg reflection from a curved crystal coupled to an x-ray streak camera. The streak camera was recently retrofitted with a new high sensitivity CCD camera. The sensitivity of the CCD has enabled it to be fiberoptically coupled directly to the streak camera output, without an image intensifier and lens coupling. This gave an increased overall spatial resolution as well as lower noise. Because of the strong short wavelength component of RT amplified imprint, the increased resolution and lower noise resulted in much lower noise floor in the measurement. Experimental results are compared with 2D simulations using FAST hydrocode for a range of foot uniformities and intensities. Work supported by the U. S. DOE/NNSA.

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Date submitted: 25 Jul 2005 Electronic form version 1.4