Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Single-Mode Deceleration Stage Rayleigh-Taylor Instability Growth in Cylindrical Implosions J. P. SAUPPE, S. PALANIYAPPAN, P. A. BRADLEY, S. H. BATHA, E. N. LOOMIS, J. L. KLINE, Los Alamos National Laboratory, B. SRINIVASAN, Virginia Tech, A. BOSE, University of Michigan, E. MALKA, Nuclear Research Center-Negev, D. SHVARTS, University of Michigan and Nuclear Research Center-Negev — We present design calculations demonstrating the feasibility of measuring single-mode deceleration stage Rayleigh-Taylor instability (RTI) growth at a factor of four convergence. RTI growth rates are modified as a result of convergence [Bell LA-1321, 1951], and cylindrical targets are considered here, as they allow direct diagnostic access along the interface. The 2D computations, performed with the radiation-hydrodynamics code xRAGE [Gittings et al., CSD 2008] utilizing a new laser ray-tracing package, predict growth factors of 6 to 10 for mode 10 and 4 to 6 for mode 4, both of high interest in evaluating inertial confinement fusion capsule degradation mechanisms [Bose et al., this conference]. These results compare favorably to a linear theory [Epstein, PoP 2004] and to a buoyancy-drag model [Srebro et al., LPB 2003], which accounts for the linear and non-linear stages. Synthetic radiographs, produced by combining 2D computations of axial and transverse cross-sections, indicate this growth will be observable, and these will be compared to experimental data obtained at the OMEGA laser facility. Work performed by Los Alamos National Laboratory under contract DE-AC52-06NA25396 for the National Nuclear Security Administration of the U.S. Department of Energy. (LA-UR-17-25608)

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Date submitted: 14 Jul 2017 Electronic form version 1.4