Short-pulse laser amplification and saturation using stimulated Raman scattering

E.S. DODD, J. REN, T.J.T. KWAN, M.J. SCHMITT, LANL, P.B. LUNDQUIST, S. SARKISYAN, E. NELSON-MELBY, A.E. — Recent theoretical and experimental work has focused on using backward-stimulated Raman scattering (BSRS) in plasmas as a means of laser pulse amplification and compression [1,2,3]. We present initial computational and experimental work on SRS amplification in a capillary-discharge generated Xe plasma. The experimental set-up uses a 200 ps pump pulse with an 800 nm wavelength seeded by a 100 fs pulse from a broadband source and counter-propagates the pulses through a plasma of length 1 cm and diameter 0.1 cm. Results from initial experiments characterizing the plasma and on short-pulse amplification will be presented. Additionally, we present results from calculations using pF3d [4], and discuss the role of SRS saturation and determine the possible significance of electron trapping with a model implemented in pF3d [5].


Evan Dodd
Los Alamos National Laboratory

Date submitted: 26 Jul 2010

Electronic form version 1.4