Abstract Submitted
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Saturation of stimulated Raman scattering in short-pulse laser amplification[1] E.S. DODD, J. REN, T.J.T. KWAN, M.J. SCHMITT, LANL, P. LUNDQUIST, S. SARKISYAN, E. NELSON-MELBY, A. E. Inc. — Recent theoretical and experimental work has focused on using stimulated Raman scattering (SRS) in plasmas as a means of laser pulse amplification and compression [1] as an alternative to the CPA technique. Initial experiments have demonstrated the amplification and compression of laser pulses in plasma to an unfocused intensity of $\sim 10^{16}$ W/cm^2[2]. However, the amplification saturated and was accompanied by deleterious spatial and temporal incoherence, and the reasons for this incoherence are not well understood. In this presentation, we will show results from recent particle-in-cell simulations using the LSP code and discuss several factors leading to the gain saturation and the importance of electron trapping. An understanding of the saturation process can lead to models for use in 3-wave calculations and subsequent experimental designs that avoid competing instabilities. We will discuss these results in the context of plasma channels with electron temperatures of $\sim$0.75 eV, electron densities of $\sim 10^{19}$ cm^{-3}, and channel lengths > 1 mm. [1] G. Shvets, N. J. Fisch, A. Pukhov, and J. Meyer-ter-Vehn, *Phys. Rev. Lett.* **81** 4879 (1998). [2] J. Ren, W.-F. Cheng, S.-L Li, and S. Suckewer, *Nat. Phys.* **3** 732 (2007).

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