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Self-organized coherent stimulated Raman scattering and scaling with $k\lambda_D$ in multi-speckled laser beams L. YIN, B.J. ALBRIGHT, H.A. ROSE, Los Alamos National Laboratory, R. KIRKWOOD, Lawrence Livermore National Laboratory, J.L. KLINE, D.S. MONTGOMERY, K.J. BOWERS, B. BERGEN, Los Alamos National Laboratory — Stimulated Raman Scattering (SRS) continues to be a laser plasma instability of concern for laser-driven fusion experiments. Recently, the key nonlinear physics governing SRS onset and saturation has been identified in multi-speckled laser beams. Hot electrons from intense speckles, produced during SRS daughter electron plasma wave bowing and filamentation, seed and enhance the growth of SRS in neighboring speckles by reducing Landau damping. Trapping-induced nonlinearity and speckle interaction through transport of hot electrons, backscatter, and sidescatter SRS waves enable the system of speckles to self-organize and exhibit coherent, sub-ps SRS bursts with more than 100% instantaneous reflectivity, consistent with an SRS transverse coherence width much larger than a speckle width [L. Yin, et al.,PRL,108, 245004 (2012)]. SRS reflectivity is found to saturate above a threshold laser intensity [L. Yin, et al., PoP, 19, 056304 (2012)] at a level of reflectivity that depends upon $k\lambda_D$: higher $k\lambda_D$ (e.g., as obtained by raising electron temperature) leads to lower SRS. We are exploring the efficacy of novel approaches to lowering SRS by raising $k\lambda_D$ in hohlraum plasmas.

Lin Yin
Los Alamos National Laboratory

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