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Density dependence of the saturation of stimulated Raman scattering in CBET-amplified multi-speckled beams[1] DAVID STARK, L. YIN, B. J. ALBRIGHT, W. D. NYSTROM, R. F. BIRD, Los Alamos National Laboratory — Cross-beam energy transfer (CBET) is the process by which two crossing laser beams transfer energy between one another through stimulated Brillouin scattering (SBS). Understanding the nonlinear saturation of CBET, including the effects of wave-particle interaction, the excitation of secondary instabilities such as backward and forward stimulated Raman scattering (BSRS and FSRS, respectively), and speckle geometry, is important to controlling low-mode asymmetry in inertial confinement fusion (ICF) implosions. We perform particle-in-cell simulations using VPIC to characterize the BSRS and FSRS in a CBET-amplified multi-speckled beam across a range of plasma densities that commonly occur in ICF and high energy density experiments. In particular, we quantify the changes in the scattering angle across different densities, the attenuation rates of the beam, and the cascade of energy to lower frequency modes and hot electrons. Tracer electrons demonstrate the particle trapping in electron plasma waves and how multi-speckle communication influences the instability threshold.

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