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The Langmuir Decay Instability and Stimulated Raman Scattering in ICF-Relevant Plasmas[1] B.J. WINJUM, A. TABLEMAN, F.S. TSUNG, W.B. MORI, UCLA — Kinetic simulations of stimulated Raman scattering (SRS) in ICF-relevant plasmas with long-scale-length density gradients have shown that SRS can grow strongly when the laser propagates above that density for which $k\lambda_D \approx 0.30$, where k is the wavenumber of the daughter electron plasma wave and λ_D is the electron Debye length. Simulations and experiments have shown that SRS saturation is dominated by kinetic effects for $k\lambda_D > 0.30$ and the Langmuir decay instability (LDI) for $k\lambda_D < 0.30$, but few kinetic simulations of SRS have explicitly explored the role of LDI in this regime or the transition in SRS behavior across this $k\lambda_D$ boundary. Here we present one- and two-dimensional PIC simulations of LDI in the midst of SRS dynamics for both single-laser-speckles as well as for lasers propagating up long-scale-length density gradients covering a range of $k\lambda_D$. We show the effect of LDI on SRS reflectivity and hot electron generation for variable ZT_e/T_i and $k\lambda_D$, as well as the effect of LDI on the spatio-temporal behavior of electron plasma wave packets generated by SRS.

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