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The effect of magnetic fields on the kinetic evolution of nonlinear electron plasma waves and stimulated Raman scattering[1] B. J. WINJUM, A. TABLEMAN, F. S. TSUNG, W. B. MORI, UCLA — Nonlinear wave-particle interactions can significantly affect the evolution of stimulated Raman scattering (SRS) for ICF-relevant parameters. An imposed magnetic field can alter the dynamics of these interactions and thereby the dynamics of SRS, altering the instability threshold and saturation. Particles resonant with an SRS-generated electron plasma wave can be rotated in velocity space, disrupting the nonlinear damping of electron plasma waves and changing the kinetically inflated SRS threshold. Resonant particles can also be rotated in physical space, changing the transverse kinetic dissipation of electron plasma waves and restricting trapped particle motion both within a single laser speckle as well as between neighboring laser speckles. We show PIC simulations of driven multi-dimensional electron plasma waves in the presence of an external field and illustrate how their nonlinear evolution is altered, particularly with regard to the dynamical behavior that can impact SRS.

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