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Modifying the Kinetic Behavior of Stimulated Raman Scattering with External Magnetic Fields[1] B.J. WINJUM, A. TABLEMAN, F.S. TSUNG, W.B. MORI, UCLA — We show the effect of an external magnetic field (B_0) on stimulated Raman scattering (SRS) in the kinetic regime using particle-in-cell simulations. 1D simulations (with three velocity components for particle motion) are sufficient to show that orienting B_0 perpendicular to the laser propagation direction can reduce SRS reflectivity. We show the effect of B_0 on trapped particle motion and on local heating. In 2D simulations of single- and multi-speckled laser beams, trapped particles can be restricted to, or freed from, speckles and local bursts of SRS activity by B_0. B_0 collinear with the laser propagation direction acts to align trapped particles with the daughter electron plasma wave (EPW) in SRS, which can both limit collective speckle interactions and make 2D SRS more 1D-like. On the other hand, B_0 perpendicular to the laser propagation direction acts to deflect trapped particles transversely across the daughter EPW and to dynamically change the population of particles that are resonant with the EPW, disrupting the nonlinear wave-particle effects on EPWs. This acts to decrease SRS reflectivity. Hot electron motion is restricted for either orientation, but to different effect with regard to local heating, SRS recurrence, and speckle interactivity.

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