Abstract Submitted
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Plasma Wave Packets in Density Gradients in 1D and 2D PIC Simulations[1] JAY FAHLEN, UCLA, B. WINJUM, T. GRISMAYER, V. DECYK, F.S. TSUNG, J. TONGE, W. MORI — Fully self-consistent simulations of Stimulated Raman Scattering in one and two dimensions indicate that the finite extent of the plasma wave, both longitudinally and transversely, can strongly affect the saturation, convection, and recurrence of the instability. Here we present 1D and 2D electrostatic, externally driven particle-in-cell simulation results that help to understand the effect of spatial localization and density gradients on plasmons. As plasmon packets convect, the rear edge of the packet damps as new particles trap and phase mix, leading to 'etching' of the packet rear. In SRS, the recurrence rate depends on this velocity and will increase for increasing etching rates. A simple model accurately predicts the etching rate observed in the simulations. In two dimensions, trapped and detrapped particle effects and transverse amplitude variation lead to localization and the eventual destruction of the wave. A suite of new diagnostics, including particle tracking, and energy fluxes (ES Poynting flux), brings greater understanding to these effects.

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