Abstract Submitted
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**Trapped Electron Instability of Electron Plasma Waves: Vlasov simulations and theory**[1] RICHARD BERGER, THOMAS CHAPMAN, Lawrence Livermore Nat'l Lab, Livermore, CA, STEPHAN BRUNNER, Ecole Polytechnique Federal de Lausanne, CRPP-PPB, CH-1015 Lausanne, Switzerland — The growth of sidebands of a large-amplitude electron plasma wave is studied with Vlasov simulations [*J. W. Banks et al, IEEE Trans. Plasma Sci* **38**, *2198 (2010); R.L. Berger, et al., Phys. Plasmas 20, 032107(2013)*] for a range of amplitudes ($.001 < e\phi_0/T_e < 1$) and wavenumbers ($0.25 < k_0\lambda_{De} < 0.45$) for systems up to $100\lambda_0$ in the propagation direction. Here, $k_0 = 2\pi/\lambda_0$ and $\lambda_{De}$ is the Debye length. The low statistical noise of Vlasov simulations allows the growth rate of the unstable modes to be determined accurately and compared to theory. Despite the simplicity of the dispersion relation, growth rates found with the Kruer-Dawson-Sudan model [*Kruer, et al PRL 23, 838 (1969*] agree quite well with the numerical results. The most unstable modes with frequency and wavenumber $\omega, k$ satisfy the relation, $\omega - k \cdot v_{ph} = \pm\omega_{be}$, where $v_{ph} = \omega_0/k_0$ and $\omega_{be}$ is the bounce frequency of a deeply trapped electron. In 2D simulations, we find that the instability persists and co-exists with the filamentation instability.

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