Abstract Submitted
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Two-dimensional Vlasov Simulation of Driven, Nonlinear Electron Plasma Waves[1] J.A. HITTINGER, J.W. BANKS, R.L. BERGER, B.I. COHEN, LLNL, S. BRUNNER, EPFL, 1015 Lausanne, CH — In the VALHALLA project at LLNL, we are developing advanced, scalable algorithms for the continuum solution of Vlasov-Maxwell that differ from traditional approaches to continuum Vlasov methods.[2] Here, continuum solution of the Vlasov-Maxwell system using these techniques is extended to two spatial dimensions and two velocity dimensions. We report Vlasov simulation studies of ponderomotively driven electron plasma waves (EPW) with fixed ions. Motivated plasma waves driven by SRS in light speckles, we consider a driving potential with a finite transverse width. This localization introduces losses as the waves propagate transversely out of the driven region and the particles are only transiently trapped. Linearly, the transverse localization leads to constant phase surfaces that defocus the EPW while nonlinearly, the constant phase surfaces from trapping-induced frequency shifts focus the EPW. We show how these processes are affected by the system length and the boundary conditions.

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[2]J. Banks and J.Hittinger, sub. to IEEE Trans. Plas. Sci. (Dec 2009), LLNL-JRNL-420843.

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