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Kinetic shear Alfvén waves in the presence of plasma flow.[1] G.J. MORALES, J. TONGE, F.S. TSUNG, UCLA — The propagation of Alfvén waves through regions where a transverse plasma flow exists relative to the wave source is a topic of interest to various space and laboratory studies. In the inertial regime, where the Alfven speed V_A is much larger than the electron thermal velocity v_e ,transverse flow above a critical speed gives rise to filamentation of currents associated with shear waves. The phenomenon arises from the competition between induction and electron inertia and is absent in MHD descriptions. In the kinetic regime ($v_A \sim v_e$) the wave-particle interaction increases the complexity of this competition. To explore this important regime, a parallel electromagnetic particle-in-cell code, PARSEC, is used. The effects of finite ion Larmor radius (kinetic Ion effects) and resonant electron damping (kinetic electron effects) are independently investigated. The major findings are: 1) the electron Landau damping experienced by launched shear-wave cones can be cancelled by the flow, thus resulting in collimated propagating structures; 2) finite ion Larmor radius gives rise to secondary, banded-structures that accompany the convection induced by the flow on the primary shear-wave cone. The dependence of these features on flow speed and wave frequency is analyzed.

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