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Effects of negative ions on instabilities driven by sheared magnetic-field-aligned positive-ion flow RYUTA ICHIKI, TOSHIRO KANEKO, RIKIZO HATAKEYAMA, Department of Electronic Engineering, Tohoku University, Japan, MARK E. KOEPKE, Physics Department, West Virginia University — Using a Q-machine, we have observed low-frequency instabilities driven by sheared magnetic-field-aligned positive- ion flow in a plasma composed of K^+, SF_6^-, and electrons ($n_p \simeq 10^{-9}$ cm^{-3}, $T_e \simeq T_i \simeq 0.2$ eV, $\phi_s \simeq -4$V). Sheared K^+ ion flow is achieved with the combination of a concentrically segmented W hot plate (positive-ion source) at one end of a magnetized plasma column and a LaB_6-coated disk cathode (electron source) at the opposite end. The characteristics of fluctuations, attributed to the shear-modified drift instability, are found to change when negative ions are introduced into the plasma. First, the range of the shear strength that stabilizes the fluctuations extends to both larger and smaller values. Second, for sufficiently large concentration of negative ions, the frequency spectrum makes a transition from sharp to broad as the shear strength is increased. These trends may be related to negative-ion effects on the wave phase velocity which, in turn, modifies Landau damping and growth. We are interested in possible applications to structure formation in turbulent plasma that contain both negative ions and sheared positive-ion flow.

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