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Superposition of Parallel and Perpendicular Flow Velocity Shears in Magnetized Hybrid-Ion Plasmas TOSHIRO KANEKO, SHUICHI TAMURA, RYUTA ICHIKI, RIKIZO HATAKEYAMA, Department of Electronic Engineering, Tohoku University — Low-frequency instabilities modified by ion flow velocity shears are investigated using concentrically three-segmented ion and electron emitters in a modified double-ended Q-machine. When each of the emitters is individually biased, the perpendicular and parallel ion flow shears can be generated and superimposed on each other. The fluctuation amplitude of the drift wave which has an azimuthal mode number m=3 increases with increasing the parallel shear strength. When the perpendicular shear is superimposed on the parallel shear, the drift wave of m=3 changes into that of m=2 through a broadband turbulence state. Furthermore, the parallel shear strength required for the excitation of the drift wave becomes large with a decrease in the azimuthal mode number. On the other hand, the effects of a negative ion as one of the hybrid ions on the drift wave in the presence of the positive-ion flow shear are also investigated. The negative ion stabilizes the shear-modified drift wave, which is the opposite result to a number of earlier studies on the negative ion plasmas.

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