

Abstract Submitted
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Laboratory Investigation of the Electromagnetic Electron-Ion Hybrid Instability¹ C. LON ENLOE, ERIK TEJERO, BILL AMATUCCI, CHRIS CRABTREE, GURU GANGULI, Naval Research Laboratory — The electromagnetic to electrostatic transition of the electron-ion hybrid instability is currently being studied in the Space Physics Simulation Chamber at NRL. It has been shown by theory that strong gradients in plasma flows perpendicular to the magnetic field can drive electromagnetic waves in the whistler branch. Velocity-sheared flows of this type may naturally arise in the boundary layer between plasmas of different characteristics, such as in the plasma sheet in the Earth's magnetosphere and laser produced plasma expansions across a magnetic field. When the wave vector normalized to the electron skin depth is much larger than 1, the waves are predominantly electrostatic in character and electromagnetic otherwise. These waves are eigenmodes in the direction of the velocity shear and demonstrate a dramatic increase in width after transitioning to an electromagnetic wave. Results from recent experiments will be presented in which this transition is observed.

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