

# Electrostatic instabilities triggered by finite amplitude Alfvén/ion-cyclotron waves and relative drifts among the ion components in the magnetosphere

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Alfvén/ion-cyclotron waves have been observed in several regions of the magnetosphere.

Parametric decays of finite amplitude Alfvén/ion-cyclotron waves in the presence of  $\text{He}^+$  ions and a mixed population of thermal and hot protons have been shown to lead to several parametric instabilities. These studies assumed that heavy ions are not drifting relative to each other. However, a relative drift velocity among the ions can affect known parametric decays and can also lead to new ones. Moreover, finite amplitude waves in a plasma system with drifting ion species are shown to destabilize nonlinear ion-acoustic-like waves supported by each species. Finally, linear ion-acoustic waves supported by different ion species can also be destabilized because of the relative drift between ion components. Copyright 2008 by the American Geophysical Union.