

The Properties of Nonlinear Plasma Waves at Comets

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Nonlinear wave properties of the Low Frequency "turbulence" surrounding comets Grigg-Skjellerup (G-S), Giacobini-Zinner (G-Z) and Halley (H1) will be reviewed. A new result, the detection of phase-steepened left-hand (Alfvén mode) waves at G-S will be illustrated. Arguments will be presented to indicate that the steepening occurs at the trailing edges of the waves. Dispersion properties of this mode can explain the location of the steepening. Results of coherency analyses will be used to show that the components of the G-Z waves above the pump frequency (H_2O group ion cyclotron frequency) are purely right-handed, e.g., the turbulence is purely "whistler mode". The G-S waves at frequencies slightly above the pump frequency are purely left-handed, e.g., Alfvén mode turbulence. Waves at Halley are linearly polarized. Detailed single wave minimum variance examination of Halley magnetic fields will be performed to try to understand the development of this unusual linearly polarized turbulence.

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