Discrete Upper-Hybrid Waves

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Naturally occurring plasma waves characterized by fine frequency structure or discrete spectrum, detected by satellite, rocket-borne instruments, or ground-based receivers, may be interpreted as eigenmodes excited and trapped in field-aligned density structures. The best and most studied example is the ground-based or rocket-based detection of auroral roar, which is interpreted as trapped electrostatic upper-hybrid waves in field-aligned density enhancement [*LaBelle et al.*, 1995; *Shepherd et al.,* 1998]. Another prime example may be the fine structure component of the kilometric continuum radiation in the Earth's plasmasphere [*Menietti et al.,* 2003]. This presentation will overview the trapped eigenmode theory of plasma waves in field-aligned density structures. A comparative analysis between the theory and ground-based detection of discrete radio waves will also be reviewed. Although the comparison shows promising qualitative agreements, some discrepancies are also found which point to the need for further investigation, or some alternative theoretical approaches.

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