
JOURNAL CLUB

Fine Structure in Auroral Radio Emissions

by

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ABSTRACT

The aurora is best known for its beautiful optical displays. Less well known is the fact that the aurora also radiates in other parts of the electromagnetic spectrum. For example, many different auroral emissions have been observed at radio frequencies ranging from the ULF (0-30 kHz) through the EHF (30-300 GHz) range. Several of these emissions exhibit interesting “fine frequency structure” which is likely influenced by inhomogeneities in the ionospheric plasma. Such emissions can be studied using both rocket-borne and ground-based instrumentation. Here we discuss two recent examples: Structured Langmuir waves (called “HF Chirps”) generated by auroral electrons just above the plasma frequency and observed during sounding rocket flights; and the fine structure of auroral roar observed with ground-based instrumentation at frequencies near electron cyclotron harmonics. Mounting theoretical and experimental evidence suggests that density structure in the source region strongly influences the frequency and time structure of these radio waves. If these models of auroral radio wave generation are accurate, they point to a more significant role for electron density structure determining emitted wave characteristics than has been previously appreciated.

Friday, February 8
Globe Room, Elvey Bldg
3:45 pm