

## HIGH LATITUDE OBSERVATIONS OF ULF WAVES

T. K. YEOMAN

Department of Physics and Astronomy, University of Leicester, UK.

This talk will provide a brief overview of recent progress in the study of high latitude ULF waves. It will then focus on two recent developments.

Firstly, Pc 3-4 pulsations ( $f \sim 10\text{-}100$  mHz) which originate in the ion foreshock upstream of the Earth's bow shock due to the interaction between reflected ions and the solar wind will be considered. Previous studies have noted increased Pc 3-4 wave power in the vicinity of the dayside cusp and inferred that the upstream waves gained entry via the cusp, although more recent studies have revealed a more complex picture. Here, we examine Pc3-4 wave power near local noon observed by search coil magnetometers at three closely-spaced stations on Svalbard, during times when an extended interval of HF radar backscatter indicative of the cusp is detected by the Hankasalmi SuperDARN radar. The location of the equatorward edge of the HF radar cusp may then be directly compared with the Pc3-4 wave power measured at three latitudes as the cusp migrates across the stations. These observations are not consistent with wave entry into the magnetosphere via the cusp proper, but rather along closed field lines equatorward of the cusp, which map to the low-latitude boundary layer or outer magnetosphere.

Secondly, longer period ULF waves which result from the interaction of the wave modes with energetic particles drifting within the magnetosphere will be considered. Examples of such waves observed close to substorm onset will be presented which exhibit equatorward phase propagation. These waves share many characteristics with previous observations of ULF waves with equatorward propagation, but also show some significant differences. These differences will be discussed in the context of the magnetic field topology and the characteristics of the drifting particles in the vicinity of substorm onset and elsewhere in the magnetosphere.

ULF waves

T. K. Yeoman, Department of Physics and Astronomy, University of Leicester, Univeristy Road, Leicester LE1 7RH, UK. [tim.yeoman@ion.le.ac.uk](mailto:tim.yeoman@ion.le.ac.uk)