ABSTRACT

Excitation of whistler-mode waves and resonant electron scattering in the Jovian magnetosphere

B. Bhattacharya (1), Richard M. Thorne (2), William S. Kurth (3), Donald J. Williams (4), Donald A. Gurnett (3)

A study of in-situ measurements form the Galileo spacecraft suggests that there is a direct association between enhanced electron fluxes and the presence of whistler-mode plasma waves. Resonant interactions between waves detected by the Plasma Wave Sybsystem and energetic electrons observed by the Energetic Particles Detector may play a role in diffuse auroral precipitation. We present here a study of wave intensifications during electron injection events in the extended Io torus region. We note that Doppler broadening due to the velocity differential between the Galileo spacecraft and corotational, magnetospheric plasma may be responsible for an appreciable shift in the observed wave frequency, particularly in the case of oblique wave propagation. We present power spectral densities and evidence of strong pitch-angle scattering that may provide the mechanism for filling the atmospheric loss cone, leading to Jupiter's diffuse aurora.

(1) SIRTF Science Center
California Institute of Technology, Pasadena, California, USA
(2) Department of Atmospheric Sciences,
University of California, Los Angeles, USA
(3) Department of Physics and Astronomy,
University of Iowa, Iowa City, USA
(4) Applied Physics Laboratory,
The Johns Hopkins University, Laurel, Maryland, USA