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Author(s):	Jaynes, Allison N. Holmes, Justin Craig
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Title:
The role of cold plasma in diffuse-like auroral precipitation and M-I coupling

Author:
Allison Jaynes

Affiliation:
University of Iowa, Department of Physics and Astronomy

Abstract:
Cold plasma plays a significant role in mediating the large-scale energy transfer from space plasma to the Earth's atmosphere by affecting the growth and intensity of VLF chorus waves in the inner magnetosphere as well as determining the crucial resonance conditions. Diffuse-like aurora, which comprises both diffuse aurora and pulsating aurora, is created by particle scattering in the equatorial magnetosphere through cyclotron resonance with chorus waves. This process depends on a complex combination of the pre-existing source and seed populations, particle injections, and cold plasma structuring. This talk summarizes recent attempts to quantify the chain of events that result in diffuse-like aurora through four main topics: (1) the energy content of precipitation, (2) the structuring of quasi-periodic VLF waves, (3) the location and MLT evolution of particle injections, and (4) impacts of the wave generation region on overall radiation belt morphology. Through all the topics, cold plasma / background plasma density is a critical component. This talk outlines the need for reliable cold plasma measurements at micro- and meso-scales in order to understand the larger question of magnetosphere-ionosphere coupling and the overall energy input into our atmosphere.