

AOS **275** SEMINAR: SPACE PHYSICS

Magnetosphere-Ionosphere Coupling: Key Role of Wave- Particle Interactions

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LIVE VIA ZOOM

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Earth's magnetosphere, the plasma environment of our planet, is shaped by solar wind flow interacting with Earth's dipole magnetic field. Dynamics of the magnetosphere (such as geomagnetic storms and substorms) are significantly controlled by the magnetosphere-ionosphere coupling, which involves energy and mass exchanges between hot, rarified magnetospheric plasma and cold, dense ionospheric plasma. One important process responsible for this coupling is energetic electron precipitation into the ionosphere, as driven by resonant wave-particle interactions in the magnetosphere. These precipitation significantly alter ionosphere properties and have long been attributed to the electron diffusive scattering by low-amplitude broadband waves. This presentation discusses that the diffusion approximation may not be applicable for the most energetic electron precipitation. We show observational evidence and theoretical models for nonlinear resonant interactions and discuss their importance for properly modeling the electron precipitation patterns.

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