

SPACE PHYSICS SEMINAR

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Observation and Modeling of Langmuir Turbulence in the Earth's Ionosphere

Thursday, November 21, 2013 725 Commonwealth Ave. Refreshments at 3:30pm in CAS 500 Talk begins at 4:00pm in CAS 502

Abstract:

Incoherent scattering radars are powerful tools to probe the quiescent ionosphere by measuring thermally excited electrostatic plasma waves at wave numbers imposed by the radar. During auroral precipitations of low energy beams of electrons, the signature of the radar measurement changes drastically in intensity and in shape. There is clear evidence from radar measurements that Langmuir turbulence occurs, a process that involves nonlinear interactions between different wave modes of the plasma. A numerical model for Langmuir turbulence is presented to support those observations. The model consists of the one-dimensional driven dissipative Zakharov system of equations where the drive is due to kinetic effect of beamplasma interactions and where thermal fluctuations effects are included as stochastic forcing. The output of the model allows direct comparison to radar measurement. Results for different beam parameters are presented, and are discussed in terms of the underlying wave-wave processes.