BOSTON UNIVERSITY

Space Physics Seminar
Thursday, September 24, 2015

Tackling the Spatial Temporal Ambiguity

Dr. Charles M Swenson

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Center for Space Engineering, Department of Electrical Engineering

3:30 pm
Refreshments
CAS Room 500

4:00 pm
Seminar
CAS Room 502

Abstract:

The most significant advances in Earth, solar, and space physics over the next decades will originate from new observational techniques. The most promising observation technique to still be fully developed is the capability to conduct multi-point or large distributed constellation-based observations of the Earth system at a feasible cost. This approach is required to understand the "big picture", system-level coupling between disparate regions such as the solar-wind, magnetosphere, ionosphere, thermosphere, mesosphere, atmosphere, land, and ocean on a planetary scale.

The NASA Auroral Spatial Structures Probe, rocket 49.002, was launched January 28, 2015 from the Poker Flat Research Range into active aurora over the northern coast of Alaska. It is one of the first NASA missions that attempted a set of multipoint measurements of the space environments in addressing its objectives. The primary objective was to unravel the difference between temporal variations within the aurora and their spatial structures when observations are made from a moving platform within a changing environment. Specifically to determine the contribution of small spatial and temporal scale fluctuations of the electromagnetic fields to the larger-scale energy deposition processes associated with the aurora.

The Auroral Spatial Structures Probe Sub-Orbital Mission consisted of a formation of 7 spacecraft (a main payload with 6 deployable sub-payloads) designed for multiple temporally spaced co-located measurements of electric and magnetic fields in the earth's ionosphere. The mission was able to make observations at a short time scale and small spatial scale convergence that is unobservable by either satellite or ground-based observations. The payloads included magnetometers, electric field double probes, and Langmuir probes as well as a sweeping impedance probe on the main payload. We present preliminary results that hint at the underlying spatial structure of the currents and energy deposition in the aurora and discuss how such an experimental campaign is conducted when one is trying to observe the erratic Aurora.

Next Week

- Min-Chang Lee
  BU / MIT
- Controlled Study of Whistler Wave Propagation and Interactions with Space Plasmas at Arecibo, Puerto Rico

http://www.bu.edu/csp/edoutreach/seminar/

C · S · P

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