BOSTON UNIVERSITY

Space Physics Seminar

A Joint Seminar with the Department of Mechanical Engineering

Thursday, February 12, 2014

Space: The Ultimate Laboratory

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Abstract:

Space provides a near-pristine laboratory for studying plasma physics. In situ particle sensors, complemented by electromagnetic field measurements, allow us to study plasma dynamics at all spatial scales, from interplanetary distances to individual particle motion ranges. However, as the compelling scientific questions approach increasingly small scales, the limitations of existing technologies present significant challenges to the scientific returns of space missions. A deep knowledge of the technical design and behavior of instrumentation, coupled with an intimate understanding of the scientific demands, allows for the development of innovative technologies that deliver precision and accuracy while meeting the tremendous challenge of design for space. Here, we provide an introduction to particle instrumentation in space and present examples of unwanted 'features' that can arise due to necessary design trade-offs to meet mass, power, and volume constraints. We further consider technical and analytical calibration innovations for the Fast Plasma Investigation Suite (FPI) on the Magnetospheric Multiscale Mission (MMS). FPI consists of an unprecedented 32 ion and 32 electron sensors spread across four spacecraft observatories, and will provide the highest ever spatial and temporal resolution measurements of space plasmas. The development of large quantities of sensors transformed space instrumentation from a prototype-driven into a production-driven design process. Key innovations in both laboratory and in-flight calibration activities will be presented that will enable MMS to study the smallest scales in Earth's space environment.

3:45 pm
Refreshments
ME Room 245
110 Cummington Mall

4:00 pm
Seminar
ME Room 245

Next Week

- Noé Lugaz
  University of New Hampshire
- Successive and Interacting Coronal Mass Ejections: Causes and Effects

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

C·S·P

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