



## AEROSPACE ENGINEERING SCIENCES

# Seminar

**Xinlin Li**

Professor, Department of Aerospace Engineering Sciences and  
Laboratory for Atmospheric and Space Physics, University of Colorado Boulder

## **Advanced Understanding of the Energetic Particle Dynamics in Earth's Inner Magnetosphere – Contributions from Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission**

Comprehensive measurements from the Relativistic Electron and Proton Telescope (REPT) onboard Van Allen Probes, launched in Aug 2012 into a geo-transfer-like orbit, revealed new features of inner belt protons and outer belt electrons in terms of their spectrum distribution, spatial distribution, pitch angle distribution, and their different source populations. Concurrent measurements from the Relativistic Electron and Proton Telescope integrated little experiment (REPTile) on board Colorado Student Space Weather Experiment (CSSWE) CubeSat, launched in Sept 2012 into a highly inclined low Earth orbit, and REPT demonstrated that there exist sub-MeV electrons in the inner belt and their flux level is orders of magnitude higher than the background associated with the inner belt protons, while higher energy electron ( $>1.6$  MeV) measurements cannot be distinguished from the background. CSSWE, a 3-unit (10cm x 10cm x 30cm) CubeSat mission funded by NSF, had operated for over two years and made high quality measurements of energetic particles: differential fluxes of 0.58 to  $>3.8$  MeV electrons and 9-40 MeV protons.

In this presentation, emphasis will be on the engineering challenges that had to be overcome to achieve such clean measurements under the constraints of mass, volume, power, data link, and, of course, the budget for a CubeSat mission, and the significant contributions of CSSWE to the advanced understanding of the energetic particle dynamics in the Earth's inner magnetosphere.



**Friday  
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2:00 PM  
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Room**

