

Physics and Space Sciences Presents:

# Quantifying Dynamic Evolution of the Near-Earth Radiation Environment

The Van Allen radiation belts consist of energetic electrons and ions at energies above 100 keV trapped by the Earth's magnetic field. These very energetic particles may be harmful to satellite electronics and humans in space. In particular, relativistic electrons are responsible for the deep dielectric charging in sensitive electronic components and cause frequent satellite failures and operational problems. Multiple satellite measurements including a number of cubesat missions provide a vast amount of data to develop accurate models of the radiation environment. Assimilation of this Big Data can be achieved by using modified Kalman filtering with the Versatile Electron Radiation Belt (VERB) model. VERB code predictions also show that during solar superstorms, heating energetic particles may become very efficient at distances less than three Earth Radii, which can significantly increase the near-Earth radiation hazards and may be devastating for the near-Earth orbiting satellites. Detailed simulations show that such superstorms may increase the radiation hazard in the inner radiation zone by a factor of 10, and such an increase will persist for up to 5 years.

**Friday, February 20, 2015**

**Meet and Greet  
3:15—3:45PM  
OPS Room 144**

**Colloquium  
4:00—5:00PM  
OPS Room 140**

Dr. Yuri Shprits  
MIT



Light Refreshments will be served