

# SPACE AND COSMIC RAY PHYSICS SEMINAR

University of Maryland  
Computer & Space Sciences Building, Rm 2400  
4:30 PM Monday, September 22, 2003  
Tea & cookies 4:00-4:30 PM

## **Hina Khan**

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### **Low Energy Neutral Atoms in the Magnetosphere: IMAGE/LENA Observations of Ionospheric Outflow and Cusp-related Emissions**

The Low-Energy Neutral Atom (LENA) imager on the IMAGE spacecraft was designed to observe ionospheric outflow events in the energy range, 10-100eV. The energetic neutrals, created through charge exchange processes involving superthermal ionospheric ions and atoms in the exosphere, are imaged by LENA and provide an insight into the dynamics of the topside ionosphere and interaction of the solar wind with the magnetosphere. In this presentation, I wish to provide an overview of the different sources of neutral atom emissions observed from within the magnetosphere. The ionospheric outflow component is principally caused by solar wind disturbances impacting the magnetopause resulting in pressure variations in the magnetosphere that cause a surge in ionospheric outflow. Clear evidence of this process has been observed and with the IMAGE satellite we are able to make global ionospheric observations of the ionosphere on short timescales, investigating the upwelling of plasma during solar wind disturbances. Furthermore, IMAGE/LENA observes neutral atom emissions from the magnetosheath, which can be associated with the cusp-like signatures in the ionosphere. Ground-based radar data are presented showing the cusp features during a time of enhanced neutral atom emission at LENA. The analysis shows a clear relationship between these observations indicating that low energy neutrals are produced as a result of the erosion of the magnetopause boundary.

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For information call Matthew Hill at (301) 405-6209 or go to the following website  
[http://space.umd.edu/seminars/Fall\\_2003\\_Seminar.html](http://space.umd.edu/seminars/Fall_2003_Seminar.html)

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