

# SPACE AND COSMIC RAY PHYSICS SEMINAR

University of Maryland  
Computer & Space Sciences Building, Room 2400  
4:30 PM Monday, October 25, 2004  
Coffee, Tea & Cookies 4:00-4:30 PM

## **Joseph Giacalone**

Department of Planetary Science  
University of Arizona

## **Diffusive Shock Acceleration in the Heliosphere**

The application of diffusive shock acceleration to our understanding of energetic particles of heliospheric origin is discussed. Particular emphasis will be placed on solar-energetic particles (SEPs), although I will also discuss the physics of shock acceleration as it pertains to a variety of heliospheric energetic particles (such as anomalous cosmic rays - ACRs). The time scale for acceleration depends strongly on the topology of the magnetic field and plasma flow speed. This is particularly relevant to our understanding of both ACRs and SEPs. For instance, on the one hand, theoretical predictions for the time scale to accelerate SEPs to high energies can range over several orders of magnitude. On the other hand, it can be shown that, very generally, low-energy particles can be accelerated to several GeV in time scales shorter than a few minutes by nearly perpendicular shocks. This will be discussed in detail in this talk. The results from new simulations of test-particles encountering shocks moving through a medium containing large-scale (much larger than the particle gyroradii) magnetic field turbulence will be presented. Also, there have been new interpretations of observations of the charge state of SEPs and its dependence on energy that point to the importance of acceleration by nearly perpendicular shocks. These will also be discussed.

**<http://space.umd.edu/seminars>**

Sponsored by: Department of Physics and the Institute for Physical Science and Technology, University of Maryland. For information call Matthew Hill at (301) 405-6237 or go to the website given above. (A PDF file of this announcement is available for download and posting it at your institution is encouraged and appreciated.)

For free parking please park in lot DD or anywhere on levels 1-2 in lot B (the big parking garage) after 4:00 pm. Make sure that you park in a spot WITHOUT a parking meter. More parking information is at the website.