SPACE AND COSMIC RAY PHYSICS SEMINAR

University of Maryland
Computer & Space Sciences Building, Rm 2400
4:30 PM Monday, May 3, 2004
Tea & cookies 4:00-4:30 PM

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Transport and Acceleration of Solar Energetic Particles

Intriguing and wide ranging intensity measurements of multi-species solar energetic particles (SEPs) have been made by a new generation of particle detectors on the Wind, ACE, and SoHo spacecraft. These observations open new windows into and challenge our understanding of the physics of SEP origin, acceleration and transport. I will discuss how far resonant wave-particle interaction, which comprises particle scattering and wave amplification, allows us to understand many observed features of gradual SEP events. I will describe the key role of wave amplification by streaming energetic protons and by shock transmission in SEP acceleration and transport. I will discuss the implications of the spatial variation of the interplanetary wave intensity spectrum, the resonant wavelength, and the Alfvén speed, and why it is difficult to observe direct evidence for wave amplification at 1 AU. A number of observational features continue to pose challenges, e.g., species dependence in the energy spectra and event-to-event variation of the spectral-knee energy. Current ideas include the re-acceleration of flare suprathermal remnants and shock geometry. To quantify these and other hypotheses, theory must treat time-dependent shock acceleration taking account of wave excitation and shock propagation through the inhomogeneous solar wind with rapidly changing shock and plasma parameters.

Sponsored by: Department of Physics, University of Maryland, and the Institute for Physical Science and Technology, University of Maryland. For information call Matthew Hill at (301) 405-6209 or go to the following website: http://space.umd.edu/seminars/Spring_2004_Seminar.html (A PDF file of this abstract is available for download at this URL.)

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