SPACE AND COSMIC RAY PHYSICS SEMINAR

University of Maryland
Computer & Space Sciences Building, Rm 2400
4:30 PM Monday, November 3, 2003
Tea & cookies 4:00-4:30 PM

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The Source and Fate of Solar Wind: New Theories that Explain Recent Riddles

Recent theoretical progress has revealed how the Sun and heliosphere may be dynamically coupled. Two elements of this coupling are discussed here. First, the source of solar wind appears to be intrinsically tied to the properties of source loops that act as a conduit for solar wind. A scaling law for the solar wind shows that hotter loops yield slower wind since they radiate more energy. In fact, the relationship between source temperature and final solar wind speed is recorded in the solar wind's charge-state composition. Thus, the solar wind scaling law provides an important link between coronal properties and observed solar wind. The scaling law also naturally explains the well-known and remarkably robust anti-correlation between final solar wind speed and freezing-in temperature determined from solar wind charge-states. The second topic discussed here is how the open magnetic fields of the Sun appear to be in a state of continuous re-organization, which has large and important effects for the structure of the heliosphere's magnetic fields. In particular, we find regions in the outer heliosphere where shearing by the solar wind creates severely distorted field lines that allow preferential injection of pickup ions into acceleration at the termination shock. These so-called heliospheric "FALTS" (Favored Acceleration Locations at the Termination Shock) may have important implications for recent Voyager observations showing an apparent crossing of the termination shock.

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/Fall_2003_Seminar.html
(A PDF file of this abstract is available for download at this URL.)

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