

SPACE AND COSMIC RAY PHYSICS SEMINAR

*University of Maryland
Computer & Space Sciences Building, Room 2400
4:30 PM Monday, March 28, 2005
Coffee, Tea & cookies 4:00-4:30 PM*

Harald Kucharek

Space Science Center, University of New Hampshire, Durham

Energetic Pickup Ions at Interplanetary Discontinuities

A systematic survey of the energetic population (0.25 – 0.8 MeV/n) of helium with ACE SEPICA during the years 1998 – 2000 revealed that, after H^+ and He^{2+} , He^+ constitutes the third most abundant ion in the inner heliosphere in this energy range. The strongest enhancements are found at CIRs, TIRs, and interplanetary traveling shocks which are known to be the major accelerators. Interstellar pickup ions have been identified to be major source of the energetic He^+ that are preferentially accelerated at CIR's, TIR's, and interplanetary traveling shocks. Additional discontinuities and magnetic field signatures, such as current sheet crossings, flows, and enhanced magnetic turbulence, have been identified which are also associated with major enhancement in energetic He^+/He^{2+} ratio. We found, for instance, that during heliospheric current sheet crossings large and prolonged enhancements of the energetic helium ratio are observed. Since, compared to solar wind ions pickup ions are already suprathermal, any accelerator can produce an enhancement in the energetic He^+/He^{2+} ratio. Therefore, and because He^+ and He^{2+} differ only in their charge state, this pair constitutes an excellent tool to investigate charge state-dependent injection and acceleration.

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

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