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Current Issues in the Acceleration and Transport of Solar Energetic Particles

Monday 24 April 2017 09:30 (30 minutes)

This presentation addresses the theory of shock acceleration as applied to gradual events (the large temporally-extended high-energy events responsible for inclement weather in space), including the basic elements of first-order Fermi and shock drift acceleration at CME-driven shocks, wave excitation (which enhances the efficiency of shock acceleration), the effect of shock obliquity, the nature of injection, and the escape of particles upstream of the shock. The spatial morphology and energy spectra of the events also depend crucially on their transport in the solar wind. Specific topics will be emphasized including the ubiquitous double-power-law fluence spectra, characteristic power-law spectral indices, wave excitation by SEPs throughout the solar wind, the high-energy rollover due to escape of accelerating particles from the ion foreshock, and the spatial distribution of the SEPs throughout the heliosphere with a "reservoir"in the inner heliosphere. Reference to the "pump mechanism"(Fisk and Gloeckler, 2014) as an alternative acceleration mechanism for these events will also be made.

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