

Title: *Source of Solar Energetic Particles*

Cluster: *Cross-Theme Theory and Data Analysis/SECTP*

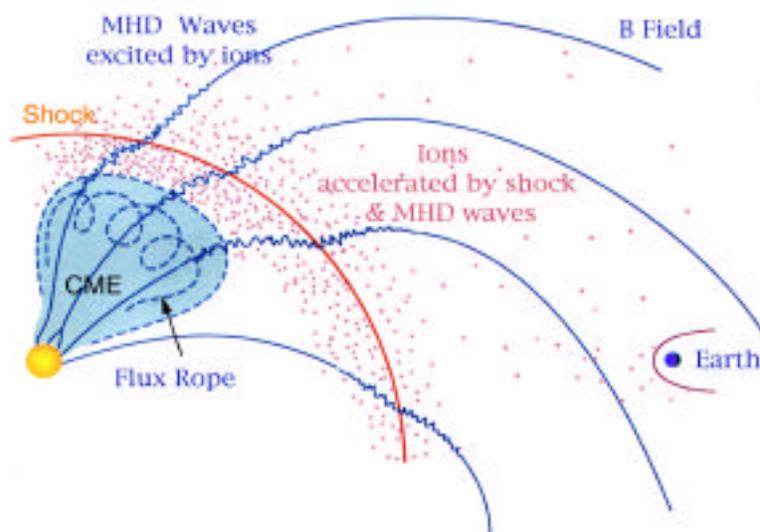
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• **New theory for solar energetic particles – a near Earth signature of remote CME's.**

A new analytic theory for gradual solar energetic particle (SEP) events has been developed by the UNH group which self-consistently incorporates the physics of the acceleration and transport processes. Such a self-consistent treatment has never been available before. In the theory, a Coronal Mass Ejection (CME) drives a shock and the ions accelerated by the process of diffusive shock acceleration drive hydromagnetic waves. The excited waves, which greatly enhance ion acceleration, are transmitted through the shock and trap accelerated ions downstream. At the outer extent of the excited-wave region some ions escape and propagate to Earth's orbit.

This is a potentially valuable result for prediction of space weather activity. It is anticipated that further more detailed model investigation of the process will eventually allow observations of precursor energetic particles to be used to determine the strength of a geoeffective shock and CME long before they reach the Earth.

Energetic Particles near Earth owe their origin to a faraway CME.



Reference: "The predicted intensities of solar energetic ions accelerated by an evolving CME-driven shock", M. A. Lee, AGU 2001 Spring Meeting, abstract in EOS Supplement, Vol. 82, # 20, p. S334, 2001.