

Tasks: Pasadena, 9/18/08

Exponential Rollovers

- Origin of double power laws? Need analysis and simulation.
- Correlating E and Q/A dependence; explore different dependencies on E .
- Careful calculation of ζ and resulting E dependence.
- Explore correlation of β and Q/A dependence in rollover.

ESP Events

- Interpretation of peak not being at shock
- What is the acceleration and transport history of ~ 10 MeV/nuc ions at ACE; do local shock conditions matter?
- Good studies using Ian's dataset?
- Infer injection rates from low-energy intensities at shock in ESP events.
- Determine downstream wave frame using ion isotropy.

Streaming Limit

- Why is the streaming limit robust?
(injection and lead time independence)
- What is the anisotropy at the streaming limit? (Ian's IMP8 data; preliminary result is that anisotropy is large)
- How interpret event distribution in Reames and Ng (1998) below and at the streaming limit?

Remnant Suprathermals

- Origin of remnant suprathermals?
- Assessment of Fisk's mechanism
- Long-time behavior of ions in the inner heliosphere?
- How do ions disengage downstream turbulence? Additional loss mechanism? Invariant Spectra?
- Expected stationary ion distribution from extrapolated impulsive flare and type III burst distributions to small magnitudes

Shock Formation at Sun

- Physics of twisted fieldlines?
- Sheath should be characterized by “shocked” density.
- In Ilya’s model can compression ratio be determined accurately?
- What is the time of shock formation relevant for ion acceleration?

211 - Event SEP Survey

- Is reacceleration of the “flare” ions in the same event significant?
- Is acceleration of remnant suprathermal ions significant?
- Would inclusion of ^3He be useful as a sensitive indicator of “flare” material?

Transport Effects

- Ordering by $K \propto v(vA/Q)^\gamma$, or v earlier in the event, is an excellent discriminator of “flare”/shock material.
- Would “flare” ions give mismatch early in event?
- Would remnant acceleration give mismatch later in event at high energies?

- Is the non-ordering with v early in some events a sign of earlier diffusion in the “flare” or shock near the Sun?
- What is the signature of $K_{\text{Sun}} \neq K_{\text{interplanetary}} \neq K_{\text{shock}}$?
- Can Gang’s and Olga’s codes investigate these orderings?
- Are there more general methods to determine the source distribution that account for diffusion, shock interaction and escape?

CME and SEP Total Energies

- Can we infer a SW injection rate?
- Physics of CME-parameter correlations with SEP energies
- Ready for a strategic capability?

Ion Injection

- Infer injection rates from low energy ESP intensities at the shock.

Upstream Wave Intensity

- Complete iterative solution and compare with analytical approximation.
- Calculate associated quantities such as upstream gradients, escaping ion intensities, etc.

Projects

- Dick, Marty, Gang, Christina: Exponential/double-power-law Rollovers
- Ian, Marty: streaming limit
- Gang, Glenn et al.: Transport in flare/shock event
- Hilary et al.: 211-list
- Dick, Angelos: CME energy versus SEP fluence and energy

- Marty: Wave calculation and associated quantities
- Dick: SEP fluences versus suprathermal background levels
- Marty: Fisk mechanism