Planned Sessions for 2004 SHINE Working Group I – Solar Sources

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The Solar Sources working group will be concentrating primarily in two areas. We will cover the low coronal signatures of CMEs in two half day sessions and vector field measurements in one half day session. We will also focus on the coronal energetics of the SHINE campaign events during a half day session. The campaign events session will also include the 2003 Oct/Nov events.

Low coronal signatures of CMEs

1. CME energetics. One of the key issues that we want to discuss is the total energy release in CMEs. What is the CME energy budget? What do the observations tell us about the partition of this energy budget into various forms (heating of plasma, acceleration of energetic particles, kinetic and gravitational energies of the CME)? What are the relationships between these forms of energy (is a fast CME always accompanied by significant heating of plasma in the low corona and acceleration of large numbers of particles)? When a massive prominence erupts, how much of the prominence mass is expelled with the CME? This topic should provide ample opportunity to include new data from RHESSI, as well as data from other sources such as SOHO, TRACE, and groundbased facilities, and should offer the possibility for comparison of models with the data.
2. Dimmings and related EUV/X-ray signatures at the onset of CMEs. How do the observations of dimming relate to the magnetic geometry (e.g. do we see dimming regions at the base of an erupting flux rope)? What predictions can the various CME models make about dimmings, and how do these relate to the observations? When do dimming regions occur during the sequence of events (before or after the onset of the flare or CME)? How much of the mass loss in a CME can be accounted for by dimming (does all of the mass in a CME originate in the low corona, or does a significant fraction of the mass get swept up as the CME propagates outward)? Why do we not see dimming with every CME?

Understanding the corona from vector field measurements.

1. Chromospheric vector magnetic fields. Coronal field models usually are constructed from photospheric vector magnetograms. However, the field in the photosphere is not, in general, force-free. How are the coronal field models impacted by the forced lower boundary condition? How different are extrapolations based on chromospheric data from those base on photospheric data?
2. Energetics of the Corona. How much energy is stored in the magnetic field? What is the energy budget of a CME? How does the energy in the CME and flare compare to the energy contained in the magnetic field?
3. Direct measurements of the coronal magnetic field. What coronal fields and structures are implied by direct measurements of the coronal magnetic field?