SHINE WG1

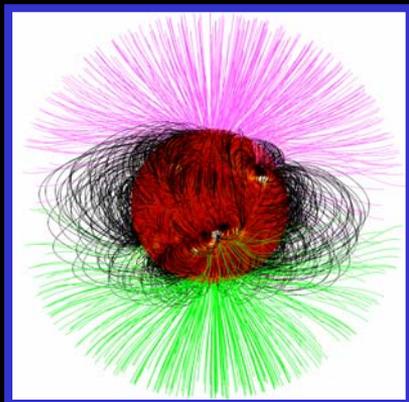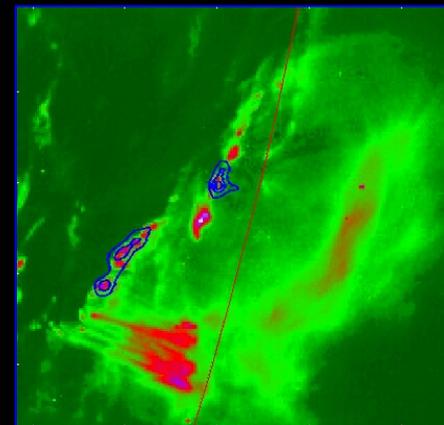**Vector B & surface v**

The CME Initiation Working Group will be participating in four topical areas emphasizing different aspects of the CME Initiation problem:

Campaign Events: This is a plenary session involving all three working groups. A number of CME events have been selected for particular attention to better foster the collaboration between modeling and observation. Preliminary details can be found at http://cdaw.gsfc.nasa.gov/CME_list/SHINE2003/.


PLENARY: **Dave Webb**

Modeling the evolution of photospheric and coronal magnetic fields: This joint session between working groups 1 and 2 follows on from the dynamic discussions on flux transport models and polar field reversal at last years meeting. Can we utilize the models of the evolutionary behavior of the surface magnetic fields to predict solar wind variability? How good are potential field models for large-scale field connectivity and interplanetary connections?

JOINT WG1/2: **Nick Arge**

SHINE WG1

Vector B & surface v

The CME Initiation Working Group will be participating in four topical areas emphasizing different aspects of the CME Initiation problem:
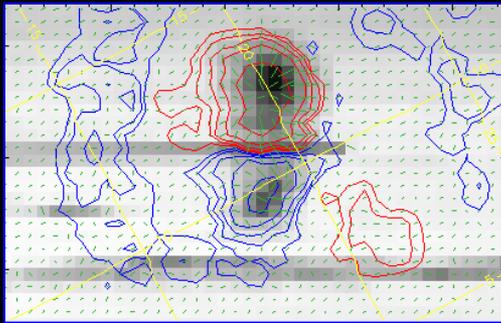
Vector field and photospheric flows: What aspects of the photospheric and coronal evolution are necessary and/or sufficient for an eruption to occur? Is magnetic complexity crucial to CME production? What photospheric motions, or emergence/submergence of flux are required for a CME to be initiated? To address these important CME initiation issues, we will concentrate on the role played by the vector magnetic field and the surface velocity fields in the build-up to a CME.

The role of energetic particles: This topic will be hosted jointly by working groups 1 and 3. This joint topic will focus on the acceleration and transport of energetic particles and what we can learn about the relationship between SEP events, CMEs and flares. What, if any, is the relationship between the particles produced close to the Sun and those seen in interplanetary space? How does the field topology in the corona influence the variability observed in SEP events? Can flare-accelerated particles provide a seed population for further acceleration at a CME–driven shock front? Can we determine where shocks become established in the solar corona and how they evolve as they move outward through the corona?
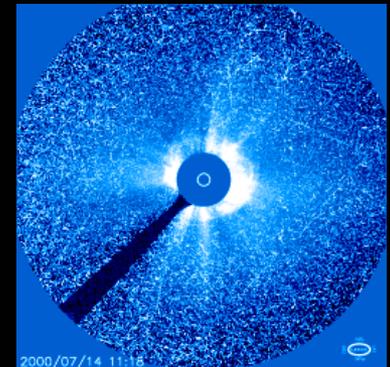
JOINT WG1/3: **Christina Cohen**

SHINE WG1
Vector B & surface v
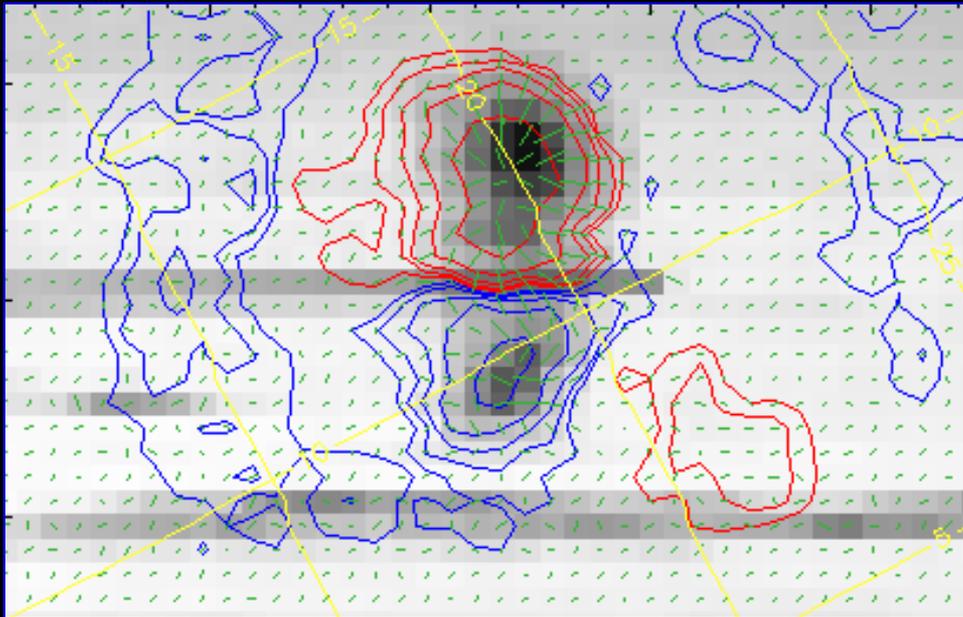
Vector field and photospheric flows:

What aspects of the photospheric and coronal evolution are necessary and/or sufficient for an eruption to occur?

Is magnetic complexity crucial to CME production?

What photospheric motions, or emergence/submergence of flux are required for a CME to be initiated?

What are the relative roles of shearing motions and flux emergence/cancellation in the CME initiation process?

SHINE WG1
Vector B & surface v

Vector field and photospheric flows

Plenary: Bruce Lites – Solar Magnetic field and flows

Session 1: **Basics**

Tom Metcalf — General Issues of vector B determination
Rich Nightingale — General Issues of photospheric flow measurements
Jeff Kuhn — Direct Measurements of coronal B-field

Session 2: **Application**

KD Leka — Use of Vector B in CME Initiation
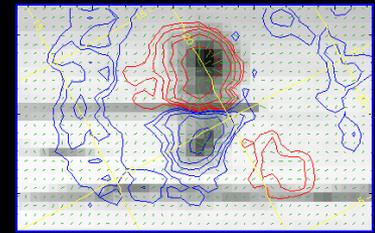Brian Welsch — Application of vector B and surface flows to CME Initiation
Zoran Mikic — Using Vector B-grams in quantitative calculations

SHINE WG1
Vector B & surface v

- **Comparison of flow fields derived from WL and B-field**
  - **Are the flow patterns derived the same?**

- **Chromospheric field measurements provide a 'cleaner' boundary condition for coronal field**

- **Magnetic free energy can be derived from vector field Virial Theorem**

- **How do we relate photospheric field to chromospheric field? - waves?**

- **What is the best combination of field measurements that give us a handle on CME Initiation?**
  - **How do we determine this?   How should models use this information?**
  - **Can we do a statistical study on models AND data to determine key parameters?**

- **How do we determine magnetic topology signatures in a CME?**
  - **forward modeling is only way to fully address this**

- **Combination of multiple techniques in B-field determination can help determine topology**
  - **polarization of IR lines, radio observations, Hanle effect (where available), …**

- **Need to consider non-event control group**

CHALLENGE

Provide simulated magnetogram and flow field (Bill Abbett, SSL) as input to the various techniques used to recover velocity and field information, LCT, multiscale regularization, extrapolations, MHD modeling etc.

Craig DeForest volunteered to run a 'hare and hounds' exercise with MHD models to compare results from different events.

Remember the control group suggestion!