

WORKING GROUP TOPICS

Working Group 1: Coronal Mass Ejections

David Alexander and Todd Hoeksema, Working Group Leaders

Topic: CME Initiation

Working Group 1 will focus on the integration of modeling and observational efforts in the search to understand the cause and early evolution of CMEs. The aim will be to identify the key observational and physical parameters that lead to and result from a CME. To this end we invite discussion on this issue with particular emphasis on the following topics:

CME Acceleration: What determines the spatial and temporal form of the acceleration profile? Where does the main acceleration occur? Are there multiple phases of acceleration? What distinguishing physics determines this parameter in the different models?

The Pre-Event Solar Atmosphere: 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? Are there “typical” pre-eruption signatures in the field or field dynamics?

Events: Can we find a small number of events that theorists, modelers, and observers can agree to study to either support or rule out specific mechanisms?

To help us guide the discussion, please see the questionnaires at <http://www.lmsal.com/~alexande/SHINE/>

Working Group 2: Interplanetary Connections

Tom Holzer and Nick Arge, Working Group Leaders

Topic: Simple and Complex Ejecta

Working Group 2 will focus on comparing and contrasting the nature and properties of two types of CME ejecta: simple and complex. A single half-day session will be devoted to this topic. The session will begin with a general overview of the boundaries and properties of CME ejecta using solar wind data and then focus on (at least) one clear example of each type. Interactions of CMEs with the steady background solar wind and with themselves will be presented, and the compositional properties of complex and simple ejecta will be addressed. We invite discussion on the following questions:

- How well can numerical simulations reproduce CME ejecta observed in the solar wind?
- Can simple and complex ejecta be distinguished based on their composition and ionization states?

Working Groups 1 and 2: Joint Session

Todd Hoeksema, Tom Holzer, and Nick Arge, Working Group Leaders

Topic: Solar Mechanisms of the Heliospheric Field Reversal

How does the polar field of the Sun and heliosphere reverse?

The Joint Session of Working Groups 1 and 2 will focus on the interactions of photospheric and coronal magnetic fields organized on large and small scales in two half-day sessions and on the implications for the heliosphere for another half day. Each session will feature just one or two invited talks and ample time for informal presentations and discussion.

Our goal is to identify what observational constraints exist and how they inform our modeling efforts.

What can we learn from

- the solar dynamo and variations of flow patterns?
- interpretation of flux emergence, distribution, and annihilation?

- the interplay of short-lived small-scale features, the global field configuration in the photosphere and corona, coronal holes, and CME's?
- solar cycle variations of asymmetry, helicity, and total flux?
- how flux escapes into the heliosphere?
- the identifying signatures of its origin that the solar wind carries?
- how the polar field change propagates outward?
- how we can observe its effects out to the bounds of the heliosphere?

We welcome your suggestions on how to refine these questions.

Working Group 3: Solar Energetic Particles

Mark Popecki and Christina Cohen, Working Group Leaders

Topic: Do characteristics of large SEP events depend on the phase of the solar cycle?

Observations made during Cycle 23 hint at qualitative differences in the composition, frequency and size of solar energetic particle events during the rising and declining phases of the cycle. The rising phase exhibited many moderate-sized events with strong fractionation apparent in elemental and isotopic composition, while the decline phase has produced more frequent and larger events with little fractionation. These findings raise the following questions for Working Group 3:

- Does the suggested cycle dependence hold up under closer scrutiny?
- Is there evidence of such a dependence in other solar observations, e.g., solar wind, CMEs, flares, radio emission?
- Is this peculiar to Cycle 23 or do other cycles exhibit similar behavior?

Sessions will begin with two 20 minute invited talks, followed by open discussion. Participants are encouraged to bring and briefly present pertinent data.

Working Groups 2 and 3: Joint Session

Nat Gopalswamy and Mark Popecki, Working Group Leaders

Topic: Are there energetic particle signatures of interacting CMEs?

Recent observations indicate that some CME-driven shocks may propagate through preceding CMEs close to the Sun. This may create a complex environment that could strongly modulate particle acceleration and CME structure. We invite discussion on the following questions:

- Are there prompt energetic particle signatures of colliding CMEs at Earth?
- Is there spectral or compositional evidence for SEP production in colliding CMEs?
- What plasma and compositional signatures are observable at Earth during the passage of complex CMEs created by collision near the Sun?