

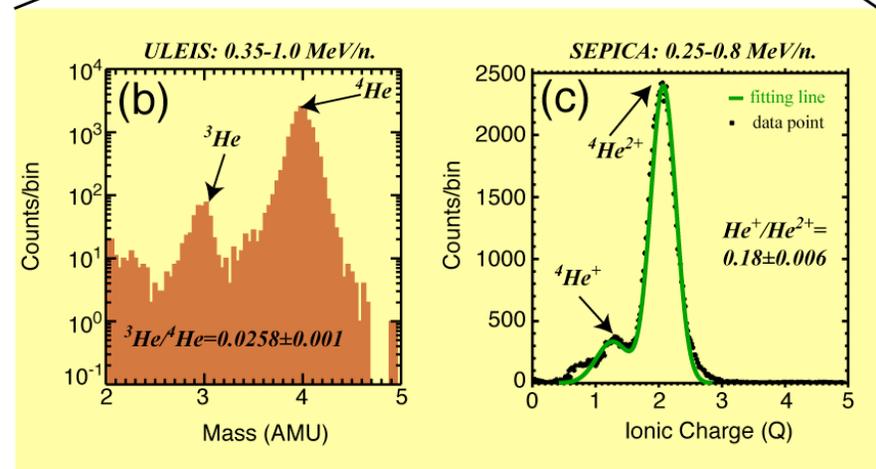
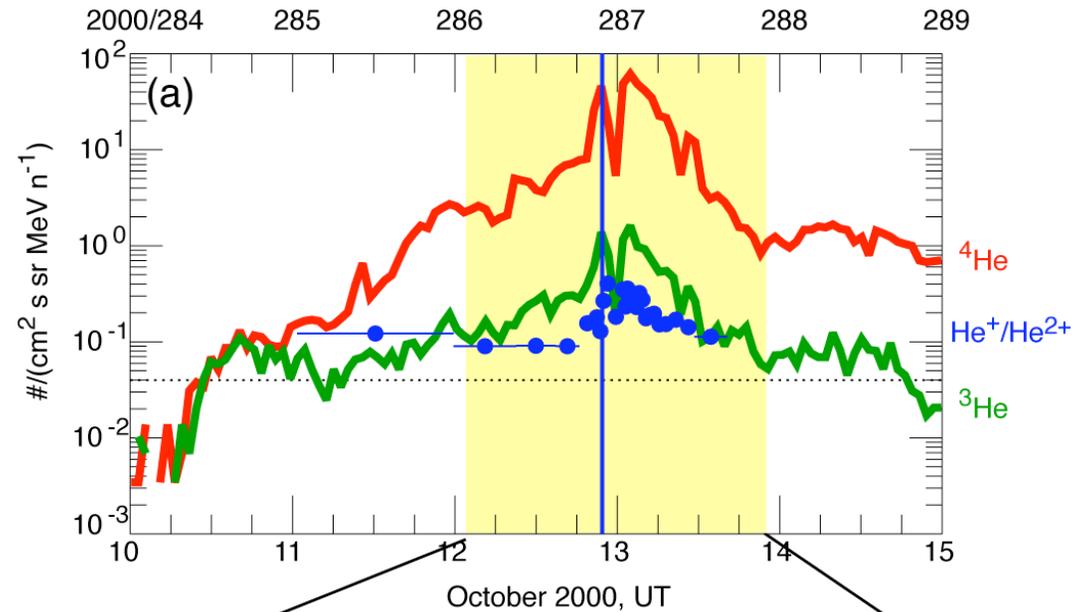
# WG3 Session#1 Sources of Suprathermal Ions in the Solar Corona and the Interplanetary Medium

Monday PM:

The acceleration of rare tracer ion species like  ${}^3\text{He}^{2+}$  and  ${}^4\text{He}^+$  at CME-driven interplanetary shocks at ACE provides clear evidence that the seed population originates from the ubiquitous suprathermal tail rather than the more abundant solar wind peak.

This session brings together data sets from ACE, Wind, Ulysses, SoHO, and Cassini to characterize key properties of the suprathermal tail and unravel some of its mysteries.

Critical for understanding particle acceleration at CME-related ESP and SEP events



**WG3 Session#1    Sources of Suprathermal Ions in the Solar Corona  
Monday PM:            and the Interplanetary Medium**

- **What are the main sources of ions in the suprathermal tail?**
- **How do the relative contributions of these sources vary in time and space?**
- **What causes these variations?**
- **How do these variations affect CME-related ESP and SEP events?**
- **What measurements and theoretical studies are needed to make further progress?**

Invited Speakers:

- **Matthew Hill**, *University of Maryland*
- **George Ho**, *Johns Hopkins University/Applied Physics Laboratory*
- **Thomas Zurbuchen**, *University of Michigan*
- **Nathan Schwadron**, *Southwest Research Institute*
- **Lennard Fisk**, *University of Michigan*

**WG3 Session#2**  
Wednesday AM:

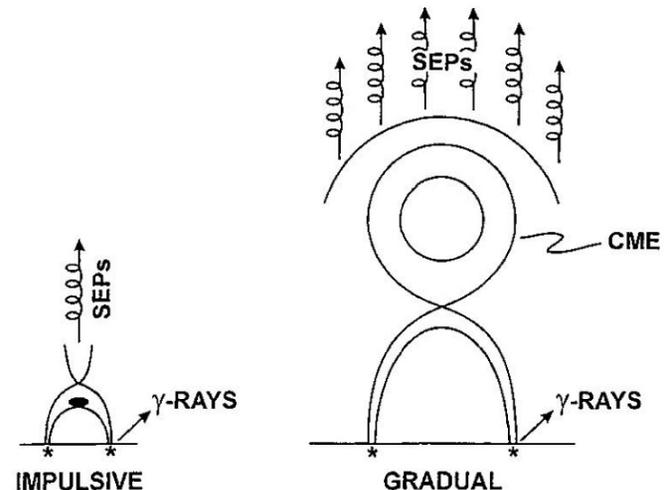
**Mechanisms of Particle Acceleration Near the Sun**

This session focuses on general acceleration mechanisms near the Sun and in the inner heliosphere.

**Because of a lack of *in situ* measurements near the Sun, no single acceleration mechanism has emerged as being dominant.**

TABLE 1. PROPERTIES OF IMPULSIVE AND GRADUAL EVENTS (45)

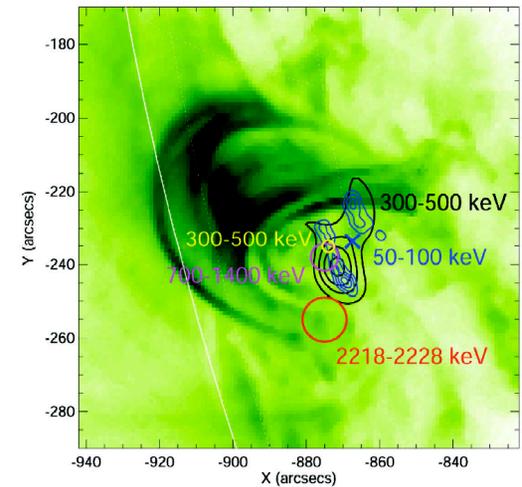
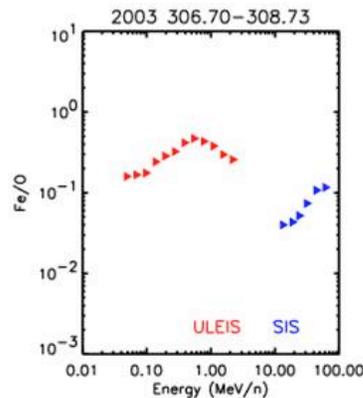
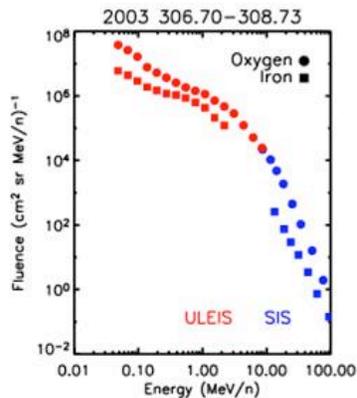
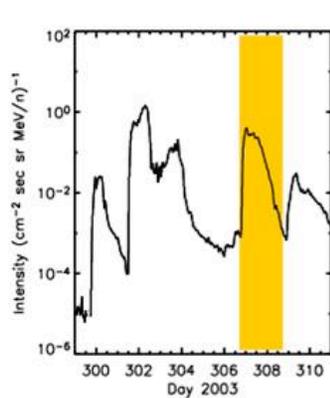
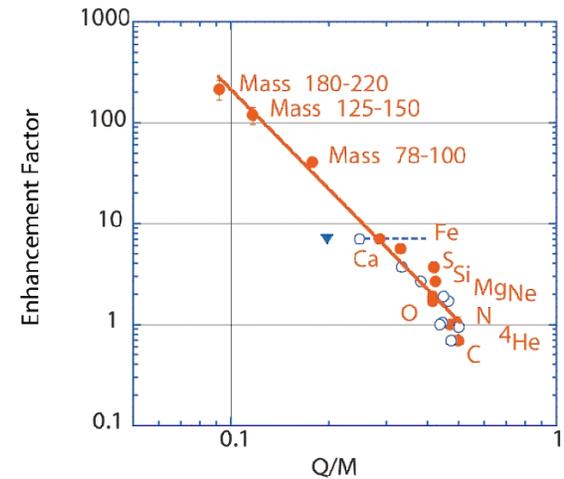
|                                  | IMPULSIVE     | GRADUAL     |
|----------------------------------|---------------|-------------|
| PARTICLES:                       | ELECTRON-RICH | PROTON-RICH |
| <sup>3</sup> He/ <sup>4</sup> He | ~1            | ~0.0005     |
| Fe/O                             | ~1            | ~0.1        |
| H/He                             | ~10           | ~100        |
| Q <sub>Fe</sub>                  | ~20           | ~14         |
| DURATION                         | HOURS         | DAYS        |
| LONGITUDE CONE                   | <30°          | ~180°       |
| RADIO TYPE                       | III, V(II)    | II, IV      |
| X-RAYS                           | IMPULSIVE     | GRADUAL     |
| CORONAGRAPH                      | ---           | CME         |
| SOLAR WIND                       | ---           | IP SHOCK    |
| EVENTS/YEAR                      | ~1000         | ~10         |



**WG3 Session#2**  
***Wednesday AM:***

**Mechanisms of Particle Acceleration Near the Sun**

As new and more sensitive remote and in situ observations become available, there is an opportunity to closer scrutinize the current acceleration mechanisms.



**WG3 Session#2**  
**Wednesday AM:**

**Mechanisms of Particle Acceleration Near the Sun**

- **For any given mechanism, what is responsible for the power law? Is the controlling parameter(s) expected to have a large variability.**
  - **Power-law spectra are a common characteristic of SEPs and the index does not vary by much.**
- **What causes double-power laws and sharp spectral breaks?**
- **Can we understand the abundance variations of ultra-heavy ions? Can the mechanisms accelerate both electrons and ions?**
- **What new observational information is needed to help address some of these questions?**

Invited Speakers:

- **Bob Lin**, *UC Berkeley* – **Plenary Talk**
- **Jim Miller**, *University of Alabama, Huntsville*
- **Yuri Litvinenko**, *University of New Hampshire*
- **Randy Jokipii**, *University of Arizona*
- **Chee Ng**, *NASA, Goddard*
- **Vahe Petrosian**, *Stanford University*

## WG3 Session#3

Thursday PM:

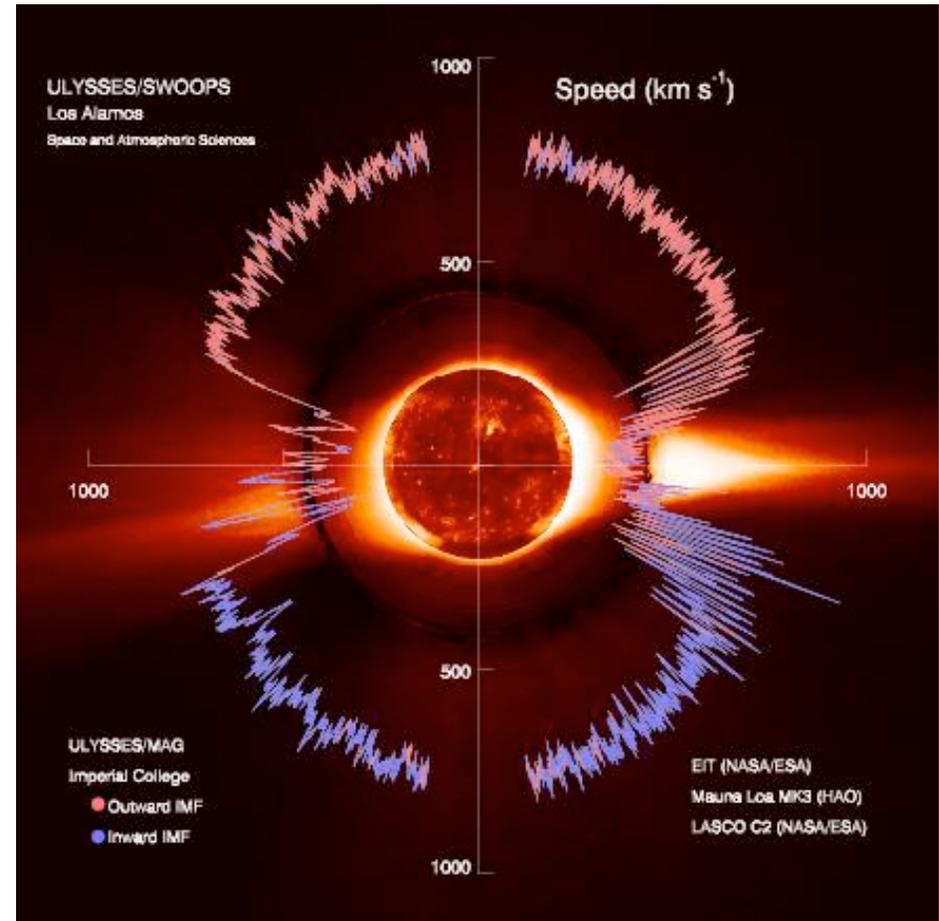
## The Effects of the Sun in the Outer Heliosphere

The main goal of this session is to investigate and characterize the global effects of the Sun as seen in the outer heliosphere.

The largest solar energetic particle events of cycle 23 e.g., the Halloween events of 2003, have been observed in the outer heliosphere at *Voyager*.

In addition, recurrent ~26-day structures have also been observed as far away as *Voyager 1* at nearly 100 AU from the Sun.

Discussion will focus on observations at *Ulysses*, *Voyager*, and *Pioneer*, and on current modeling of these events.



## **WG3 Session#3**

**Thursday PM:**

## **The Effects of the Sun in the Outer Heliosphere**

- **What are the observations of solar activity in the outer heliosphere? How does the Sun influence the location of heliospheric boundaries? How does it effect the transport of energetic particles?**
- **What are the consequences of solar magnetic-field models on the nature of the heliospheric magnetic field?**
- **What are causes and implications of recurrent particle fluxes in the outer heliosphere?**
- **How do SEPs contribute to particle populations in the outer heliosphere?**

### **Invited Speakers:**

- **John Richardson, *MIT***
- **Devrie Intrilligator, *Carmel Research Center***
- **Trevor Sanderson, *ESA***
- **Nathan Schwadron, *Southwest Research Institute***