

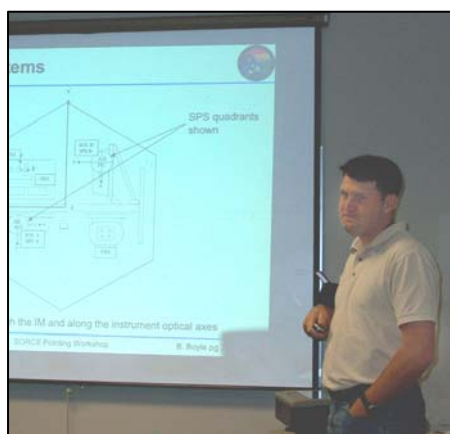


## *SORCE Team Holds Field-of-View / Pointing Workshop*

The SORCE team met on October 27 for a special half-day workshop to address instrument field-of-view (FOV) and pointing issues and discuss the analysis of the FOV maps.

One of the important corrections needed for the SORCE instruments' high radiometric accuracy is a FOV correction. This correction accounts for how the instruments sensitivity changes as a function pointing angle. Inhomogeneities in the optical materials and detectors give rise to small, but important, changes in the instruments' response as a function of view angle. This problem is further complicated by the fact that optical degradation occurs in all space-borne instrumentation.

The SORCE spacecraft performs a FOV mapping experiment every 6-months to account for this phenomena and this FOV maneuver provides data to make the correction. To a large extent, the need for this correction is negated by the high accuracy of the SORCE spacecraft's pointing system, but as the spacecraft and instruments age, this correction will become increasingly important.



Brian Boyle, SORCE Systems Engineer, kicked-off the FOV Workshop with a spacecraft pointing overview.

Brian Boyle started the meeting with a spacecraft pointing overview, which was followed by the instrument scientists each discussing the individual instrument FOV map results. The interpretation and utility of the FOV maps is very different for each instrument; for the TIM instrument, the variability of the instrument response with pointing angle is so small it cannot be accurately measured because the 5-minute oscillation on the Sun masks the signal, but for the SOLSTICE,

SIM, and XPS instruments responsivity changes of a few percent are seen over the 20-arc min range of the FOV map. This workshop crystallized a number of important issues in developing and interpreting the FOV corrections that are used in SORCE data processing.



Greg Kopp comments on Marty Snow's SOLSTICE FOV maps presentation. Also shown are Brian Boyle and Chris Pankratz.

There were five action items resulting from this productive workshop:

1. To establish what is the best flag to use in data analysis and data processing for determining when there is valid data for a FOV map point.
2. To develop code to get target angles from different sources (FSS, S/C attitude, SOLSTICE SPS), and to determine reference frame for all of these different sources.
3. To determine what are the long-term trends of FSS angles
4. To establish the best technique to smooth over wavelength for SOLSTICE and SIM FOV maps.
5. To research whether several FOV map points might be missing in XPS maps.

### *Gary Rottman's Retirement Party Photos*

Photos from Gary's retirement gathering at the Hotel Boulderado on September 29 are available on the LASP website at:

[http://lasp.colorado.edu/rottman\\_retirement/](http://lasp.colorado.edu/rottman_retirement/)

After 2 months from LASP, Gary tells us that retirement is going "very well".



To compliment a great breakfast, Marty Snow treated everyone with home-made latte coffee drinks.

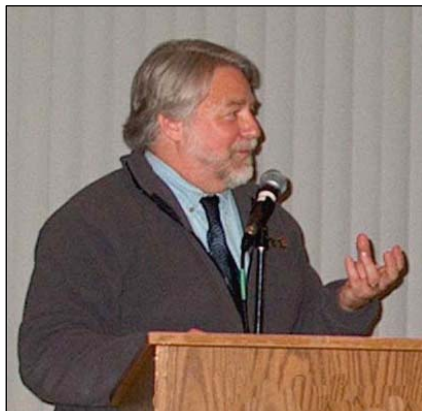
Besides focusing on FOV issues, the workshop was accompanied by a great pot luck breakfast. The next *SORCE* team workshop is scheduled for late December and it will focus on instrument degradation. Discussion will focus on the magnitude and mechanisms of instrument response degradation and effectiveness of the in-flight corrections.

## ***SORCE Recognized in the NASA Climate and Radiation Branch's "Image of the Day" Gallery***

Bob Cahalan, NASA's *SORCE* Project Scientist and a member of the NASA Climate and Radiation Branch, recently posted an image on that group's "Image of the Day Gallery" featuring some work from the *SORCE* SIM instrument. The NASA Climate and Radiation Branch investigates atmospheric radiation, both as a driver for climate change and as a tool for the remote sensing of Earth's atmosphere and surface. Their research program seeks to better understand how our planet reached its present state and how it may respond to future drivers, both natural and anthropogenic. This image and a discussion of the science can be found at:

<http://climate.gsfc.nasa.gov/viewImage.php?id=158>.

The article discusses that the Sun behaves differently at ultraviolet, visible, and near-infrared wavelengths, and that this is important for determining the



Robert Cahalan is the NASA *SORCE* Project Scientist.

Earth's climate response, since the various wavelengths are forcing different components of the Earth system.

## ***Jerry Harder Takes On Role of LASP *SORCE* Program Scientist***

With Gary Rottman's retirement, Tom Woods became the *SORCE* Principal Investigator. And with Tom's many new responsibilities he has recently passed on the *SORCE* Program Scientist role to Jerry Harder, who is the SIM instrument scientist. As Program Scientist, Jerry is responsible for overseeing the integrity of the science data.



Jerry Harder, *SORCE*'s new Project Scientist at LASP.

**151,804**

**Hits to the *SORCE* Website**

*(Since 4/21/03, As of 11/11/05)*

## ***Solar Physics "SORCE Issue" Will Soon Be Available***

The special issue of *Solar Physics* featuring 18 *SORCE* papers will be hitting the news stands soon. The issue will be August 2005, volume 230, issue 1, and we are hoping to see it out in December. Included in this publication will be:

- Anderson, Donald E. and Robert F. Cahalan, "The Solar Radiation and Climate Experiment (*SORCE*) Mission for the NASA Earth Observing System (EOS)", *Solar Physics*, **203**, 1, 3-6, 2005.
- Harder, Jerald, George Lawrence, Juan Fontenla, Gary Rottman, and Thomas Woods, "The Spectral Irradiance Monitor: Scientific Requirements, Instrument Design, and Operation Modes", *Solar Physics*, **203**, 1, 141-167, 2005.
- Harder, Jerald W., Juan Fontenla, George Lawrence, Thomas Woods, and Gary Rottman, "The Spectral Irradiance Monitor: Measurement Equations and Calibration", *Solar Physics*, **203**, 1, 169-203, 2005.



## The Solar Radiation and Climate Experiment (SORCE)

### Mission Description and Early Results



- Kopp, Greg and George Lawrence, "The Total Irradiance Monitor (TIM): Instrument Design", *Solar Physics*, **203**, 1, 91-109, 2005.
- Kopp, Greg, Karl Heuerman, and George Lawrence, "The Total Irradiance Monitor (TIM): Instrument Calibration", *Solar Physics*, **203**, 1, 111-127, 2005.
- Kopp, Greg, George Lawrence, and Gary Rottman, "The Total Irradiance Monitor (TIM): Science Results", *Solar Physics*, **203**, 1, 129-140, 2005.
- Lean, Judith, Gary Rottman, Jerald Harder, and Greg Kopp, "SORCE Contributions to New Understanding of Global Change and Solar Variability", *Solar Physics*, **203**, 1, 27-53, 2005.
- McClintock, William E., Gary J. Rottman, and Thomas N. Woods, "Solar Stellar Irradiance Comparison Experiment II (SOLSTICE II): Instrument Concept and Design", *Solar Physics*, **203**, 1, 225-258, 2005.
- McClintock, William E., Martin Snow, and Thomas N. Woods, "Solar Stellar Irradiance Comparison Experiment II (SOLSTICE II): Pre-Launch and On-Orbit Calibrations", *Solar Physics*, **203**, 1, 259-294, 2005.
- Pankratz, Christopher K., Barry G. Knapp, Randy A. Reukauf, Juan Fontenla, Michael A. Dorey, Lillian M. Connelly, and Ann K. Windnagel, "The SORCE Science Data System", *Solar Physics*, **203**, 1, 389-413, 2005.

- Pilewskie, Peter, Gary Rottman, and Erik Richard, "An Overview of the Disposition of Solar Radiation in the Lower Atmosphere: Connections to the SORCE Mission and Climate Change", *Solar Physics*, **203**, 1, 55-69, 2005.
- Rottman, Gary, "The SORCE Mission", *Solar Physics*, **203**, 1, 7-25, 2005.
- Rottman, Gary, Jerald Harder, Juan Fontenla, Thomas Woods, Oran R. White, and George M. Lawrence, "The Spectral Irradiance Monitor (SIM): Early Observations", *Solar Physics*, **203**, 1, 205-224, 2005.
- Snow, Martin, William E. McClintock, Gary Rottman, and Thomas N. Woods, "Solar Stellar Irradiance Comparison Experiment II (SOLSTICE II): Examination of the Solar Stellar Comparison Technique", *Solar Physics*, **203**, 1, 295-324, 2005.
- Snow, Martin, William E. McClintock, Thomas N. Woods, Oran R. White, Jerald W. Harder, and Gary Rottman, "The Mg II Index from SORCE", *Solar Physics*, **203**, 1, 325-344, 2005.
- Sparr, Thomas P., Gary Rottman, Thomas N. Woods, Brian D. Boyle, Richard Kohnert, Sean Ryan, and Randall Davis, "The SORCE Spacecraft and Operations", *Solar Physics*, **203**, 1, 71-89, 2005.
- Woods, Thomas N., Gary Rottman, and Robert Vest, "XUV Photometer System (XPS): Overview and Calibrations", *Solar Physics*, **203**, 1, 345-374, 2005.
- Woods, Thomas N. and Gary Rottman, "XUV Photometer System (XPS): Solar Variations during the SORCE Mission", *Solar Physics*, **203**, 1, 375-387, 2005.

## Additional SORCE Team Publications –

Juan Fontenla of the SORCE SIM team has recently published two papers also. They are "Radiation-Effective Solar Atmosphere Models. I. Quiet and Active-Sun Photosphere", which is in press with the *Astrophysical Journal*, and "Chromospheric Plasma and the Farley-Buneman Instability in Solar Magnetic Regions", which is currently available in *Astronomy & Astrophysics*, volume 442, pages 1099-1103. The A&A abstract is included here.



Juan Fontenla, SIM scientist.

**Abstract.** We study the plasma parameters in recent models of the observed magnetic features in the solar atmosphere and find that electrons are strongly magnetized in the chromosphere but protons are unmagnetized up to the transition region. Considering the magnetization and the classical Pedersen conductivity we find that magnetic diffusion is too small for effectively affecting propagating MHD waves of periods of a few minutes. However, the chromospheric-plasma parameters suggest a scenario in

which upward-propagating fast-mode MHD waves of mHz frequencies would trigger the Farley-Buneman plasma instability at chromospheric layers where horizontal magnetic fields are present. We show that, because of the collisions between charged particles and neutral H atoms, the conditions in the chromosphere meet the instability criteria if the MHD wave velocity amplitude is lower but near the adiabatic sound speed. The instability growth is much faster than the wave frequency and the instability would quickly saturate. The electrostatic plasma waves resulting from the instability are expected to produce anomalous resistivity and wave energy dissipation that would heat the chromosphere as well as absorb the p-modes in magnetic regions.



***Upcoming Meetings / Talks –  
SORCE scientists plan to present papers or attend  
the following 2005-2006 meetings:***

AGU Fall Meeting, Dec. 5-9, San Francisco, California  
Glory Science Team Meeting, Jan TBD,  
Boulder, Colorado  
International Living With a Star Meeting, Feb. 19-24,  
Goa, India  
SCOSTEP STP-11, March 6-10, Rio de Janeiro, Brazil  
Measurement Science Conference, Feb. 28 - March 3,  
Anaheim, California

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