

From the NSO Director's Office

Steve Keil

Congratulations to our colleagues with the Hinode project on the spectacular data being returned from the Hinode satellite, formerly known as Solar-B. Hinode ("Sunrise") is a mission led by the Japanese Aerospace Exploration Agency in collaboration with NASA, the Particle Physics and Astronomy Research Council (United Kingdom), and the European Space Agency. Hinode data will further our understanding of the processes of magneto-convection and its consequences in the solar atmosphere.

The NSO telescope time allocation process is now giving priority to proposals for joint observations with NSO telescopes and Hinode. NSO has already undertaken joint observing runs with the Hinode instruments using the Dunn Solar Telescope (DST) at Sac Peak. The DST can provide high-resolution multi-line spectropolarimetry, imaging polarimetry, multi-line spectroscopy, and simultaneous high-speed imaging at several wavelengths as complements to the superb Hinode imaging and polarimetry. The NSO recently implemented a new queue-observing mode with the Diffraction-Limited Spectropolarimeter (DLSP) at the DST. The queue works by shifting the beam to the DLSP at times when seeing conditions are good during the interval when a Principal Investigator is setting up his or her experiment. If there is sufficient demand, NSO can begin setting aside specific time intervals to run a series of queue observations.

The SOLIS vector spectromagnetograph (VSM) line-of-site magnetograms in the photosphere and chromosphere, 10830 images, and quick-look vector magnetograms have been used and are still available for collaborative Hinode observations, as well as other projects. The Air Force Optical Solar Patrol Network (OSPAN) telescope provides high cadence H-alpha images in the core and red and blue wings. Those images are available at the NSO Web site and are being used for Hinode target selection.

The Global Oscillation Network Group (GONG⁺⁺) has a significant role in magnetogram support for the STEREO mission. GONG⁺⁺ full-disk magnetograms are being collected daily at a one-minute cadence and are being used to extrapolate the coronal magnetic field and predict interplanetary sector boundaries. GONG⁺⁺ far-side imaging is now conducted on a regular basis and can provide early warning of major active regions before they rotate onto the visible solar disk.

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The Advanced Technology Solar Telescope (ATST) project was informed of a decision by the NSF director to complete the environmental impact studies on Maui and to continue moving the project through the MREFC process. The project team continues to work toward a final design and prepare for construction. System-level reviews of major subsystems are being conducted at a rapid pace. A Preliminary Design Review for the M2/M5 optics has been completed, and a review of the wavefront correction package, including the adaptive optics, is scheduled for this summer. Several potential

ATST international partners have submitted letters of intent to the NSF for participation in the project. NSO publishes a quarterly ATST Newsletter, and if you're interested in being on the distribution list, send a request to ddooling@nso.edu. The newsletter is also posted on the ATST Web site (atst.nso.edu/) where updated information on the project is available

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In order to continue providing a suite of observing capabilities that span the entire Sun, NSO is actively seeking funds outside of the NSF for GONG⁺⁺ operations in response to one of the Senior Review recommendations. We are also identifying synergisms between SOLIS and GONG⁺⁺ to streamline operations of the major NSO synoptic programs. In addition, we are exploring options for creating a SOLIS network of vector magnetograph stations. In anticipation of NSO operations in the ATST era, our cooperative agreement proposal will contain a plan for NSO staff consolidation, divestiture of older telescope facilities, establishment of an ATST operations center, and a plan for locating a new NSO headquarters near a university with strong solar research and teaching interests. The latter plan will establish an open process that will allow interested universities the opportunity to express their desire for hosting NSO.

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Over the course of the past year, four NSO tenure-track scientists achieved tenure. K. S. (Bala) Balasubramaniam was awarded tenure last spring. Bala's work on the origins of solar activity, development of methods for analyzing polarized light, and his strong service to the community and NSO were critical factors. Bala has led our student programs, is always willing to help with establishing successful collaborative science programs, and has been a driving force for many of NSO's science workshops.

In the fall of 2006, tenure was awarded to Alexei Pevtsov, whose work on solar helicity as a major component of solar activity has made him a leader in this area of research. As part of his community service, Alex is currently a solar physics discipline scientist at NASA headquarters, and is the program scientist for Hinode and the Solar Dynamics Observatory (SDO).

Matt Penn received tenure in early 2007 based on his pioneering work on the solar corona and infrared observing techniques. He is also a strong participant in NSO educational outreach programs, and serves as the McMath-Pierce Solar Telescope facility scientist.

This spring, Han Uitenbroek received tenure based on his work on understanding the formation of photospheric and chromospheric spectral lines and molecular bands in dynamic motions, magnetic

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From the NSO Director's Office continued

fields, and complex structuring seen in these layers, including the effects of partial redistribution. Han's work is forming the basis for interpreting much of the data now being obtained with sophisticated, diffraction-limited spectropolarimeters. Han also plays an active role in user support and educational outreach.

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Irene González-Hernández is the NSO recipient of the 2007 AURA Science Award, which was presented to her on April 17 at the NSO Workshop at Sac Peak on Subsurface and Atmospheric Influences on Solar Activity. The award is in recognition of Irene's work developing the relationship between active region characteristics and their signature in helioseismic far side images, including her contributions to the implementation of a far-side pipeline, and her contributions to studies of meridional flows below the solar surface.

This year's AURA Team Excellence Award was presented to the GONG++ Implementation Team for their design, development, and deployment of the GONG++ modulator upgrade, and the parallel development and implementation of the magnetogram data pipeline, subsequently achieving a major milestone in providing high-quality magnetograms to the solar physics community. The team effort involved two groups: the instrument group (Dave Dryden, Jack Harvey, Dave Hauth, Ron Kroll, George Luis, Guillermo Montijo, Sang Nguyen, Gary Poczulp, Tim Purdy, Mike Soukup, Ed Stover, and Humberto Villegas), and the software group (John Bolding, Richard Clark, Kerri Donaldson-Hanna, Jack Harvey, Harry Jones, Gordon Petrie, Cliff Toner, and Tom Wentzel). Congratulations to all! 🎉



Irene González-Hernández receives the 2007 AURA Science Award from NSO Director Steve Keil at the NSO workshop at Sac Peak on Subsurface and Atmospheric Influences on Solar Activity.



The GONG++ magnetic field team instrument group with Steve Keil. Left to right: Keil, Dave Hauth, Dave Dryden, Ed Stover, George Luis, Ron Kroll, Sang Nguyen, Tim Purdy, Humberto Villegas. Missing: Jack Harvey, Guillermo Montijo, Gary Poczulp, and Mike Soukup.



The GONG++ magnetic field team software group with Steve Keil. Left to right: Keil, John Bolding, Gordon Petrie, Richard Clark, Kerri Donaldson-Hanna, Cliff Toner, Tom Wentzel. Missing: Jack Harvey and Harry Jones.

ATST Design Refinements and EIS Milestone

The ATST Team

The Advanced Technology Solar Telescope (ATST) project recently reviewed the Nasmyth optical design with the Near-Infrared Spectro-Polarimeter (NIRSP) team at the University of Hawaii Institute for Astronomy. The review led to the realization that the following changes are required to optimize the baseline optical design: reduce the time required to change to and from the coudé configuration; redesign the focal plane to be perpendicular to the gut ray to allow simple de-rotation; redesign the $f/13$ baseline; and adapt the optical design to ensure “high quality” on-disk images.

Initial discussions were aimed at quantifying and prioritizing these new requirements and goals. Optical design options were packaged, based on which goals were best met by each family of designs. Two basic classes of designs were investigated.

The first class of designs used the baseline $f/13$ configuration with a minimum number of optics, all fixed to the optical support structure, ensuring minimum polarization change with tracking. Using this type design, 0.2-arcsecond delivered image quality (DIQ) could not be achieved over the 5-arcminute field of view. Another drawback was that the optical design was not compatible with use of quasi-static alignment correction, making the high DIQ goal problematic even with additional correctors. The second class of designs delivered an $f/54$ beam though the elevation trunnion, then assumed that different optics would be used to accommodate the on-disk and coronal instrumentation. This solution incorporated the quasi-static alignment (QSA) correction capability that would likely be required for the on-disk work, and is flexible in terms of rotation-axis orientation. However, the added number of mirrors required was a concern from both a throughput and polarization perspective. This family of designs led to consideration of the use of the coudé optical train until reaching the coudé lab, where imaging optics mounted on the coudé bench could be used to create the $f/10$ beam. Ultimately, use of the coudé optical train through M8 was selected.

A similar review of the coudé optical design is now underway as other instrument designs mature. The major question is whether it is still the optimum design to include field flattening and tilting correction in the facility optical train.

The ATST Data Handling and Observatory Control systems have completed their preliminary design and are awaiting review. The Common Services software framework is in the process of porting to C++ through a contract with Observatory Sciences, Ltd. This port will allow software developers to use C++ in addition to Java to develop ATST applications.

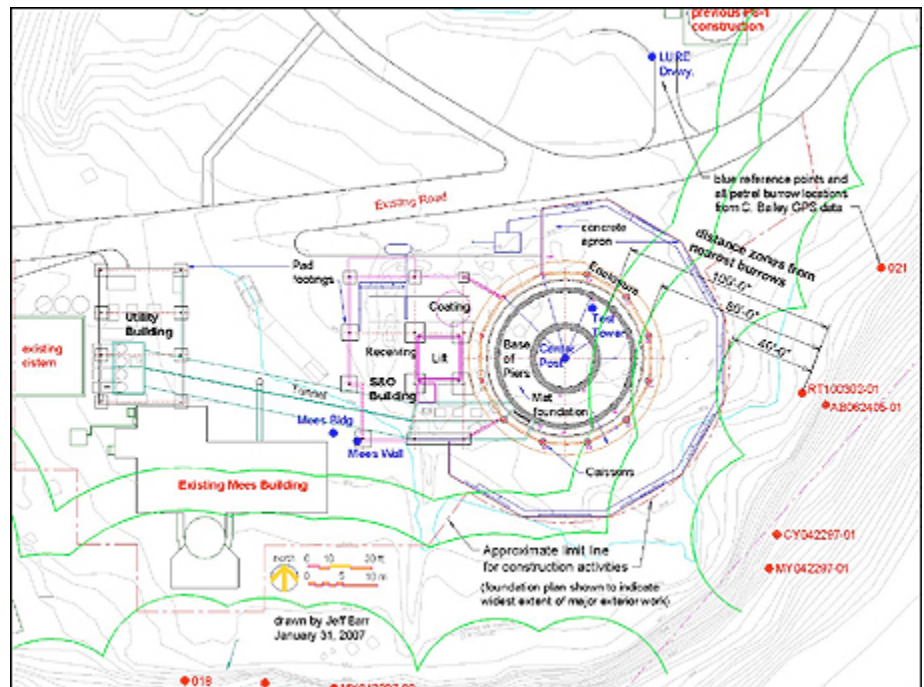
An important milestone was reached in the Environmental Impact Statement (EIS) for the Haleakalā site with the completion by the US Fish & Wildlife Service (USF&WS) of a Biological Opinion, related to the potential impact of ATST on endangered or threatened species. The Biological Opinion was based on the project description in the Draft EIS, supplemental information from the ATST

engineering team, and thorough research by USF&WS of the issues involved. The conclusion of the Biological Opinion is that “with appropriate avoidance and minimization measures...the ATST project is not likely to adversely affect the Hawaiian petrel,” an endangered sea bird.

Of primary concern was the affect of ATST construction and operation on the endangered Hawaiian petrels that nest in the 33 burrows near the proposed site. The foundation plan of the facility (figure 1) shows the closest petrel burrows (dots) and proximity zones of 40, 80 and 100 ft. from the burrows (arcs) that were used to assess the potential impact of noise and vibration from construction of the ATST facility.

Similarly, it was determined that the project was not likely to cause adverse impact on the Hawaiian goose, Silversword plant, or several other species of concern. This is an encouraging outcome from what was a very cooperative effort between the USF&WS,

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ATST Design Refinements and EIS Milestone continued

Haleakalā National Park biologists, the ATST team, and ATST project consultant KC Environmental Inc.

The project responded to inquiries from USF&WS concerning specific measures to minimize disturbance of the petrels. After review and consultation, the ATST agreed to specific limits on the amount of vibration and

noise that would be generated by construction, as well as a defined period during early summer months, while the petrels are incubating their eggs, when only quiet work would be allowed.

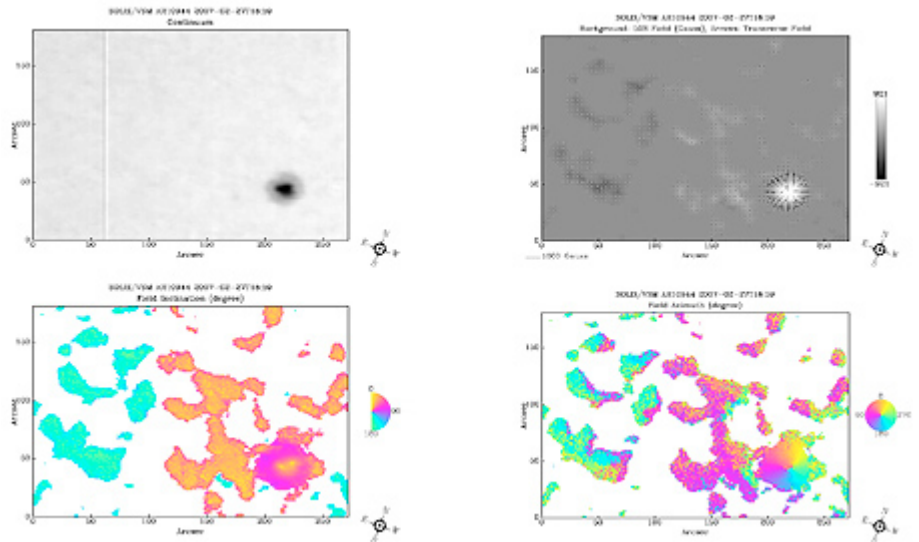
In addition to monitoring and minimizing the levels of noise and vibration, other stipulated measures would make the construction

crane less hazardous to flying birds, avoid potential increase in predator population, and establish procedures to minimize risk posed by construction and operations traffic. The Biological Opinion was formally transmitted to the NSF, the lead agency for the EIS, at the end of March. **■**

SOLIS "Quick-Look" Vector Magnetic Field Images Now Available

Carl Henney & the SOLIS Team

Preliminary SOLIS vector spectromagnetograph (VSM) "quick-look" vector magnetic images for active regions are now available for recent observations. The images are corrected for the 180-degree ambiguity using the Non-Potential Field Calculation (NPFC) method developed by Manolis Georgoulis (Johns Hopkins Applied Physics Lab). The VSM Vector Working Group (VSWG) is in the process of finalizing calibration and pipeline code for processing VSM 630.2 nanometer vector data. Milne-Eddington inversion parameter data will be available soon after this work is completed. During this interim period, qualitative quick-look parameter JPEG images (see sample set, figure 1) will be available for active regions from the most current VSM observations. Note that the SOLIS/VSM quick-look active region interface Web pages currently work best with FireFox and Safari.



These quick-look images of AR 10921, observed with the VSM on 27 February 2007, illustrate the parameters publicly available daily: continuum intensity (upper left), line-of-sight field strength with arrows indicating transverse field strength and direction (upper right), field inclination (lower left), and field azimuth (lower right). The quick-look parameters have been corrected for the 180-degree azimuth ambiguity.

Two-Dimensional Spectropolarimetry with IBIS

*Alexandra Tritschler (NSO), Kevin Reardon (Arcetri Astrophysical Observatory),
Han Uitenbroek (NSO) & Lucia Kleint (ETH-Zürich/NSO)*

The measurement of the chromospheric magnetic field within individual structures in the solar atmosphere is important for the understanding of the structure of the chromosphere, as well as connection of the sub-surface and photospheric magnetic field to the corona. It continues to be a persistent observational challenge.

Successful measurements throughout different layers of the atmosphere would offer important contributions to our understanding of solar activity, and would provide valuable constraints for theoretical modeling. Even more than the denser photosphere below it, the solar chromosphere is highly dynamic. Coming from below, it is the first layer whose structure is dominated by magnetic, rather than hydrodynamic, forces. Determining the structure and dynamics of the chromospheric magnetic field on the appropriate small spatial and short temporal scales is, therefore, essential for understanding this layer, which is the regulating interface to the Sun's outermost layer, the corona. In the context of fast, high-resolution observations, two-dimensional full-Stokes spectropolarimetry based on narrowband and rapidly tunable filters can offer several unique advantages in contrast to more traditional, grating spectropolarimeters.

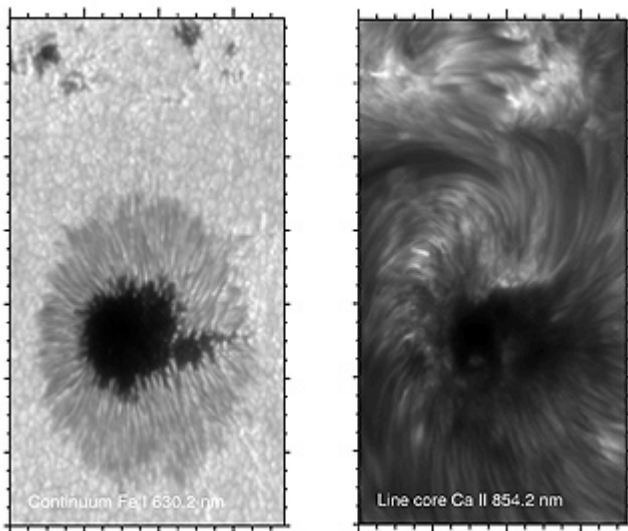


Figure 1. Maps of the continuum near the Fe I 630.25 nm (left panel), and the core of the Ca II 854.21 nm line (right).

The Interferometric BI-dimensional Spectrometer (IBIS), permanently installed at the Dunn Solar Telescope at NSO/Sacramento Peak, has recently been upgraded to a vector polarimeter with unparalleled capabilities, most notably in the chromospheric wavelength range. IBIS is operated with the high-order adaptive optics system, which provides high spatial resolution over a large field of view (FOV). After a proper calibration for instrumental polarization and correction for image distortions (de-stretch), the full Stokes vector is easily accessible at each point in the FOV.

Here we present some of the first observations with IBIS, performed on 28 January 2007 in its novel spectropolarimetric mode. The target was the leading sunspot of AR NOAA 10940, observed at E 50 S 05, well away from center. The photospheric Fe I line at 630.25 nanometers (nm) and the chromospheric Ca II 854.21 nm line were scanned successively with 26 and 41 wavelength points, respectively. At each wavelength step, six different modulation states were recorded, amounting to a total scan time of 125 seconds for both lines.

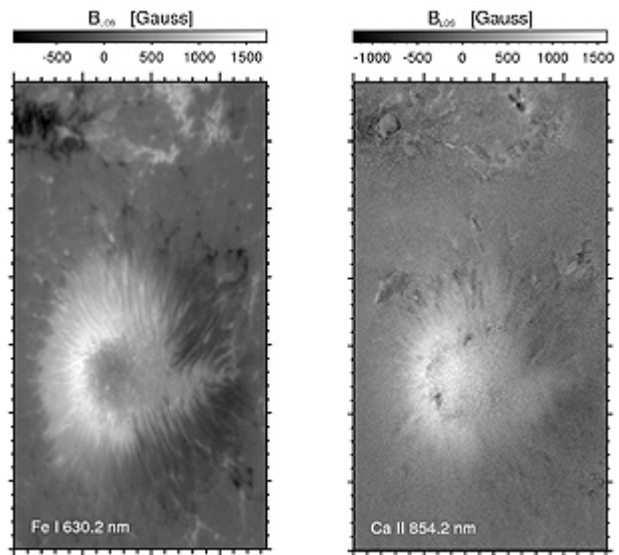


Figure 2. Strength of the photospheric (left panel) and chromospheric magnetic field (right) in the direction of the line of sight.

The well-resolved Stokes profiles observed in the Ca II 854.21 nm line show a large variety of forms, indicating widely varying behavior of the field strength, velocity, and temperature. We show maps of continuum intensity and the line-core intensity of the Ca II line in figure 1. In addition, we show preliminary maps of the line-of-sight magnetic field strength in the photosphere and chromosphere in figure 2, estimated from the relative shift of left- and right-circularly polarized profiles at each point in the FOV.

While photospheric determination of the full vector field from the observed Stokes intensities is well established, the situation is considerably less developed for chromospheric observations. To a large degree, this is caused by departures from Local Thermodynamic Equilibrium (LTE), which make the inversion of Stokes spectra substantially more challenging, theoretically. In the near future, we plan to complement the observational progress achieved with IBIS with a reliable inversion procedure for non-LTE lines to take full advantage of the new chromospheric data.

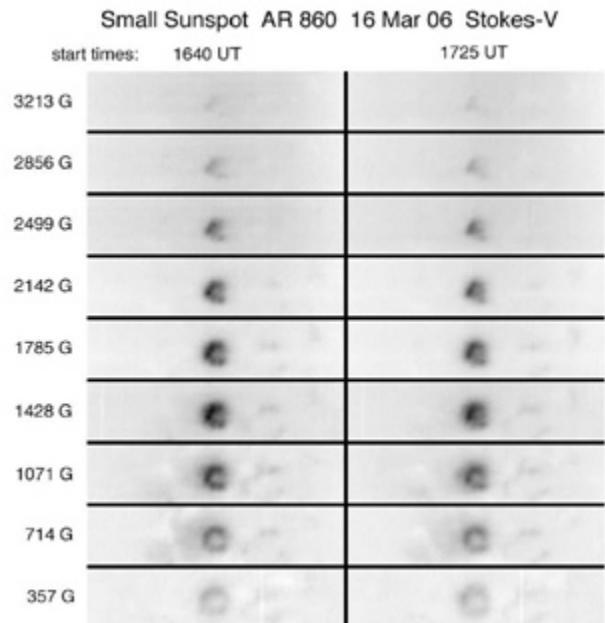
Solar Infrared Observations at 12 Microns with CELESTE

Don Jennings (NASA Goddard Space Flight Center), Pedro Sada (Universidad de Monterrey), George McCabe, Tom Moran, Diane Paulson (NASA Goddard), Claude Plymate (National Solar Observatory), & Christoph Keller (Utrecht University)

In March 2006, the 12-micron CELESTE polarimeter at the NSO/Kitt Peak McMath-Pierce Solar Telescope was used to observe a small, newly forming sunspot. The figure shows two spectral images of this spot recorded about 45 minutes apart. The images were recorded in Stokes-V on the 12.3 micron Mg I emission line. Tip-tilt was used to stabilize the spot image and to create a two-dimensional image by stepping across the slit. The imaged area was 98 by 22 arcseconds, and darker shading in the images corresponds to greater line intensity. The spectral images have been sliced in Zeeman splitting to show the structure at increments of increasing field strength.

This sunspot was just beginning to form at the time of observation, and by the next day it had developed into a complex active region. In the images, a beaded-ring structure of dark dots appears and can be interpreted as a group of emerging flux tubes. The ten-arcsecond size of the beaded ring was the same as the diameter of the spot in a visible continuum image. Each flux tube is smaller than the two-arcsecond diffraction limit, which sets the sizes of the dark dots. At the center of the spot, the flux tubes are tightly grouped and the field strengths are highest. As they spread away from the center, the field weakens. These images imply that at this early stage of spot formation, the flux tubes retain their individual identities and spread radially.

The CELESTE 12-micron polarimeter was built by NASA Goddard Space Flight Center. Rotating waveplates select Stokes I, Q, U, and V, and these are followed by a liquid helium spectrometer that records the Mg I emission spectrum along a two-arcminute slit. CELESTE is currently used for prototype development for the Advanced Technology Solar Telescope. The instrument is available for visitor use at the McMath-Pierce Solar Telescope on a collaborative basis.



Two 12-micron Stokes-V images of a small sunspot. The images are sliced in increments of Zeeman splitting to show the field structure at increasing field strengths. They were recorded with the CELESTE 12-micron polarimeter at the NSO/Kitt Peak McMath-Pierce Solar Telescope.

GONG⁺⁺

Frank Hill & the GONG Team

It has been a very good quarter, and right now GONG⁺⁺ is thriving! Our magnetic field products have been released and well received by the solar physics research community. In fact, one of these images is on the cover of this *Newsletter*. A new aspect of the solar magnetic field, discussed in the “Science Highlights” section (J. Harvey et al.), has been detected thanks to the rapid cadence and high sensitivity of the GONG⁺⁺ magnetic field data.

Science Highlights

Much of the science this quarter has focused on the surface magnetic field. The range of GONG⁺⁺ magnetic field products has been greatly expanded by Gordon Petrie and now includes seven varieties of projections of source-surface potential field extrapolations. These extrapolations are useful for space weather applications, such as predictors of coronal mass ejections (CMEs). The extrapolations are updated on the GONG⁺⁺ Web site

every hour, as are the synoptic maps of the surface field. The synoptic maps are vital “ground truth” for solar wind models that are used to anticipate geomagnetic storms which can disrupt satellites, telecommunications, Global Positioning System data, and airline traffic. GONG⁺⁺ also routinely produces ten-minute average full-disk magnetograms around the clock, and will soon start providing one-per-minute magnetograms created by merging together the data from the individual sites.

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GONG⁺⁺ *continued*

The new products and recent advances of GONG⁺⁺ would not have been possible without the installation of the new polarization modulators and driving circuitry deployed around the network last year, and the development and implementation of the magnetogram data processing pipeline. This was a team effort that involved 20 staff members in the instrument operations and data processing groups. For their significant achievement, the team was presented with the 2007 AURA Team Excellence award. Congratulations!

While the magnetograms show the field on the near side of the Sun facing the Earth, GONG⁺⁺ can also detect strong fields on the otherwise invisible far side using acoustic holography techniques developed by Charlie Lindsey and Doug Braun (NorthWest Research Associates, Inc.). The signal is expressed in terms of a phase shift experienced by the acoustic waves when they encounter an active region on the surface. However, it is much more scientifically useful to have more familiar properties of the active regions, such as the magnetic field strength and the area of the region. Irene González Hernández, in collaboration with Lindsey and Frank Hill, has now developed the first calibration between the observed phase shift, magnetic field, and area of the active region. One of the calibration curves is shown in figure 1. The shape of the curve is consistent with the idea that the phase shift arises from an “acoustic Wilson depression,” where the magnetic field changes the near-surface temperature gradient and effectively moves the upper reflection point of the waves deeper into the Sun.

Preparations for the upcoming 2007 International Research Experience for Students (IRES) Summer School are well underway. Thanks to a grant from the NSF Office of International Science and Engineering (OISE), NSO/GONG⁺⁺ is sponsoring an eight-week summer school for US astronomy graduate students to be held at the Indian Institute for Astrophysics (IIA) in Bangalore, India. This year will be the first of three annual programs. The participants, along with their mentors at the IIA are: Natalie Hinkel (Arizona State University), study focus—stellar, mentor R. T. Gangadhara; Nicholas Moskovitz (University of Hawaii at Manoa), study focus—stellar, mentor B. E. Reddy; Sarah Sonnett (University of Hawaii at Manoa), study

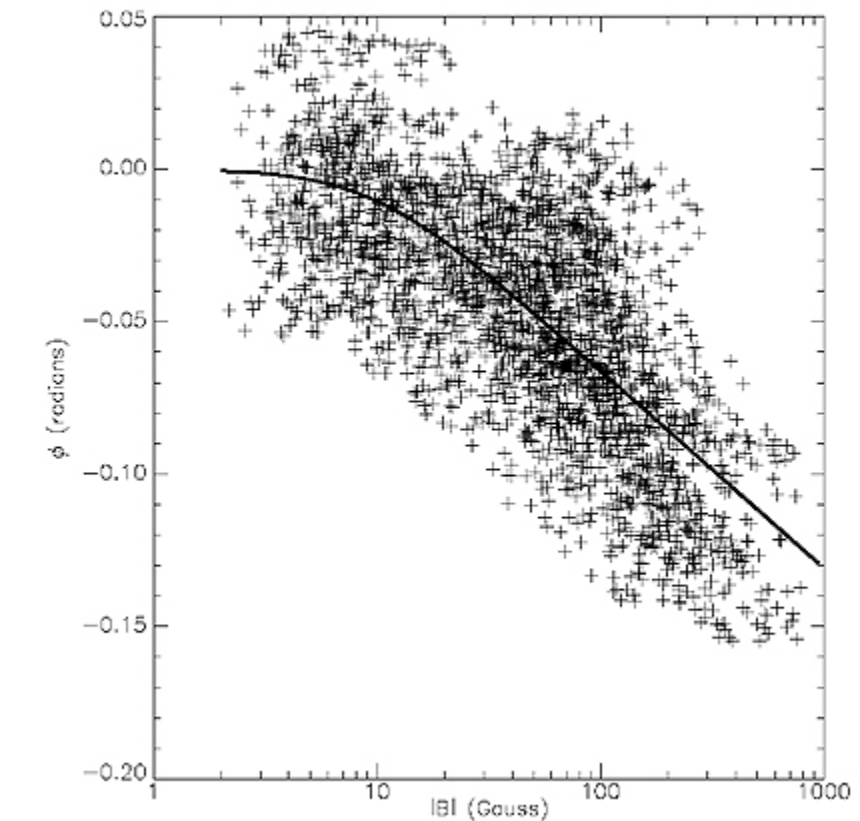


Figure 1. Relationship between acoustic holography phase shift (ϕ) and absolute magnetic field strength ($|B|$) for large active regions on the solar far side. The shape of the curve suggests that the phase shift arises from an increase in the depth of the upper reflection point of the waves, resulting from the magnetic field in the active regions.

focus—solar, mentor R. Ramesh; and Russell Stoneback (University of Texas at Dallas), study focus—solar, mentor D. Banerjee. Our program coordinator, Kiran Jain, will meet the students upon arrival in Delhi, then take a field trip to Udaipur and Mount Abu, and escort them on to Bangalore. Folks at IIA and GONG⁺⁺ are very excited and expect that this program will result in increased collaborations between US and Indian scientists.

Program

While the challenges presented by the recommendation of the NSF Senior Review remain, talks have begun with the US Air Force, which is considering the possibility of supporting GONG⁺⁺ operations to supply the new magnetic field products to the Air Force Weather Agency (AFWA). The Air Force is also interested in the calibrated far side signal, as well as possible helioseismic indicators of forthcoming activity.

The SOHO19/GONG⁺⁺ 2007 meeting will be held at Monash University in Melbourne, Australia, July 9–13. Hosted by Paul Cally, the meeting will focus on “Seismology of Magnetic Activity.” Preparations for the 2008 GONG⁺⁺ meeting have begun. The meeting will be held 10–15 August 2008, at the High Altitude Observatory (HAO) facilities in Boulder, Colorado, and Mausumi Dikpati will chair the local organizing committee. Further details will be forthcoming.

There have been two recent departures from the GONG⁺⁺ staff. Guillermo Montijo left NSO to pursue a career in power management at the University of Arizona, and Mike Soukup also departed. We wish Guillermo and Mike good luck and success in their future endeavors. ☐

International Solar Workshop Probes Beyond “Skin Deep”

Dave Dooling

Sunspots and solar flares are more than skin deep, and the desire to understand their birth and growth is a driving force in modern solar physics.

To share what’s known and what needs to be learned, 60 scientists from across the United States and 10 other nations met at the National Solar Observatory’s 24th annual international workshop in Sunspot, New Mexico, April 24-27.

“The main goal of this workshop was to bring together experts in magnetometry, activity, and helioseismology to further our understanding of solar active regions and their creation and evolution,” said K. S. Balasubramaniam, one of the organizers at NSO/Sac Peak. “Even when the Sun appears quiet, as it is now, there is a lot going on below the surface as the Sun starts towards the next sunspot maximum.”

Magnetometry and helioseismology are key tools in solar physics. Magnetometry involves understanding how electrified gases generate magnetic fields, and how those fields in turn affect the flow of mass and energy in the solar atmosphere. Helioseismology uses the subtle acoustic ringing of the Sun, observed as red and blue shift changes in spectral lines, to deduce the solar structure where massive gas flows lead to activities that appear on the surface and then reach across space.

The workshop, titled “Subsurface and Atmospheric Influences on Solar Activity,” focused on active regions, their origin, and their evolution. These are inferred from helioseismology and magnetometry, which lead to new models of the engines that drive solar activity.

The combination of observation and theory makes it possible, for example, to follow a magnetic field’s twist and helicity—how the



field wraps around itself—and magnetic flux tubes from below the visible surface through the solar atmosphere and into interplanetary space. Helicity-loaded fields are probably responsible for solar phenomena such as flares and coronal mass ejections that can affect Earth.

The workshop sessions covered flows around active regions, both surface and below; flux emergence and cancellation; space weather and active regions; back to front; morphology of active regions and filaments; magnetic flux and magneto-acoustic waves; and influences on coronal complexity.

Participants were drawn from 11 US states and from Australia, France, Italy, Norway, Russia, Spain, Taiwan, and the United Kingdom.

Markus Aschwanden of the Solar & Astrophysics Laboratory, Lockheed Martin Advanced Technology Center in Palo Alto, California, gave the opening keynote on “Solar Active Regions: A Transition from Morphological Studies to Physical Modeling.”

Workshop organizers were K. S. Balasubramaniam, Rudi Komm (chair), Rachel Howe, and Gordon Petrie. Sponsors included the NSO, the NSF Division of Astronomical Sciences and Division of Atmospheric Sciences, NASA’s Heliospheric Physics Division, and the Air Force Office of Scientific Research.

The Scientific Organizing Committee was composed of Bill Abbett (Space Sciences Laboratory, University of California, Berkeley), Tom Bogdan (Space Environment Center, National Oceanic and Atmospheric Administration), Véronique Bommier (Observatoire de Meudon), Todd Hoeksema (HEPL, Stanford University), Terry Kucera (NASA Goddard Space Flight Center), Valentin Martinez Pillet (Instituto de Astrofísica de Canarias), and Saku Tsuneta (National Astronomical Observatory of Japan).

Proceedings from the conference will be published in 2008 in cooperation with the Astronomical Society of the Pacific.