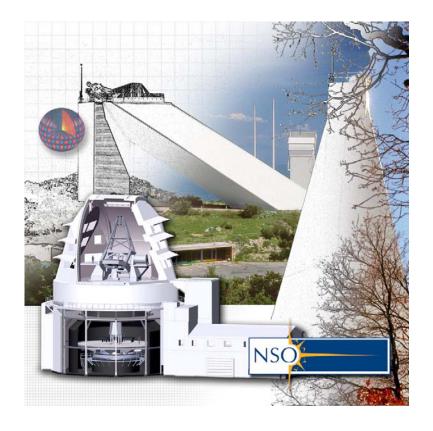
NATIONAL SOLAR OBSERVATORY



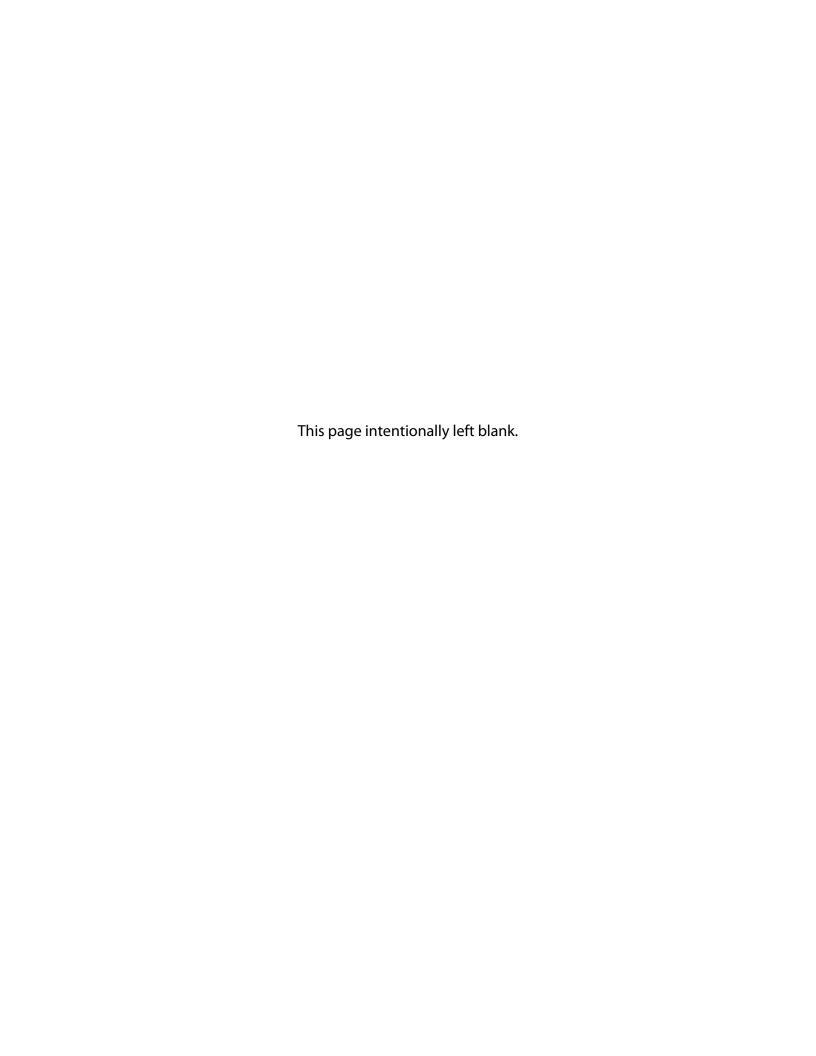
NSO Quarterly Report (3) FY 2007 April 1, 2007 – June 30, 2007

> Submitted to the National Science Foundation Under Cooperative Agreement No. AST-0132798 Scientific Program Order No. 2

Also published on the NSO Web site: http://www.nso.edu







National Solar Observatory

Quarterly Report (3) FY 2007 April 1 – June 30, 2007

Submitted to the National Science Foundation under Scientific Program Order No. 2, Cooperative Agreement No. 0132798

Also published on the NSO Web site: http://www.nso.edu

This report consists of summary statistics and other data on NSO observing programs and telescope usage, and a safety report for the fiscal quarter ended June 30, 2007. Quarterly highlights of public and educational outreach activities are also described. The appendix contains a comprehensive list of principal investigators and collaborators, program titles, telescopes used, and observing hours associated with the quarter's observing programs.

Scientific highlights and current updates on NSO initiatives, new capabilities, instrumentation, and operational activities are published separately in the quarterly NOAO-NSO Newsletter.

Table of Contents

I.	Observing Programs	1
II.	Telescope Usage and Performance Data	2
III.	User Statistics - Archives and Data Bases	3
IV.	Public and Educational Outreach Activities	5
V	. Safety Report	7
ΑP	PENDIX – Observing Programs	8

I. Observing Programs*

26 observing programs, six of which were thesis programs involving nine graduate students, were carried out at NSO this quarter. A comprehensive list of PI's, Co-I's, and collaborators, as well as program titles, telescopes used, and observing hours associated with the quarter's observing programs is attached as the Appendix.

NSO Observing Programs by Type (US vs Foreign)		
3 Months Ending June 2007	Nbr	% Total
Programs (US, involving 1 non-thesis grad student)	18	69%
Programs (non-US)	2	8%
Thesis (US, involving 4 grad students)	5	19%
Thesis (non-US, involving 5 grad students)	1	4%
Total Number of Unique Science Projects*	26	100%

^{*}Includes observing programs conducted by NSO/NOAO staff scientists.

Users of NSO Facilities by Category						
		Vis	NSO/NOAO Staff			
	US	Non-US	Total	% Total		
PhDs	26	7	33	60%	11	
Graduate Students	5	5	10	18%	0	
Undergraduate Students	4	0	4	7%	0	
Other	7	1	8	15%	7	
Total Users	42	13	55	100%	18	

Institutions Represented by Visiting Users**					
	US	Non-US	Total	% Total	
Academic	17	5	22	69%	
Non-Academic	9	1	10	31%	
Total Academic & Non-Academic	26	6	32	100%	

^{**}Note: Total number of institutions represented by users do not include departments or divisions within an institution as separate entities (e.g., US Air Force and NASA are each counted as one institution even though several different sites/bases/centers are separately listed in the data base).

Number of Users by Nationality					
Canada	1	Mexico	1		
Germany	6	Norway	3		
Italy	2	United States	60		

INSTITUTIONS REPRESENTED BY USERS
Foreign Institutions (6)
INAF - Arcetri Astrophysical Observatory, Italy
Max-Planck-Institut fur Aeronomie
University of Cologne, Germany
Universidad de Monterrey, Mexico
University of Montreal, Canada
University of Oslo, Norway

Universidad de Monterrey, Mexico
University of Montreal, Canada
University of Oslo, Norway

US Institutions (25)

Adler Planetarium, Chicago
Austen Paey State University
Challenger Center, Arlington, VA
CMA Consulting, Latham, NY
Dickinson College, Carlisle, PA
Edinboro University, PA
Helio Research, La Crescenta, CA

High Altitude Observatory, NCAR, Boulder Lawrence High School, Lawrence, Kansas

Mt. Wilson Observatory, CA

NASA/Goddard Space Flight Center (NASA/GSFC) New Explorations/Science & Technology (NEST), NY

New Jersey Institute of Techonology (NJIT)

NJIT/Big Bear Solar Observatory

Northwest High School, St. Louis, MO

Southwest Research Institute, San Antonio

Stanford University

University of Califonia, Northridge

University of California, Berkeley

University of Colorado

University of Hawaii, Institute for Astronomy

University of Maryland

University of Wisconsin, Madison

University of Washington

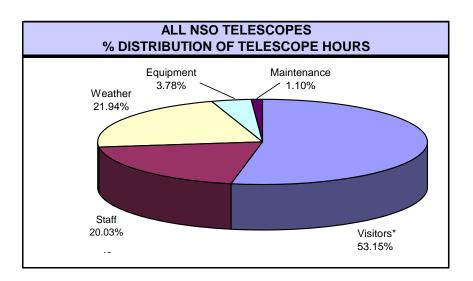
US Air Force/Philips Lab (USAF/PL/GSS)

Westbrook High School, Westbrook, CT

II. Telescope Usage and Performance Data

In the quarter ending June 30, 2007, 53.1% of total available telescope hours at NSO/Sacramento Peak and NSO/Kitt Peak went to the observing programs of visiting principal investigators and synoptic programs; 20.0% were devoted to the programs of NSO and NOAO scientists. Scheduled maintenance, including instrument tests, engineering, and equipment changes, accounted for 1.1% of total allotted telescope hours.

Total "downtime" (hours lost to weather and equipment problems) for NSO telescopes was 25.7%. 21.9% of these lost observing hours were due to bad weather, with 3.8% lost to equipment problems.



NSO TELESCOPES Percent Distribution of Telescope Hours (Scheduled vs. Downtime) April 1, 2007 - June 30, 2007						
		% Hours Used By:		% Hours	s Lost To:	% Hrs. Lost To:
Telescope	Hours Available	Visitors ^a	Staff	Weather	Equipment	Scheduled Maintenance
Dunn Solar Telescope/SP	1,032.0	36.7%	30.9%	28.7%	0.6%	3.1%
McMath-Pierce*	1,544.0	62.2%	17.1%	13.9%	6.7%	0.0%
KP SOLIS Tower ^b	0.0	0.0%	0.0%	0.0%	0.0%	0.0%
FTS Lab ^c *	0.0	0.0%	0.0%	0.0%	0.0%	0.0%
Evans Facility	256.0	50.0%	0.0%	50.0%	0.0%	0.0%
Hilltop Dome	80.0	0.0%	0.0%	0.0%	0.0%	0.0%
All Telescopes	2,912.0	53.1%	20.0%	21.9%	3.8%	1.1%

^aIncludes synoptic programs for which all data are made available immediately to the public and the scientific community at large.

^b Formerly the Kitt Peak Vacuum Telescope (KPVT). SOLIS is not yet available to the user community.

^c Shut down this quarter for repairs/upgrade.

^{*}Totals include both day and night hours. (All others are day only.)

III. User Statistics - Archives/Data Bases

A. NSO/Sacramento Peak (NSO/SP)

Combined FTP & WWW Service Demographics (NSO/SP)					
Demographic Group	Requests	Traffic			
U.S. Science (.gov, .edu, .mil)	42.6%	48.7%			
Other U.S. (.com, .net, misc.)	44.3%	39.2%			
Foreign	13.1%	12.1%			
Unresolved	0.0%	0.0%			
Total	100.0%	100.0%			

FTP Archive Statistics

There were 237,962 successful user requests, serving 1,210 distinct files to 4,976 distinct hosts. A total of 59.300 Gbytes were served, averaging 667.304 Mbytes per day.

FTP User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	45.2%	44.7%		
Other U.S. (.com, .net, misc.)	38.0%	34.5%		
Foreign	16.8%	20.8%		
Unresolved	0.0%	0.0%		
Total	100.0%	100.0%		

FTP Products (NSO/SP)				
Product	Requests	Traffic		
Realtime Images	3.3%	5.8%		
Corona Maps	95.9%	81.7%		
Staff Outgoing	0.4%	12.0%		
OSPAN Data Archive	0.1%	0.3%		
Other	0.3%	0.2%		
Total	100.0%	100.0%		

World Wide Web Statistics

There were 1,241,534 successful user requests, serving 20,309 distinct files to 32,758 distinct hosts. A total of 94.170 Gbytes were served, averaging 1.035 Gbytes per day.

WWW User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (. <i>gov, .edu, .mil</i>)	42.2%	51.3%		
Other U.S. (.com, .net, misc.)	45.4%	42.1%		
Foreign	12.4%	6.6%		
Unresolved	0.0%	0.0%		
Total	100.0%	100.0%		

Note: Sac Peak statistics exclude the use of NSO archives and data bases from within the NSO/Sac Peak Local Area Network (LAN), from the NSO/Tucson LAN, and from NOAO as a whole.

WWW Products (NSO/SP)					
Product	Requests	Traffic			
Realtime Images and Movies					
(OSPAN, Other)	40.0%	45.1%			
Other Images	1.0%	1.3%			
Icon and Background Images	17.8%	1.2%			
Public Relations Pages	2.0%	0.5%			
Press Releases	1.5%	5.2%			
Telescope Home Pages	3.2%	1.0%			
OSPAN Project Pages	5.4%	0.8%			
SMEI Experiment & Data Pages	15.1%	35.6%			
Adaptive Optics Pages	0.6%	0.7%			
General Information	4.2%	6.0%			
Staff Pages	2.2%	1.9%			
Other	7.0%	0.7%			
Total	100.0%	100.0%			

FTP Upload Statistics - Sac Peak (cont.)

Most of the FTP upload activity is related to the USAF Solar Mass Ejection Imager (SMEI) experiment.

There were 5,314 successful user requests, uploading 125 distinct files from 10 distinct hosts. A total of 154.818 Gbytes were uploaded, averaging 1.702 Gbytes per day.

Incoming FTP User Demographics (NSO/SP)			
Demographic Group	Requests	Traffic	
U.S. Science (. <i>edu, .mil</i>)	99.8%	100.0%	
Other U.S. (.com, .net, misc.)	0.2%	0.0%	
Foreign	0.2%	0.0%	
Total	100.0%	100.0%	

Incoming FTP Uploads (NSO/SP)					
Product Requests Traf					
SMEI Data	99.5%	100.0%			
NSO Workshop Papers	0.5%	0.0%			
Total	100.0%	100.0%			

B. NSO/Tucson (NSO/Tuc)

FTP User Demographics (NSO/Tuc)			
Demographic Group	%Total		
U.S. Science (. <i>gov, .edu, .mil</i>)	124	17.20%	
Other U.S. (.com, .net, misc.)	196	27.18%	
Foreign	339	47.02%	
Unresolved	62	8.60%	
Total Users	721	100%	

FTP Logins (NSO/Tuc)				
Demographic Group No. of Logins %To				
U.S. Science (.gov, .edu, .mil)	16	1.16%		
Other U.S. (.com, .net, misc.)	8	0.58%		
Foreign	593	43.13%		
Unresolved	758	55.13%		
Total Logins	1,375	100%		

FTP Products (NSO/Tuc)			
Demographic Group	%Total		
U.S. Science (.gov, .edu, .mil)	16,755	2.48%	
Other U.S. (.com, .net, misc.)	1,125	0.17%	
Foreign	2,045	0.30%	
Unresolved	656,584	97.05%	
Total Products	676,509	100%	

Gbytes of FTP & WWW Data Downloaded (NSO/Tuc)			
Demographic Group Gbytes %To			
U.S. Science (.gov, .edu, .mil)	8.97	1.7%	
Other U.S. (.com, .net, misc.)	1.60	0.3%	
Foreign	1.73	0.3%	
Unresolved	525.51	97.7%	
Total Gbytes	537.81	100%	

Product Distribution by Downloaded Files (NSO/Tuc)			
Product Type	No. of Files	%Total	
GONG Helioseismology	602,342	89.1%	
GONG (Magnetograms, spectra, time			
series, frequencies)	3,004	0.4%	
SOLIS/VSM	23,175	3.4%	
KPVT (magnetograms, synoptic maps,			
helium images)	3,484	0.5%	
FTS (Spectral atlases, general archive)	1,338	0.2%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	47	0.0%	
Other	42,888	6.3%	
Total Downloaded Files	676,278	100.0%	

Product Distribution by Downloaded Gbytes (NSO/Tuc)			
Product Type	Gbytes	%Total	
GONG Helioseismology	500.85	93.2%	
GONG (Magnetograms, spectra, time			
series, frequencies)	1.50	0.3%	
SOLIS/VSM	11.48	2.1%	
KPVT (magnetograms, synoptic maps,			
helium images)	0.99	0.2%	
FTS (Spectral atlases, general archive)	0.42	0.1%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	0.01	0.00%	
Other	21.92	4.08%	
Total Downloaded Files	537.17	100.0%	

Note: All statistics are for NSO/Tucson archive usage by non-NSO and non-NOAO personnel. The numbers do not include NSO/Sunspot.

V. Public and Educational Outreach Activities

NSO public and educational outreach encompasses activities at the Sunspot Astronomy and Visitor Center, including the Visitor Center's retail operations, educational exhibits, and of the NSO/Kitt Peak facilities; Web site outreach, including public information requests; scientific press and media relations; and staff involvement in programs to enhance science education in grades K–12, as well as higher education. Highlights for this quarter follow.

A. Educational Outreach

1. Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), and Other NSO Summer Research Assistantship (SRA) Programs

During this quarter, a combination of 14 students and teachers participated in summer research opportunities at locations in Tucson and Sunspot for 2007. There were six REU students, 3 RET teachers, and five graduate SRAs, one of which is a PhD candidate (Brian Harker, Utah State), who is supplementing his thesis project with a summer research assistantship at Sunspot with advisor K. S. Balasubramaniam.

Four U.S. astronomy graduate students participated in the inaugural NSO/GONG 2007 International Research Experience for (Graduate) Students (IRES) Program. Sponsored by a grant from the NSF Office of International Science and Engineering (OISE), the eight-week program started on 11 June and took place in Bangalore, India under the auspices of the Indian Institute of Astrophysics (IIA). Details about the 2007 program are available at http://eo.nso.edu/ires/.

2. Research Based Science Education (RBSE)

As part of a 10-day workshop hosted by the NOAO Astronomy RBSE program, Claude Plymate, with NOAO's Connie Walker, conducted four days of successful observing at the McMath-Pierce Solar Telescope in late June with four RBSE teachers. The teachers used the McMath-Pierce Apogee CCD camera to measure differential Doppler rotation velocities on the solar limb as a function of latitude. The RBSE workshop participants were also provided with copies of the NSO designed RASL/DASL (Research in Active Solar Longitudes/Data and Activities for Solar Learning) software and workbooks as part of the workshop activities.

3. Other Educational Outreach

More than 30 students and faculty attended the second in a series of five weeklong Solar Physics Summer Schools held by the NSO and the University of Arizona's Lunar and Planetary Laboratory (LPL). The school was held June 11-15 at NSO/Sacramento Peak and is designed for advanced undergraduate and beginning graduate students interested in the physics of the Sun and possible careers in solar physics, space physics, or related fields. The featured speaker was Eugene Parker, the S. Chandrasekhar Distinguished Service Professor in Physics and Astronomy & Astrophysics at the University of Chicago. Parker is highly respected in the physics community for his seminal work of the solar wind and on the nature of astrophysical magnetic fields. Speakers representing NSO included Han Uitenbroek, Frank Hill, Aimee Norton, and Matt Penn. Other speakers included Steve Cranmer (Harvard-Smithsonian Center for Astrophysics), Terry Forbes (University of New Hampshire), Joe Giacalone and Randy Jokipii (University of Arizona), and Tami Rogers

(High Altitude Observatory and University of Arizona). In addition, several students gave short talks on their own work. Topics included solar radiative transfer, helioseismology, solar interior, solar MHD, chromospheric and photospheric magnetic fields, the corona and solar wind, solar activity and magnetic reconnection, and high-energy charged particles. Details about the UofA/NSO 2007 Solar Physics Summer School are available at http://www.lpl.arizona.edu/SummerSchool07/.

On April 19, Mark Giampapa served as the "Space Advisor" for a 5th grade class from Fruchthendler Elementary School during their field trip to the Pima Air & Space Museum. This all-day activity included assisting students with their "exploration assignments" on a simulated shuttle mission. Giampapa also gave a talk on "Stars and Planets" to a 3rd grade class at Fruchthendler Elementary in May.

B. Public Outreach

1. Sunspot Visitor Center

Sunspot Astronomy & Visitor Center Summary of Visitors and Tours (3 Months Ending 06/30/07)			
Group/Program	No. of Visitors		
General Public Tours (Visits to Center and Self-Guided Tours)	4,235		
Guided Public Tours:			
- School Groups K-12	115		
- Special Tours 276			
Total Visitors 4,626			

2. Other Public Outreach, Including External Coordination, Media and Public Information

On April 24-27, NSO hosted an international workshop on "Subsurface and Atmospheric Influences on Solar Activity," involving 60 scientists from across the U.S. and 10 other nations. Held in Sunspot, New Mexico, the workshop's goal was to bring together experts in magnetometry, activity, and helioseismology to further the understanding of solar active regions and their creation and evolution. Proceedings from the workshop will be published in 2008 in cooperation with the Astronomical Society of the Pacific.

Sixteen NSO staff members participated in the 2007 Solar Physics Division (SPD) meeting in conjunction with the 210th Meeting of the American Astronomical Society (AAS) in Honolulu, Hawaii, May 27-31. NSO also hosted an exhibit booth at the meeting. In addition, the following NSO/REU students, RET teacher, and graduate student in residence at NSO/Sac Peak who just completed his PhD (Marino, 2007), presented posters with the results of their summer projects:

De Wet, Stephanie (REU), Tripathy, S. C., Jain, K., Clark, R., Hill, F., "Helioseismic Analysis of Mode Parameters I the Source Regions of CMEs, Poster No. 029.09.

MacDonald, Rachel (REU), Penn, M. J., "Further Investigations of the Umbral Intensity of Sunspots," Poster No. 092.01.

Schad, Thomas A. (REU), **Seeley, Daniel** (RET), Keil, S.L., Tomczyk, S., "Coronal Seismology: The Search for Propagating Waves in Coronal Loops," Poster No. 091.13.

Marino, Jose (SRA), Rimmele, T. R., "Long Exposure Point Spread Function Estimation Adaptive Optics Loop Data: Results and Validation," Poster No. 026.01.

NSO did not issue any press releases during this quarter. However, NSO staff were interviewed by news media on various solar-related topics. Dave Dooling was interviewed by the *Alamogordo Daily News* in May about the future of NSO facilities. Aimee Norton (NSO) and Hector Socas-Navarro (HAO) were interviewed in early June by a science journalist at BBC *Sky at Night* magazine for a feature about the Sun. Norton and Socas-Navarro were also interviewed by a journalist at *PhysOrg.com* (http://www.physorg.com/news97326842.html) about their work on the solar oxygen crisis. This work on the "abundance of oxygen in the Sun" also made it onto the *slashdot* forum (http://science.slashdot.org/article.pl?sid=07/04/28/1425202).

V. Risk Management and Safety Report

Risk Management services at NSO/Kitt Peak and Tucson are shared with NOAO. See also the "Tucson and Kitt Peak Site Safety Report" section (pages 7-9) of the NOAO April - June 2007 Quarterly Report for additional details on risk management activities.

A. OSHA Recordable Occupational Injuries, Illnesses, and Other Incidents

• During this quarter, there were no recordable accidents at Sac Peak.

B. Safety and Health

• Ten Tucson employees representing Central Facilities Operations, Shipping and Receiving, and GONG participated in an OSHA mandated forklift-training class on April 18.

C. Insurance

 It was verified that NSO's four full-time summer research positions for the eight-week International Research Experience for Students (IRES) Program for graduate study of astronomy/astrophysics in India are covered under the AURA international insurance package. The 2007 IRES program began on June 11, 2007.

APPENDIX

National Solar Observatory 01 April - 30 June 2007

April - June 2007: During this period, 26 observing programs, 6 of which were thesis programs involving 9 graduate students, were carried out at NSO. Graduate and undergraduate students are indicated by (T) for thesis students, (G) for non-thesis graduate students, (UT) for undergraduate thesis students, and (U) for undergraduate students. (RBSE) identifies middle and high school teachers who are Research-Based Science Education program participants, (REU) identifies Research Experiences for Undergraduates program participants, and (RET) identifies Research Experience for Teachers participants.

		Nights	Days	Hours
1858		0.0	9.0	106.0
William Livingston	National Solar Observatory			
Anderson (REU)	University of California, Berkeley			
Cycle Variability of the S	Solar Spectrum			
McMP Main spectrogra	ph			
2030d		12.5	0.0	295.0
Ronald Oliversen	NASA/Goddard Space Flight Center			
Harris	University of Washington, Seattle			
Morgenthaler	University of Washington, Seattle			
Mierkiewicz	University of Wisconsin-Madison			
Io As a Probe of the Plas	sma Torus			
McMP Stellar spectrogr	aph			
2030d		12.5	0.0	295.0
Ronald Oliversen	NASA/Goddard Space Flight Center			
Dawson (T)	University of Washington			
Line (U)	University of Wisconsin-Madison, Dept. of Physic	cs		
Lupie	NASA Goddard Space Flight Center			
Nunez-Carpena (U)	Univ. of Puerto Rico-Piedra Campus / NASA GS	FC Space Grant		
Io As a Probe of the Plas	sma Torus			
McMP Stellar spectrogr	aph			
2058		0.0	7.0	45.0
Andrew Potter	National Solar Observatory			
Killen	University of Maryland			
Knight (T)	University of Maryland			
Studies of Exospheric En	mission Lines in the Inner Solar System			
McMP Stellar spectrogr	aph			
2127		0.0	15.1	72.0
Richard Altrock	USAF Research Laboratory			

Three-Line Coronal Photometer

Evans Facility Sac Peak

		Nights	Days	Hours
2120		0.0	15.1	5 (0
2128 Simon Worden	NASA Ames Research Center	0.0	15.1	56.0
Keil	National Solar Observatory			
Ca K Solar Rotation				
Evans Facility Sac Peal	k			
2282		0.0	14.0	140.0
Donald Jennings	NASA/Goddard Space Flight Center			
McCabe	NASA Goddard Space Flight Center			
Sada	Universidad de Monterrey			
Boyle	Dickinson College			
Lunsford	NASA Goddard Space Flight Center			
Zeeman Splitting in OH	at 12 Microns			
McMP Main spectrogra	aph			
2282n		14.0	0.0	136.0
Donald Jennings	NASA/Goddard Space Flight Center	2.00		2000
McCabe	NASA Goddard Space Flight Center			
Sada	Universidad de Monterrey			
Boyle	Dickinson College			
Lunsford	NASA Goddard Space Flight Center			
Zeeman Splitting in OH				
McMP Main spectrogra	aph			
2366		0.0	3.0	0.0
Drake Deming	NASA/Goddard Space Flight Center	0.0	3.0	0.0
Plymate	National Solar Observatory			
The Apparent Velocity of	f Integrated Sunlight			
McMP FTS/Mc-P				
2375a		0.0	5.0	16.0
Constance Walker	National Optical Astronomy Observatory			
Gleue (RBSE)	Lawrence High School			
Small (RBSE)	Northwest High School, St. Louis			
Pereira (RBSE)	New Explorations into Science & Technology (NE	ST)		
St. Martin (RBSE)	Westbrook High School			
	phology of Active Regions: Using Zeeman-Split IR Lines	to Determine Mag	netic Field Str	rengths of
MaMD Main anastro arr	nah.			

McMP Main spectrograph

		Nights	Days	Hours
2439		0.0	2.0	12.0
James LoPresto	Edinboro University of Pennsylvania	0.0	2.0	12.0
Plymate	National Solar Observatory			
Simmons	Mt. Wilson Observatory			
Lazar Pearl	Adler Planetarium, Chicago			
Polar Solar Vortex	Tutor Tameunan, emenge			
McMP FTS/Mc-P				
MCMP F15/MC-P				
2454c		0.0	10.0	80.0
Steven Tomczyk	High Altitude Observatory, NCAR			
Bibeau-Delisle (G)	University of Montreal			
Coronal Multi-Channel				
Hilltop Dome Sac Peak	- '			
Timop Boine Sac Fear				
2489		0.0	1.0	10.0
Douglas Gilliam	National Solar Observatory			
Bradford	National Solar Observatory			
Elrod	National Solar Observatory			
Dunn Solar Telescope M	<i>Maintenance</i>			
Dunn Solar Telescope/SI				
2491b		0.0	10.0	94.0
Carsten Denker	New Jersey Institute of Technology			
Deng	California State University, Northridge, Dept.	of Physics & Astronom	ny	
Verdoni (T)	New Jersey Institute of Technology			
Liu	Big Bear Solar Observatory/NJIT			
Precursors and Origins	of Coronal Mass Ejections (Part II)			
Dunn Solar Telescope/SI				
2498		0.0	15.0	68.0
Aimee Norton	National Solar Observatory			
MHD Wave Speeds As a	a Function of Umbral Field Strengths			
McMP Main spectrogra	aph			
2500		0.0	8.0	29.0
Matthew Penn	National Solar Observatory			
Butner (REU)	Austin Paey State University			
NSO Array Camera (NA	AC) Engineering			
MaMD Main speatrogra	anh.			

McMP Main spectrograph

		Nights	Days	Hours
2508		0.0	5.0	41.5
Guido Sonnabend	University of Cologne, Physikalisches Institut	0.0	2.0	11.0
Sornig (T)	University of Cologne, Physikalisches Institut			
Kroetz (T)	University of Cologne, Physikalisches Institut			
Stupar (T)	University of Cologne, Physikalisches Institut			
Saur (T)	University of Cologne, Geophysical Institute			
	per Atmosphere Dynamics, and Feasibility Study on the Obs	servability of	SO, in the Ai	tmosphere of
McMP Main spectrograph		of		mospitere oj
2500		0.0	5.0	41.5
2508	University of Colorus Dhaniladia has Institut	0.0	5.0	41.5
Guido Sonnabend	University of Cologne, Physikalisches Institut			
Kostiuk	NASA/Goddard Space Flight Center			
Livengood	Challenger Center			
Determination of Venus Up	per Atmosphere Dynamics, and Feasibility Study on the Obs	servability of	f SO, in the Ai	tmosphere of
McMP Main spectrograph		· · · · · · · · · · · · · · · · · · ·	2	r
2519		0.0	2.0	20.0
ose Marino (T)	New Jersey Institute of Technology			
Rimmele	National Solar Observatory			
Richards	National Solar Observatory			
Point Spread Function (PSI	F) Observations and High-Order Adaptive Optics Testing			
Ounn Solar Telescope/SP S	ac Peak			
2528		0.0	4.5	54.0
	National Solar Observatory	0.0	4.5	54.0
Krishna Balasubramaniam	National Solar Observatory National Solar Observatory	0.0	4.5	54.0
Krishna Balasubramaniam Rimmele		0.0	4.5	54.0
Krishna Balasubramaniam Rimmele Fritschler	National Solar Observatory	0.0	4.5	54.0
2528 Krishna Balasubramaniam Rimmele Tritschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing	0.0	4.5	54.0
Krishna Balasubramaniam Rimmele Fritschler Diffraction-Limited Spectro	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing	0.0		
Krishna Balasubramaniam Rimmele Fritschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing ac Peak		4.5	54.0 52.0
Krishna Balasubramaniam Rimmele Fritschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S 2529 Oddbjorn Engvold	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing ac Peak University of Oslo			
Krishna Balasubramaniam Rimmele Critschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S 529 Oddbjorn Engvold Martin	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing ac Peak University of Oslo Helio Research			
Krishna Balasubramaniam Rimmele Critschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S Didbjorn Engvold Martin Lin	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing ac Peak University of Oslo Helio Research University of Oslo, Institute of Theoretical Astrophysics			
Krishna Balasubramaniam Rimmele Critschler Diffraction-Limited Spectro Dunn Solar Telescope/SP S	National Solar Observatory National Solar Observatory -Polarimeter (DLSP) Queue Observing ac Peak University of Oslo Helio Research			

Dunn Solar Telescope/SP Sac Peak

		Nights	Days	Hours
2530		0.0	9.5	26.0
Gianna Cauzzi	Osservatorio Astrofisico di Arcetri			
Teriaca	Max-Planck-Institut fur Aeronomie			
Reardon	INAF - Arcetri Astrophysical Observatory			
Woeger	National Solar Observatory			
Uitenbroek	National Solar Observatory			
Chromospheric Counter	parts of UV Explosive Events			
Dunn Solar Telescope/SP	Sac Peak			
2531		0.0	12.0	122.0
Haosheng Lin	University of Hawaii, IFA	0.0	12.0	122.0
Hegwer	National Solar Observatory			
-	o-Polarimeter (FIRS) Engineering			
Dunn Solar Telescope/SP	Sac Peak			
2532		0.0	6.0	72.0
Thomas Rimmele	National Solar Observatory			
Hegwer	National Solar Observatory			
ATST Coude Lab Seeing	r Tests			
Dunn Solar Telescope/SP	Sac Peak			
2533		0.0	5.0	28.0
Steve Hegwer	National Solar Observatory	0.0	3.0	20.0
Gullixson	National Solar Observatory			
	ctro-Polarimeter (DLSP) Engineering			
Dunn Solar Telescope/SP				
2534		0.0	9.5	66.0
Friedrich Woeger	National Solar Observatory			
Rimmele	National Solar Observatory			
Wedemeyer-Boehm	University of Oslo, Institute for Theoretical Physics			
Magnetic Properties of the	he Solar Chromosphere			
Dunn Solar Telescope/SP	Sac Peak			
2535		0.0	10.0	82.0
Richard Wachter	Stanford University			
Reardon	INAF - Arcetri Astrophysical Observatory			
Rajaguru	Stanford University			
Scherrer	Stanford University			
Gullixson	National Solar Observatory			
Validation of Local Heli	oseismology of Active Regions and the Observation of Upwar	rd Propagating	g Waves	
D 0.1 TT.1 /0D				

Dunn Solar Telescope/SP Sac Peak

	Nights	Days	Hours
2537	0.0	10.0	82.0
C · DE ·			

Craig DeForest Southwest Research Institute

Lamb (T) University of Colorado, Dept. of Astrophysical & Planetary Science

Elmore High Altitude Observatory, NCAR

Rimmele National Solar Observatory

Stereoscopic Magnetography

Dunn Solar Telescope/SP Sac Peak