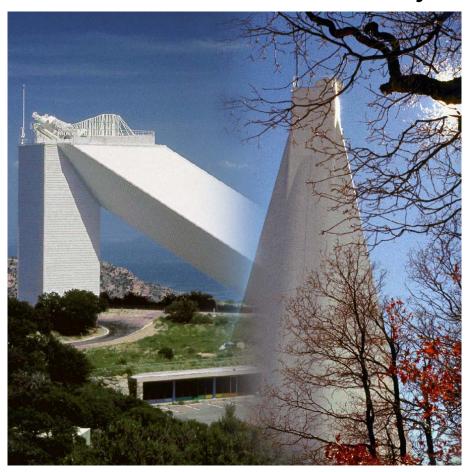


National Solar Observatory



NSO Quarterly Report FY 2003 October 1, 2002 - December 31, 2002

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





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> February 20, 2003 Revised May 15, 2003

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This report consists of summary statistics and other data on NSO observing programs, telescope usage, personnel changes, and visiting scientists, and a safety report for the fiscal quarter ending December 31, 2002. Quarterly highlights of public and educational outreach activities are also described here. The appendix contains a comprehensive list of all 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*.

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Observing Programs*

37 observing programs were carried out at NSO this quarter; one of these was a thesis program involving two students. A comprehensive list of all 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 Dec-2002	Nbr	% Total		
Programs (US)	28	76%		
Programs (non-US)	8	22%		
Thesis (US)	1	3%		
Thesis (non-US)	0	0%		
Total Number of Unique Science Projects*	37	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	20	12	32	86%	9
Graduate Students	2	1	3	8%	-
Undergraduate Students	0	0	0	0%	-
Other (Research Tech.)	1	1	2	5%	7
Total Users	23	14	37	100%	16

Institutions Represented by Visiting Users**					
	US	Non-US	Total	% Total	
Academic	6	6	12	60%	
Non-Academic	5	3	8	40%	
Total Academic & Non-Academic	11	9	20	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	3	Germany	3		
Chile	2	Ireland	3		
England	1	Mexico	1		
France	1	United States	39		

INSTITUTIONS REPRESENTED BY USERS

Foreign Institutions (9):

European Southern Observatory
Max-Planck Institute for Astrophysics
Mullard Space Science Laboratory
Observatoire de Pic-du-Midi
Queens University
Universidad de Monterrey, Mexico
University of Calgary
University of Cologne
University of Waterloo

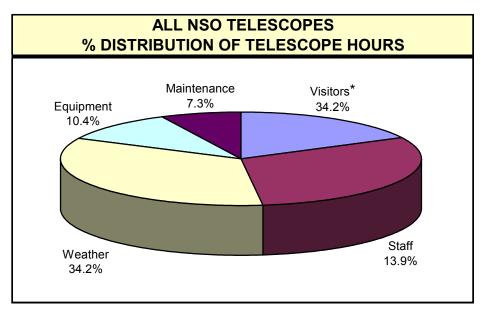
US Institutions (11):

Cambridge Research & Instrumentation
College of William & Mary
Connecticut College
Edinboro University, PA
Jet Propulsion Laboratory
NASA Goddard Space Flight Center
NASA Langley Research Center
National Oceanic & Atmospheric Administration
Southern Illinois University at Edwardsville
University of Arizona
University of California, Berkeley
US Air Force, Los Angeles AFB
US Air Force/Philips Lab (USAF/PL/GSS)

Telescope Usage and Performance Data

In the quarter ending 31 December 2002, 34.2% of total available telescope hours at NSO/Sacramento Peak and NSO/Kitt Peak went to the observing programs of visiting principal investigators as well as synoptic programs; 13.9% were devoted to the programs of NSO scientists. Scheduled maintenance (including instrument tests, engineering, and equipment changes accounted for 7.3% of total telescope hours.

Total "downtime" (hours lost to weather and equipment problems) for NSO telescopes was 44.6%. Almost all of these lost observing hours were due to bad weather (34.2%), with only 10.4% lost to equipment problems.



NSO TELESCOPES Percent Distribution of Telescope Hours (Schedule vs. Downtime) October - December 2002						
T-1	% Hours Used By: % Hours Lost To:					% Hrs. Lost To:
Telescope	Hours Available	Visitors*	Staff	Weather	Equipment	Scheduled Maintenance
Dunn Solar Telescope/SP	790.0	8.4%	5.9%	32.9%	2.0%	50.8%
McMath-Pierce	1142.5	37.1%	26.9%	14.0%	22.1%	0.0%
KP Vacuum	603.0	5.6%	62.2%	31.7%	0.5%	0.0%
FTS Lab	390.3	91.3%	0.0%	0.0%	6.6%	2.0%
Evans Facility	1084.6	35.0%	4.9%	37.9%	22.1%	0.1%
Hilltop Dome 1609.0 41.2% 0.0% 55.9% 2.9% 0.0%						0.0%
All Telescopes	5619.4	34.2%	13.9%	34.2%	10.4%	7.3%

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

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 NSO/Sac Peak tours; tours 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.

Sunspot Astronomy and Visitor Center

Sunspot Astronomy & Visitor Center Summary of Visitors and Tours (3 Months Ending 12/31/02)				
Group/Program	No. of Visitors			
General Public Tours (Visits to Center				
and Self-Guided Tours)*	0			
Guided Public Tours:				
- General Public	0			
- School Groups K-12	157			
- Special Tours	58			
Total Visitors	215			
*Note: Public tours were suspended as of 07 Sept 2002, at the end of summer season, and will resume in spring 2003.				

- A new exhibit banner on ancient observatories of the southwest was designed for the Visitor Center.
- In November, special NSO Sac Peak facility tours were conducted for groups including gifted students from Red Sands Elementary School in El Paso, the Boy Scouts, and teachers and amateur astronomers from the New Mexico Museum of Space History Project Astro Program.

Media and Public Information

- Curt Suplee, a freelance writer on assignment for *National Geographic*, visited Sunspot on December 6-7, for interviews on an article on recent solar science developments and plans for future work. He talked with NSO Director Steve Keil and Thomas Rimmele, Joel Mozer, and Jack Zirker, then went to NSO/Tucson for additional interviews with Christoph Keller and Claude Plymate.
- NSO/SP was discussed, with other observatories in the state, in the November 2002 issue of *New Mexico Magazine*.
- Thomas Rimmele was quoted in *Science News*, "Something New on the Sun" (November 16, 2002).
- The Advanced Technology Solar Telescope (ATST) was discussed briefly at the end of a *Nature* article, "Solar Physics: The Sun under a Microscope" (November 14), on recent high-resolution observations at the Swedish Solar Telescope on La Palma.
- A web story on simultaneous solar flares observed on October 31 by the Improved Solar Observing Optical Network (ISOON) generated extensive coverage. The original story was written by NSO Outreach and

Education Officer Dave Dooling and posted to the web, then forwarded to John Fleck at the *Albuquerque Journal* who interviewed Don Neidig. An Associated Press version was carried by CNN, MSNBC, and other outlets.

- The *Arizona Daily Star* featured a cover story (October 24, 2002) on the Space Weather Center at Kitt Peak in which Mark Giampapa is quoted, describing NSO's Synoptic Optical Long-term Investigations of the Sun (SOLIS).
- The Internet home page for the National Solar Observatory is being redesigned to make them more informative and user-friendly and will be completed by spring 2003.
- Work has begun on a booklet that will describe the Advanced Technology Solar Telescope (ATST) mission and science. The booklet will be written for a science attentive audience and similar in style to previous NASA booklets describing space missions.
- A fact sheet on the ATST was developed for use by NSO Director Steve Keil in presentations at AURA and NSF, and to a town hall meeting with Steve Pearce, the newly elected U.S. Representative for New Mexico's 2nd District, in November.
- Two brochures are being developed for public distribution, one to attract tourists to NSO, and one to explain the ATST. Final review and printing are scheduled for early 2003.

Public and Educational Outreach

- At the October 8 ribbon-cutting ceremony for the traveling NASA Space Weather Center exhibit at the
 Visitor Center at Kitt Peak, Christoph Keller represented NSO and gave a brief speech about the NSO role in
 space weather monitoring. Tucson Mayor Robert Walkup, several middle school students from the Tohono
 O'odham Nation, and four-dozen members of the Tucson tourist bureau and hotel communities were among
 the special guests at the ceremony.
- On the evening of October 19, Cliff Toner introduced nighttime observing with an 8-inch telescope and a 10-inch telescope at a Girl Scout Jamboree at Picacho Peak Campground. The event involved approximately 60 girl scouts and 15 adult leaders. In addition to looking at planets and stars and explaining how a telescope works, Cliff described what he does as an NSO/GONG staff member, and talked about the academic requirements for becoming a professional astronomer.
- On November 9, 135 Girl Scouts attended a special program on Kitt Peak involving the Space Weather Center exhibit. The program included a tour of the McMath-Pierce solar telescope, where careers in astronomy and academic preparation, and solar observing with a 16-inch telescope and H-alpha filter were discussed. On November 16, 150 Boy Scouts attended the same program.
- The Mayor of La Serena, Chile and a delegation of six toured the McMath-Pierce solar telescope, the Mayall 4-meter telescope, and the WIYN 3.5-meter telescope. The group included Dr. Malcolm Smith, director of the Cerro Tololo Inter-American Observatory.
- Jackie Diehl, Ramona Elrod, Rex Hunter, and Dave Dooling staffed an exhibit on NSO at the Lincoln National Forest centennial celebration held by the U.S. Forest Service, November 13, in Alamogordo. The exhibit included a new poster that depicted the history (1947-present) of NSO at Sacramento Peak and bookmarks that included a map to guide visitors to Sunspot.

- NSO Director Steve Keil gave a public lecture on the Advanced Technology Solar Telescope at Montana State University on October 18. He also provided general course material to Boston University on solar activity and variability on November 8; met with Daniel Dwyer, Vice Provost for Research at New Mexico State University, on November 20, to discuss the ATST; and on December 12, briefed New Mexico Congressman Steve Pearce and the Alamogordo Chamber of Commerce on NSO Structure and Plans, including ATST.
- In November, Frank Hill presented an invited talk about the Advanced Technology Solar Telescope to faculty, staff and students at the University of Sonora in Hermosillo, Mexico.
- NSO/SP hosted approximately 20 participants at the Project ASTRO statewide teacher's workshop in Sunspot on November 1 and 2.
- Ramona Elrod, Lou Ann Gregory, and Dave Dooling represented NSO at the annual meeting of the Southwestern Consortium of Observatories for Public Education (SCOPE), November 14-15 at the McDonald Observatory, Fort Davis, Texas.
- Jackie Diehl and Dave Dooling represented NSO at an NSF-sponsored workshop, "Visions and Voices: Educational Leadership in the Research Center Environment," in Santa Cruz, California, October 26-28.
- Ray Smartt (NSO Emeritus Astronomer in residence at Malabula, New South Wales, Australia) accompanied a group of students (11 astrophysics majors) and faculty from Williams College on a trip to Ceduna, South Australia, for the total eclipse on December 4. The group was led by Prof. Jay Pasachoff. During the course of the trip, Dr. Smartt presented four talks on solar astronomy and observing techniques, and provided advice on setups for observing the eclipse.
- In October, Mark Giampapa spent time with first-grade class at Fruchtendler Elementary School in Tucson to talk about a portable meteorite display (provided courtesy of Dr. David Kring, University of Arizona, Lunar and Planetary Laboratory).
- Mark Giampapa gave a 90-minute lecture on "Solar and Stellar Variability" to an undergraduate honors class at the University of Arizona on "The Science and Politics of Global Warming,"at the invitation of class instructor Prof. Uwe Fink.
- Jeff Sudol, collaborating with a group at Gettysburg College on Project CLEA (Contemporary Laboratory Experiences in Astronomy), worked on the Solar Rotation Laboratory exercise portion of the project that involves 368 archived images of the Sun obtained by GONG during a period near solar maximum between January 1, 2002 and April 30, 2002. Jeff's efforts were in preparation for a poster and software demonstration at the January 2003 meeting of the American Astronomical Society (AAS) in Seattle.
- Over 700 announcements about the NSO Summer 2003 Research Experiences for Undergraduates (REU)
 Program were sent to astronomy, physics, engineering, mathematics, and natural science departments
 throughout the US and Puerto Rico. An announcement about the NSO Summer 2003 Research Experience
 for Teachers (RET) Program was widely distributed electronically via the National Astronomy List Serves,
 Arizona Physics Teachers List Serves and the Arizona Science and Math Education Center; announcements
 were also sent to schools districts throughout New Mexico and in Tucson.
- A poster paper co-authored by summer-2003 NSO/RET teacher William (Joey) Rogers on "Vorticity Patterns in Superpenumbral Filaments" was presented at the October-2002 Committee on Space Research (COSPAR) meeting in Houston.

- In December, three summer-2003 NSO/REU students prepared posters for presentation at the January 2003 AAS meeting in Seattle:
 - Adam Kraus on "A Prototype Data Reduction Pipeline for the GNAT System;"
 - Carol Thornton on "Comparison of Three Solar Magnetographs;" and
 - Adria Updike on "Calculation of Magnetic Helicity in a Force-Free Field."
- A poster paper co-authored by summer-2003 NSO/RET teacher Nate Van Wey on "Forecasting Daytime Seeing Conditions Using a Mesoscale Numerical Weather Prediction Model" was presented at the Fall (Dec-2002) meeting of the American Geophysical Union in San Francisco.

User Statistics - Archives/Data Bases

NSO/Sacramento Peak

Combined User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	7.3%	4.3%		
Other U.S. (.com, .net, misc.)	70.5%	74.5%		
Foreign	18.5%	19.1%		
Unresolved	3.7%	2.1%		

FTP Archive Statistics:

There were 123,612 successful user requests serving 3,626 distinct files to 6,944 distinct hosts. A total of 17.817 Gbytes were served averaging 198.426 Mbytes per day.

FTP User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	2.5%	1.9%		
Other U.S. (.com, .net, misc.)	71.5%	79.6%		
Foreign	24.5%	17.7%		
Unresolved	1.5%	0.8%		

FTP Products (NSO/SP)				
Demographic Group	Requests	Traffic		
Realtime Flare Patrol Images	44.9%	66.4%		
Flare Patrol Movie Archive	0.7%	1.8%		
RISE/PSPT Images (realtime and archive)	3.9%	0.5%		
Corona Maps	42.9%	13.5%		
Sunspot Numbers	1.7%	0.3%		
NASA Orbital Debris Observatory	0.7%	0.6%		
Other	5.2%	16.9%		

World Wide Web Statistics:

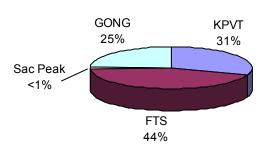
There were 735,324 successful user requests serving 14,344 distinct files to 49,235 distinct hosts. A total of 11.427 Gbytes were served averaging 127.198 Mbytes per day.

WWW User Demographics (NSO/SP)					
Demographic Group	Requests	Traffic			
U.S. Science (.gov, .edu, .mil)	8.1%	8.2%			
Other U.S. (.com, .net, misc.)	70.4%	66.4%			
Foreign	17.4%	21.3%			
Unresolved	4.1%	4.1%			

WWW Products (NSO/SP)					
Demographic Group	Requests	Traffic			
Realtime Images	13.7%	14.1%			
Other Images	11.4%	31.1%			
General Icon and Background Images	26.8%	7.3%			
Public Relations Pages	18.6%	11.1%			
Press Releases	0.9%	2.9%			
Telescope Home Pages	4.7%	2.9%			
NASA Orbital Debris Observatory Home Page	0.9%	1.9%			
Adaptive Optics Pages	0.8%	3.7%			
Other	22.2%	25.0%			

NSO/Tucson

- Most recent complete quarter (01 September 2002 31 December 2002)
 - 1. 1,184 FTP users
 - 2. 26,091 FTP logins (excluding 70,642 from fastsearch crawler)
 - 3. 22,724 files downloaded via anonymous FTP (excluding 12,922 from fastsearch crawler)
 - 4. 28,638 web page hits (not counting in-line images)
 - 5. 393,385 web page hits including in-line images
- Distribution of downloaded data products by number of files for most recent complete quarter:
 - 1. 31% KPVT (magnetograms, synoptic maps, helium images).
 - 2. 44% FTS (spectral atlases, general archive).
 - 3. <1% Sac Peak spectroheliograms (Hα, Calcium K images).
 - 4. 25% GONG (magnetograms, spectra, time series, frequencies).



• Digital Library access was used for 30% of file downloads.

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

Safety Report

- During this quarter, no recordable injuries occurred at Tucson, Kitt Peak, or Sacramento Peak.
- The NOAO/NSO Contingency Plan is currently being reviewed by the NOAO/NSO management committee. The plan consists of sections detailing a "non-scientific" business impact analysis, risk reduction and elimination, list of emergency plans, recovery goals, objectives, organizational structure, individual roles and responsibilities, recovery procedures, database/document lists, service and supplies lists, and other useful information. The plan is expected to be approved and distributed to key personnel by mid February 2003.
- The first course of wild land firefighting training on Kitt Peak has been in progress since November 2002. Eleven Kitt Peak personnel and three tenants completed the course in January 2003. This course is provided by Tohono O'Odham Nation Department of Public Safety at no cost to our organization.
- NOAO/NSO has implemented procedures and projects that were intended to enhance security including locking of critical doors, the installation of a parking lot video monitor, installation of new control doors and electronic access control. Electronic access control includes the Tucson office main entrance doors, directors' offices and Kitt Peak dorm rooms.

Personnel Changes and Visiting Scientists

Date	Name	Position	Site/Project
10/14/02	Dave Dooling	Outreach and Education Officer	NSO/SP
11/04/02	Tony A. Spence	Engineer	NSO/SP
12/02/02	Dylan G. Sexton	Senior Technician Electronics	NSO/SP
G L LE	unlaymant		
Completed Er	прюушени		
Completed Er 10/21/02	Ann Barringer	Administrative Assistant	NSO/T

None

Visiting Scientists (one month or longer)

None

APPENDIX National Solar Observatory 01 January - 31 March 2003

January - March 2003: During this period, 33 observing programs (2 of which were thesis programs involving 4 graduate students) were carried out at the National Solar Observatory. Graduate and undergraduate students are indicated by a (T) for thesis students, (G) for non-thesis graduate students, (UT) for undergraduate thesis students; and (U) for undergraduate students.

		Nights	Days	Hours
8		0.0	6.0	7.0
Michael Dulick	National Solar Observatory			
FTS Beamsplitter Char	nges			
McMP FTS Lab				
1222		0.0	9.0	0.0
Curtis Rinsland	NASA Langley Research Center			
Monitoring of Long-Te	erm Trends in the Concentrations of Atmosphe	ric Gases from McM	ath FTS Sol	ar Spectra
1661		0.0	5.0	0.0
Linda Brown	Jet Propulsion Laboratory			
Devi	College of William and Mary			
Laboratory Infrared Sp McMP FTS Lab	pectroscopy			
Welvii 115 Euo				
1854		0.0	3.0	30.0
William Livingston	National Solar Observatory			
Line Asymmetry Chang McMP FTS/Mc-P	ges in the Solar Irradiance Spectrum			
1858		0.0	8.0	28.0
William Livingston	National Solar Observatory			

Cycle Variability of the Solar Spectrum

McMP Main spectrograph

		Nights	Days	Hours
2030		17.0	0.0	376.5
Ronald Oliversen	NASA/Goddard Space Flight Center			
Morgenthaler	NASA Goddard Space Flight Center			
Hilton	NASA/Goddard Space Flight Center			
Mierkiewicz	University of Wisconsin-Madison, Dept. of A	Atmospheric & Oc	eanic	
Baldeosingh (U)	South Carolina State University			
Observations of [OI] (6300 Emission from Io			
McMP Stellar spectro	graph			
2058		0.0	7.0	36.0
Andrew Potter	National Solar Observatory			
Killen	Southwest Research Institute			
Morgan	Southwest Research Institute			
Studies of Exospheric	Emission Lines in the Inner Solar System			
McMP Stellar spectro	graph			
2058n		7.0	0.0	70.0
Andrew Potter	National Solar Observatory			
Killen	Southwest Research Institute			
Morgan	Southwest Research Institute			
Studies of Exospheric	Emission Lines in the Inner Solar System			
McMP Stellar spectro	graph			
2066b		0.0	12.0	86.0
Jan Stenflo	ETH- Zürich			
Gandorfer	Max Planck Institute for Aeronomy			
Gisler	ETH-Zurich Institut fur Astronomie			
Schmid	ETH- Zürich			
Keller	National Solar Observatory			
Coherence Effects in	Spectral Lines Near the Solar Limb			
McMP Main spectrog	raph			
2066b		12.0	0.0	89.0
Jan Stenflo	ETH- Zürich			
Feller (T)	ETH-Zurich Institut fur Astronomie			
Joos (T)	ETH-Zurich Institut fur Astronomie			

Coherence Effects in Spectral Lines Near the Solar Limb

McMP Main spectrograph

		Nights	Days	Hours
2127		0.0	16.1	28.0
Richard Altrock	USAF Research Laboratory			
Three-Line Coronal F	Photometer			
Evans Facility Sac Pe	ak			
2128		0.0	11.2	37.0
Simon Worden	USAF			
Keil	National Solar Observatory			
Ca K Solar Rotation				
Evans Facility Sac Pe	ak			
2141		0.0	20.0	0.0
Steve Hegwer	National Solar Observatory			
Gilliam	National Solar Observatory			
Telescope Maintenand	ce			
Dunn Solar Sac Pea				
2149		0.0	90.0	424.0
Archives	National Solar Observatory			
Flare Patrol: Daily/C	Community			
Hilltop Dome Sac Pea	ık			
2150		0.0	90.0	424.0
Archives	National Solar Observatory	0.0	70.0	.2
White Light Patrol: L	Daily/Community			
Hilltop Dome Sac Pea	ık			
2151		0.0	8.0	32.0
Archives	National Solar Observatory		2.0	20
Sunspot Drawing: Da	nily/Community			
Hilltop Dome Sac Pea	ık			

		Nights	Days	Hours
2193		0.0	11.2	37.5
Richard Altrock	USAF Research Laboratory			
Elrod	National Solar Observatory			
Calibration of Corona				
Evans Facility Sac Pe	ak			
2219		0.0	3.0	0.0
Donald Lubowich	American Institute of Physics			
The Solar Boron Abu	ndance			
McMP FTS/Mc-P				
2245		0.0	18.0	92.0
Christoph Keller	National Solar Observatory	0.0	10.0	72.0
ATST Key Technology	y Developments			
McMP Main spectrog	raph			
2290		0.0	7.0	23.0
Harrison Jones	NASA/Goddard Space Flight Center	•••	7.0	20.0
Penn	National Solar Observatory			
Malanushenko	National Solar Observatory			
Flare Polarimetry Usi	ing He I 1083 nm			
KPVT				
2292		0.0	2.0	16.0
Claude Plymate	National Solar Observatory	0.0	2.0	10.0
Infrared Spectral Ima	ging at the McMath-Pierce Telescope			
McMP Main spectrog	raph			
2293n		9.0	0.0	47.0
Andrew Potter	National Solar Observatory	7.0	V•V	17.0
NEO Astrometry with	the McMath-Pierce East Auxiliary Telescope			
McPE Stellar spectrog	•			

		Nights	Days	Hours
2303		0.0	6.0	16.0
Archives				
Malanushenko	National Solar Observatory			
TRACE Observations				
KPVT Spectromagnetogra	aph			
2320		0.0	5.0	50.0
Thomas Ayres	University of Colorado, CASA	0.0	3.0	30.0
Pushing the Resolution E	nvelone in the Thermal IR			
McMP Main spectrograph				
2336		0.0	6.0	40.0
Jacques Beckers	National Solar Observatory			
Rimmele	National Solar Observatory			
Development of Solar SCI	DAR			
Dunn Solar Sac Peak				
2336a		0.0	5.0	31.0
Jacques Beckers	National Solar Observatory	0.0	3.0	31.0
Rimmele	National Solar Observatory			
Davelonment of Solar SCI	D 4 P			
Development of Solar SCI McMP Main spectrograph				
2337		0.0	5.0	6.0
Linda Brown	Jet Propulsion Laboratory			
Steyert	NASA Goddard Space Flight Center			
Butler	Jet Propulsion Laboratory			
Laboratory Spectroscopy of	of Hot Methane			
McMP FTS Lab				
2342		0.0	21.0	77.0
Arturo Lopez Ariste	High Altitude Observatory, NCAR	U. U	41.0	77.0
Tomczyk	High Altitude Observatory, NCAR			
Casini	High Altitude Observatory, NCAR			
Balasubramaniam	National Solar Observatory			
Pevtsov	National Solar Observatory			
Vector Magnetic Fields in	•			

Dunn Solar Sac Peak

		Nights	Days	Hours
2355		0.0	10.5	36.0
Maud Langlois	New Jersey Institute of Technology			
Rimmele	National Solar Observatory			
Moretto	National Solar Observatory			
Evaluation of the Anisopla	natism and Feasibility of Solar MCAO			
Dunn Solar Sac Peak				
2356		0.0	10.0	53.0
Krishna Balasubramaniam	National Solar Observatory			
Pevtsov	National Solar Observatory			
Rotional Motions in Spicu	les			
Dunn Solar Sac Peak				
2357		0.0	11.0	57.0
Yukio Katsukawa (T)	University of Tokyo, National Astronomical Obs	servatory		
Shimizu	University of Tokyo, NAO			
Kubo (T)	University of Tokyo, NAO			
Tsuneta	National Astronomical Observatory of Japan			
Magnetic Field Evolution	around Leading Sunspots			
Dunn Solar Sac Peak				
2358		0.0	11.5	56.0
Bruce Lites	High Altitude Observatory			
Norton	High Altitude Observatory, UCAR			
Socas-Navarro	High Altitude Observatory, NCAR			
Deep Internetwork Magne	tograms at High Resolution			
Dunn Solar Sac Peak				
3790		0.0	90.0	296.0
Archives	National Solar Observatory			
Vacuum Telescope Synopt	ic Program: Daily/Community			

KPVT Spectromagnetograph