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SPACE TELESCOPE SCIENCE INSTITUTE

# Newsletter

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## The PLANET Project: study of unseen lenses, stars and extra-solar planets through microlensing

*Kailash C. Sahu, STScI* ksahu@stsci.edu

The idea of microlensing is not new. More than half a century ago, Einstein wrote a small paper in *Science* where he did ‘a little calculation’ at the request of R.W. Mandal, and showed that if a star happens to pass very close to another star in the line of sight, then the background star will be lensed. However, he also dismissed the idea as only a theoretical exercise and remarked that there was ‘no hope of observing such a phenomenon directly’ since the probability of observing is less than one in a million.

Times have changed. The technologies have been put to use to beat the enormous odds. The herculean experiments designed in late 80s to look for microlensing events — by monitoring millions of stars towards the Magellanic Clouds and the Galactic Bulge — have borne fruit. After the first detection of a microlensing event in 1993, microlensing events have been detected at a prodigious rate by the microlensing survey programs MACHO, OGLE, EROS, and DUO, and there has been a steady and increasing interest in the study of microlensing phenomena. By now, more than 200 microlensing events have been detected towards the Galactic Bulge, and more than a dozen microlensing events have been detected towards the Magellanic Clouds.

The microlensing survey programs have an ‘Alert’ capability that has opened the possibility of carrying out independent follow-up study of the microlensing events while the events are in progress. Now, at any given time during the months when the Galactic Bulge is up in the sky, there are typically 10 or more microlensing events in progress, so it is possible to even plan and dedicate some telescope time to carry out such follow up studies of the microlensing events.

### *Science with microlensing monitoring programs*

Traditionally, microlensing events are thought to be symmetric, non-repeatable and achromatic — which is true only for point source, point lens cases. While most microlensing light curves can indeed be approximated in that way, the departure from such an approximation can provide very useful information on the source and lens characteristics. The number of additional and interesting science programs that can be done by studying such finer structures in the light curve is large. For example, frequent monitoring of a caustic crossing caused by a binary lens can potentially provide information on the location of the lens. Monitoring of high-amplification events where the lens passes across the face of the source can be used as an effective high-angular-

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## *Cycle 8*

*Who got time on HST to do what ...*

*How the selection process works ...*

*A new RPS2 for Cycle 8 ...*

*A new Phase II ...*

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## NGST SCIENCE AT STScI

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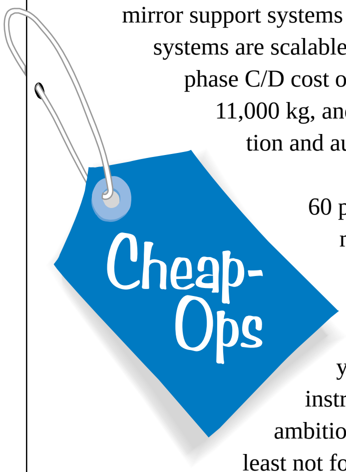
# DIRECTOR'S PERSPECTIVE

### Steven Beckwith

You can buy a Sony Walkman for $35. It cost more than $100 fifteen years ago, when the dollar's worth was 50% greater. The cost of computers has come down drastically at the same time that computing power has increased exponentially. Long-distance telephone calls are much cheaper; so too are mobile phones. Many commodities have come down in price, with oil being the most remarkable. Gasoline costs less now in constant dollars than at any time since the 1920s. Across the wide spectrum of manufactured goods, services, and commodities, you pay less to get better quality today than you did only a decade ago. The business sector has enormously increased its productivity.

Telescopes are cheaper to build too, and the new ones are much better than those we built even 15 years ago. They have faster focal ratios, so they are shorter and lighter. We understand the importance of thermal control to reduce dome seeing. Computers allow us to use alt-az drives, reducing the cost of mountings, while simultaneously increasing their strength. Computer-controlled mirror support systems let us use segmented (Keck) or thin-meniscus (VLT, Gemini) primary mirrors; in principle, these systems are scalable to apertures of enormous size: MAXAT (50m) and OWL (100m). We expect to build the NGST for a phase C/D cost of $500 million; a large part of the savings is that NGST will weigh 3700 kg, whereas *HST* weighs 11,000 kg, and cost tends to scale with weight for spacecraft. We have constructed more sophisticated instrumentation and automated systems to point, track, and record data without requiring heroics from the observers.



The big telescopes have become *more* expensive to operate. Keck has an on-site staff of more than 60 people. A similar number of people work on instrumentation for the telescope. The VLT will need to maintain four telescopes and will require an even larger staff. The Space Telescope Science Institute has a staff of 470 people, almost all of whom work full time to maintain the data flow from the Hubble Space Telescope. There are yet more people employed by Goddard Space Flight Center and in industry to service the telescope. Only 20% of the *HST* budget goes to STScI operations (~40 M$/year). Grants and fellowships are another ~28 M$/year. The rest, of order 180 M$/year, is for new instrumentation, servicing, and flight operations. Gone are the days when a professor with a couple of ambitious graduate students and a technician could build state-of-the-art equipment to explore the heavens, at least not for the biggest telescopes.

There are gains, of course. The information content of a single observation is generally much higher than it used to be, in some cases by orders of magnitude, so the cost per bit of data has not risen as dramatically as operating expenses. Large CCD detectors deliver enormous amounts of high-quality data, although we should temper our enthusiasm by noting that photographic plates in the 1920s provided more raw bits of information than today's CCDs. The principle gain is high quantum efficiency needed for the faintest objects, that are naturally the most interesting. Similarly, *HST* delivers images with such superb resolution that it has changed the nature of what we expect. Quite a bit of modern astronomy now *requires* this resolution and its correspondingly high price. *HST* set the bar higher both in quality and cost of data.

I think it is a good time to examine these costs and see if we can reduce them without sacrificing those services necessary to do great science. We provide many services at STScI, some of which we can almost certainly do more cost effectively than anyone else; calibrating the standard instrument modes, for example, and archiving the data. Others may be less expensive and just as effective if done by the users. Novel uses of the telescope or observations with rarely-used configurations may be more successful if the expertise is vested in the community. Soon there will be redundant capability on *HST* whose incremental support cost will be high, but whose incremental scientific value is, at the very least, debatable.

Productivity gains in industry normally come at the cost of up-front capital investment for new equipment and training. When spread across millions of units, robotic welding equipment to manufacture automobiles or satellites to handle phone calls will greatly reduce costs in the long run, even if they are more expensive to implement at first. We can achieve similar productivity

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## Editorial

*Because of STScI's role in the Next Generation Space Telescope, this and future issues of the Newsletter are being sent to infrared astronomers as well as to the HST community. We hope you find the Newsletter useful and encourage your responses on its content (see the back page). You may, of course, ask to not receive this publication if you wish.*

# The *HST* Proposal Selection Process

*Mike Shara, STScI* shara@stsci.edu

Next month I'll step down as Head of the STScI Science Programs Selection Office (SPSO) after overseeing proposal Cycles 5, 6, and 8. The Panels and TACs I've had the privilege of working with have allocated about 10,000 *HST* orbits, equivalent to roughly a billion dollars (when you amortize the *HST* mission cost over 20 years). Their hard work, and that of the SPSO staff, is directed at selecting the very best proposals received each year.

The oversubscription rate is typically four- or five to one, with 1000+ proposals each year, so it's inevitable that some very good proposals are declined each cycle. I'd like to share with you some details of how the process works, what the Panels and TAC look for in supporting the truly outstanding proposals, and some ideas that you might find useful when you write your next *HST* proposal.

## *How the Proposal Selection Process Works*

The proposal selection process has not changed drastically in recent years, though details have been different in different cycles. As an illustration I'll describe here the process as it was just applied to Cycle 8 proposals.

First, we asked STScI staff scientists to help by acting as Panel Support Scientists (PSSs). One senior and one junior STScI staffer were assigned to each panel. The PSSs acted solely to provide knowledgeable help for the work of the individual TAC panels, and were not voting members. Immediately after the proposal deadline the senior PSS read each proposal for his or her panel and sent those with potential technical problems to an Instrument Scientist for a technical review. A "swap meet" was held by SPSO and the PSSs to make sure proposals ended up in the most appropriate panel. We worked hard to ensure that all proposals in a given area ended up in the same panel and that the assigned panel had the appropriate expertise to judge those proposals.

Proposals were assigned to Panelist reviewers on the basis of the proposal title and keywords, and the panelists' fields of expertise. Stringent conflict-of-interest rules were in place to prevent PIs, co-Is, same-institution colleagues, former supervisors and direct competitors from judging each other's proposals. We asked TAC

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## Cheap Ops *from page 2*

gains by investing in software to handle routine tasks now being done by people, and we do it all the time. The STScI staff has decreased by 14% since 1993, when it peaked. Our data rate has more than doubled, and a smaller staff provides more services for more complex instruments than in the past. We are implementing new software to automate the grant awards, handle our accounting systems, and translate scheduling information for the telescope from people-oriented language to machine code. All of these investments cost money, principally by using STScI software engineers to write and debug new code. It makes sense for some areas, but would be wasteful for others, where the number of "units," observation blocks, special instrument modes, or user inquiries is small. Our support of NGST will make possible more of these productivity gains by spreading the infrastructure costs over two projects.

NASA sets our budget assuming no change in the level of support for science instruments, and no change in the number of services we provide. The agency wants to do everything it can to insure the continued great flow of data from *HST*. But we will do ourselves a service by becoming more efficient before we face budget cutbacks: They are inevitable. And we are looking forward to the era of the NGST with the important assumption that we can operate it for about 30% of the cost of operating Hubble. We are working now to meet this goal; it will depend on some discipline in mission design, but it should be doable. In the meantime, it is useful to ask if we can reduce the costs of running *HST*. If we can make gains in our *HST* productivity, it bodes well for the future of space astronomy.

This effort will start at STScI and involve the users through community dialogue. The users committee, STUC, should play a major role in helping make the tradeoffs between essential and non-essential services. Some of the changes will be transparent to the user, resulting from internal improvements in the way we carry out tasks. Some will involve changes in the way the users work and what they expect from STScI. I do not see much waste in our current system. We scientists should demonstrate that we can increase productivity just as industry does. It may get the attention of our supporters if we who use astronomical facilities for research can increase our overall output without more input. Food for thought.

Steven Beckwith
Baltimore, December 22, 1998

# Mike Shara to Leave STScI

As the accompanying article on proposal selection notes, Mike Shara will soon leave STScI to go to the American Museum of Natural History. The profiles of Institute scientists that have appeared in the *Newsletter* have mostly been of people recently promoted to tenure, which has meant I have missed more senior staff members. Mike has been at the Space Telescope Science Institute since its earliest days, and I wanted to make sure readers knew a little about him.

Mike is one of the Institute's many Canadians (you can still hear it a little in words like "about"). Despite the long and cold winters of Montreal, where he was born and raised, he took early to observing the heavens with a small refractor. He knew he wanted to be an astronomer when he was eight years old, and pursued that goal. His parents (an accountant and bookkeeper) encouraged his interest in science, as did an uncle who was involved with pharmaceutical research for a time. Some old books of a cousin, including some 1940s astronomy textbooks, also helped fuel his interest. He got his BSc in physics from the University of Toronto in 1971, then spent an additional year there to finish a Masters degree with Maurice Clement.

*Mike Shara*

A desire to explore his Jewish background and a sense of adventure led Mike to go to graduate school at Tel Aviv University. He and his wife arrived in Israel just before the Yom Kippur war began, but stayed on to finish his degree in 1977. He worked with Giora Shaviv on hydrodynamic simulations of stellar collisions involving white dwarfs. Offshoots from this have been prominent in most of his subsequent research. For instance, the simulations showed that such collisions — which are likely to occur in globular cluster cores — lead to the white dwarf being coated with hydrogen after the collision event. This leads to a nova-like phenomenon after the main sequence star (the target of the collision) get destroyed.

Mike returned to Montreal after his PhD to take up a National Research Council (of Canada) post-doctoral fellowship at the University of Montreal. This led to collaborations with Rene Racine and Tony Moffat that also were critical in his career. Despite his youthful observational interest, Mike's professional background was entirely in theory, but Rene (re)introduced Mike to observational astronomy. Tony got Mike involved with Wolf-Rayet stars.

Mike spent 1980 to 1982 as a Visiting Assistant Professor at Arizona State University, then he came to STScI in 1982. His younger brother is also a scientist (a chemical engineer), and his wife, Honey, runs a small business supplying medical equipment. When he can, Mike gets away for scuba diving, and is well known here for his competitive squash racquet.

The Institute will miss Mike, but the move to New York works well for him. The position at AMNH offers more time for research, his wife markets equipment via the web, and their two children are in New York. We wish them all well.

*— The Editor*

## Proposal Selection Process

*from page 3*

panelists to provide preliminary grades and comments before the panels met.

Panelists came to STScI for intense two-day meetings. The panels reviewed and graded proposals on the first day, with a more reflective overview the second day. This overview was aimed at achieving scientific balance and breadth, consistent with panel orbit allocations. Snap and AR proposals were judged after GO orbits were assigned.

Each panel was allocated a number of *HST* orbits that was based mostly on proposal pressure. The total number of orbits assigned by the panels was about two-thirds of the available spacecraft orbits, with TAC assigning the rest. A significant pool of "matching incentive" orbits for larger proposals was made available to the panels this year for the first time.

This helped panels with modest initial orbit allocations award time to one or more larger proposals. Further details on this will be available in the Cycle 9 Call for Proposals.

The final product of each panel was a rank-ordered list of proposals. After each panel exhausted its available orbits it assembled a list of the best remaining proposals which were forwarded to the TAC for consideration. The TAC was charged with addressing the overall scientific quality and interdisciplinary balance of the Cycle 8 program. This was done by having the 20 TAC members consider and vote on the Large proposals, the scientifically risky proposals, and the best proposals not assigned time by the panels.

The 16 Panel chairs and 4 TAC members-at-large were asked to be advocates for the entire field of astronomy. In their initial presentations, each panel chair's goal was to educate the TAC on the key scientific themes in the sub-field, on the special role of *HST*, and on the overall quality level of proposals in the panel. For that reason, panel chairs limited their sub-area advocacy to their initial presenta-

*continued page 5*

## Proposal Selection Process *from page 4*

tions. Chairs were asked to respond honestly to questions about strengths and weaknesses of proposals.

The TAC then proceeded to “rounds” for proposals in various categories. A special round for the largest proposals was held, which carefully considered the recommendation from panels about these Large proposals. Rounds for all remaining competing proposals (including the “risky” class) followed. In these rounds, each panel chair presented one proposal, and the TAC then voted. Typically 4 to 6 proposals were accepted per round. At appropriate moments, TAC discussed and compared the general quality of the remaining proposals, and then proceeded to further rounds until all available time was allocated. Both TAC and the panelists have supplied STScI with detailed critiques of our procedures so that we can further improve our selection process in future cycles.

### *Observations and Suggestions*

At least half of all proposals that are rejected have violated one or more of the following simple rules:

First, the best proposals can be understood in their entirety by a first-year graduate student. In other words, a clear and succinct statement of the broad science background is essential. Convincing the Panel that the proposed observations will significantly advance our understanding of a class of objects or physical process is no less crucial. Narrowly-focused proposals or those proposing only modest increments of knowledge rarely succeed.

Second, tell the panel why *HST* is essential to the success of your proposal. If it can be done from the ground, even with difficulty, your proposal will not receive time.

Third, signal-to-noise calculations must be thoroughly documented. Vague descriptions force STScI technical personnel to do Exposure Time Calculations in support of panels, and they may have to guess at proposers’ intentions. Significant doubt about the technical feasibility of a proposal is usually fatal to that proposal; the onus is on the proposer!

Fourth, panels look very hard at what you’ve done with your past allocations of *HST* time. Requesting more time when you haven’t published observations from two or more cycles ago regularly leads to rebukes and proposal downgrading by panels. Timely publication in refereed journals is regarded by panels as a strong plus.

Fifth, proposers who request exactly the number of orbits that they really need, regardless of the “Small,” “Medium,” or “Large” orbit boundaries, tend to do best. Panels and TAC have an uncanny sense of orbit inflation and punish it. They also recognize a truly great, exciting proposal right away and support it with little regard for orbit cost.

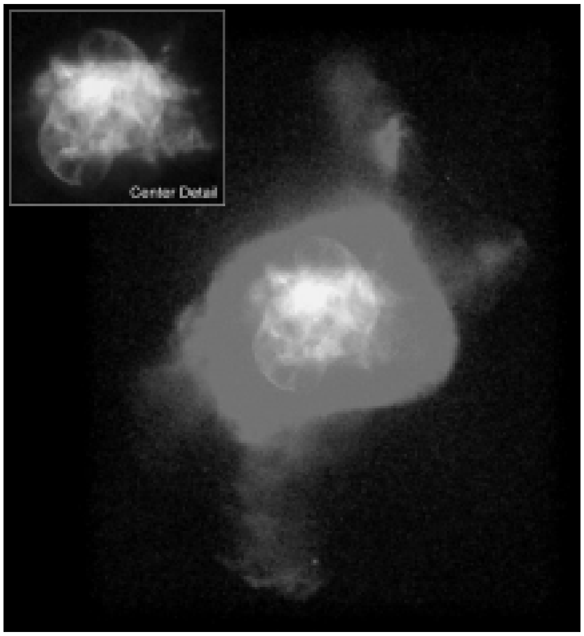
Finally, edit your proposals carefully and have a colleague read them for clarity. Missing references, mislabelled figures, garbled sentences and proposals exceeding the page limit rapidly sour panelists trying to absorb up to 100 competing proposals.

### *Final Thoughts*

If your proposal was turned down, should you reapply? Panelists rarely serve more than once every three or four years. Because successive panels are composed of completely different members, it’s probably worth resubmitting a proposal which ranked in the top half but failed to get time (but heed the referees’ advice first!). On the other hand, proposals in the bottom half usually had flaws serious enough that the proposer will have to strengthen them significantly to have any realistic chance of success in the next round.

Finally, consider submitting your proposal a few days ahead of the deadline. Please. The internet didn’t melt down on September 11, as your proposals came flooding in, despite the fact that Ken Starr’s report was competing for bandwidth. But did you really need the adrenaline rush of watching your proposal vanish into the ether with less than 100% probability of receipt before the deadline?

On a personal note, it’s been a genuine privilege and pleasure to do this job. The technical and scientific support I’ve consistently received from the SPSO staff, PRESTO division office and STScI colleagues has been outstanding. The encouragement and moral support from the Director’s Office has been equally invaluable. I’ll be moving permanently to the American Museum of Natural History and Hayden Planetarium in Manhattan next summer, leaving SPSO in Meg Urry’s experienced hands. Cycle 9 will bring on the Advanced Camera, a resurrected NICMOS and, I’m certain, well over 1000 strong proposals for an extraordinary telescope.



*HST Recent Release: Turtle In Space*

*NASA’s Hubble Space Telescope has shown us that the shrouds of gas surrounding planetary nebulae come in a variety of strange shapes, from an "hourglass" to a "butterfly" to a "stingray." With this image of NGC 6210, the Hubble telescope has added another bizarre form to the rogues’ gallery of planetary nebulae: a turtle swallowing a seashell.*

*Credits: Robert Rubin and Christopher Ortiz (NASA Ames Research Center), Patrick Harrington and Nancy Jo Lame (University of Maryland), Reginald Dufour (Rice University), and NASA*

*http://oposite.stsci.edu/pubinfo/pr/1998/36/index.html*

## Panels

### TAC Chair
*Steve Strom, University Of Massachusetts*

### TAC At-Large Members
*Joe Burns, Cornell University*

*Ray Carlberg, University Of Toronto*
*Francoise Combes, Observatorie De Paris-Meudon*
*Dave Meyer, Northwestern University*
*Jim Pringle, University Of Cambridge Institute Of Astromony*

### AGN Hosts And Environment
*Patrick J. McCarthy, Carnegie Observatories*
*(Panel Chair)*

*Joanne Baker, U. Of California Berkeley*
*Kenneth C. Chambers, U. Of Hawaii, Institute For Astronomy*
*David De Young, KPNO/NOAO*
*Richard W. Pogge, Ohio State University*
*Susan M. Simkin, Michigan State University*
*S. Adam, University Of California*
*Catherine Boisson, (ESA), Observatorie De Paris-Meudon*

### AGN Physics
*P. D. Barthel, Kapteyn Astronomical Institute*
*(Panel Chair)*

*Gerald N. Cecil, KPNO/NOAO*
*Martin C. Gaskell, University Of Nebraska*
*Hagai Netzer, Tel Aviv University*
*Christopher Reynolds, University Of Colorado, JILA*
*Paul S. Smith, KPNO/NOAO*
*Thomas Boller, (ESA), MPI Für Extraterrestrische Physik*

### Binary Stars
*Edward M. Sion, Villanova University*
*(Panel Chair)*

*Douglas R. Gies, Georgia State University*
*Carole Haswell, University Of Sussex*
*Coel Hellier, Keele University*
*David W. Latham, Center For Astrophysics*
*Ronald Webbink, University Of Illinois*
*Hilmar W. Duerbeck, (ESA), Westpfalische Wilhelms-Universität*

### Cool Stars
*Douglas K. Duncan, University Of Chicago*
*(Panel Chair)*

*George F. Benedict, U. Of Texas-Austin, McDonald Observatory*
*Nancy S. Brickhouse, Center For Astrophysics*
*Alexander Brown, University Of Colorado CASA*
*Geoffrey C. Clayton, Louisiana State University*
*Constantine P. Deliyannis, Indiana University*
*Iain Neil Reid, Caltech*
*Raffaele Gratton, (ESA), Osservatorio Astronomico Di Padova*

### Clusters, Lensing, and Cosmology
*Wendy L. Freedman, Carnegie Observatories*
*(Panel Chair)*

*Warrick Couch, University Of New South Wales*
*Philippe Fischer, University Of Michigan*
*Lori M. Lubin, Caltech*
*Hans Boehringer, (ESA), MPI Für Extraterrestrische Physik*
*Edward A. Ajhar, KPNO/NOAO*
*Ronald O. Marzke, Carnegie Observatories*
*Brian P. Schmidt, Mount Stromlo & Siding Spring Obs. The Australian National University*
*David N. Spergel, Princeton University*
*Yannick Mellier, (ESA), Observatoire Midi Pyrenees*

### Distant Galaxies
*David C. Koo, University Of California, Lick Observatory*
*(Panel Chair)*

*Stephane Courteau, Dominion Astrophyiscal Observatory*
*Erica Ellingson, University Of Colorado, CASA*
*Michael A. Pahre, Center For Astrophysics*
*David Schade, Dominion Astrophyiscal Observatory*
*Jeffrey A. Willick, Stanford University*
*Emanuele Giallongo, (ESA), Osservatorio Astronomico Di Roma*

### Field Stellar Populations
*Donna Weistrop, University Of Nevada, Las Vegas*
*(Panel Chair)*

*Timothy C. Beers, Michigan State University*
*Eva Grebel, University Of California Lick Observatory*
*Kem Cook, Lawrence Livermore National Lab., U. Of California*
*Andrew C. Layden, Bowling Green State University*
*Michael Rich, Columbia University*
*Bengt Edvardsson, (ESA), Uppsala Astronomical Observatory*

## Panels

### Galaxy Populations And Interactions

*Robert W. O'Connell, University Of Virginia*
*(Panel Chair)*

*Darren L. Depoy, Ohio State University*
*Michael Gregg, Lawrence Livermore National Lab.*
*Carl J. Grillmair, SIRTF Science Center*
*Inger Jorgensen, Gemini 8-M Telescopes Project*
*Chris Mihos, Case Western Reserve Univ.*
*Curtis Struck, Iowa State University*
*Brigitte Rocca-Volmerange, (ESA), Institut D'astrophysique De Paris CNRS*

### Galaxy Structure And Dynamics

*Debra M. Elmegreen, Vassar College*
*(Panel Chair)*

*Gregory D. Bothun, University Of Oregon*
*Marcella Carollo, The Johns Hopkins University*
*John J. Dubinski, University Of Toronto, CITA*
*Karl Gebhardt, University Of California Lick Observatory*
*Michael Loewenstein, NASA/GSFC, University of Maryland*
*K. H. Kuijken, (ESA), Kapteyn Astronomical Institute*
*Mark Whittle, Univ. Of Virginia*

### Hot Stars

*James W. Liebert, University Of Arizona, Steward*
*(Panel Chair)*

*Laurent Drissen, Université Laval*
*Jean Dupuis, University Of California At Berkeley*
*Andrew King, University Of Leicester*
*Mordecai-Mark Mac Low, Max Planck Institute For Astronomy*
*Linda Smith, University College London*
*Kim Venn, Macalester College*
*Saeqa Dil Vrtilek, Center For Astrophysics*
*Joachim Puls, (ESA), Universitaetssternwarte Muenchen*

### Interstellar and Intergalactic Matter

*Michael J. Barlow, (ESA), University College London*
*(Panel Chair)*

*Steven R. Federman, University Of Toledo*
*Donald R. Garnett, University Of Arizona Steward Observatory*
*Katherine Roth, University Of Hawaii Institute For Astronomy*
*Robert H. Rubin, NASA/Ames Research Center*
*Blair D. Savage, University Of Wisconsin*
*Giovanno Vladilo, (ESA), Osservatorio Astronomico Di Trieste*

### Quasar Absorption Lines

*Chris David Impey, University Of Arizona, Steward Observatory*
*(Panel Chair)*

*Neal Katz, University Of Massachusetts*
*Kirk T. Korista, Western Michigan University*
*Howard Yee, University Of Toronto*
*Sandra Savaglio, Space Telescope Science Institute*
*Patrick Boisse, (ESA), Departement De Physique De Lens*
*David Bowen, (ESA), Royal Observatory Edinburgh*

### Solar System

*Paul D. Feldman, The Johns Hopkins University*
*(Panel Chair)*

*Jane Fox, Wright State University, SUNY At Stony Brook*
*Richard G. French, Wellesley College*
*Will Grundy, Lowell Observatory*
*Erich Karkoschka, University Of Arizona*
*Steven W. Lee, University Of Colorado, LASP*
*Harold F. Levison, Southwest Research Institute*
*Pierre Drossart, (ESA), Observatoire De Meudon*

### Stellar Ejecta

*Bo Reipurth, University Of Colorado*
*(Panel Chair)*

*Michael F. Bode, Liverpool John Mores University*
*You-Hua Chu, University Of Illinois*
*Sun Kwok, University Of Calgary*
*John C. Raymond, Center For Astrophysics*
*Raghvendra Sahai, Jet Propulsion Lab.*
*Lifan Wang, University Of Texas At Austin*
*Peter Lundqvist, (ESA), Stockholm Observatory*

### Stellar Populations In Clusters

*William E. Harris, McMaster University*
*(Panel Chair)*

*Brian C. Chaboyer, U. Of Arizona, Steward Observatory*
*Adrienne Cool, San Francisco State Univ.*
*Randy L. Phelps, California State University*
*Carlton Pryor, Rutgers University*
*F.W.M. Verbunt, University Of Utrecht, Sterrekundig Instituut*
*Peter Linde (ESA), Lund Observatory*

### Young Stars and Circumstellar Material

*Michal Simon, SUNY At Stony Brook*
*(Panel Chair)*

*Mary A. Barsony, University Of California, Riverside, Harvey Mudd College*
*Adam Frank, University Of Rochester*
*Carol Anne Grady, STIS Group, NOAO/GSFC*
*Lynne Hillenbrand, Caltech*
*Mark J. McCaughrean, (ESA), Astrophysikalisches Institut Potsdam*
*T. P. Ray, (ESA), Dublin Institute For Advanced Studies*

## Proposals by Country:

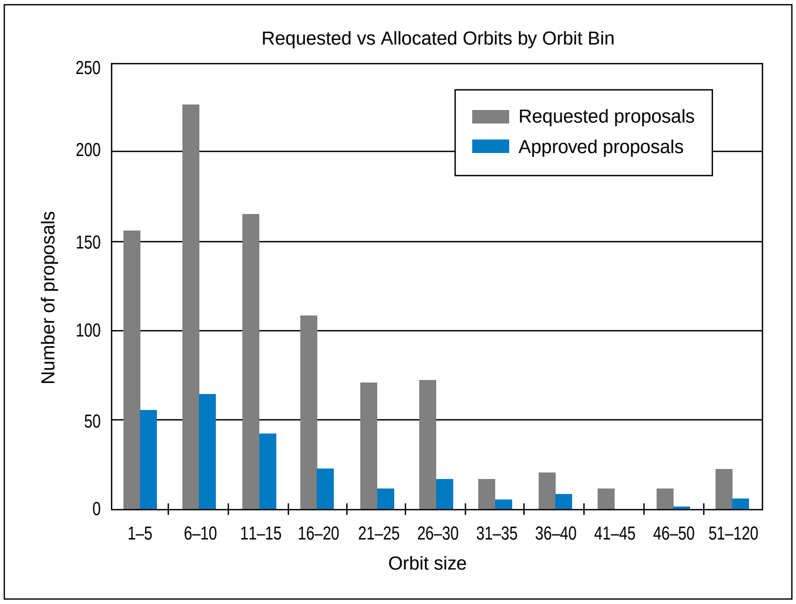
| Country | Submitted | Approved |
|---|---|---|
| Australia | 12 | 1 |
| Austria | 1 | 0 |
| Belgium | 1 | 0 |
| Brazil | 4 | 0 |
| Canada | 19 | 7 |
| Chile | 4 | 1 |
| China | 2 | 0 |
| Denmark | 4 | 0 |
| France | 37 | 14 |
| Germany | 52 | 10 |
| Greece | 1 | 0 |
| India | 2 | 0 |
| Israel | 8 | 1 |
| Italy | 25 | 4 |
| Japan | 3 | 0 |
| Korea | 3 | 0 |
| Netherlands | 18 | 8 |
| Norway | 1 | 0 |
| South Africa | 1 | 0 |
| Spain | 8 | 2 |
| Sweden | 14 | 1 |
| Switzerland | 3 | 0 |
| United Kingdom | 70 | 28 |
| United States | 760 | 218 |

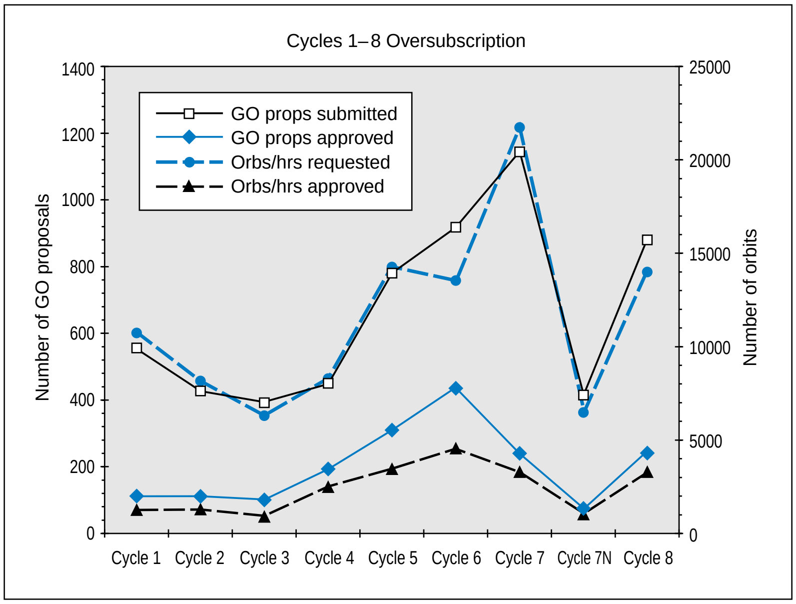
## US PIs by State:

| Country | Submitted | Approved |
|---|---|---|
| AL | 8 | 2 |
| AZ | 56 | 18 |
| CA | 128 | 33 |
| CO | 45 | 15 |
| CT | 11 | 2 |
| DC | 9 | 2 |
| DE | 4 | 0 |
| FL | 2 | 1 |
| GA | 2 | 1 |
| HI | 8 | 2 |
| IA | 4 | 0 |
| IL | 17 | 6 |
| IN | 7 | 1 |
| KY | 4 | 2 |
| LA | 7 | 1 |
| MA | 49 | 13 |
| MD | 190 | 61 |
| MI | 16 | 5 |
| MN | 7 | 5 |
| NC | 3 | 0 |
| NE | 2 | 0 |
| NH | 4 | 2 |
| NJ | 10 | 1 |
| NM | 7 | 2 |
| NV | 4 | 0 |
| NY | 31 | 6 |
| OH | 10 | 4 |
| OK | 2 | 1 |
| OR | 3 | 1 |
| PA | 34 | 6 |
| SC | 1 | 0 |
| TN | 1 | 0 |
| TX | 27 | 6 |
| VA | 10 | 4 |
| VT | 1 | 1 |
| WA | 17 | 5 |
| WI | 19 | 9 |

## Cycle 8 Panels

| Abbreviation | Panel |
|---|---|
| AGHN | AGN Host |
| AGHP | AGN Physics |
| BIN | Binary Stars |
| CLUS | Clusters, Lensing and Cosmology |
| CS | Cool Stars |
| DG | Distant Galaxies |
| FSP | Field Stellar Populations |
| GPI | Galaxy Populations and Interactions |
| GSD | Galaxy Structure and Dynamics |
| HS | Hot Stars |
| ISM | ISM |
| QAL | QAL |
| SS | Solar System |
| SE | Stellar Ejecta |
| SPC | Stellar Populations in Clusters |
| YS | Young Stars |





## Summary of Cycle 8 Results

| | Requested | Accepted | % Accepted | ESA Accepted | ESA % Total |
|---|---|---|---|---|---|
| Proposals | | | | | |
| GO | 880 | 231 | 26% | 62 | 27% |
| SNAP | 64 | 23 | 36% | 9 | 39% |
| AR | 109 | 41 | 38% | — | — |
| **Total** | **1,053** | **295** | **28%** | **71** | **27%** |
| Primary Orbits | 14,005 | 3,314 | 24% | 814 | 25% |
| AR Funding | $6,457,494 | $2,232,523 | 35% | — | — |

| | Accepted | % Total | Oribits | % Total |
|---|---|---|---|---|
| GO Proposals by SI* | | | | |
| FGS | 9 | 4% | 86 | 3% |
| STIS / CCD | 53 | 21% | 570 | 17% |
| STIS / MAMA | 99 | 40% | 1,349 | 41%** |
| WFPC2 | 86 | 35% | 1,309 | 39% |

* The proposal numbers presented in the Science Instrument chart reflect multiple SI usage (either for coordinated parallels or Multi-SI Prime).

** ~ Maximum supportable value

## Proposal Statistics by Panel

| | AGNH | AGNP | BIN | CLUS | CS | DG | FSP | GPI | GSD | HS | ISM | QAL | SE | SPC | SS | YS | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Proposals Received | | | | | | | | | | | | | | | | | |
| GO | 39 | 63 | 47 | 63 | 73 | 25 | 55 | 62 | 38 | 85 | 61 | 44 | 86 | 42 | 51 | 46 | 880 |
| SNAP | 5 | 6 | 5 | 6 | 1 | 4 | 5 | 6 | 8 | 2 | 1 | 4 | 6 | 3 | 0 | 2 | 64 |
| AR | 7 | 4 | 4 | 10 | 6 | 28 | 7 | 5 | 7 | 1 | 4 | 4 | 5 | 3 | 12 | 2 | 109 |
| Proposals Accepted | | | | | | | | | | | | | | | | | |
| GO | 11 | 17 | 16 | 16 | 15 | 8 | 9 | 16 | 13 | 18 | 17 | 12 | 22 | 14 | 15 | 12 | 231 |
| SNAP | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 4 | 2 | 0 | 1 | 23 |
| AR | 3 | 2 | 2 | 2 | 3 | 8 | 2 | 2 | 3 | 0 | 3 | 0 | 2 | 2 | 6 | 1 | 41 |
| Primary Orbits Requested | | | | | | | | | | | | | | | | | |
| | 606 | 874 | 567 | 1401 | 1450 | 755 | 1104 | 925 | 630 | 1000 | 926 | 970 | 1061 | 489 | 619 | 628 | 14005 |
| Panel Fraction of Total Accepted | | | | | | | | | | | | | | | | | |
| | 5% | 7% | 5% | 9% | 13% | 7% | 5% | 5% | 6% | 7% | 5% | 6% | 8% | 4% | 4% | 4% | — |
| Primary Orbits Accepted | | | | | | | | | | | | | | | | | |
| | 163 | 219 | 173 | 306 | 429 | 232 | 170 | 151 | 183 | 228 | 152 | 211 | 278 | 136 | 136 | 147 | 3314 |
| Fraction of Orbits Accepted/Requested | | | | | | | | | | | | | | | | | |
| | 27% | 25% | 31% | 22% | 30% | 31% | 15% | 16% | 29% | 23% | 16% | 22% | 26% | 28% | 22% | 23% | 24% |
| ESA PIs Accepted | | | | | | | | | | | | | | | | | |
| | 6 | 4 | 6 | 5 | 3 | 2 | 2 | 3 | 4 | 7 | 4 | 6 | 8 | 3 | 4 | 4 | 71 |
| ESA Primary Orbits Accepted | | | | | | | | | | | | | | | | | |
| | 107 | 24 | 42 | 95 | 42 | 12 | 54 | 22 | 63 | 50 | 33 | 127 | 57 | 22 | 29 | 35 | 814 |
| Fraction of ESA Orbits Accepted | | | | | | | | | | | | | | | | | |
| | 66% | 11% | 24% | 31% | 10% | 5% | 32% | 15% | 34% | 22% | 22% | 60% | 21% | 16% | 21% | 24% | 25% |

# Approved Observing Programs for Cycle 8

## AGN Hosts And Environment

| | | | |
|---|---|---|---|
| Antonucci | University Of California — Santa Barbara | United States | Optical Nuclear Hotspot In NGC 1068 |
| Best | Sterrewacht Leiden | Netherlands | Alignment And Evolution Of Redshift One Radio Galaxies |
| Filippenko | University Of California — Berkeley | United States | The Bulge Properties And Fueling Mechanisms Of Nearby Agns |
| Hasinger | Astrophysikalisches Institut Potsdam | Germany | Evolution Of High-Redshift Seyfert Galaxies |
| Heckman | The Johns Hopkins University | United States | Comparing The Hosts Of High-$z$ Radio-Quiet Quasars To Lyman Break Galaxies |
| Impey | University Of Arizona | United States | Lensed Quasar Hosts At High Redshift |
| Jaffe | Leiden Observatory | Netherlands | Mapping The Dynamics Of The Quasar 3C 48 |
| Kinney | Space Telescope Science Institute | United States | Accretion Disks And Dust Disks In Active Elliptical Galaxies |
| Lacy | University Of Oxford | United Kingdom | The Nature Of Radio-Optical Alignments In Faint Radio Sources |
| Lehnert | Sterrewacht Leiden | Netherlands | The Evolution Of The Host Galaxies Of Powerful Radio Sources |
| Miley | Sterrewacht Leiden | Netherlands | Morphology Of The Most Massive Galaxies In The Early Universe |
| Sanders | University Of Hawaii | United States | The Nuclei Of Warm Ultraluminous Infrared Galaxies - Superstarbursts Or AGN |
| Sparks | Space Telescope Science Institute | United States | Ultraviolet Snapshots Of 3CR Radio Source Counterparts At Low $z$ |
| Stockton | Institute For Astronomy | United States | The Location Of The Active Nucleus In The Radio Galaxy 3C 294 |
| White | Space Telescope Science Institute | United States | HST Observations Of Millijansky Radio Sources From The First Survey |

## AGN Physics

| | | | |
|---|---|---|---|
| Arav | Institute Of Geophysics And Planetary Physics | United States | Deep STIS Observations Of BALQSO PG 0946+301 |
| Baker | University Of California Berkeley | United States | Absorption And Obscuration In Radio-Loud Quasars |
| Baldwin | Cerro Tololo Interamerican Observatory | Chile | High Abundances In Luminous Quasars: A Test Case |
| Baum | Space Telescope Science Institute | United States | UV Imaging Of Optical Jets: A New Window On The Physics Of Jets |
| Baum | Space Telescope Science Institute | United States | Jets Winds And Bubbles In Hercules A? |
| Biretta | Space Telescope Science Institute | United States | Far-UV STIS Imaging Of The M87 Jet |
| Brandt | The Pennsylvania State University | United States | Coordinated STIS/AXAF Spectroscopy Of UV/X-Ray Absorption In The Seyfert 1 Galaxy NGC 4051 |
| Charles | Oxford University | United Kingdom | UV Spectroscopy Of M33-X8: Mini-AGN Or Black-Hole Binary? |
| Crenshaw | Catholic University Of America | United States | Probing The Kinematics Of The Narrow-Line Region In Seyfert Galaxies With Slitless Spectroscopy |
| Falcke | Max-Planck-Institut Fuer Radioastronomie | Germany | Imaging The NLR In A Complete Sample Of $z<0.5$ Radio-Quiet PG Quasars |
| Junkkarinen | University Of California — San Diego | United States | Chemical Abundances And Geometry In QSO Broad Absorption Line Regions |
| Keenan | Queen's University Of Belfast | United Kingdom | Fe II Emission Lines As A Chronometer For High-Redshift Quasars |
| Kinney | Space Telescope Science Institute | United States | Survey Of Extended OI 5007 Å Emission In Seyfert Galaxies |
| Kriss | Space Telescope Science Institute | United States | UV Spectroscopic Snapshots Of FUSE AGN Targets |
| Mundell | University Of Maryland | United States | Powering The Narrow Line Regions In Seyfert Galaxies - Are Radio Jets The Key? |
| O'Brien | University Of Leicester | United Kingdom | PDS 456: A Radio-Quiet Analogue Of 3C 273 |
| O'Dea | Space Telescope Science Institute | United States | Constraints On The Evolution Of Powerful Radio Galaxies |
| Peterson | Ohio State University | United States | Reverberation Mapping Of A Narrow-Line Seyfert 1 Galaxy |
| Turner | Goddard Space Flight Center | United States | Determination Of The SED For TON S180: A Direct Probe Of The Big Blue Bump |
| Whittle | University Of Virginia | United States | Jet Acceleration Of Narrow Line Region Gas |
| Whittle | University Of Virginia | United States | The Origin Of Blue Wings On NLR Line Profiles |

## Binary Stars

| | | | |
|---|---|---|---|
| Bond | Space Telescope Science Institute | United States | Two Post-Common-Envelope Binaries In The Hyades Cluster |
| Burleigh | University Of Leicester | United Kingdom | Double Degenerates Among DAO White Dwarfs |
| Chaboyer | Dartmouth College | United States | Anomalously Blue Giants: Possible Precursors To Subdwarf B Stars |
| Charles | University Of Oxford | United Kingdom | Structure And Evolution Of The Globular Cluster Low Mass X-Ray Binary AC211 In M15 |
| Drew | Imperial College | United Kingdom | High Resolution UV Imaging Of The Binary Nucleus Of Abell 35 |

| | | | |
|---|---|---|---|
| Gehrz | University Of Minnesota | United States | The Complex Circumstellar Environment Of The Massive Contact Binary RY Scuti |
| Gies | Georgia State University | United States | The FUV Spectrum Of SS 433 |
| Haswell | University Of Sussex | United Kingdom | Black Hole Accretion Outbursts In Soft X-Ray Transients |
| Hellier | Keele University | United Kingdom | The Accretion Geometry In The Soft Double-Pulsing Intermediate Polar V405 Aur |
| Karovska | Smithsonian Astrophysical Observatory | United States | Binary Interaction In The Mira AB Accreting System |
| Kenyon | Smithsonian Astrophysical Observatory | United States | Evolution Of The Symbiotic Nova AG Pegasi |
| Knigge | Space Telescope Science Institute | United States | A Definitive Census Of The Cataclysmic Variable Population In 47 Tuc |
| Margon | University Of Washington | United States | An Ultraviolet Census Of Counterparts To Highly Luminous X-Ray Sources In M31 Globular Clusters |
| Naylor | Keele University | United Kingdom | Solving The Iron Curtain Conundrum |
| Robinson | University Of Texas — Austin | United States | Ultraviolet Spectroscopy Of The X-Ray Transient CI Cam |
| Schneider | University Of Arizona | United States | Duplicity And Variability In HST Guide Stars - An FGS Serendipitous Survey |
| Shara | Space Telescope Science Institute | United States | The Shock Cones And Underlying Stars In Interacting Wolf-Rayet Binaries |
| Sion | Villanova University | United States | Probing An Ancient Thermonuclear Runaway On A White Dwarf In A Dwarf Nova |
| Szkody | University Of Washington | United States | A Global Picture Of White Dwarfs In Cataclysmic Variables |
| Wade | The Pennsylvania State University | United States | The UV Spectrum Of An Elliptical Accretion Disk Devoid Of Hydrogen |

## *Clusters, Lensing And Cosmology*

| | | | |
|---|---|---|---|
| Ajhar | National Optical Astronomy Observatories | United States | Reconciling The SBF And SNIa Distance Scales |
| Bothun | University Of Oregon | United States | The Distance To NGC 2841: Improving The TF Calibration And Definitively Testing MOND |
| Davies | University Of Durham | United Kingdom | Galaxy Evolution In Low-Density Environments: WFPC2 Imaging Of Poor X-Ray Clusters At Z=0.2—0.3 |
| Davis | University Of California | United States | Local Cosmology: The Nearby Flow Field And Its Structure |
| Ellis | Institute Of Astronomy | United Kingdom | Imaging The Host Galaxies Of High Redshift Type Ia Supernovae |
| Falco | Smithsonian Astrophysical Observatory | United States | A Survey Of Gravitational Lenses As Cosmological Tools III |
| Franx | Leiden Observatory | Netherlands | Galaxy M/L Ratios The Morphology-Density Relation And Weak Lensing In The Z=1 Cluster Of 3C184 |
| Gregg | University Of California — Davis | United States | Bright Quasar Close Lensing Search |
| Hajian | United States Naval Observatory | United States | The Gravitational Lens Candidate PKS 1445-161 |
| Kneib | Observatoire Midi-Pyrenees | France | A Strong Lensing Survey Of The Mass Distribution In X-Ray Luminous Clusters |
| Mulchaey | The Observatories Of The Carnegie Institution Of Washington | United States | HST Imaging Of Moderate Redshift X-Ray Emitting Groups Of Galaxies |
| O'Dea | Space Telescope Science Institute | United States | What Is The Nature Of The Cold Medium In Cooling Flow Clusters? |
| Perlmutter | Lawrence Berkeley Laboratory | United States | Cosmological Parameters From Type Ia Supernovae At High Redshift |
| Saha | National Optical Astronomy Observatories | United States | Calibration Of Nearby Type Ia Supernovae As Standard Candles: The Next Step |
| Sasselov | Harvard-Center For Astrophysics | United States | Direct Distances To M31 And M33 Using Detached Eclipsing Binaries And Cepheids |
| Scarpa | Space Telescope Science Institute | United States | Spectroscopy Of Gravitational Lens Candidates From The HST Survey Of BL Lac Objects |
| Schmidt | Mt. Stromlo & Siding Spring Observatories | Australia | Investigating Type Ia Supernovae And An Accelerating Universe |
| Whitmore | Space Telescope Science Institute | United States | The Globular Cluster Luminosity Function As A Distance Indicator |
| Wilkinson | NRAL University Of Manchester | United Kingdom | WFPC2 Observations Of Potential JVAS/CLASS Gravitational Lenses |
| Windhorst | Arizona State University | United States | Searching For The Hydrogen Reionization Edge Of The Universe At $5<z<7.5$ With Deep STIS/CCD Parallels |

## *Cool Stars*

| | | | |
|---|---|---|---|
| Ayres | University Of Colorado | United States | Origins Structure And Evolution Of Magnetic Activity In The Cool Half Of The H-R Diagram: A STIS Survey |
| Bennett | University Of Colorado | United States | A Semi-Empirical Model Of The Structured Wind Of 32 Cygni |
| Bennett | University Of Colorado | United States | VV Cephei: The Egress From Chromospheric Eclipse |
| Burrows | Space Telescope Science Institute | United States | Weather Moons And Orbit Of The Brown Dwarf Gl 229B |
| Cowan | University Of Oklahoma | United States | Abundances In Halo Stars And Galactic Element Formation |
| Duncan | University Of Chicago | United States | Detection Of $^{11}B/^{10}B$: Part II |
| Forveille | Observatoire De Grenoble | France | FGS Astrometry Of The Extrasolar Planet Of Gl 876 |
| Gilliland | Space Telescope Science Institute | United States | Taking The Measure Of Planets In The Globular Cluster 47 Tucanae |

## Approved Observing Programs for Cycle 8

| | | | |
|---|---|---|---|
| Henry | Harvard-Smithsonian Center For Astrophysics | United States | Calibrating The Mass-Luminosity Relation At The End Of The Main Sequence |
| Jordan | University Of Oxford | United Kingdom | Is SIO Observed In The UV Spectrum Of Beta Gem? |
| Kulkarni | California Institute Of Technology | United States | Search For Brown Dwarfs Around Nearby Stars |
| Reid | California Institute Of Technology | United States | A Search For Binary L-Dwarfs |
| Robinson | Catholic University Of America | United States | Rapid UV Spectroscopy Of Stellar Flares |
| Saar | Smithsonian Astrophysical Observatory | United States | A Search For Acoustic Heating In The Chromospheres Of Low Activity Dwarfs |
| Schneider | University Of Arizona | United States | Confirmation And Characterization Of Brown Dwarfs And Giant Planets From NICMOS 7226/7227 |
| Sneden | University Of Texas | United States | CS 22892-052: A Rosetta Star For The Age And Early History Of The Galaxy |
| Soderblom | Space Telescope Science Institute | United States | Calibrating Stellar Models With The Pleiades: Resolving The Distance Discrepancy |
| Valenti | National Optical Astronomy Observatories | United States | Stellar Seismology From Space: From The Sun To The Stars |
| Walter | State University Of New York | United States | The Spatial Location Of The Flaring Regions On AB Doradus |

## *Distant Galaxies*

| | | | |
|---|---|---|---|
| Clements | Institut d'Astrophysique Spatiale & Cardiff University | France | Probing The Dark Side Of Galaxy Formation: HST Imaging Of The ISO Ultradeep Survey |
| Dickinson | Space Telescope Science Institute | United States | The Five Deep Fields: Lyman Break Galaxies From Multi-Color WFPC2 Images |
| Elston | University Of Florida | United States | The Morphological Evolution Of Field Galaxies At $1<z<2$ |
| Ferguson | Space Telescope Science Institute | United States | Constraints On The Evolution Of Dwarf Elliptical Galaxies From Deep HST Images |
| Fruchter | Space Telescope Science Institute | United States | The Source Of Gamma Ray Bursts And The Nature Of Their Hosts |
| Gardner | NASA - Goddard Space Flight Center | United States | Star Formation In Galaxies At $0<z<1.6$ |
| Koo | Lick Observatory University Of California | United States | Quantitative NICMOS Structural Parameters Of Galaxies In The Hubble Deep Field - North |
| Lilly | Department Of Astronomy University Of Toronto | Canada | Identifying The Hidden Phases Of Galaxy Evolution |
| Lowenthal | University Of Massachusetts | United States | The Faintest Radio Galaxies: Interacting Starbursts At $z<1$ |
| Martin | California Institute Of Technology | United States | Moderate Redshift Analogs To Lyman Break Galaxies? |
| McCarthy | Observatories Of The Carnegie Institution Of Washington | United States | STIS Imaging Of The Deep NICMOS Parallel Fields: Building On The NICMOS Legacy |
| Patton | University Of Victoria | Canada | Snapshot Survey Of Dynamically Close Galaxy Pairs From $z=0.1$ To $z=0.5$ |
| Ratnatunga | Carnegie Mellon University | United States | The Morphology Of Faint WFPC2 Galaxies |
| Serjeant | Imperial College London | United Kingdom | Snapshots Of Sub-Mjy Starburst Galaxies |
| Stern | University Of California Berkeley | United States | WFPC2 Imaging Of A Galaxy At $z = 5.34$ And Its Field |
| Waddington | Arizona State University | United States | Rest-Frame Galaxy Morphology At Intermediate To High Redshifts Using Archival NICMOS Images |
| Windhorst | Arizona State University | United States | Locating Compact Ly-Alpha Emitting Galaxies At $z$=2.3-2.8: Analysis Of Archival WFPC2 Medium-Band Images |
| Yan | Carnegie Observatories | United States | Search For Emission Line Galaxies In The Near Infrared Using The NICMOS Grism Data |

## *Field Stellar Populations*

| | | | |
|---|---|---|---|
| Armandroff | Kitt Peak National Observatory | United States | The Horizontal Branches Of The M31 Dwarf Spheroidal Companions And V & VI |
| Bruhweiler | Institute For Astrophysics & Computational Sciences | United States | UV Spectral Properties Of O And B Stars Versus Metallicity |
| Harris | University Of Waterloo | Canada | The Stellar Halo And The Metallicity Distribution Function In The Giant Elliptical NGC 5128 |
| Ibata | European Southern Observatory | Germany | Illuminating The Galactic Dark Matter |
| Ibata | European Southern Observatory | Germany | Accurate Proper Motions Of Galactic Halo Populations |
| Knezek | The Johns Hopkins University | United States | Stellar Populations In The Closest Large Low Surface Brightness Galaxy |
| Leitherer | Space Telescope Science Institute | United States | The Alpha-Element/Iron Ratio In Starburst Populations |
| Mateo | University Of Michigan | United States | Intermediate-Age Dwarf Spheroidal Galaxies In The M81 Group Schulte |
| Schulte-Ladbeck | University Of Pittsburgh | United States | The Evolution Of Galaxies — Mining The Stellar Content Of The Two Most Local Blue Compact Dwarf Galaxies |
| Seitzer | University Of Michigan | United States | A Snapshot Survey Of Probable Nearby Galaxies |
| Wakker | University Of Wisconsin-Madison | United States | A Search For Intergalactic Stars In The Local Group |
| Walterbos | New Mexico State University | United States | Massive Emission-Line Stars In Nearby Galaxies |

## Galaxy Populations And Interactions

| | | | |
|---|---|---|---|
| Calzetti | Space Telescope Science Institute | United States | The Youngest Super-Star-Cluster |
| Calzetti | Space Telescope Science Institute | United States | Calibrating Star Formation With The Metal-Rich Starburst Galaxy M83 (NGC5236) |
| Ciardullo | The Pennsylvania State University | United States | Red Giants  Planetary Nebulae  And The Properties Of Virgo's Intracluster Stars |
| Corbin | Steward Observatory | United States | Pox 186: A Nearby Protogalaxy? |
| Driver | University Of St Andrews | Scotland | Dwarf Busting In Abell 868 |
| Gregg | University Of California — Davis | United States | Galaxy Interactions  Tidal Debris  And The Origin Of Intracluster Light In The Coma Cluster |
| Grillmair | SIRTF Science Center | United States | The Evolution Of Globular Cluster Systems In Early Type Galaxies |
| Harris | Mcmaster University | Canada | Globular Cluster Systems In Three Giant Coma Ellipticals |
| Keel | University Of Alabama | United States | Ongoing Mass Transfer In The Galaxy Pair NGC 1409/10 |
| Leitherer | Space Telescope Science Institute | United States | Ultraviolet Spectra Of Galaxies With Active Star Formation |
| Majewski | University Of Virginia  Dept. Of Astronomy | United States | What Is 52W036?! |
| Maoz | Tel-Aviv University | Israel | Spatial Structure Of Super Star Clusters In NGC 1569 |
| Meurer | The Johns Hopkins University | United States | The Ultraviolet Properties Of Ultra-Luminous Infrared Galaxies |
| Miller | Leiden Observatory | Netherlands | Globular Clusters Of Low Surface Brightness Galaxies |
| Peterson | Astrophysical Advances | United States | Near-UV Spectra Of Andromeda Globular Clusters Compared To Spectral Calculations |
| Treyer | Astrophysikalisches Institut Potsdam | Germany | Dust And Ultraviolet Light In The Local Universe |
| Van Der Marel | Space Telescope Science Institute | United States | Nuclear Structure & Merger—Starburst Relation In The Ultraluminous IR Galaxy NGC 6240: II. Kinematics |
| West | Saint Mary's University | Canada | A Search For Intergalactic Globular Clusters In A1185 |
| Whitmore | Space Telescope Science Institute | United States | Kinematics Of The  Young Star Clusters And The Gas In The Antennae Galaxies |

## Galaxy Structure And Dynamics

| | | | |
|---|---|---|---|
| Axon | University Of Manchester | United Kingdom | The Black Hole Versus Bulge Mass Relationship In Spiral Galaxies |
| Baum | Space Telescope Science Institute | United States | Black Holes And Gas Disks In A Complete Sample Of Radio-Loud Ellipticals - II: Kinematics |
| Bregman | University Of Michigan | United States | The Properties Of Gaseous Halos Around Disk Galaxies |
| Buta | University Of Alabama | United States | High Resolution Imaging Of The Core Of Maffei 1  The Nearest Normal Massive Elliptical Galaxy |
| Cote | California Institute Of Technology | United States | The Origin Of cD Envelopes |
| Edge | University Of Durham | United Kingdom | A Snapshot Survey Of X-Ray Selected Central Cluster Galaxies |
| Ford | The Johns Hopkins University | United States | The Nature Of Dusty Nuclear Disks In Early Type Galaxies |
| Giovanelli | Cornell University | United States | The Evolution Of The Mass-To-Light Ratio Of Spiral Galaxies |
| Kuijken | Kapteyn Institute | Netherlands | Proper Motions Of Bulge Stars |
| Olszewski | Steward Observatory  U. Of Arizona | United States | Absolute Proper Motions Of Nearby Dwarf Spheroidal Galaxies |
| Savage | University Of Wisconsin-Madison | United States | WFPC2 Imaging Of Dust Structures And Star Formation In The Disk-Halo Interface Of Spiral Galaxies |
| Schreier | Space Telescope Science Institute | United States | Measuring The Black Hole Mass In Centaurus A  The Nearest Active Galaxy |
| Shlosman | University Of Kentucky | United States | Testing The Stellar Dynamics Of Nested Bars In NGC 5728 |
| Siegel | University Of Virginia | United States | Proper Motion Of The Leo II Dwarf Spheroidal |
| Smith | University Of Colorado | United States | The Morphology Of Dust Lanes In Barred Spirals |
| Tadhunter | University Of Sheffield | United Kingdom | The Mass Of The Black Hole In Cygnus A |
| Wang | Northwestern University | United States | WFPC2 Narrow-Band Halpha  Imaging Of The Edge-On Galaxy NGC4631 |
| Wilson | University Of Maryland | United States | Masses And Spins Of Black Holes In Seyfert Galaxies |

## Hot Stars

| | | | |
|---|---|---|---|
| Barstow | University Of Leicester | United Kingdom | The Composition And Evolution Of Extremely Hot DA White Dwarfs |
| Barstow | University Of Leicester | United Kingdom | Resolving Sirius-Like Binaries |
| Bianchi | The Johns Hopkins University | United States | The Ofpe/WN Stars In M33: Understanding Wolf-Rayet Star Formation In Different Environments |
| Caraveo | Istituto Di Fisica Cosmica Del CNR | Italy | HST Astrometry To Gauge The Distance Of PSR0833-45 (VELA) And PSR 0656+14 |

## Approved Observing Programs for Cycle 8

| | | | |
|---|---|---|---|
| Davidson | University Of Minnesota | United States | STIS Observations Of Eta Carinae: The Central Star |
| Herrero | Instituto De Astrofisica De Canarias | Spain | Calibration Of The Wind Momentum-Luminosity Relationship In Cyg OB2 |
| Heydari-Malayeri | Observatoire De Paris | France | The Youngest Massive Star Clusters In The SMC As Clues To Star Formation In The Early Universe |
| Kulkarni | California Institute Of Technology | United States | The Optical Counterpart Of The Soft Gamma-Ray Repeater 1900+14 |
| Kwok | University Of Calgary | Canada | Stellar Winds From Central Stars Of Young Planetary Nebulae |
| Landsman | Raytheon STX | United States | Deep Helium-Mixing And The Ultraviolet Spectra Of Hot Horizontal Branch Stars |
| Massey | National Optical Astronomy Observatories | United States | Tests Of Stellar Models Using Four Extremely Massive Spectroscopic Binaries In The R136 Cluster |
| Shara | Space Telescope Science Institute | United States | Discerning The Origins Of Blue Stragglers: Masses And Rotation Rates |
| Smith | University College London | United Kingdom | Probing The Evolution Of Massive Stars: Ejecta Ring Nebulae Abundances And Dynamics |
| Van Kerkwijk | University Of Utrecht | Netherlands | The Massive Binary Pulsar 2303+46: An Unexpected Companion |
| Venn | Macalester College | United States | Boron In The Magellanic Clouds: A Novel Test Of Light Element Formation |
| Walborn | Space Telescope Science Institute | United States | Trapezium Systems And Stellar Jets In 30 Doradus |
| Wallace | The Johns Hopkins University | United States | A Link Between Massive Binary Stars And Non-Thermal Radio Emission |
| Walter | State University Of New York At Stony Brook | United States | The Spectral Energy Distribution Of A Neutron Star Photosphere |
| Winget | Univeristy Of Texas — Austin | United States | A Unique Calibration Of Asteroseismology: The DBV GD358 |

### Interstellar And Intergalactic Matter

| | | | |
|---|---|---|---|
| Allen | Space Telescope Science Institute | United States | How Opaque Are Spiral Galaxies? |
| Bomans | Astronomisches Institut Universitaet Bochum | Germany | The $H_2$/CO Ratio In The Large Magellanic Cloud |
| Deharveng | Laboratoire d'Astronomie Spatiale | France | The Lyman Continuum Radiation From Galaxies |
| Federman | University Of Toledo | United States | Physical Conditions In Predominantly Atomic Interstellar Clouds |
| Garnett | University Of Arizona | United States | High Spatial Resolution UV/Optical Spectroscopy Of H II Regions In The Magellanic Clouds |
| Gordon | Louisiana State University | United States | Understanding The Starburst-Like Dust In The Small Magellanic Cloud |
| Keenan | Queen's University Of Belfast | United Kingdom | The Interstellar Medium Near To And Beyond The Galactic Center |
| Kochanek | Harvard-Center For Astrophysics | United States | Extinction Curves Of Distant Galaxies |
| Kunth | Institut d'Astrophysique De Paris | France | Lyman Alpha Emission In Starburst Galaxies |
| Lauroesch | Northwestern University | United States | A SNAPSHOT Survey Of Interstellar Absorption Lines |
| Leitherer | Space Telescope Science Institute | United States | The Physical State Of The Starburst Outflow In NGC1705 |
| Meyer | Northwestern University | United States | The Oxygen Abundance In Translucent Interstellar Clouds |
| Rubin | NASA Ames Research Center | United States | Fundamental Problems In Plasma Astrophysics: The Thermal Equilibrium Of NGC 7009 |
| Sembach | The Johns Hopkins University | United States | C IV High Velocity Clouds: Remnants Of The Local Group? |
| Shopbell | University Of Maryland | United States | The Starburst-ISM Interaction In NGC 1569 |
| Sonneborn | NASA/Goddard Space Flight Center | United States | Probing The Galactic Halo And Beyond With Young Supernovae |
| Stocke | University Of Colorado — Boulder | United States | The Extent Of Metal Transport In The Low Redshift Intergalactic Medium |
| Wakker | University Of Wisconsin-Madison | United States | The Metallicity And Dust Content Of HVC Complex C |
| Welty | University Of Chicago | United States | Abundances And Physical Conditions In The ISM Of The Magellanic Clouds |
| Wolff | Space Science Institute | United States | Further Insights Into Interstellar Dust Grains Using Ultraviolet Polarimetry And Spectroscopy |
| Wood | Smithsonian Astrophysical Observatory | United States | Detecting Circumstellar Hydrogen Wall Emission Around A Nearby Sun-Like Star |

### Quasar Absorption Lines

| | | | |
|---|---|---|---|
| Bowen | Royal Observatory Edinburgh | United Kingdom | The Lyalpha Absorption Cross-Section Of Nearby Galaxies |
| Cohen | University Of California — San Diego | United States | A Unique Measurement Of The Dust-To-Gas Ratio In An Absorption Line System |
| Impey | University Of Arizona | United States | The Coherence Length Of Lyman-Alpha Absorbers At $z \sim 1$ |
| Jannuzi | National Optical Astronomy Observatories | United States | Low Column Density Ly-Alpha Absorbers At $z$=1.2: High SNR Echelle Spectroscopy Of PG 1634+706 |
| Jenkins | Princeton University Observatory | United States | Pervasive Hot Gas Hidden In Galaxy Groups: A Substantial Baryon Reservoir? |
| Lemoine | Departement d'Astrophysique Relativiste Et De Cosmologie | France | Lyman Alpha Clouds Toward PKS1302-102. |
| Moller | European Southern Observatory Garching | Germany | STIS Deep DLA Imaging Survey II |

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|---|---|---|---|
| Monier | The Ohio State University | United States | The Homogeneity Of Damped Lyalpha Systems (And Variability In BAL Systems) |
| Petitjean | Institut d'Astrophysique De Paris | France | STIS Observations Of QSO Pairs |
| Reimers | Hamburger Sternwarte | Germany | A Search For Transparent Lines Of Sight With Intergalactic He II Absorption Towards 26 Bright $z > 2.9$ Quasars |
| Reimers | Hamburger Sternwarte | Germany | UV Brightest Known Intermediate Redshift QSO: A $z = 1.15$ DLA And Metals In The Ly Alpha Forest |
| Shull | University Of Colorado — Boulder | United States | Primordial Low-$z$ Lyalpha Clouds Towards PKS 2155-304? |

## *Stellar Ejecta*

| | | | |
|---|---|---|---|
| Bally | CASA / University Of Colorado — Boulder | United States | Herbig-Haro Jets Irradiated By Massive OB Stars |
| Bode | Liverpool John Moores University | United Kingdom | High Resolution Imagery Of Selected Symbiotic Stars |
| Bode | Liverpool John Moores University | United Kingdom | A Snapshot Survey Of Symbiotic Stars |
| Bujarrabal | Observatorio Astronomico Nacional | Spain | Colliding Stellar Winds And Proto-Planetary Dynamics: WFPC2 Imaging Of OH231.8+4.2 |
| Chu | University Of Illinois | United States | Supernova Remnants In A Cloudy Interstellar Medium |
| Dougados | Laboratoire d'Astrophysique Observatoire De Grenoble | France | New Clues To The Ejection Process In Young Stars: Forbidden Line Imaging Of T Tauri Micro-Jets |
| Drew | Imperial College Of Science Technology & Medicine | United Kingdom | Cataclysmic Variable Disk Winds: A High Time- And Spectral Resolution Study Of Flow Inhomogeneity |
| Fesen | Dartmouth College | United States | The Spatial And Ionization Structure Of Cas A's Metal-Rich Ejecta |
| Harrington | University Of Maryland | United States | Spectroscopy Of The Rapidly-Evolving Chemically Inhomogeneous Planetary Nebula BD+30 3639 |
| Hester | Arizona State University | United States | An Emission Line Survey Of The Crab Nebula |
| Hrivnak | Valparaiso University | United States | HST Imaging Of Bipolar Proto-Planetary Nebulae And Circumstellar Arcs |
| Humphreys | University Of Minnesota | United States | Imaging The Circumstellar Environments Of The Cool Hypergiants |
| Keyes | Space Telescope Science Institute | United States | Snapshot Spectroscopic Diagnostic Survey Of The Symbiotic Stars |
| Kirshner | Harvard College Observatory | United States | SINS: The Supernova Intensive Study - Cycle 8 |
| Kwok | University Of Calgary | Canada | Morphology Of High Radio Surface Brightness Planetary Nebulae |
| Latter | SIRTF Science Center/Caltech | United States | Using STIS To Unravel Planetary Nebulae |
| Morse | University Of Colorado | United States | Tracking The Evolution Of The Homunculus And Outer Debris In Eta Carinae |
| Nordsieck | University Of Wisconsin-Madison | United States | Orientation And Extent Of The Bipolar Outflow In Beta Lyrae |
| O'Dell | Rice University | United States | Proper Motions And Variability Of HH Objects Near The Orion Nebula |
| Perinotto | Dipartimento Astronomia | Italy | Stalking FLIERS In Planetary Nebualae: A STIS Study |
| Reipurth | University Of Colorado Boulder | United States | The Kinematics Of Knots Along Herbig-Haro Jets At High Spatial Resolution |
| Sahai | Jet Propulsion Laboratory California Institute Of Technology | United States | Multipolar Bubbles And Jets In Very Low Excitation Planetary Nebulae - A WFPC2 Halpha Imaging Survey |
| Shara | Space Telescope Science Institute | United States | The Next Bright Galactic Nova: High Resolution Imaging |
| Stanghellini | Space Telescope Science Institute | United States | A SNAPSHOT Survey Of LMC Planetary Nebulae: A Study Of Nebular And Late Stellar Evolution |
| Verner | University Of Kentucky | United States | The Fe II Spectra Of Eta Carinae: Implications For Atomic And Plasma Astrophysics |
| Weis | Universitaet Heidelberg Institut Fuer Theoretische Astrophysik | Germany | Highly Collimated Strings In The Nebula Around Eta Carinae - A New Phenomenon |
| Whitney | Prism Computational Sciences Inc. | United States | Measuring Eta Car's Giant Eruption By Modeling Dust Scattering And Emission In The Homunculus |
| Winkler | Middlebury College | United States | Probing Stellar Ejecta In SN 1006 Through UV Absorption Spectroscopy |

## *Stellar Populations In Clusters*

| | | | |
|---|---|---|---|
| Bailyn | Yale University | United States | High Precision Photometry Of The Core Of M13 |
| Briley | University Of Wisconsin-Madison | United States | Light Element Abundance Variations In The Core Of 47 Tucanae |
| Heydari-Malayeri | Observatoire De Paris | France | Hidden New-Born Massive Stars In Compact H2 Blobs Of The Large Magellanic Cloud |
| Hodge | University Of Washington | United States | Massive Blue Clusters In M31 |
| Hodge | University Of Washington | United States | The Cluster Formation Rate In Nearby Galaxies |
| Hodge | University Of Washington | United States | Star Clusters Of NGC 6822 |
| King | University Of California — Berkeley | United States | Exploring The Luminosity Function Near The Limit Of Hydrogen Burning In Globular Clusters |
| King | University Of California — Berkeley | United States | A Proper-Motion Study Of Two Fields In The Globular Cluster 47 Tucanae |
| Landsman | Raytheon STX | United States | A Complete Census Of Hot Stars In Globular Clusters |
| Layden | Bowling Green State University | United States | White Dwarf Distances To Globular Clusters And The RR Lyrae Luminosity Calibration - M5 And NGC 3201 |

## Approved Observing Programs for Cycle 8

| | | | |
|---|---|---|---|
| Nota | Space Telescope Science Institute | United States | Is The IMF Universal At Low Stellar Masses? |
| Piotto | Universita Di Padova | Italy | A Snapshot Survey Of Galactic Globular Clusters |
| Piotto | Universita Di Padova | Italy | The Stellar Initial Mass Function Of Globular Clusters |
| Rich | University Of California At Los Angeles | United States | High Quality WFPC2 Photometry For 3 Intermediate Age LMC Clusters With Multiple (?) Turnoffs |
| Smith | Michigan State University | United States | The Second-Parameter Effect In Metal-Rich Globular Clusters: A Snapshot Study Of NGC 6441 |
| Van Altena | Yale University | United States | Internal Velocity Distribution In Globular Clusters II |
| van der Marel | Space Telescope Science Institute | United States | Nuclear Kinematics Of The Dense Globular Cluster M15 |
| Walker | National Optical Astronomy Observatories | United States | NGC 1866: A Critical Test Of Stellar Evolution For Intermediate Mass Stars |

### Solar System

| | | | |
|---|---|---|---|
| Bagenal | University Of Colorado | United States | HST-Galileo Io Campaign |
| Bell | Cornell University | United States | Mineralogy And Weathering History Of Mars |
| Brown | Caltech | United States | A Search For Kuiper Belt Object Satellites |
| Chanover | New Mexico State University | United States | An Archival Study Of The Quiescent And Disturbed Atmosphere Of Saturn |
| Clarke | University Of Michigan | United States | HST Far-UV Imaging And Spectra Of Jupiter's Aurora During The Galileo Extended Mission |
| Elliot | Massachusetts Institute Of Technology | United States | Global Change On Pluto? |
| Emerich | CNRS-Institut d'Astrophysique Spatiale | France | Search For Origin Of Supersonic Turbulence Observed In The Upper Equatorial Atmosphere Of Jupiter |
| Festou | Southwest Research Institute | United States | Determination Of The Radius Of Comet 19P/Borrelly In Support Of The NMP DS1 Flyby |
| Griffith | Northern Arizona University | United States | Spatially Resolved Spectroscopy Of Titan's Atmosphere And Surface |
| Lamy | Laboratoire d'Astronomie Spatiale | France | A Size Survey Of Cometary Nuclei |
| McGrath | Space Telescope Science Institute | United States | UV Imaging Of Europa & Ganymede: Unveiling Satellite Aurora & Electrodynamical Interactions |
| Orton | Jet Propulsion Laboratory California Institute Of Technology | United States | Discrete Photometry Of Galileo Mission Atmospheric Targets In Jupiter |
| Prange | Institut d'Astrophysique Spatiale | France | FUV Diagnostic Of Saturn's Stratosphere With STIS. Water Influx From The Ring And Polar Haze |
| Rages | NASA Ames Research Center (Space Physics Research Inst.) | United States | Changes In Uranus' Atmosphere Since The Voyager Encounter |
| Richardson | Massachusetts Institute Of Technology | United States | Constructing A 2-D Picture Of Saturn's OH Cloud |
| Sromovsky | University Of Wisconsin-Madison | United States | Multispectral Investigation Of Jovian Cloud Structure |
| Stern | Southwest Research Institute | United States | Mapping Triton |
| Stern | Southwest Research Institute | United States | Exploring Triton In The Act Of Global Change |
| Trauger | Jet Propulsion Laboratory | United States | Saturn's Far-UV Aurora And Polar Hazes |
| Weaver | The Johns Hopkins University | United States | UV Spectroscopic Investigation Of Any Bright Newly Discovered Comet |
| Whitney | Prism Computational Sciences Inc. | United States | A Critical Extension To Martian Ozone Abundances Using WFPC2 |

### Young Stars And Circumstellar Material

| | | | |
|---|---|---|---|
| Bally | University Of Colorado Boulder | United States | The Structure And Kinematics Of Irradiated Disks And Associated High Velocity Features In Orion |
| Burrows | Space Telescope Science Institute | United States | Development And Evolution Of YSO Outflows And Jets |
| Calvet | Smithsonian Astrophysical Observatory | United States | Mass Accretion Rates For Pre-Main Sequence Intermediate Mass Stars |
| Grady | National Optical Astronomy Observatories STIS Group | United States | UV Spectroscopy Of Infalling Cometary Material In Solar-Type Pre-Main Sequence Stars |
| Gullbring | Stockholm Observatory | Sweden | The Structure Of The Accretion Flow On Pre-Main-Sequence Stars |
| Hartigan | Rice University | United States | Collimated Jets And Low Velocity Forbidden Emission From T Tauri Stars |
| Lagrange | Observatoire De Grenoble | France | Testing The Falling Evaporating Bodies Hypothesis On The Herbig Star HD100546 |
| O'Dell | Rice University | United States | Determination Of Circumstellar Cloud Mass Loss Rates With STIS Spectra |
| Ray | Dublin Institute For Advanced Studies | United Kingdom | The Nature Of T Tauri And Herbig Ae/Be Star Winds |
| Simon | SUNY | United States | Masses And Distances Of Pre-Main Sequence Binaries |
| Soderblom | Space Telescope Science Institute | United States | HD 98800: An Opportunity To Measure True Masses For Low-Mass PMS Stars |
| Stapelfeldt | Jet Propulsion Laboratory | United States | T Tauri Star Snapshot Survey II. Completing The CTTS Sample |
| Walter | State University Of New York | United States | Molecular Hydrogen In The Circumstellar Environments Of T Tauri Stars |
| Whitney | Prism Computational Sciences Inc. | United States | Testing Protostellar Collapse And Outflow Models |

# A New Phase II in Cycle 8

*David Soderblom, STScI soderblom@stsci.edu*

If you are among the successful *HST* proposers for Cycle 8 congratulations! You now have to submit the complete details of how your program is to be executed, meaning the Phase II program. There are some important differences in the Phase II process from previous cycles that you need to be aware of:

1. We will be strict about the deadlines for submission. Having accurate Phase II submissions right at the beginning goes a long way toward effective and efficient use of *HST* by making it possible for us to make a long-range observing plan.

   *Phase II programs will be due February 18. In exceptional cases we can grant a short extension of the deadline if you inform us before February 18. In any case, if no Phase II program has been submitted by March 18, the orbits allocated to the program will be lost.*

2. We will also be strict about the quality of what is submitted, meaning that we expect PIs to provide us with complete and accurate information right at the beginning. To make this clearer, we draw a distinction between “submission” and “acceptance” of your Phase II program. “Acceptance” means either that what is submitted is error-free (according to RPS2) or that the errors that remain cannot be remedied by the PI. The latter case means that your Program Coordinator (PC) overrides RPS2 and officially accepts the program anyway.

   *The Phase II program that is submitted by February 18 must also be **accepted** by that date.*

3. Phase II programs must include all targets to be observed in that program, and the orbits required must be at or below your allocation.

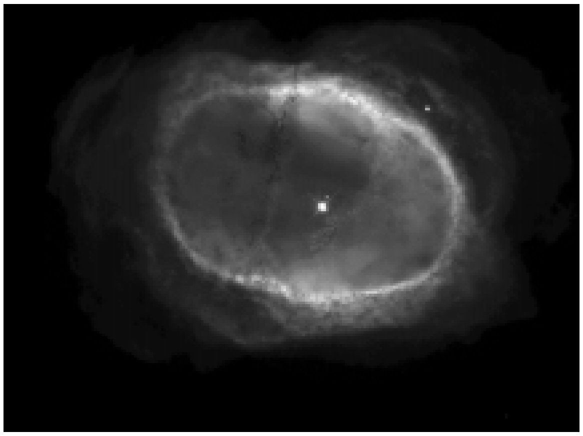
4. In Cycle 8 we have reduced the scope of duplication checking done at STScI. We will check for near-to-exact matches with GTO observations and with programs that still have data within the proprietary period. However, we recognize that the PI has the best sense of when another program may encroach on their valid data rights. Therefore we will expect PIs to check for possible data conflicts once all the Phase II submissions are in. A web-based duplication checking tool will be available.

5. Once a program has been submitted and accepted, changes are possible, but only when documented and justified. Minor changes can be approved by your PC or Contact Scientist (CS), but you must file a Change Request form to accompany the RPS2 resubmission. Major changes (see the policies on the Observer’s web page at *http://www.stsci.edu/observing/observing.html*) require a formal Program Change Request, which is done via the web.

If you experience problems or have questions, get in touch with your PC or CS; they were identified in your notification letter.

Your Phase II program is essentially written in a high-level programming language. The commands available to you and the syntax to be used are described in the Phase II Proposal Instructions. These have been completely reedited for Cycle 8. There are substantial changes to RPS2 — new capabilities, obsolete functions removed — that the Phase II Proposal Instructions describe.

The new Phase II Proposal Instructions are available exclusively on-line in PDF format. No paper version will be supplied, but it is easy to print from the PDF. PDF offers all the useful capabilities of HTML with many additional features, and navigation within PDF is much, much faster than within HTML. The PDF version of the Phase II Proposal Instructions has many added features to make it easy to find the information you need, including a fully-linked and extensive table of contents, and index, and navigation buttons on each page. You should be able to read the PDF by clicking in your web browser. You can also obtain Acroread for free from www.adobe.com. Your comments on this document are welcome and can be sent to *help@stsci.edu*.



*HST Recent Release: A Glowing Pool of Light*

*NGC 3132 is a striking example of a planetary nebula. This expanding cloud of gas, surrounding a dying star, is known to amateur astronomers in the southern hemisphere as the "Eight-Burst" or the "Southern Ring" Nebula.*

*NGC 3132 is nearly half a light year in diameter, and at a distance of about 2000 light years is one of the nearer known planetary nebulae. The gases are expanding away from the central star at a speed of 9 miles per second.*

*This image, captured by NASA's Hubble Space Telescope, clearly shows two stars near the center of the nebula, a bright white one, and an adjacent, fainter companion to its upper right. (A third, unrelated star lies near the edge of the nebula.) The faint partner is actually the star that has ejected the nebula. This star is now smaller than our own Sun, but extremely hot. The flood of ultraviolet radiation from its surface makes the surrounding gases glow through fluorescence. The brighter star is in an earlier stage of stellar evolution, but in the future it will probably eject its own planetary nebula.*

*Credit: Hubble Heritage Team (STScI/AURA/NASA)*

*http://oposite.stsci.edu/pubinfo/pr/1998/39/index.html*

# The New, Improved, RPS2

*Andy Gerb, STScI* *gerb@stsci.edu*

With the aim of better support for Hubble's observers, STScI has been looking at ways to improve our Remote Proposal Submission (RPS2) software. Efforts are currently underway to improve the speed and robustness of the tool and to seek ways of making it more useful.

## *Speed*

In order for RPS2 to accurately advise users on the feasibility of their programs, it needs to build up a detailed model of how the observations will execute on *HST*. To do this, RPS2 relies on a tool embedded within it called Transformation (Trans). The complicated buffer management requirements of the newer instruments have made Trans' job more difficult, resulting in a noticeable slowdown of RPS2.

To alleviate this, we are embarking on the TransVERSE project to reengineer the Trans system. In addition to simplifying the Trans system and thereby allowing faster execution, this project will also provide greater control over how Trans does its job, allowing better trade-offs between speed and precision. Although TransVERSE is a two-year project, so its benefits will not be fully realized until Cycle 10, it is being added to the system incrementally so there is a good chance that improvements to Cycle 9 RPS2 will also be evident.

## *Robustness*

Although RPS2 is installed and runs without difficulty on the majority of sites that use it, some users have reported problems with "hangs" during execution and unexpected results from RPS2's user interface. To eliminate these, we are working to upgrade the controller within RPS2 to use tools which conform to the Common Object Request Broker Architecture (CORBA). We are also reimplementing portions of the graphical user interfaces to use the Java programming language. CORBA and Java have become widely used standards that did not exist five years ago when RPS2 was designed.

The look and feel of RPS2 will change little as a result of this upgrade, but we expect that the use of new standards will make the software more robust to minor differences in platform and environment. It will also enable us to incorporate state-of-the-art process control tools into RPS2 to ensure that it runs reliably. In order to give us adequate time to test these changes, we have opted not to release them with the Cycle 8 version of RPS2, but we are confident they will be available by Cycle 9.

## *Usability*

We are actively seeking ways to improve the user-friendliness of RPS2 and to ensure that the information that it gives observers is as useful and applicable as possible. Anuradha Koratkar, STScI's Presto Project Scientist, is chairing a focus group of *HST* proposers and STScI personnel tasked with improving the Phase II proposal preparation process. Improving RPS2 figures prominently within their charter.

We are open to additional suggestions on how to make RPS2 a better tool. If you have ideas, we'd like to hear them. Email any comments, suggestions or ideas you have to *gerb@stsci.edu.*

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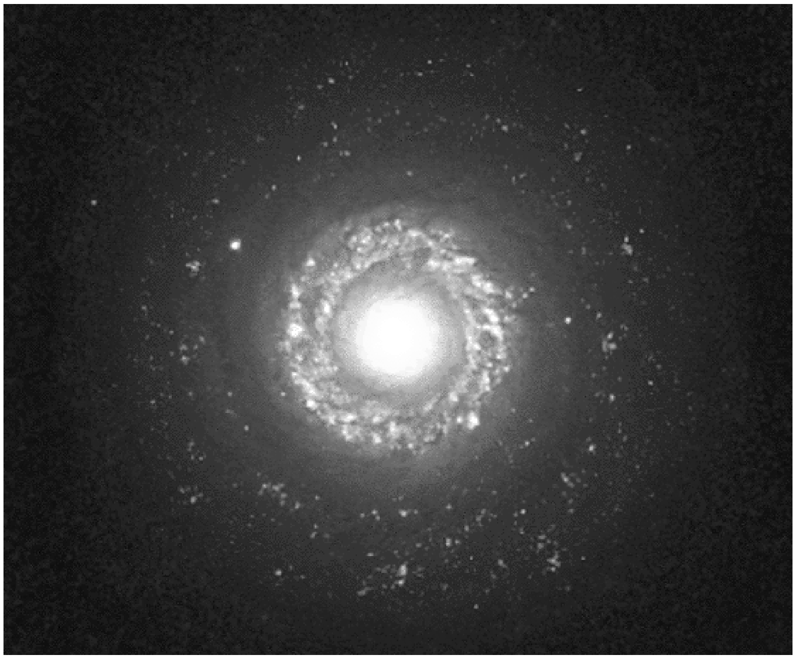
## *HST Recent Release: Astronomers Unveil Colorful Hubble Photo Gallery*

*What may first appear as a sunny side up egg is actually NASA Hubble Space Telescope's face-on snapshot of the small spiral galaxy NGC 7742. But NGC 7742 is not a run-of-the-mill spiral galaxy. In fact, this spiral is known to be a Seyfert 2 active galaxy, a type of galaxy that is probably powered by a black hole residing in its core.*

*Credit: Hubble Heritage Team (STScI/AURA/NASA)*

*http://oposite.stsci.edu/pubinfo/pr/1998/28/index.html*



# The Hubble Heritage Project

*Keith Noll* *noll@stsci.edu*

An STScI/NASA press release in October 1998 announced the kickoff of a new outreach program, the Hubble Heritage Project. After more than a year of preparation, the Heritage Project went public with the release of four color images produced from non-proprietary data in the *HST* archive. The Heritage team also announced their plans to release one new image each month at their web site and have done so in November and December. These are to be followed by a new three-color image of the Ring Nebula made by the team that will be released at the AAS in Austin on January 6.

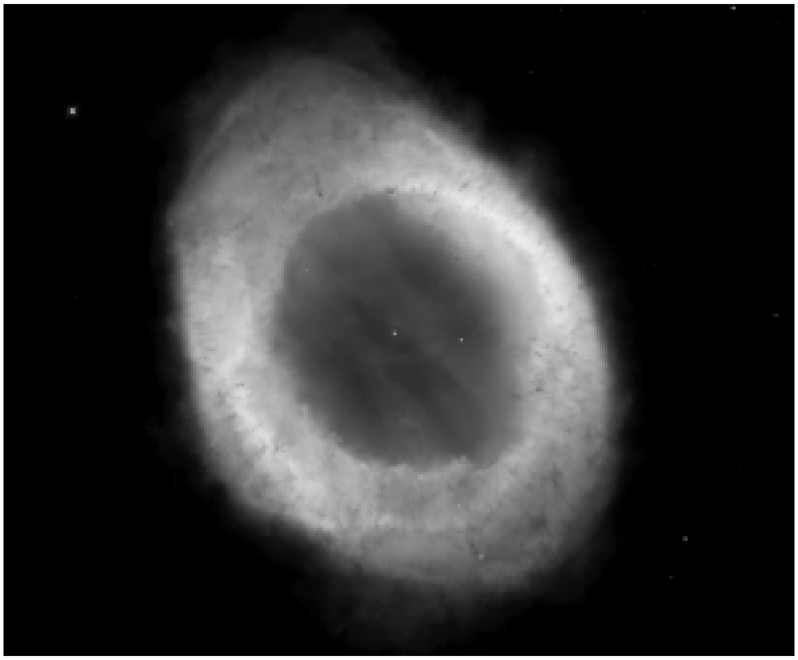
The Hubble Heritage project was conceived by STScI Astronomers Keith Noll, Anne Kinney, Howard Bond, and Carol Christian. The team also includes Jayanne English, Lisa Frattare, Forrest Hamilton, and Zolt Levay, all at STScI.

The mission of the Heritage team is to produce a steady stream of esthetically impressive images using data obtained with *HST*. The majority of the releases will come from the *HST* archive. Many potentially excellent images reside in there but have never been released, either because the results from the project do not meet the relatively high criteria of newsworthiness applied to normal press releases, or because the astronomers involved simply do not have the considerable amount of time needed to produce a very high quality color image. The Heritage project provides both a separate channel to the public where the main criterion is the quality of the image itself and the resources needed to produce esthetically optimized images.

In addition to archival images, the Heritage team has a small budget of Director's Discretionary time with which to make new observations. The Ring Nebula color image is the first example of such an observation. Future observations will be decided, in part, by public voting at the Heritage web site, where visitors will be asked to choose between a small sample of preselected targets. Of course, all data obtained by the Heritage Project will be non-proprietary and it is our expectation that these data will be of value scientifically as well as for public outreach.

The Heritage web site has been enormously popular with 17 million hits in the first seven weeks of operation. Public comments have been almost unanimously favorable. And, of course, we are continually upgrading the site in response to external suggestions. The Heritage web site can be found at *http://heritage.stsci.edu/* and we invite you to visit. You will find a site that is somewhat different in flavor from a traditional astronomical web page with a mix of design elements intended to convey both the seriousness of the scientific enterprise as well as the sheer beauty of the images.

The ultimate success of the Heritage project depends on the support of the *HST* user community. We have enjoyed excellent cooperation with PIs of the programs whose archival images we have used. Their insight and feedback has enriched the releases and is a service to the entire community. We invite suggestions for improving the Heritage project and look forward to working with many more *HST* users in the months to come.



## *HST Recent Release: Looking Down a Barrel of Gas at a Doomed Star*

*The NASA Hubble Space Telescope has captured the sharpest view yet of the most famous of all planetary nebulae: the Ring Nebula (M57). In this October 1998 image, the telescope has looked down a barrel of gas cast off by a dying star thousands of years ago. This photo reveals elongated dark clumps of material embedded in the gas at the edge of the nebula; the dying central star floating in a blue haze of hot gas. The nebula is about a light-year in diameter and is located some 2,000 light-years from Earth in the direction of the constellation Lyra.*

*Credit: Hubble Heritage Team (STScI/AURA/NASA)*

*http://oposite.stsci.edu/pubinfo/pr/1999/01/index.html*

# A Workshop on Observing Tools

*Anuradha Koratkar and Jeremy Jones koratkar@stsci.edu*

A Workshop on Observing Tools was held recently to explore where collaborative effort could benefit both observers and observatories. The workshop was held on October 28 and 29, 1998 at the University of Maryland Inn and Conference Center in College Park, Maryland. Over fifty representatives — a mixture of astronomers and software developers representing a variety of observatories (ground- and space-based, optical, x-ray, infrared) — discussed the role of collaboration in the development of future observing tools.

The primary goal of the workshop was to encourage discussion between groups. Formal presentations were kept to a minimum, and consisted of four talks: a short introduction by Keith Kalinowski, an overview by Anuradha Koratkar and Sandy Grosvenor, a presentation on the results of the NOAO meeting by Jeannette Barnes (see below), and a presentation on the Future of User Support Tools by Tom Brooks. Most of the time was spent on focused panel discussions and breakout sessions. At the end of the workshop we formed six working groups:

*Target Visualization Tools:*

- Exposure Time Calculators
- Defining an Observation
- Optimizing Calibration Observations for Ground Based Observatories
- Common Observatory Definition
- Data Services

These working groups will start with simple goals and explore collaboration on their own terms. The short-term goals of these groups will be to develop a common definition of what each tool should contain. The long-term goals are to define interfaces that make tools interoperable, share code and pool efforts in the development of next-generation capabilities.

The emphasis on discussion over presentation was clearly appreciated. The group seemed to feel that it was a great first step in what we hope to be a much longer collaborative effort. The true measure of success, however, will be if efforts put forth by the working groups actually produce tangible results. Still, it was an exciting two days, and we were glad we had the opportunity to facilitate such interesting discussion. We look forward to hearing from the working groups in the near future. For more information on this meeting report, slides and information on next generation observing tools see the web site *http://aaaprod.gsfc.nasa.gov/workshop* and *http://aaaprod.gsfc.nasa.gov/SEA*.

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# NOAO Workshop on Telescope Proposals of the Future

*Caty Pilachowski and Jeannette Barnes*

As new and more complex telescopes come on line, telescope time applications are becoming more complex too, with requirements for machine-readable target lists, guide star selections, detailed exposure estimates, and specifications on sky conditions. Learning to use new tools for each observatory just to submit proposals may well become a daunting and time-consuming task for all of us.

To try to prevent this situation from arising, representatives of several observatories, including NOAO, Gemini, STScI, McDonald Observatory and the HET, the MMT Observatory, the CFHT, the National Research Council of Canada, the AAO, and JACH, met together in Tucson in August. The goal of the Proposal Process Workshop, hosted by NOAO, was to develop a shared understanding among observatories, including the National Gemini Offices and the Gemini Project, of the requirements and procedures for telescope proposals, and to encourage cooperation among the national observatories of the partner countries, STScI, and other institutions faced with similar issues and concerns related to the telescope proposal process.

Through discussions at the Workshop, a broad consensus emerged. First, the proposal process should include an option for web-based proposal preparation and submission that does not require the distribution of software. For now this was the best option for the US community, but we will need to continually re-evaluate the situation as new tools and methods become available.

Second, the proposal process should be as simple as possible for users, with required information kept to a minimum, while allowing investigators to present their case in a suitable manner. Wherever possible, observatories should share common and familiar tools for developing proposals.

Finally, the process should also minimize the effort required at each observatory to support TAC evaluation and observing. The process should allow integration of proposals for the variety of telescope time available through each observatory.

Actions resulting from the Workshop include the distribution of the NOAO Web proposal system to several observatories, and the formation of two working sub-groups to develop a set of LaTeX/XML tags to be shared among observatories and to develop guidelines for layout and organization of Web-based tools for proposal submission that will allow the sharing of tools among observatories.

# Starburst99: Synthesis Models for Galaxies with Active Star Formation

*Claus Leitherer (STScI), Daniel Schaerer (Obs. Midi-Pyrenees), Jeffrey D. Goldader (Univ. of Pennsylvania), Rosa M. González Delgado (Inst. Astrof. de Andalucía), Carmelle Robert (Laval University), Denis Foo Kune (Macalester College), Duília F. de Mello (STScI), Daniel Devost (STScI), and Timothy M. Heckman (JHU)*

Those of you who frequently surf the internet may already have discovered it: a new webpage entitled “Starburst99” has been added to the STScI website. In case you have not yet visited this site, give it a try at http://www.stsci.edu/science/starburst99/. The welcome page is shown in Figure 1. This project is a collaborative effort of the STScI Starburst Group to provide the community with a convenient tool for the interpretation of galaxies with ongoing star formation.

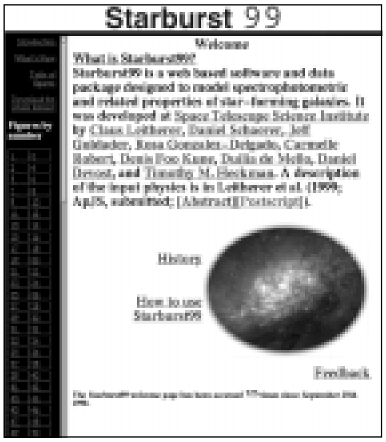
What is it? Starburst99 is a comprehensive set of model predictions for spectrophotometric and related properties of galaxies with active star formation. The models are an improved and extended version of the data set previously published by Leitherer & Heckman (1995). We have upgraded our code by implementing the latest set of stellar evolution models of the Geneva group and the model atmosphere grid compiled by Lejeune et al. (1997). Several predictions which were not included in the previous publication are now shown for the first time. The models are presented in a homogeneous way for five metallicities between Z =0.040 and 0.001 and three choices of the initial mass function. The age coverage is $10^6$ to $10^9$ yr. Also shown are the spectral energy distributions which are used to compute colors and other quantities.

Examples of sets of spectral energy distributions are shown in Figure 2. These spectra have a wavelength-dependent resolution of typically 10 to 20 Å. Apart from being able to view more than 500 figures, the user can download the files that were used to produce the plots. The files are simple ascii tables which can easily be manipulated, for instance, for applying reddening or K corrections to the spectra.

Most users may find the information in these figures sufficient for their needs. If the figure and table set does not cover the required parameter space, you can run your own models. A typical example would be a case with a non-standard IMF. The input parameters can be entered via a web interface (Figure 3). After submission of the job, the computations are done remotely at Space Telescope Science Institute. Once the job is complete, the users are notified by e-mail and can retrieve the output files by ftp. If the cpu load is low, a typical run should last less than an hour. However, we anticipate that it may take a bit longer during the first weeks after the STScI *Newsletter* has been published... Be patient!

Finally, if all else fails, the Starburst99 user has the option to download the code and all auxiliary files. We distribute the source code freely to the community and the users may modify the code to suit their needs.

More details on the code and the models are on our website and in a paper we have submitted to ApJS (Leitherer et al. 1999; a copy may be downloaded from the Starburst99 webpage). Feel free to browse and create your own starburst model. Comments and questions are welcome.



Welcome

What is Starburst99?

Starburst99 is a web based software and data package designed to model spectrophotometric and related properties of star-forming galaxies. It was developed at Space Telescope Science Institute by Claus Leitherer, Daniel Schaerer, Jeff Goldader, Rosa Gonzalez-Delgado, Carmelle Robert, Denis Foo Kune, Duilia de Mello, Daniel Devost, and Timothy M. Heckman. A description of the input physics is in Leitherer et al. (1999; ApJS, submitted; [Abstract][Postscript]).

*Figure 1. The default webpage of the Starburst99 project at http://www.stsci.edu/science/starburst99/. The user can view and download the figures, tables and the source code, and can submit her/his own tailored models for computation.*

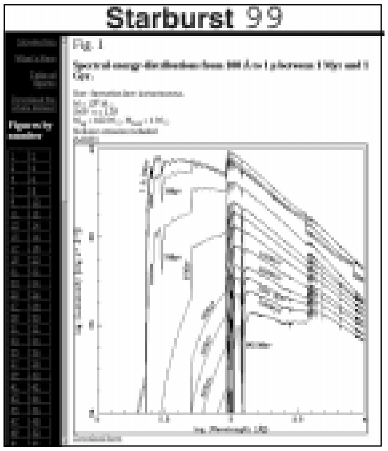


*Figure 2. Set of spectral energy distributions for single stellar populations at 1/20 solar metallicity. The data can be downloaded by simply clicking on the figure.*

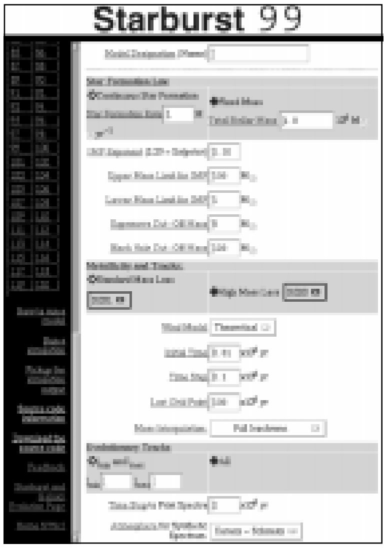


*Figure 3. Interface for running tailored starburst models. The webpage allows users to enter their desired parameters and submit the job for execution at STScI.*

## Microlensing follow-up *from page 1*

resolution telescope to resolve the source and get limb-darkening parameters. And if the lens has a planetary system, the planet can cause an extra-short-duration spike on the light curve, which can be used to detect planets around the lensing stars.

However, the microlensing survey programs, which monitor the events nightly, would mostly miss such fine structures in the light curve. Looking for such fine structures in the light curve would require dedicated telescopes specially suited for this purpose, capable of monitoring the events 24-hours a day and frequently, with good photometric accuracy in the monitoring program. This requires dedicated access to telescopes around the globe, the best time for monitoring being the 'Bulge-season' when there are more than 10 events at any given time.

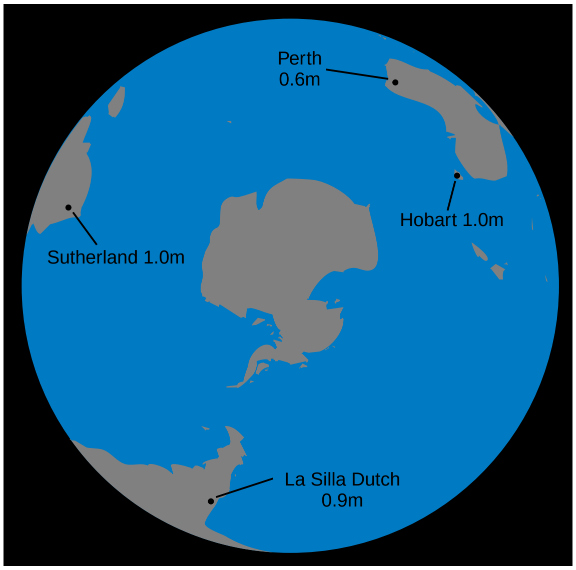


*Fig. 1. A south-pole centered view of the location of the PLANET telescopes.*

### *The PLANET collaboration*

Conceived in the early winter of 1995 to meet this challenge, PLANET (Probing Lensing Anomalies NETwork) was born soon after as a worldwide collaboration of astronomers with access to a set of 3 telescopes situated in Chile, South Africa, and Australia. In the 1996 Bulge season, two additional telescopes - the CTIO 1m telescope in Chile and the Hobart 1m telescope in Australia - joined PLANET, which improved the longitude and time coverage. This brings the total to (at least) five participating sites: CTIO, Dutch/ESO 0.9m, SAAO 1m, Perth 0.6m and Hobart 1m (Fig. 1). Some of the science high-lights of the PLANET collaboration follow.

### *Where are the lenses? Monitoring a caustic crossing to find the answer*

Four years of monitoring of millions of stars towards the Magellanic Clouds has resulted in the detection of more than a dozen microlensing events towards the LMC, and 2 events towards the SMC. However, the simple microlensing light curve is insufficient to provide information on the exact location of the lens due to a degeneracy between the mass, distance, and the perpendicular velocity of the lens.

*continued page 23*

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### *HST Recent Release: Combined Deep View of Infrared and Visible Light Galaxies*

*This narrow, deep view of the universe reveals a plethora of galaxies (reaching fainter than 28th magnitude), as seen in visible and infrared light by NASA's Hubble Space Telescope. Several distinctive types of galaxies can be seen in these views: blue dwarf galaxies, disk galaxies, and very red elliptical galaxies. A bright, nearby face-on spiral galaxy appears at upper right. Some of the brightest objects in the field are foreground stars in the halo of our own Milky Way galaxy. By combining views in infrared light and visible light astronomers have a better idea of the shapes of galaxies in the remote universe, and of the fraction which are old or dust-obscured at early epochs.*

*Credit: R. Williams (STScI), the HDF-South team, and NASA*

*http://oposite.stsci.edu/pubinfo/pr/1999/02/index.html*

## Microlensing follow-up *from page 22*

As a result, there is much controversy on the exact location of the lenses and there is, as yet, no consensus on whether the lenses are located in the Galactic halo, the local Galactic disk, or within the Magellanic Clouds. Direct determination of the location of the lens in a few cases can potentially put this long-standing controversy to rest.

Frequent monitoring of a caustic-crossing event caused by a binary lens provides one such means of determining the lens location. The caustic is essentially a straight line in space, so the time taken by the caustic to cross the source provides a direct measure of the proper motion of the lens projected onto the source plane. If the lens is in the halo at a distance of 15 kpc, then, since the expected proper motion of the lens is about 200 km/s, the time to cross the caustic would be of the order of half an hour. If, on the other hand, the lens is within the SMC, the caustic crossing time is expected to be of the order of 10 hours. Thus monitoring a caustic crossing provides a neat method to determine the location of the lens. Such an opportunity occurred last June when a binary lens event was discovered towards the SMC.

The binary lens event, MACHO 98-SMC-1, was discovered by the MACHO collaboration. After the first caustic crossing event was reported, PLANET, with its 24-hour access to telescopes around the world, began monitoring this event, with a particular interest in fully sampling the second caustic crossing. The peak of the second caustic crossing occurred when it was night in South Africa, and the whole caustic crossing was covered with great frequency by PLANET. The time for the caustic to cross was found to be 8.5 hours, which suggested that the lens is within the SMC (Fig. 2). A more detailed model, taking all the data into account, confirmed this early suggestion that the lens is most likely within the SMC proper (Ref. 1). The result was further confirmed by the EROS, OGLE, MACHO and MPS collaborations, who also concluded that the lens is most likely within the SMC.

A few more such determinations of the lens locations will potentially provide conclusive tests on the lens locations.

### *Microlensing as a high angular resolution telescope*

The event MACHO 97-BLG-28 is a very unique event among all the events monitored by PLANET. This is a binary lens event where the source star directly passed behind the cusp — the region where the caustics meet — thereby highly magnifying the portion of source star lying directly behind the cusp during the caustic transit and allowing a rare opportunity to study in detail the structure of the stellar surface. PLANET monitored this event with very high accuracy and frequency, and the results are spectacular (Fig. 3).

From a spectrum of the source we know that it is a K-giant. Analysis of the PLANET dataset not only shows that the observations are inconsistent with a uniformly bright disk model, but allows the measurement of limb-darkening parameters in two filters from the light curve data alone. The resulting stellar profiles are in excellent agreement with those predicted by stellar atmospheric models for K giants. The limb-darkening coefficients measured here are among the first derived from microlensing. They are also among the first for normal giants by any technique, and any star as distant as the Galactic Bulge (Ref. 2).

### *Search for extra-solar planets*

If the lensing star has a planetary system, the effect of the planet can be seen, in most cases, as sharp extra peaks in the microlensing light curve (Fig. 4). The probability of detection of such extra peaks by a planetary system has been investigated by several authors. It is found that for a solar-like system half way between us and the Galactic Bulge, Jupiter's orbital radius coincides with the Einstein ring radius of a solar-mass lensing star. Such a case is termed 'resonant lensing,' which increases the probability of detecting the planetary signal. Detailed models show that if every star has a Jupiter, then in 20% of the cases there would be a planetary signature with magnification larger than 5%. It is worth adding here that among the currently-available methods, microlensing is probably the only method which is sensitive to detection of Earth-mass planets.

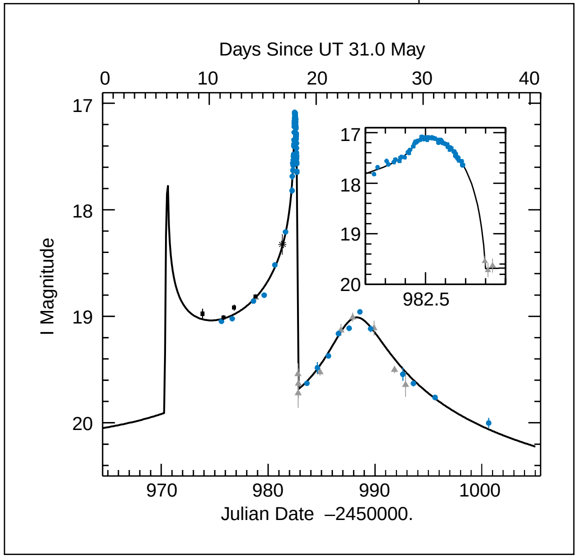

*Fig. 2. Light curve of the PLANET data for MACHO-98-SMC-1. Shown are the data from the SAAO 1 m (circles), the CTIO 0.9 m (squares), the CTIO-Yale 1 m (triangles), and the Canopus 1 m (asterisks). The inset covers about 0.6 days, corresponding to less than one tick mark on the main figure.*

The minimum duration of the extra feature due to the planet, to a first approximation, is the time taken by the source to cross the caustic, which can be about 1.5 to 5 hrs. The maximum duration of the spike is roughly the time taken by the planet to cross its own Einstein ring. Using a reasonable set of parameters (the lower mass of the planet is taken as that of the Earth, the higher mass is assumed to be that of Jupiter), this can be a few hours to about 3 days. Thus one of the

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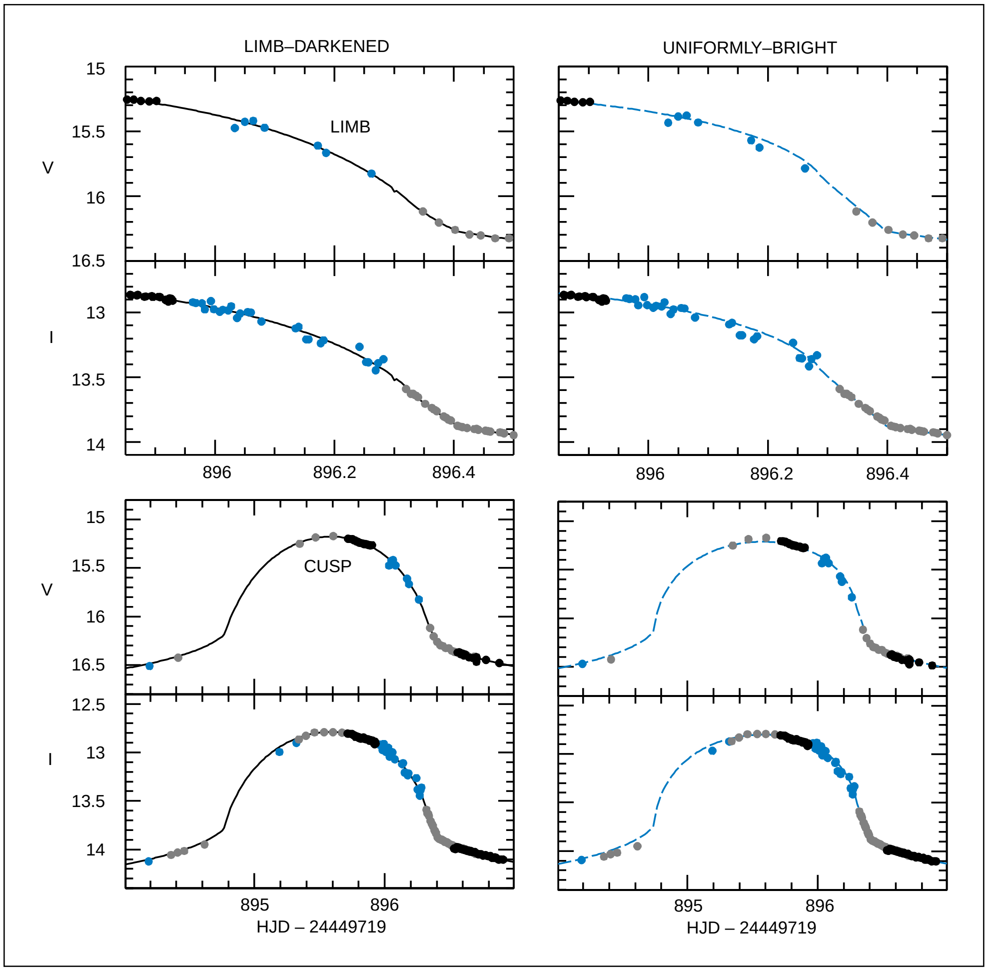

*Fig. 3. Left: Light curves for the best fitting 2-parameter limb-darkening model superimposed on PLANET data sets for a 3-day period centered on the cusp-crossing (bottom) and a 16-hour period during which the stellar limb swept over the cusp (top). Right: Same for the best uniform bright source model (UB) shown as a dashed line. The limb-darkening model is clearly superior.*

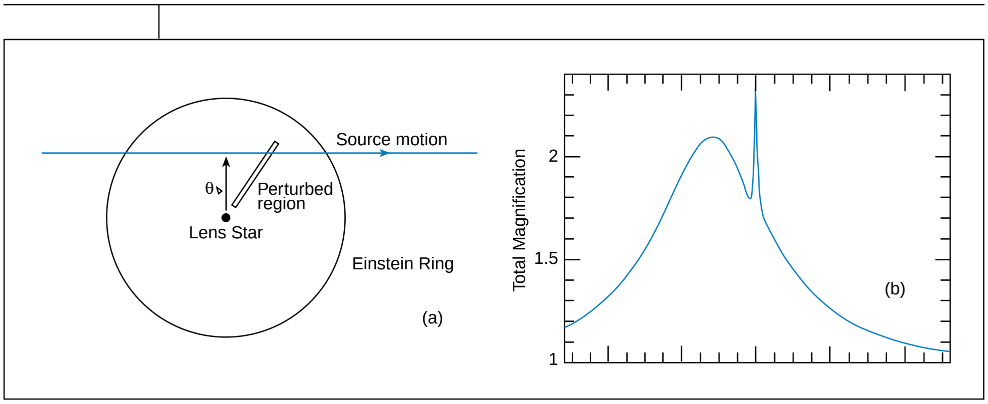

*Fig.4. (a) The geometry of the star-plus-planet lensing event and fig. (b) the resulting light curve.*

## Microlensing follow-up *from page 24*

requirements for a monitoring program is the ability to monitor hourly so that the extra feature due to the planet is well-sampled. Other requirements include the capability of 24-hour coverage in the monitoring program, and high photometric accuracy.

PLANET is thus ideally suited for such a monitoring program (Ref. 3). The present capability of the PLANET collaboration is the following:

- Access to four 1-meter size telescopes at appropriately spaced longitudes throughout the Bulge season.
- Photometric accuracy of better than 5%.
- Hourly monitoring and (weather permitting) close to 24-hour coverage in the monitoring program
- Online reduction facilities
- Capability of providing ‘secondary alerts.’

In addition, a near-IR capability is being added in the 1999 observing season. PLANET has now completed 4 years of observing campaigns and has intensely monitored more than 2 dozen microlensing events, during which several binary events have been discovered and monitored. At the time of writing this article, the full datasets are still being analyzed, and intensive efforts are under way in modeling and better understanding of the many ‘anomalous’ events detected by PLANET.

More Information on the PLANET project can be found at *http://www.astro.rug.nl/~planet*

References:

1. Albrow, M. et al. (PLANET Collaboration), 1998, ApJ, in press (astro-ph/9807086)

2. Albrow, M. et al. (PLANET Collaboration), 1998, Submitted to ApJ. (astro-ph/9811479)

3. Albrow, M. et al. (PLANET Collaboration), 1998, ApJ, in press (astro-ph/9807299)

# NGST Ad Hoc Science Working Group Prioritizes Science Capabilities

*Peter Stockman and John Mather*
stockman@stsci.edu

On October 15 and 16, the NGST Ad Hoc Science Working Group (ASWG) met in Baltimore to review preparations for the upcoming external review (see neighboring article on the NESR) and to decide on priorities for key NGST science capabilities. Science leads for the five NGST science themes presented highlights and required capabilities for each field. These capabilities included wavelength regions, spectral and angular resolution, and any special requirements for the spacecraft (e.g., tracking moving targets). Pierre Bely described relevant technical studies of NGST designs in regard to visual imaging and realistic mid-IR backgrounds (see adjoining article).

At the July ASWG meeting in Belmont, we had experimented with a voting system in which each ASWG member could allocate up to 100 priority points (in units of 5 points) to a large list of elements. At that meeting, the ASWG "voted" on the relative amount of observing time in the Design Reference Mission (DRM) to be devoted to the five science themes. The results are shown in Fig. 1. We found that the dispersion among the votes was very tight indicating a strong consensus within the group. In October, the ASWG was requested by NASA HQ to prioritize the scientific capabilities of NGST in preparation for entering the next development phase (Phase A). After much discussion, we voted in a similar fashion on a selected list of 8 science capabilities. The results of this vote are shown in Fig. 2. Imaging and spectroscopy in the near infrared (1 to 5 microns) obtained half the votes, with imaging and spectroscopy in the mid-IR (MIR, 6 to 28 microns) getting 28% of the votes and visible and high contrast imaging garnering about 22%. This vote showed a larger dispersion in votes, probably because each science theme stresses different parts of the Observatory. As a result, we estimate that these priorities are uncertain by 5% even within the ASWG. Nevertheless, we were pleased to see that the results were remarkably similar to what was obtained from the DRM program itself (e.g. the percentage time spent using different instruments in different wavebands).

The recommendations of the ASWG, together with technical and budgetary information, were presented to Dr. Edward Weiler, then Acting Associate Administrator for the Office of Space Science, on November 2. Dr. Weiler approved the recommendation of the NGST Project to proceed into Phase A with a nominal wavelength range of 0.6 to 10 microns. The short wavelength corresponds to a possible cutoff due to gold coatings and was influenced by data showing that near-infrared (NIR) detectors can have excellent performance at visible wavelengths. The long wavelength extension to 10 microns corresponds to the shortest wavelength at which scattered and emitted thermal background from a MIR-compatible NGST equals the natural zodiacal background toward the ecliptic poles. A detailed engineering study has shown that a MIR-friendly design is actually less expensive and less risky to develop and

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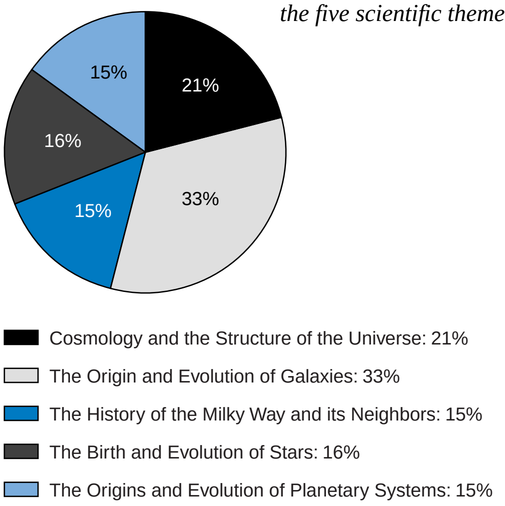

*Figure 1: The percentage of the 2.5 year DRM for the five scientific themes.*

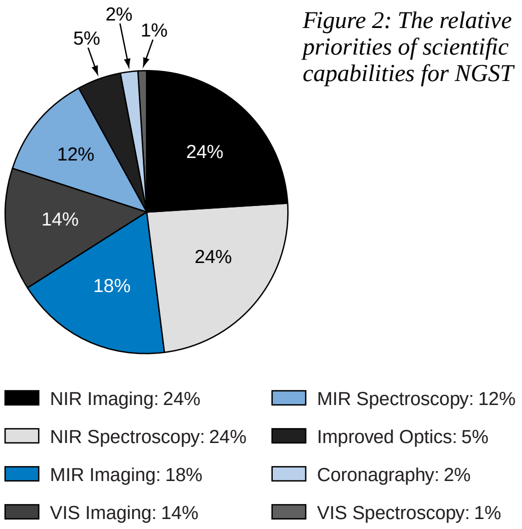

*Figure 2: The relative priorities of scientific capabilities for NGST*

## Ad Hoc Science Working Group *from page 25*

test than a warmer, temperature-controlled NGST for the NIR only. This wavelength range is intended to be a guideline to the Phase A observatory studies to be undertaken by two or more aerospace contractors beginning in the spring of 1999. (Note that these studies will inform the solicitation for science instruments in 2001.)

The ASWG will continue to advise the NGST Project during the Phase A study on a wide variety of scientific and technical areas, including the general capabilities of the scientific instruments. We encourage the astronomy community to send their comments and concerns to members of the ASWG or to us (*stockman@stsci.edu*, *john.c.mather@gsfc.nasa.gov*). We include a list of the ASWG members and their national or study team allegiances.

*Editor’s Note:*

*This membership list appeared in the previous Newsletter but with a number of errors, which we regret.*

*The current ASWG membership is:*

*Jill Bechtold, Steward Obs.*[1]
*Mike Fall, STScI*
*Robert Fosbury, ESO/STECF*[2]
*Jon Gardner, GSFC*
*James Graham, UC Berkeley*[1]
*Tom Greene, ARC*[1]
*Matt Greenhouse, GSFC*[1]
*Don Hall, Univ. Hawaii*
*Avi Loeb, Harvard*
*Peter Jakobsen, ESTEC*[2]
*Bob Kirshner, Harvard*
*Simon Lilly, Univ. Toronto*[3]
*Bruce Margon, Univ. Washington*
*John Mather, GSFC (Co-Chair)*
*John MacKenty, STScI*
*Michael Meyer , Steward Obs.*
*Harvey Mosely, GSFC*[1]
*Phil Nicholson, Cornell Univ.*
*Takashi Onaka, U. Tokyo*[4]
*Marcia Rieke, Steward Obs.*
*Mike Rich, UC Los Angeles*
*Peter Schneider, Max Planck Inst.*[2]
*Gene Serabyn, JPL*[1]
*Massimo Stiavelli, STScI*
*Peter Stockman, STScI (Co-Chair)*
*John Trauger, JPL*[1]
*Ewine van Dishoeck, Leiden*[2]

[1] *ISIM Science Lead*
[2] *ESA Science Representative*
[3] *CSA Science Representative*
[4] *ASAS Science Representative*

## Implications of the Mid-Infrared capability for NGST

*Pierre Bely*

*on behalf of a team composed of L. Petro (STScI), R. Burg, (JHU), S. Castles, M. Greenhouse, K. Parrish (GSFC), D. Jacobson, (MSFC), C. Perrygo (Swales), D. Redding (JPL), and consultants at Ball Aerospace, Lockheed-Martin and TRW.*

The “*HST* and Beyond” (Dressler) report, which is at the origin of the current NGST program, calls for a near-infrared (NIR) zodiacal-light-limited observatory optimized for the 1 to 5 micron range. Additionally, the report also advocates extending NGST’s capability to the mid-infrared (MIR), from 5 to about 30 microns. Preliminary studies performed over the last three years followed these guidelines, with the MIR capability being considered as optional. For the “Formulation” phase of NGST (the old NASA Phase A), we need to better define the technical implications and cost of extending the wavelength coverage beyond 5 microns.

To that end, we compared the performance, cost, and risk of three candidate NGST architectures: NIR-optimized; MIR-compatible; and MIR-optimized. The NIR optimized architecture has the telescope operating at about 100 K, a temperature high enough to allow ground testing in readily-available liquid-nitrogen-cooled chambers. The thermal radiation from optics at about 100 K would limit the zodiacal-limited spectral range of NGST to about 7 microns. In such a “warm” environment the NIR detectors, which operate at ~30 K, must be actively cooled by a mechanical cryo-cooler.

The MIR-compatible architecture (Figure 1) eliminates the need for a mechanical cryo-cooler by the incorporation of more layers in the sunshield. This brings the telescope and instruments down to about 40 K and 30K respectively, allowing the NIR detectors to be cooled passively. In this case, the main source of infrared background at the focal plane is due not to direct emission from the optics but to the radiation emitted by the back of the sunshield scattering off the primary and secondary mirrors (Figure 2). With a

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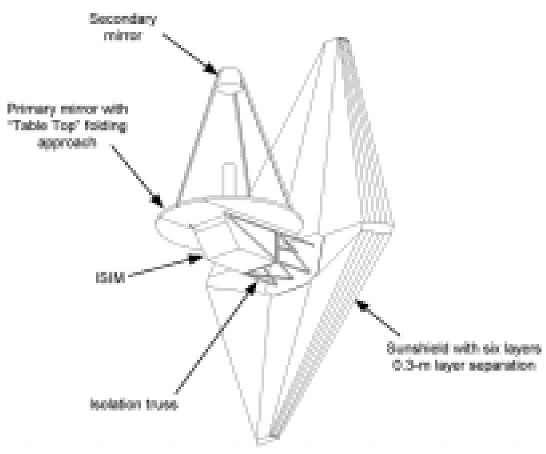


*Figure 1. MIR-compatible architecture. The NIR-optimized architecture is similar, but with fewer sunshield layers and the telescope is thermally controlled at 100 K. The MIR-optimized architecture has a sunshield which is composed of two structures with a total of 8 layers.*

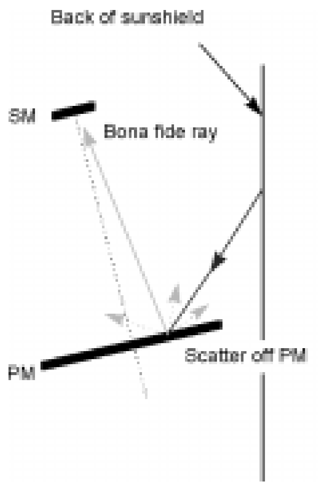


*Figure 2. The thermal radiation from the back of the NGST sunshield can scatter off the primary and secondary mirrors and exceed the MIR background due to the radiation from the cooler optics.*

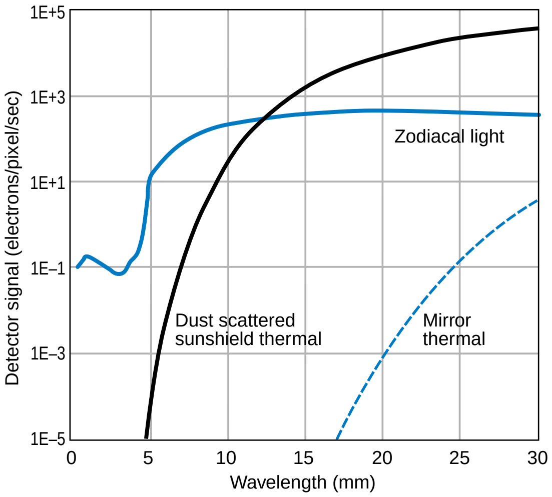


*Figure 3. Focal plane backgrounds for the MIR-compatible case due to (i) the thermal emission of the NGST primary and secondary optics, (ii) radiation by the sunshield backlayer scattering off the optics, and (iii) detector noise compared to the zodiacal light level in the field of view.*

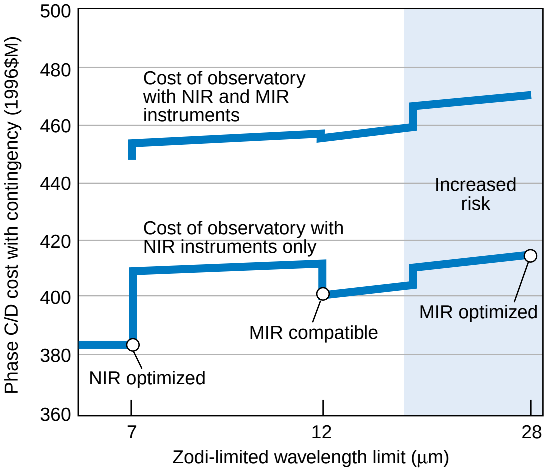


*Figure 4 Cost of NGST as a function of infrared wavelength coverage. The recommended wavelength coverage (0.6 to 10 microns) corresponds to the local minimum in the lower line in the center of the diagram - the cost/contribution of a MIR instrument is included in the upper line.*

## Mid Infrared *from page 26*

6-layer sunshield, the back layer is at about 100K and the scatter-induced background radiation at the focal plane is negligible compared to the zodiacal light for wavelengths shorter than 12 microns (Fig. 3). The drawback of this solution is that it requires testing many elements of the observatory at a temperature of 30 K which implies upgrading testing chambers by adding liquid helium shields.

The MIR-optimized architecture is similar to the MIR-compatible architecture, but with additional sunshield layers to further reduce the radiation from the sunshield back layer. Eight layers are needed for the observatory to be zodiacal-light-limited up to about 30 microns. Such a telescope+sunshield configuration is very difficult to validate, however, because of the very low operating temperatures involved and the difficulty of eliminating thermal leaks.

We estimated the cost and risk of these three schemes in detail using the model for the NASA “yardstick” architecture and estimates for the testing from aerospace consultants. We estimated that the cost of the NIR-optimized scheme is $385M, the MIR-compatible and MIR-optimized being $17M and $25M higher respectively (Figure 4). These costs are in 1996 dollars and do not include a $100M management reserve nor the MIR instrument cost estimated at $50M. Our analysis showed that the savings offered by the easier testing on the ground of the NIR-optimized system is partially offset by the need for precise temperature control of the optics and the cost of the cryo-cooler for the NIR detectors. Cryo coolers can also be avoided for the MIR detectors, which operate at 8 K, since in such a 30 to 40 K environment a stored cryogen system would last 10 years. In the end, a passively-cooled observatory such as the MIR-compatible architecture appears a more natural technical solution and has the advantage of keeping the option of adding the MIR instrument open (e.g. for international collaborators). This approach enables MIR observations which are zodiacal-light-limited out to 10 microns, and vastly superior to other facilities at longer wavelengths, without increasing complexity, risk or cost of the observatory.

Based upon this study and the ability of NIR detectors to work at visible wavelengths (assuming that the optics remain diffraction-limited only at 2 microns) we recommended to the Project and to Dr. Weiler that a zodiacal-light-limited spectral range of 0.6 to 10 microns form the basis for the upcoming Phase A study of NGST.

## The NGST External Science Review: Is NGST Ready for Prime Time?

*Peter Stockman* *stockman@stsci.edu*

Summer breezes in December brought an air of unreality to Baltimore. But on December 1 and 2, the real heat was felt in the STScI Boardroom. The NGST External Science Review (NESR, a nasty nested acronym), led by Rob Kennicutt, grilled the NGST Ad Hoc Science Working Group and the NGST Project on everything from science to budgets. The NESR is the brain-child of Harley Thronson, Acting Director of the Origins Theme at NASA Headquarters. His motive was to make sure that the science program was sufficiently important and robust that the NGST would still be breaking new ground in 2007, after ten years of two Kecks, four VLTs, the Geminis, Subaru, Magellan, the LBT, etc. In addition, Harley asked the NESR to look at the entire Project, the technology plans, the telescope designs, and the overall budget with the viewpoint of the astronomy community. Is this Project ready to move into Phase A? An earlier independent review by engineers and managers, the Standing Review Board, had given a green light to the Project, but HQ wanted a representative group of scientists to check the health of the activity. Harley intends to have similar reviews of all the Origins missions periodically.

The NESR was briefed on the overall science goals by members of the ASWG representing the five science themes. Simon Lilly led off with a discussion of the original “Dressler core mission” for NGST, the origin and evolution of galaxies. He was followed by Bob Kirshner (cosmology), Mike Rich (history of the Milky Way and its neighbors), Mike Meyer (the birth and formation of stars), and Marcia Rieke (the origins and evolution of planetary systems). The review group also heard about plans for soliciting and constructing the NGST science instruments and the possible contributions from ESA and the Canadian Space Agency (CSA).

The preliminary verbal report of the NESR on December 2 was positive. Their final report, which is under preparation, will be sent directly to Dr. Thronson and the NGST Project. It is expected to raise significant issues for the Project to address during Phase A. The members of the NESR are: Rob Kennicutt, Chair, Len Cowie, Alan Dressler, Mark Dickinson, Harriet Dinerstein, Richard Ellis, John Hutchings, Anne Kinney, Jill Knapp, Richard Kron, Steve Shore, Charles Steidel, Alan Tokunaga, Mark Voit, Mike Werner, Ned Wright.

## The European Space Agency (ESA) and NASA agree on NGST Collaboration

*Peter Jakobsen (ESTEC)*

As a result of NASA's invitation to ESA to participate in its ongoing studies of NGST, a framework for future collaboration on the project has recently been reached by the two agencies. The draft agreement assumes that ESA will participate in the project at the level of a so-called "F" class mission (~200 M$) — in the parlance of its Horizon 2000 long-term plan — in return for a guaranteed minimum of 15% of NGST observing time for ESA member state astronomers. The envisaged ESA/NASA NGST collaboration conforms closely to the successful *HST* model; i.e. it assumes that a key component of ESA's hardware contribution will be in the form of a scientific instrument, augmented by contributions to the spacecraft and operations.

ESA is presently sponsoring three studies by scientific consortia and aerospace industries of various potential instrument and telescope concepts for NGST. These studies are scheduled to be completed during 1999 and will form the basis for identifying ESA's potential hardware contributions to the mission. To aid in this process, an ESA NGST Study Science Team has been appointed (see box), and an exchange of members and information with the corresponding ASWG has been instituted.

Once ESA's contributions to NGST have been further defined and agreed upon, final approval of ESA's participation in NGST will be sought in 2001.

*ESA NGST Study Science Team:*

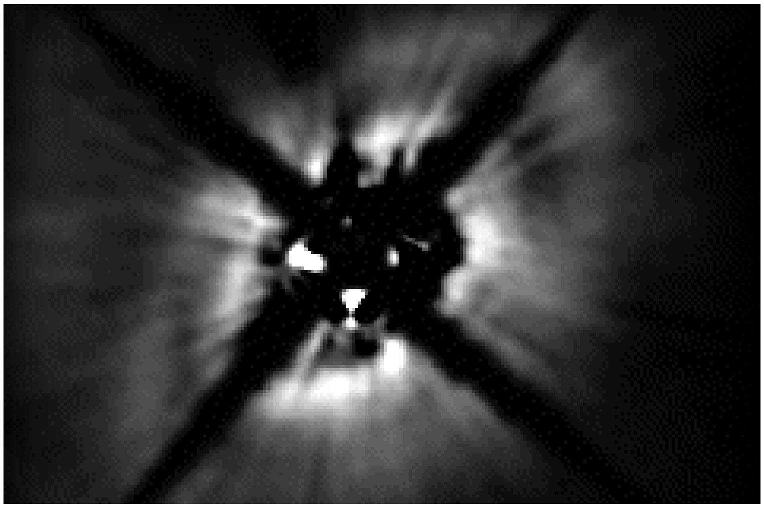
*S. Arribas (Tenerife)*
*C. Burrows (ESA/STScI)*
*R. Davies (Durham)*
*E. van Dishoeck (Leiden)*
*A. Ferrara (Arcetri)*
*R. Fosbury (ESA/ST-ECF)*
*J. Hjorth (Copenhagen)*
*P. Jakobsen (ESA/ESTEC - Chair)*
*O. Le Fèvre (LAS, Marseille)*
*J. Mather (NASA/GSFC)*
*M. McCaughrean (Potsdam)*
*P. Schneider (MPE, Garching)*
*P. Stockman (STScI)*

### *HST Recent Release: Gap In Stellar Dust Disk May Be Swept Out By Planet*

*A striking HST near-infrared picture of a disk around the star HD 141569, located about 320 light-years away in the constellation Libra. Hubble shows that the 75 billion-mile wide disk seems to come in two parts: a dark band separates a bright inner region from a fainter outer region.*

*Credit: Alycia Weinberger, Eric Becklin (UCLA), Glenn Schneider (University of Arizona) and NASA*

*http://oposite.stsci.edu/pubinfo/pr/1999/03/index.html*



## NGST Detector Workshop

*April 20-21, 1999 at the Space Telescope Science Institute*

NGST will be NASA's foremost infrared observatory beginning in 2007. To exploit the scientific capabilities of a cooled 8 meter-class telescope in space, close coordination between instrument designers and detector suppliers is required today. To facilitate this relationship, the STScI will host a detector technology workshop in Baltimore on April 20-21, 1999.

*The main goals of the workshop are:*

- To identify the requirements for and trade-offs involved in creating detectors for NGST science,
- To summarize current experience in the ground-based and space-based community with IR detectors,
- To educate instrument designers and the NGST science community on the detector technologies likely to be available for use for NGST, and
- To promote good working relationships between detector suppliers and the rest of the NGST community.

Interested astronomers, instrument developers, and detector suppliers are urged to obtain further information about planning and registration for the conference on its web page:

*http://www.stsci.edu/ngst/detector_conf.html.*

## Fine Guidance Sensors

*Ed Nelan, STScI nelan@stsci.edu*

As reported in earlier *Newsletters*, FGS1r has demonstrated that it significantly outperforms FGS3 in its ability to detect and resolve close binary systems. As a result, it has been designated the astrometer for Cycle 8. To perform well as a science instrument, an FGS's interferometric response must have both optimal fringe visibility and long-term stability. During its first 9 months in orbit, FGS1r showed significant evolution of its interferograms, presumably due to out gassing of the instrument's graphite epoxy composites. But more recent data obtained from Transfer Mode observations of a standard star suggests that FGS1r's fringes have stabilized to within 2%. This implies that the instrument can be accurately calibrated and reliably used for scientific investigations. (For perspective, a binary system with a small magnitude difference and a separation of 10 mas results in an interferogram which differs by 10% relative to that from a point source.) By contrast, FGS3, after 8 years in orbit, never achieved long term stability below about 18% (for unknown reasons). This variability contributed to FGS3's inability to reliably resolve binary systems with angular separations less than about 20 mas.

## Spectrographs Group

*Melissa McGrath mcgrath@stsci.edu*

STIS continued to operate smoothly during the transition to a higher execution rate for STIS observations following completion of the NICMOS science program. A new version (v2.0) of calstis was installed in the pipeline on November 10, 1998, and was made available to the public for downloading in the interim until the next STSDAS release. For details on the improvements available with version 2.0, see the STIS WWW pages (*http://www.stsci.edu/instruments/stis*). Further releases are planned and will be posted to that location. We also plan an update to the STIS portion of the Data Handbook to be released in early 1999. This will incorporate numerous enhancements made since the last update of the Data Handbook roughly 9 months ago.

*continued page 31*

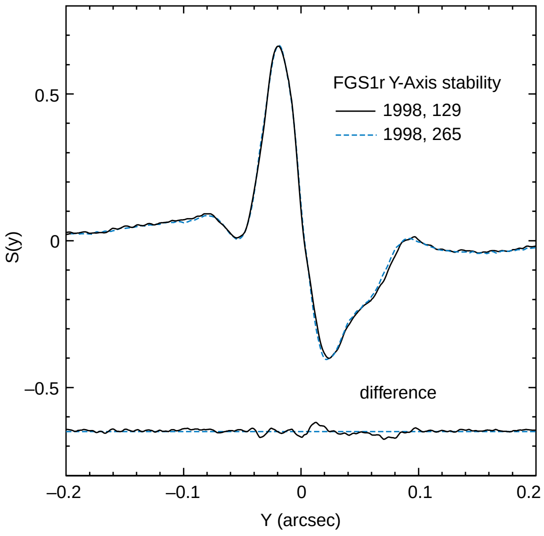
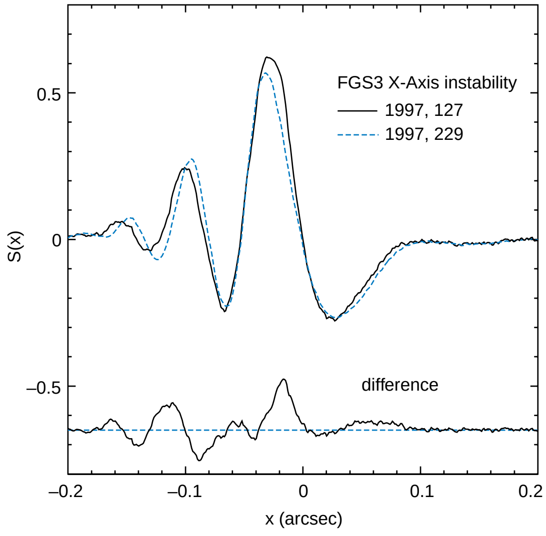


*Figure 1 shows the remarkable stability of FGS1r's y-axis fringes over a 136 day interval (May 9 to September 22). For comparison, Figure 2 shows the persistent variability of FGS3's x-axis fringes over a similar time span. We will continue to monitor FGS1r's stability as Cycle 8 approaches.*



*FGS1r is equipped with the Articulated Mirror Assembly (AMA) which allows for in-flight alignment of the interferometer with HST's optical telescope assembly. The final AMA adjustment was made on October 12, resulting in near-ideal point-source fringes. A stable FGS1r with optimal fringes should be well suited for resolving structure down to 10 mas (or less) in objects as faint as V=15.*

## Spectrographs *from page 30*

The HDF-South calibrated data were made available to the public on November 23. The data are beautiful, and completion of the very-detailed calibration work has resulted in numerous improvements to the pipeline calibration software, including better calibration reference files (e.g., both low-order and pixel-to-pixel flat fields for the MAMAs; low-order flat fields for the CCD clear and F28X50LP apertures), and some new data analysis tools (Spectrum Splicer and Optimal Extraction) that will be available soon.

We are beginning a transition to a new, more concise format for the *HST* Spectroscopy STAN (our electronic newsletter). At the beginning a high-level index of topics is given, accompanied by the web address where you can go to get all of the details. Below this, short summaries are provided for each topic. As before, the STAN will be posted on the STIS web site, where all of these topics will be hypertext links directing you to the full writeup.

Preparations are in progress for the development of the STIS Interface Kit (STIK) to the Aft Shroud Cooling System which will be installed in *HST* during the third servicing mission. The STIK will provide an added cooling capability for the STIS MAMA detectors. In addition to providing a thermal safety margin for the operation of the MAMA detectors, the added cooling capability has the potential to provide a reduced dark rate for NUV-MAMA and FUV-MAMA observations, and this would provide important science gains for UV observations of faint objects.

## WFPC2 Group

*John Biretta* biretta@stsci.edu

WFPC2 continues to perform flawlessly. In connection with the recent HDF-South campaign, we have examined many of the routine calibrations for low-level changes. In general, the news is good and the changes are very small. Both the number of permanent hotpixels and the low-level dark current continue to increase with time, presumably due to long-term radiation damage. The number of permanent hotpixels has increased by a factor ~2.5 since 1995 at all intensity levels, but these still represent a very small fraction of the total pixels (about 0.2%). In addition, the low-level dark current has approximately doubled in that time, and now ranges from ~7 to $10 \times 10^{-4}$ DN/sec across the different CCDs. But again, this has little impact, and will only be an important noise source for long exposures in narrow band and far-UV filters. Changes have also been seen in the flat fields, and are mostly due to small changes in the optical alignments inside the camera. These changes cause the positions of dust spots and other obscurations to shift, hence making bright/dark patterns in the flats. Most of the changes are about 0.5% or less, although there are ~100 spots across WFPC2, each a few pixels in size, where ~5% changes are seen. These are mostly associated with strong features in the existing flats. New super-darks have been generated, and work is underway to make new flats to calibrate-out these long-term changes.

Our group has recently completed a detail, hands-on guide to the drizzling software package, called the “Drizzling Cookbook.” Most long-imaging observations made with *HST* now use position dithers to aid in removal of detector artifacts, as well as for enhancement of the spatial resolution. After the data are obtained, the images are aligned and combined using the Drizzle software package written by Andy Fruchter and Richard Hook. The new Cookbook gives detailed examples of the drizzling procedures for WFPC2, STIS, and NICMOS data for a wide range of targets. Input images, command scripts, and final images are also available on our WWW site, so that users can first practice on our examples before Drizzling their own data. The current cookbook illustrates the drizzling tasks in STSDAS as well as the “ditherII” update, which allows cosmic ray removal when there are only single images at each pointing. Work is underway to add additional capabilities to the drizzling software, including the ability to mosaic the 4 WFPC2 CCDs onto a single drizzled image. An update to both STSDAS and the Cookbook for these added capabilities is planned for next Spring.

A recent study of the *HST* long-range plan shows that opportunities for long, contiguous observations (more than 5 orbits) are over-subscribed. This is due to a number of factors, including a trend towards longer observations of fewer targets, and the recent suspension of NICMOS observing. We have taken a number of steps to alleviate this situation for WFPC2 observers. We have already asked a number of WFPC2 PIs to split their long visits into pairs of shorter ones wherever possible. This will avoid further scheduling delays and help observers obtain the same data sooner than otherwise. We also made the South Atlantic Anomaly avoidance region smaller for WFPC2. Approximately 0.1% of WFPC2 images will see some increase in cosmic rays as a result, but ~10% more time becomes available for scheduling long visits. Finally, for programs with short exposures, more effort will be

*continued page 32*

## WFPC2 *from page 31*

made to utilize short visibility periods which are often available in the schedule, rather than requiring the usual ~56 minutes of visibility per orbit. We believe these changes will be transparent to most observers and will mitigate the over-subscription.

For the latest WFPC2 news, and the Drizzling Cookbook, please see our WWW site at *http://www.stsci.edu/ftp/instrument_news/WFPC2/wfpc2_top.html*

## Near Infrared Camera and Multiobject Spectrometer

*Alex Storrs, STScI* storrs@stsci.edu

The Near-Infrared Camera and MultiObject Spectrometer (NICMOS) has entered its warmup stage. The solid nitrogen used to cool the detectors to 61.5 K (-349 F) is entirely gone, after almost two years of operation. The first evidence of this depletion came in late August, when the temperature at the back of the dewar (the container of solid nitrogen) and the temperature of the nitrogen ice were observed to differ. This deviation indicated that the nitrogen had sublimated away from the end of the dewar farthest from the detectors.

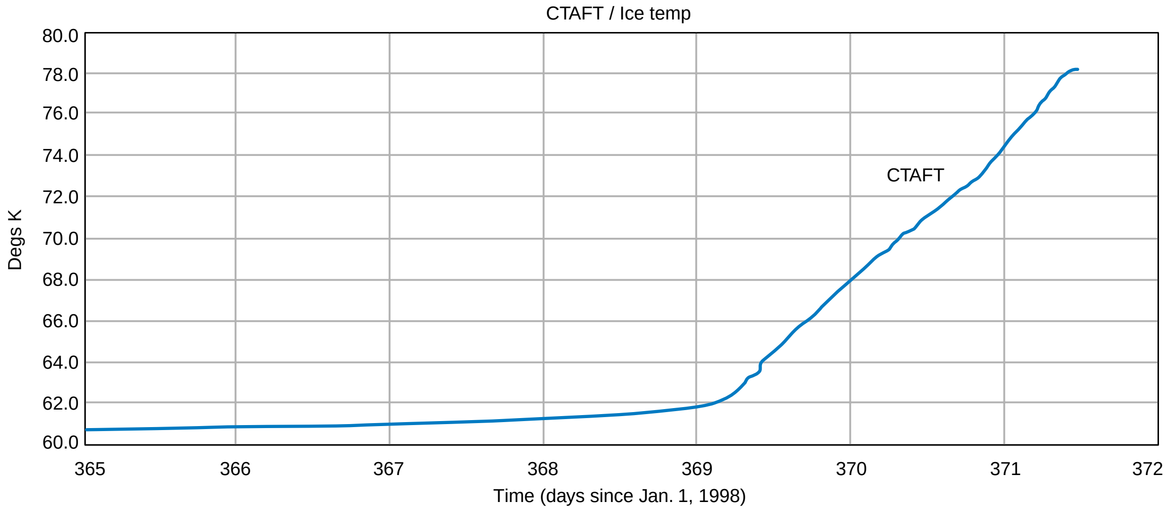
A second indicator of the impending depletion of cryogen was when the temperature at the detector mounting cup started to rise. Although the detector temperature has been increasing steadily throughout the instrument's lifetime, the rate of increase jumped sharply in the early days of December.

The final indicator of cryogen depletion was a marked increase in the rate of temperature change. The official end of cryogen life was on Sunday January 3rd, when all the temperature sensors indicated a surge of 0.5 K in eight hours. This rate of increase was 19 times that seen previously. At this time the detectors were at about 64 K and the aft end of the dewar was at about 62 K. The temperature soared through 78 K, the highest temperature for which the thermometers are calibrated. This change is illustrated in Figure 1.

NICMOS was prohibited from moving its filter wheels on January 6th (at 1435 UT) by ground commanding. Monitoring observations (see below) continued through the end of the week, but with the BLANK filter in place. All NICMOS observations were pulled out of succeeding weeks' schedules, and the instrument put in a hibernating state.

The NICMOS group has constructed an addition to our web site (*http://www.stsci.edu/ftp/ instrument_news/NICMOS/topnicmos.html*) that contains up-to-date information on the depletion of the cryogen. We have observed the behavior of the detectors as they pass through the circa 77 K region where the NICMOS Cooling System (NCS, or "cryocooler") will operate. This data will give us a head start at determining the performance of NICMOS in Cycle 9, and allow potential observers a chance to predict how well NICMOS can perform their observations. The detectors

*continued page 33*



*The temperature of the aft end of the NICMOS dewar in late 1998. Note the inflection in the trend on January 4, 1999 (day 369), indicating the depletion of the cryogen. (courtesy John Bacinski, STScI)*

## NICMOS *from page 32*

warmed up through the NCS operational temperature range quite quickly (see Fig. 1), and the effects of this passage are not well known yet.

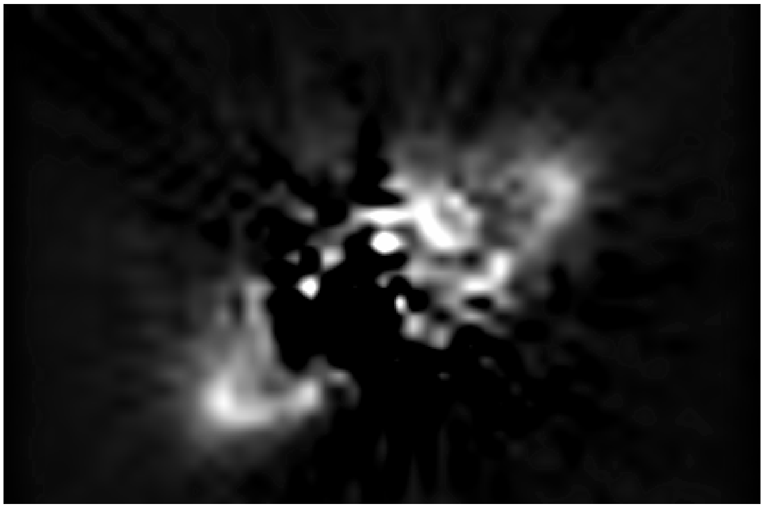
The NICMOS group has monitored the focus, flat field, and dark current behavior on a regular basis. Program 7961 took lamp flats four times a day in a number of filters in all three cameras. Its goal is to follow the QE variations as a function of temperature and wavelength to provide sensitivity estimates for NCS operation. Program 7962 observed a star cluster twice a week in order to monitor possible focus variations due to varying mechanical stresses in the dewar. Program 7963 took darks in all three cameras once every orbit that was not affected by the South Atlantic Anomaly (SAA), or used for one of the other two monitoring proposals. These data will allow us to check for any temperature-induced electronic effects.

The detector temperature change has caused only a few percent variations in the flat field response of the detectors, an expected development as their sensitivity increases with temperature. There has been only small changes in dark current as well, although individual pixels have been observed to suddenly start emitting much more dark current as the temperature increases. A change of 1 K or more will require a new set of calibration files, however, the temperature variation should not effect observations taken in December. The focus has been steady. NIC1 and NIC2 remain near their nominal focus values, and NIC3 has if anything gotten closer to being in focus. It has been hovering around -12 mm in PAM units. Note that the PAM can only be adjusted to about -9.5 mm, so observers at short wavelengths with NIC3 will continue to see some degradation in their ability to detect faint point sources.

One major observing benchmark was passed on November 15, the "end of science" (EOS) date for NICMOS in the long range plan. At that time, 97% of NICMOS science had been scheduled. The remainder was either constrained to be schedule beyond EOS, or were repeats of failed observations. The latest of these observations successfully executed on December 18th. Thus no science observations should be affected by the temperature changes discussed above.

There were many intriguing abstracts based on NICMOS data at the January AAS meeting in Austin, TX. See the AAS website (*http://www.aas.org/meetings/aas193/program/index.html*) for details. Press releases and images can be found at the STScI Office of Public Outreach web site (*http://oposite.stsci.edu/pubinfo/pr.html*) as usual.

*We are pleased to note that NICMOS Instrument Scientist Al Schultz received an Honorable Mention in the sciences category from Computer Sciences Corporation for his work "First Results from the Space Telescope Imaging Spectrograph: Optical Spectra of Gliese 229B." He received his award in a ceremony at CSC December 15, 1998.*



### *HST Recent Release: Dust Ring Around Star Offers New Clues Into Planet Formation*

*A NASA Hubble Space Telescope false-color near infrared image of a novel type of structure seen in space — a dust ring around a star. Superficially resembling Saturn's rings — but on a vastly larger scale — the "hula-hoop" around the star called HR 4796A offers new clues into the possible presence of young planets.*

*Credit: Brad Smith (University of Hawaii), Glenn Schneider (University of Arizona), and NASA*

*http://oposite.stsci.edu/pubinfo/pr/1999/03/index.html*

# Multi-Mission Archive at the Space Telescope Science Institute (MAST) News

*Paolo Padovani, padovani@stsci.edu*

### *Hubble Data Archive*

Archive ingest reached a record value of 174 Gbytes (5.8 Gbytes/day) in November. The average monthly ingest rate for the past year has been around 5 Gbytes/day. Retrieval rates have been about 4 times larger, with a record high of 22 Gbytes/day in June. On October 22, at 23:10 GMT, STScI began processing the 250,000th *HST* observation since launch in May, 1990.

### *Guest Account Discontinued*

The guest account on the Archive host machine (archive.stsci.edu, also known as stdatu.stsci.edu) has been discontinued. This account was used by some users to run StarView from our machine and display the screens back to theirs. It had originally been planned that the guest account would be closed by the end of the year. For security reasons, however, we have been forced to move up the date. Our apologies for any inconvenience this will cause. Users using SunOS 4.1.3, Solaris 2.4, Digital Unix on Alpha, and OpenVMS on both VAX and Alpha can install StarView on their machine. This will be much faster than running it remotely and displaying the windows locally. The Hubble Data Archive can also be searched on the World Wide Web (WWW) at *http://archive.stsci.edu/cgi-bin/nph-hst*. Users having problems with both these options should contact us at *archive@stsci.edu*.

### *StarView Release 5.4*

StarView 5.4 was released in November. To avoid problems with both searches and retrievals, we recommend that users update any locally-installed StarView software. Installation instructions are available at *http://archive.stsci.edu/hst/distributed_starview.html*. The main new features of this release include changes in preparation for the On-The-Fly Calibration, the possibility of performing cross-correlations from custom queries, and updates to reflect database structure changes.

### *Hubble Deep Field Data Available*

As most of our readers should know by now, a second Hubble Deep Field (HDF) campaign was carried out with *HST* in October 1998. The selected field is located in the southern Continuous Viewing Zone (J2000 coordinates 22:32:56.2 -60:33:02.7). All HDF-South data, including derived object catalogs prepared by the STScI HDF-South team, were made available on November 23 1998 at 20:00 GMT. The data can be retrieved via anonymous ftp at ftp://archive.stsci.edu/pub/hdf-south/version1. Further details about the HDF-South, including flux limits and flanking field observations, can be found on the WWW at *http://www.stsci.edu/ftp/science/hdf/hdfsouth/hdfs.html*.

### *New Digitized Sky Survey Jukebox*

The WWW page of the Digitized Sky Survey (DSS), at *http://archive.stsci.edu/dss/*, is one of the most popular pages of our WWW server. Since this service was opened in May 1995, usage has steadily increased up to one to two thousand accesses per day. This has strained the original jukebox to its limits, forcing us to replace it. The new jukebox is much faster than the old one and is providing easier access to the DSS images.

### *New MAST Page*

A new main entry page for the Multi-Mission Archive at the Space Telescope Science Institute (MAST) WWW site has been implemented at *http://archive.stsci.edu/mast.html*. A new form allows the user to locate available data sets according to wavelength range and data type. This is another step to make the MAST site relevant for those users not familiar with the individual missions and instruments and to focus on the scientific content of the archives. The page continues to provide links to the WWW pages of the various archives, the cross correlation search, and other general information.

## 1999 STScI May Symposium

As announced in the last *Newsletter*, the 1999 May Workshop is titled “The Largest Explosions since the Big Bang: Supernovae and Gamma-Ray Bursts” and will be held from from May 3 to 6, 1999. A complete program is not yet available, but the speakers will include:

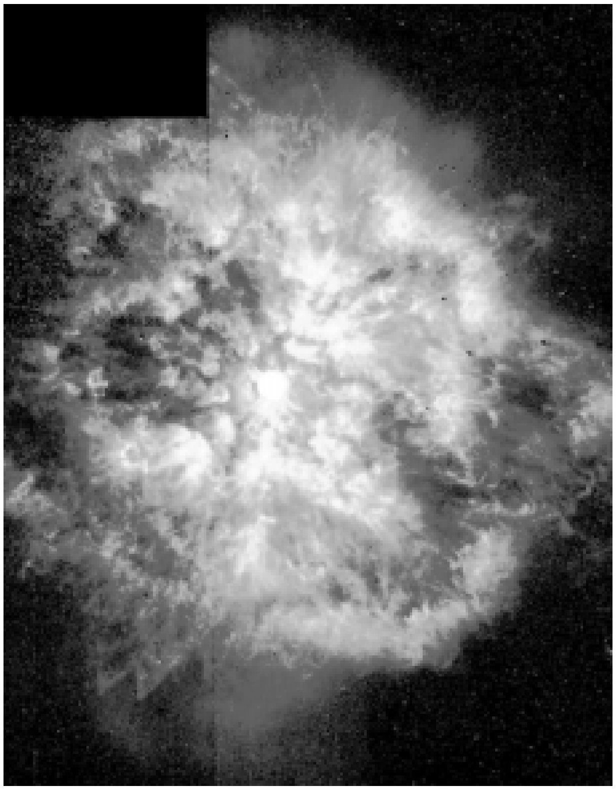
D. Arnett
D. Branch
R. Chevalier
Y.-H. Chu
D. Frail
A. Fruchter
A. Khokhlov
R. Kirshner
C. Kouveliotou
S. Kulkarni
M. Livio
K. Nomoto
B. Paczynski
S. Perlmutter
E. Pian
T. Piran
L. Piro
M. Rees
A. Sandage
B. Schmidt
J. van Paradijs
E. Waxman
K. Weiler
J. C. Wheeler
S. Woosley.

## A 1999 Summer Student Program at STScI

The Space Telescope Science Institute will again host a dozen or more undergraduate research interns in the summer of 1999. We encourage you to let students know about this opportunity. Complete information may be found at our web page: *http://www.stsci.edu/stsci/summer.html*

Applications will be due February 15, 1999.

Specific inquiries may be made to David Soderblom (*soderblom@stsci.edu*), but please read the web page first.



### *HST Recent Release: Great Balls of Fire*

*Resembling an aerial fireworks explosion, this dramatic HST picture of the energetic star WR124 reveals it is surrounded by hot clumps of gas being ejected into space at speeds of over 100,000 miles per hour. Also remarkable are vast arcs of glowing gas around the star, which are resolved into filamentary, chaotic substructures, yet with no overall global shell structure.*

*Credit: Yves Grosdidier (University of Montreal and Observatoire de Strasbourg), Anthony Moffat (Universitie de Montreal), Gilles Joncas (Universite Laval), Agnes Acker (Observatoire de Strasbourg), and NASA*

*http://oposite.stsci.edu/pubinfo/pr/1998/38/index.html*

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## Calendar

### *Cycle 8*

| | |
|---|---|
| Phase II Proposals Due | February 18, 1999 (firm) |

### *Cycle 9*

| | |
|---|---|
| Call for Proposals issued | June, 1999 (tentative) |
| Phase I proposals due | September, 1999 (tentative) |
| Proposers notified | December, 1999 (tentative) |
| Phase II Proposals Due | February, 2000 (tentative) |
| Routine Observing Begins | June, 2000 (tentative) |

### *Meetings and Symposia*

| | |
|---|---|
| May Symposium | May 3-6, 1999 |

## ST-ECF Newsletter

*The Space Telescope — European Coordinating Facility publishes a quarterly newsletter which, although aimed principally at European Space Telescope users, contains articles of general interest to the HST community. If you wish to be included in the mailing list, please contact the editor and state your affiliation and specific involvement in the Space Telescope Project.*

**Robert Fosbury** *(Editor)*
*Space Telescope —*
*European Coordinating Facility*

**Karl Schwarzschild Str. 2**
*D-85748 Garching bei München*
*Federal Republic of Germany*

*E-Mail:* *rfosbury@eso.org*

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## How to contact us:

First, we recommend trying our Web site: *http://www.stsci.edu*
You will find there further information on many of the topics mentioned in this issue.

**Second, if you need assistance on any matter send e-mail to *help@stsci.edu* or call 800-544-8125. International callers may use 1-410-338-1082.**

Third, the following address is for the *HST* Data Archive:
*archive@stsci.edu*

Fourth, if you are a current *HST* user you may wish to address questions to your Program Coordinator or Contact Scientist; their names are given in the letter of notification you received from the Director, or they may be found on the Presto Web page *http://presto.stsci.edu/public/propinfo.html.*

Finally, you may wish to communicate with members of the Space Telescope Users Committee (STUC). They are:

Fred Walter (chair), SUNY Stony Brook,
*fwalter@sbast1.ess.sunysb.edu*
Bruce Balick, U. Washington
John Bally, U. Colorado
John Clarke, U. Michigan
Bob Fosbury, ESO
Jay Frogel, Ohio State University
Laura Kay, Barnard College
Pat McCarthy, O.C.I.W.
Felix Mirabel, CEA-CEN Saclay
Sergio Ortolani, Padova
Regina Schulte-Ladbeck, U. Pittsburgh
Sue Tereby, Extrasolar Research Corp.
Rodger Thompson, U. Arizona
Harold Weaver, JHU
Bruce Woodgate, GSFC

The Space Telescope Science Institute *Newsletter* is edited by David Soderblom, to whom correspondence may be sent (*soderblom@stsci.edu*). To record a change of address, please contact Ms. Nancy Fulton (*fulton@stsci.edu*).

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Editorial Assistance: Jack MacConnell

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