

# BULLETIN

volume 84, issue 7 *July 2010*

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**OUR 84th YEAR OF  
ASTRONOMY IN LOS ANGELES**

**Los Angeles Astronomical Society**  
Griffith Observatory  
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Los Angeles, CA 90027

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*Editor's Corner*

*W*e'll, the May public star party was a wash out, literally. I had to leave at 9pm due to a long day at Griffith, but at 10pm, the sprinklers came on. Unfortunately, the sidewalk astronomers were set up right over those sprinklers, and one can only hope that not a lot of damage was done to those telescopes. What happened was that someone turned the sprinklers on again after they were turned off Friday night. Also, as of press time, I've received no word from Griffith that the experiment to stay open until 11pm is going to be tried for June.

Unfortunately, we had to move the June general meeting date, and we found this out from Griffith a week before the meeting. This should be sufficient reason for everyone with email access to join at least the LAAS Yahoo group announcements list. We cannot possibly call or use regular mail to inform everyone of last minute changes like this, so PLEASE JOIN ! All you need is an email address we can reach you at. The announcements list is only used for these sudden important messages, and so received infrequent postings, but it is IMPORTANT that every LAAS member possible join this group.

For whatever reason, we've received a large number of new member applications this month. My personal welcome to all these new members !

*(Continued on page 3)*

Articles, short news or story items, and photographs and images are welcome as long as they're focused on LAAS interests. Articles need to be 1,500 words or less. Please submit only a few images at one time, with a caption for each. Include such information as camera type, telescope or other equipment used, and exposure times, where pertinent. The deadline for submitting bulletin material is the 10th of each month. If possible, please submit electronically to:

BulletinEditor@laas.org

Material may be sent to the LAAS address listed at the top of the column at left, but timely reception and publication cannot be guaranteed. ✧

*David Nakamoto*

## *New Members*

The new members approved at the last board meeting are:

- Ali Batuk
- Diane Breuer
- John Cline
- Rudolph Flores
- Penny Kunitani
- Thomas Levitt
- Denise Longrie
- Luigi Manna
- Lea and Theodore Pringle
- Facundo Rabaudi
- Gene Riley
- Jeff Schroeder
- John Stephenson
- Pamela Thompson (a returning member)
- Jennifer Tinidad
- Gabriel Uribe
- Christina and David Velarde
- William Webb
- Kevin Weber
- Colin and Mai Whipple
- Keith Williams
- Conrad Wright

25 new members in all !!!

Welcome to our club, and we hope you'll enjoy your Astronomy with all of us ! ✧

# *The Herschel Space Observatory*

*By Timothy Thompson*

The Herschel Space Observatory launched atop an Ariane 5 ECA on 14 May 2009 at 13:12 UTC (06:12 PDT) from the European spaceport at Kourou, French Guiana. It was stacked on top of another European Space Agency mission, the Planck mission to study the cosmic microwave background. The two spacecraft separated after launch and made their way independently to the L2 Lagrange point, about 1,500,000 km (932,000 miles, about  $1/10^{\text{th}}$  of the Earth-Sun distance) in the anti-Sun direction from Earth. Planck has already completed one full map of the sky, but the first results have not yet been released as I write this. So I will say no more about Planck, and report on the first results extensively reported from the Herschel Space observatory.

The Herschel mission is named after Sir Frederick William Herschel (15 Nov 1738 – 25 Aug 1822). Perhaps best known amongst amateur astronomers as the discoverer of the planet Uranus, he also discovered the Uranian moons Oberon & Titania on 11 Jan 1787, as well as the Saturnian moons Enceladus (28 Aug 1789) and Mimas (17 Sep 1789). But he is also the man who discovered the infrared (IR), a form of light just too red for human eyes to see. He did this on 11 Feb 1800 while using a thermometer to measure the temperature of the different colors of light in a solar spectrum made by a prism. He noticed that his thermometers were measuring something, even though they were already past the red end of his prism “rainbow”. I would say this is the most significant of his discoveries. His sister Caroline and his son John were also accomplished astronomers, his son also being knighted as Sir John Frederick William Herschel.

Herschel launched on the day before its predecessor, the NASA Spitzer Space Telescope, ran out of cryogen and could no longer be cooled sufficiently to work at the longer IR wavelengths. Spitzer could make images and do photometry at wavelengths 3.6, 4.5, 5.8, 8.0, 24, 79 and 160 microns, and do spectroscopy over the wavelength range 5.2 – 38 microns. After running out of cryogen, Spitzer now operates as a “warm mission”, able only to make images and do photometry at 3.6 & 4.5 microns.

The Herschel Space Observatory carries 3 instruments. The Heterodyne Instrument for the Far Infrared (HIFI) is a spectrometer that operates in the wavelength range 157 – 625 microns. The Photodetector Array Camera and Spectrometer (PACS) can image and do photometry at 70, 100 and 160 micron wavelengths (overlapping Spitzer but with much higher spatial resolution), and do spectroscopy over the wavelength range 60 – 210 microns. The Spectral and

*(Continued on page 5)*



© ESA & the PACS Consortium

This is the initial test image from the Photodetector Array Camera and Spectrometer (PACS) instrument on the Herschel Space Observatory. It is a composite of 70 micron (blue) and 160 micron (red) image data of the galaxy M51. This image demonstrated that PACS was working well.

Image credit: The European Space Agency and the PACS Consortium.

Photometric Imaging Receiver (SPIRE) can image and do photometry at 250, 360 and 520 microns, and do spectroscopy over the wavelength range 200 – 670 microns. Wavelengths longer than about 300 microns (0.3 millimeters) are usually no longer referred to as infrared, but rather as submillimeter (submm) wavelengths. Herschel is the first space observatory to bridge the gap between infrared and submm astronomy. To work at such long wavelengths requires very low temperatures. So Herschel carries over 2000 liters (528 gallons) of liquid helium which will be used to help cool the instrument detectors to 0.3 Kelvins (that's 0.3 degrees above absolute zero). The range of wavelengths that

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Reflection Nebula NGC 1999



PRC00-10 • Space Telescope Science Institute • NASA and The Hubble Heritage Team (STScI)

This is an HST WFPC2 image of NGC 1999 (“Keyhole Nebula”). Released 2 March 2000 the caption identifies the dark keyhole feature as a dark dust cloud between the blue reflection nebula and us. As figure 4 shows, Herschel has seen this is not the case.

Image credit: NASA and the Hubble Heritage Team (STScI/AURA).

Herschel is exploring is mostly invisible to astronomers on the ground because of the opacity of the atmosphere, so Herschel is opening a new astronomical wavelength window.

The Herschel spacecraft weighs 3400 kilograms (7500 pounds), is 7.5 meters (25 feet) high and 4 meters (13 feet) across. The primary mirror is made of silicon carbide with a reflective aluminum surface, protected by a silicon oxide coating, and is 3.5 meters (11.5 feet or 138 inches) across. The Spitzer Space Telescope primary mirror is 0.85 meters (33.5 inches) across, so Herschel will achieve much higher spatial resolution at 70 and 160 microns than did Spitzer. The Herschel resolution at its longer wavelengths will be similar to the Spitzer resolution at 160 microns.

The science objectives set for Herschel are wide in scope. The main cosmological goal is to study the formation and evolution of galaxies in the early universe. Another cosmological goal is the study of the chemical evolution of the universe. Closer to home, Herschel will study the formation and evolution of stars, and the chemistry of the interstellar medium, mostly in our own Milky Way, but also in other nearby galaxies. And still closer to home, in our own solar system, Herschel will study the physics & chemistry of atmospheres, and the chemistry of exposed surfaces of asteroids and satellites.

Solar system observations released so far include Neptune, Mars, two comets (C/2006 W3 (Christensen) and C/2008 Q3 (Garradd)) and several Kuiper belt objects. The observations of Neptune & Mars are directed towards understanding the chemistry and physics of the planetary atmospheres. In the case of Neptune, the Herschel data show that the atmospheric temperature

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The green cloud at the top of the image is NGC 1999, a reflection nebula in Orion just below M42. The dark area in the right side of NGC 1999 was identified in HST images as a dense cloud of dust blocking all light from behind. But Herschel has demonstrated that it is in fact a hole in the cloud, of undetermined origin. It does not look black because there is a dust cloud in the way; it looks black because there is literally nothing there.

Image credit: The European Space Agency and the PACS consortium.

profile is on average about 3 degrees Kelvin warmer than implied by the Voyager radio occultation profile. We also confirm that Neptune has a higher abundance of deuterium (hydrogen with a nucleus of proton plus neutron, rather than a single proton) than does the sun. Mars is so bright as to require special procedures to avoid saturating the detectors. But the first ever disk averaged spectrum in the wavelength range 193 – 670 microns allows the investigation of the H<sub>2</sub>O and <sup>12</sup>CO mixing ratios in the Martian atmosphere. The best-fit models to the Herschel data for Mars indicate an H<sub>2</sub>O mixing ratio of  $1 \times 10^{-4}$  and a <sup>12</sup>CO mixing ratio of  $9 \times 10^{-4}$ . Herschel also observed several Kuiper belt objects (KBO's), enough to determine that none of the existing models for

the thermal properties of KBO's is a really good fit to the Herschel data. So new work has to be done to determine what the KBO surfaces are made of.

Very little of the early Herschel data deal with solar system targets. The vast majority of the data deals with galaxies (all the way from the Local Group to distant, high redshift galaxies), or with the interstellar medium and star formation in our own Milky Way. A particular study was made of our Local Group neighbor M33. Maps of M33 were made using the PACS and SPIRE instruments at wavelengths 100, 160, 250, 350 and 500 microns (that's 0.1, 0.16, 0.25, 0.35 and 0.5 millimeters, so unlike visible light, these wavelengths are large enough to "see"). The maps reveal that the disk of M33 is dominated by "cold dust", where cold is about 24 Kelvins in the warm inner regions of the galaxy, down to about 13 Kelvins in the outer regions. The warm dust component is roughly 60 Kelvins. We also see that the molecular hydrogen (H<sub>2</sub>) mass is only about 15% of the atomic hydrogen (HI) mass averaged over the disk of M33, the most reliable determination yet of this molecular to atomic gas ratio. Both of these items are key to understanding star formation in any galaxy.

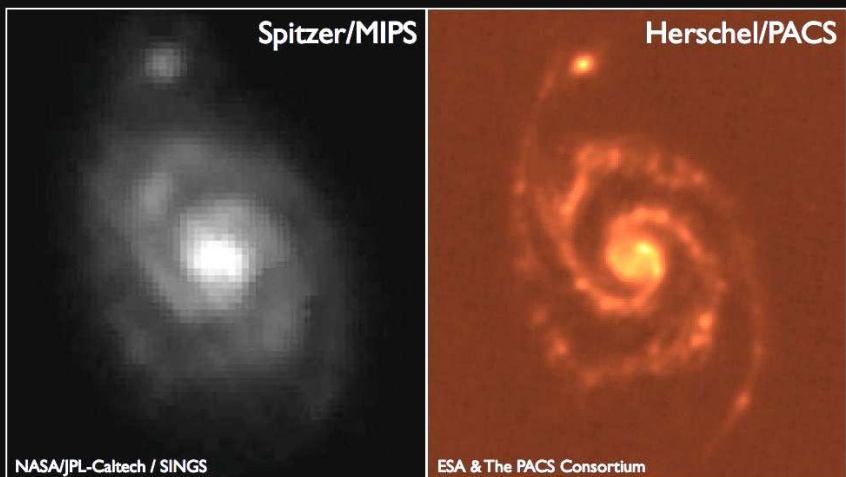
A study of star formation regions in our own Galaxy at the very long Herschel wavelengths is able to penetrate deeply into dense interstellar dust clouds at high spatial resolution for the first time. We can now see that dense clouds fragment first into long filaments, and only thereafter into the dense cores that eventually become stars & star clusters.

The early science data release from the Herschel Space Observatory is extensive and I can only scratch the surface here. Herschel is not quite the imager that Hubble & Spitzer have been; it does have imaging capability, but is mostly intended to do spectroscopy and photometry, which does not always produce the most eye catching images for the public. Still, you can see some images by linking to the image gallery through the European Space Agency's Herschel webpage at <http://www.esa.int/SPECIALS/Herschel/index.html> ✧

## *PATS Show Discounted Tickets*

The LAAS can get discounted tickets to this year's PATS show, September 18<sup>th</sup> and 19<sup>th</sup>. This is significantly less than the \$21 at the door. If you're interested, please contact Mary Brown at (626) 791 - 2740.





### Spiral Galaxy M51 (“Whirlpool Galaxy”) in the Far Infrared (160 $\mu$ m)

This image compares 160 micron images of M51 from the Spitzer Space Telescope and the PACS instrument on Herschel. The improved spatial resolution of PACS is obvious. Spitzer was the only prior instrument to image at 160 microns, so Herschel will improve on Spitzer at the common wavelengths of 70 and 160 microns.

Image credit: The European Space Agency and the PACS Consortium.



The LAAS “desk” at this year’s RTMC was well attended by the reports I’ve gotten, even if RTMC itself was underpopulated by both vendors and the amateur astronomy public. Michael White is in the middle; my apologies to the other two but I don’t recognize them. — David Nakamoto

# LAAS Email Lists

The LAAS maintains two E-mail lists, *for LAAS members only*, a general list and an announcements list. Instructions for joining either list can be found in the LAAS webpages:

[http://www.laas.org/Resources\\_Newsgroup.htm](http://www.laas.org/Resources_Newsgroup.htm)

Or look at the bottom of this article for instructions.

The announcements list is intended for announcements of events such as upcoming speakers, special star parties, or other functions planned by the LAAS board. General members are not expected to respond on this list, just to receive announcements. It is a very low traffic list. *Every member should join this group.*

The general list is intended for use by all LAAS members to communicate with each other; ask questions about events, ask questions about astronomy or the LAAS, plan your own events, ask for help with a telescope, or just talk about something relating to astronomy. Traffic will vary greatly depending on member interest & current events.

The LAAS does not automatically put anyone on an E-mail list; you have to choose to do it. E-mail is the most efficient way for the board of directors to communicate quickly with the members, and for the members to communicate with each other. We ask all members to join the announcements list, and ask all members to consider joining the general list.

The group is private, and therefore does not come up in a search. To join, visit the website at : [http://www.laas.org/Resources\\_Newsgroup.htm](http://www.laas.org/Resources_Newsgroup.htm). If approved, you will receive further instructions via email. ✧

# Outreach Program

We've got a large number of requests despite the Recession and the cutback in school funding.

We especially need people living in the San Gabriel Valley to go to outreach events there. Nearly all of the regular volunteers live in the San Fernando

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Valley, so the need in the “other” valley is great.

Come on out to the school and show all the enthusiastic kids, parents, and teachers the night sky. They always appreciate it. And if you get WOW's when they look through you scope, you'll feel good. If no scope, come out anyway and help up set up or answer questions from the kids. So, Outreach volunteers, let's pitch in. I'm sure the kids and adults will appreciate our effort.

Thanks !

Outreach@laas.org (818) 891-3087 ✧

(Editors Note: Be aware that often these requests come with very little advanced notice. Therefore, we won't post any events in the bulletin. The best way to get news of these events is to join the LAAS Yahoo group.

*Don DeGregori*



Herbert Kraus took this photo of Larry Steenhoek at the April dark party event. Larry uses a 12-inch Meade SCT with a Meade DSI Pro camera on a Borg 77 Astrograph mounted on top.

# *Griffith Observatory*

## *Public Star Party Procedure*

Before 6:00pm, show your LAAS badge or card to the traffic control person at the fork at the top of Vermont road just before you reach the tunnel. You'll be allowed to drive up East Observatory Ave. After 6:00pm, no one is allowed to drive up East Observatory Ave, and you'll need to drive through the tunnel, up West Observatory Ave., and through the public parking lot to the traffic control person at the end of the lot. Show the person there your badge and they should let you through. Once at the U curve in front of the Observatory, temporarily park your car on the side nearest to the observatory and unload your equipment. Mary Brown will be available with a cart to facilitate moving your equipment. Unloaded your equipment at the spot where you wish to set up. Mary will oversee your equipment while you park along East Observatory Rd. Then set up your equipment.

Volunteers without equipment are also needed. We especially need help with crowd control with the LAAS 26-inch telescope.

Those who volunteer should remember that the main focus is to be of service to the patrons at Griffith Observatory and show them the nighttime sky. New Members are not expected to adhere to this policy.

Please check the LAAS website and Yahoo group messages for changes and updates in any LAAS event.

We still need more members trained in moving the 26-inch, setting it up and preparing it for moving. If you're interested, please attend one of the Griffith public star party events. We normally bring the telescope out around one hour before sunset so we have enough light to do so, weather permitting. We'd like as many members to be trained and comfortable handling the telescope, so that it will always be available for viewing by the public.

Have fun and enjoy! ✧

*PJ Goldfinger & David Nakamoto*

On the next page you see Linton Rohr at the same dark night that the picture on the previous page was taken at. He uses a Starmaster 14.5-inch Newtonian reflector on a Dobsonian mount outfitted with Argo-Navis digital setting circles and a ServoCAT tracking system. The photo was taken by Herbert Kraus.



**Map to Monterey Park Observatory**  
 (The place to build your telescope)



## LOANER CORNER

Despite the rain, the spring and summer star party season is sneaking up on us. Mars and Saturn are in view in the evening sky. Below are listed the telescopes that are currently available in the loaner program.

LAAS-1 - 4.5" f/8 Celestron reflector on a Polaris mount. This is an easily portable instrument that is still capable of good performance.

LAAS-5 - 6" f/6 Parks reflector on a Polaris clone equatorial mount with a clock drive.

LAAS-8 - 80mm Selsi refractor on an equatorial mount. This is a good telescope for planetary observation.

LAAS-9 - 80mm f/6.25 refractor with a University Optics objective on a heavy duty Celestron camera tripod with a pan-head mount. This RFT is good for the Messier marathon.

All telescopes are equipped with 3 eyepieces. Reflectors include a simple collimation tool and refractors come with a star diagonal

For more information call: David Sovereign at (626) 794—0646. ✧

*David Sovereign*

## *Lost and Found*

Last year a power cord was left at a public star party at Griffith Observatory. It has a "cigarette lighter" connector one end and a DC connector on the other that looks as if it goes with a go-to telescope.

A few months ago, also after a public star party, a 9mm 1.25" eyepiece was found next to the curb where we load and unload.

For further information call David Sovereign at (626) 794-0646 ✧

# EVENTS CALENDAR

Date	Event	Location and Information
Jul 7th (Wed)	Board Meeting	Garvey Ranch Park Class Room. 8:00pm to 10:00pm
Jul 10th (Sat)	Dark Sky Night	Lockwood Valley
Jul 12th (Mon)	General Mtg	Griffith Observatory, Event Horizon Theater, 7:45pm to 9:45pm. Speaker information below.
Jul 17th (Sat)	Public Star Party	Griffith Observatory, 2:00pm to 10:00pm, See pg 12 for details on how to attend.
Aug 4th (Wed)	Board Meeting	Garvey Ranch Park Class Room. 8:00pm to 10:00pm
Aug 7th (Sat)	Dark Sky Night	Lockwood Valley
Aug 9th (Mon)	General Mtg	Griffith Observatory, Event Horizon Theater, 7:45pm to 9:45pm. Speaker information below.
Aug 14th (Sat)	Public Star Party	Griffith Observatory, 2:00pm to 10:00pm, See pg 12 for details on how to attend.

## *General Meeting Speaker Information*

The Speaker for July and August are not known as we go to press. ✧



## Sky and Telescope Subscriptions

Sky and Telescope subscriptions renewals should be sent directly to Sky Publishing. To start a Sky and Telescope subscription, contact the LAAS Treasurer (see the contact information on page 2) directly to get the club rates, then thereafter send the renewal bills directly to Sky Publishing. ✧

## Astronomy Magazine Subscriptions

For those that subscribe to Astronomy Magazine through the LAAS, the rate is \$34 a year, \$60 for two years. ✧



LAAS Home Page: <http://www.laas.org>  
LAAS Bulletin Online: [http://www.laas.org/Resources\\_Newsletter.htm](http://www.laas.org/Resources_Newsletter.htm)

### Membership Annual Dues:

Youth	\$ 20.00
Regular (18-65)	\$ 45.00
Senior Citizen (65 and up)	\$ 30.00
Senior Family	\$ 40.00
Family	\$ 60.00
Life	\$ 500.00

### Additional fees:

Charter Star member	\$ 30.00
Star member, with pad	\$ 70.00
Star member, no pad	\$ 60.00
Printed Bulletin	\$ 15.00

**(Membership due date is indicated on the mailing label)**

## HANDY PHONE LIST



LAAS Answering Machine .....	(213) 673-7355
Griffith Observatory	
Program.....	(213) 473-0800
Sky Report.....	unavailable for now
Lockwood Site .....	(661) 245-2106
	(not answered, arrange time with caller.)
	Outgoing calls – collect or calling card)
Mt. Wilson Institute.....	(626) 793-3100