LOS ANGELES ASTRONOMICAL SOCIETY

BULLETIN

volume 82, issue 1 *January 2008*

Inside this issue

OUR 81st 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 Message

Our apologies for how the election materials were handled this year. A delay in the November meeting due to a holiday was one of the causes. The board will work to resolve this issue so it won't happen next year.

Your new board members will also take over in February, since tradition says that such a change in the governance board happens at the banquet, being held this year in February.

The new board members are:

President—David Sovereign

Vice-President—Mary Brown

Secretary—Steve Dashiel

Treasurer—Herbert Kraus

Board Members:
PJ Goldfinger
Tim Thompson
Reggie Flores
Norman Vargas
David Nakamoto
Mike White
Don Degregori
Herman Meyerdierks
Darrell Dooley
(alternate) Bob Deubler

Please wish our new board members good luck and lend them your support.

The annual banquet will be held on Sunday February 17 at the Monterey Hills restaurant in Monterey Park, the same venue as our 2006 annual

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banquet. Dinner is tentatively scheduled to be served at 6:00pm. The speaker is Mike Simmons and the topic is the history of Mount Wilson. Price is set at $40 per person. Please reserve early. Send your payment to the LAAS address on the previous page, attention Treasurer.

Because of the tradition of not holding a general meeting in January due to the annual banquet, we'll have NO general meeting in January, and we'll hold both a general meeting and the annual banquet in February. This is only for this year. Next year we should be back to the normal schedule.

My continued thanks to all who have and continue to contribute to the success of the bulletin with their articles and images. And a plea for more of you to write or submit images for our bulletin. The deadline for submitting bulletin material is the 10th of each month. Please submit electronically, if possible, to

BulletinEditor@laas.org

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

David Nakamoto

Griffith Observatory Public Star Party Update

David Nakamoto

Since the public is now allowed to park up at Griffith, and we're collaborating with Tony Cook now instead of Elisa Lam, there might be changes to the way we arrange for and access the observatory for public star parties. Keep an eye out here for further details. ✧

For those that haven't visited the new Griffith Observatory, here is an image of the interior of the Leonard Nimoy Event Horizon Theater. Standing behind the podium is our past and future President, David Sovereign. The bearded wonder in the white shirt is our past President Tim Thompson. As can be seen, the new venue for our meetings is a far cry from the nights when it was held in the Planetarium. Image supplied by David Nakamoto.

Deep Impact

By Tim Thompson

At 10:52 PM PDT, July 3 2005, a 168.7 pound (372 kg) NASA space probe slammed into Comet 9P/Tempel 1 at 23,040 mph (10.4 km/sec), resulting in a modest explosion equal to about 4.72 tons of TNT. This was no accident; it was the impactor portion of the Deep Space Mission, which had lifted off six months previously, from Cape Canaveral, Florida, at 1:47:08.574 PM EST on January 5, 2005.

What are comets, really? For ages we have been able to see only the enormous coma and tails of comets, the hardly asteroid sized nucleus hidden deep within. It was not until the European Space Agency sent its Giotto mission for a face-to-face visit with Comet 1P/Halley that we got our first look at the nucleus of a comet. That encounter revealed a much darker surface than we had expected for a "dirty snowball". One might almost think it was a "snowy dirtball". Is the surface hard or soft? Crusty or mushy? Is it a single surface or a complex layer of surfaces? And what's inside? We have come to understand the innards of comets by studying the material ejected from them, in the coma and tail, with telescopes, in the old fashioned traditions of astronomy. But we don't know how much the material has been altered by sunlight and the solar wind by the time it gets to where we see it.

Enter Deep Impact. It's a simple idea, really. You crash a big heavy thing into a comet, and watch from up close as it punches a hole in the comet surface. That way we find out what the surface is like, and we get to see the stuff that comet jets are made of in a pristine state, just as it first comes out of the comet. Aside from the impactor, and the Deep Impact flyby mission, all manner of telescopes, on Earth and in space, watched the show unfold. The final reports on the Deep Impact mission have now been published, so I want to review just a bit of what was learned.

Figure 1 shows an image of the comet nucleus from the flyby module. It certainly looks like there are impact craters, and several different kinds of terrain. Smooth areas trending downhill may be flows of material erupted from beneath the surface, but without the usual associated jets. A raised ridge running across the face of the image separates different kinds of terrain. The surface properties show that the comet cannot be reliably described using either of the popular "rubble pile" or "onion layer" models. Despite its low density (about 0.4 grams/cm3, rather less than water), the comet nucleus is a complex object, both on the surface and internally.

The 6 frames of figure 2 show the evolution of the impact flash for almost a half second after the impact. Laboratory experiments were performed at the

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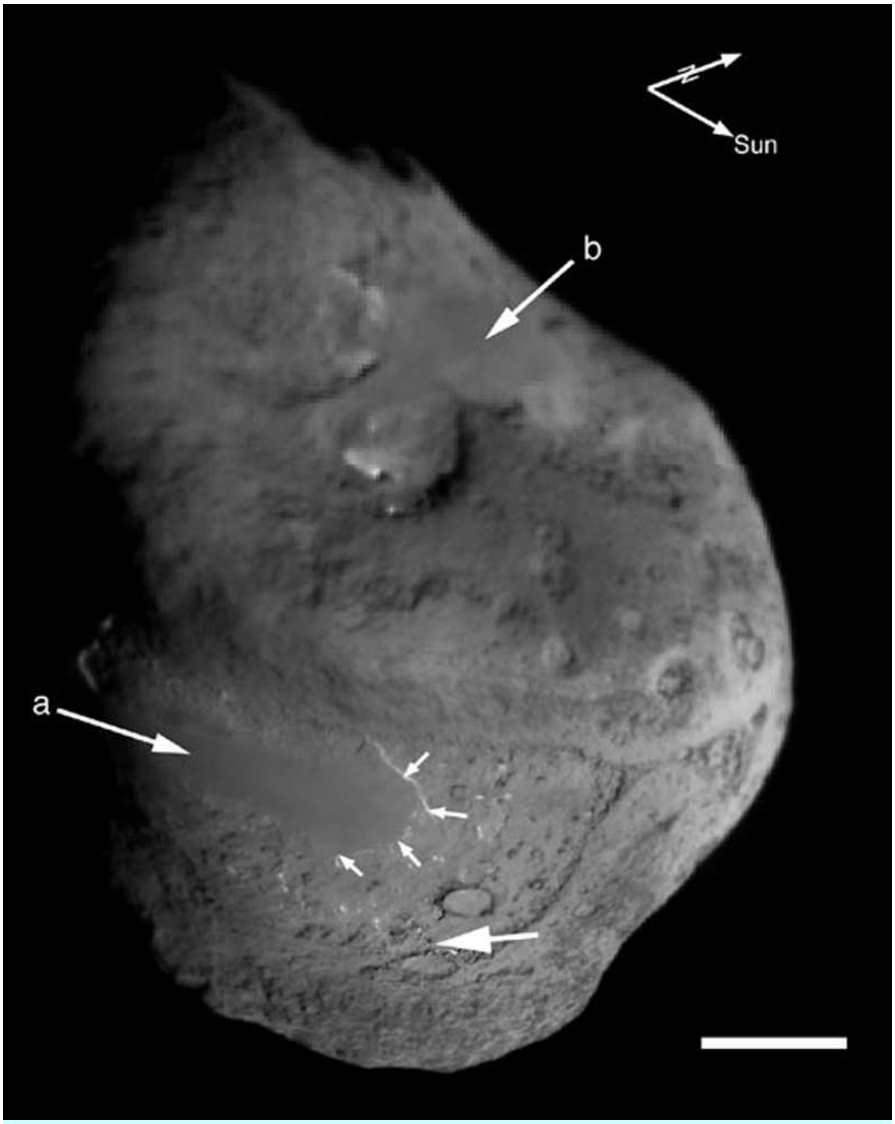

The nucleus of comet 9P/Tempel 1. Arrows a & b show smooth areas that may be eruptive flows. The 4 small arrows highlight a cliff lit up by the sun. The short arrow at the bottom shows the impact site. The scale bar in the lower right is 1 kilometer (0.62 miles).

Ames Research Center Vertical Gun Range, where 0.635 cm diameter Pyrex spheres were fired into various targets, at 5.67 km/sec (12,560 mph) at am angle of 30 degrees, to mimic the Deep Impact event. Comparing the laboratory experiments and numerical models to the Deep Impact flash reveals that the comet surface must be highly porous, low in mechanical strength, multi layered, and must include silicates and carbon compounds. So one of the key results to come out of Deep Impact is our first real observational evidence for the physical properties of the dark crust of the comet nucleus.

The flash evolution shown in figure 2 starts with an initial self-luminous flash in frames A-C, which is material blown out through a narrow tunnel carved by the impactor penetrating the surface. In frames D & E the detector is saturated by a delayed flash as an impact crater is formed by collapse of the weak crust over the impact area, and the liberation of hot gas & dust. Beginning in frame E, and indicated by 3 arrows, we can see the expanding plume as a jet develops, and the excavated gas & dust cools & expands rapidly from the impact.

Another key goal of Deep Impact was to disclose whether of not there is water ice at or near the comet surface. We have long assumed that this is the case, but observational evidence is weak. Figure 3 shows an absorption spectrum of the impact ejecta which is best fit by absorption from water ice

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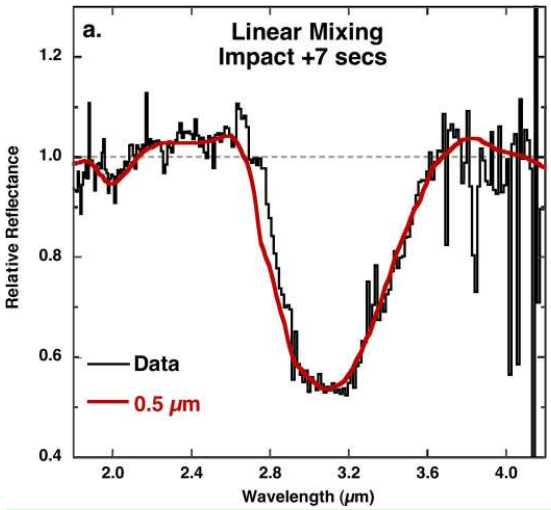
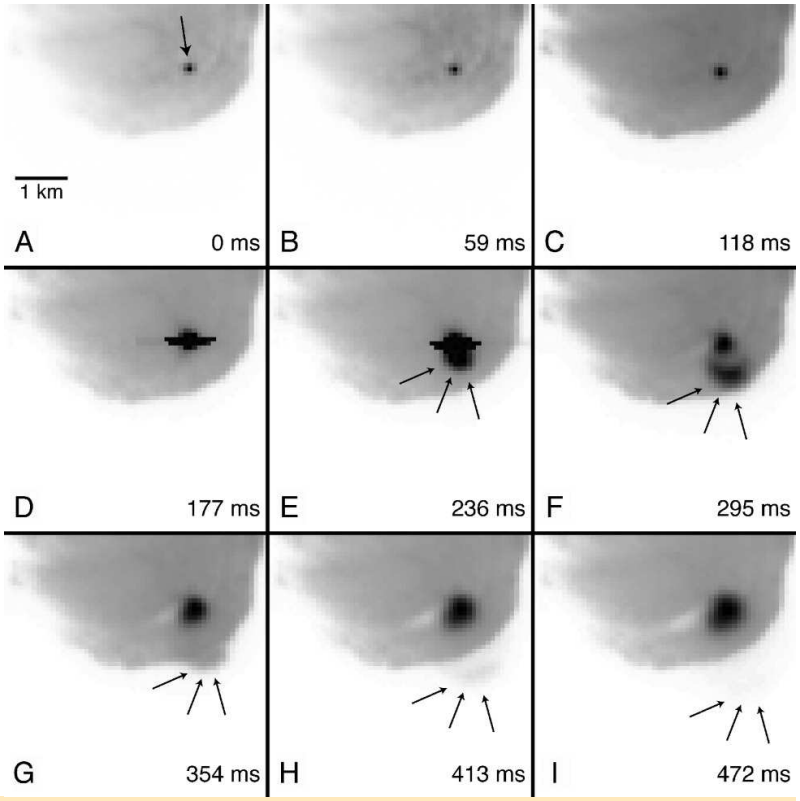


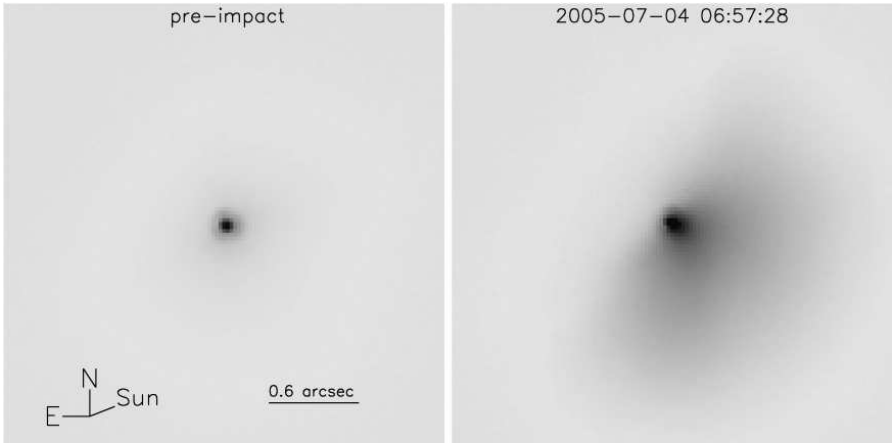
An absorption spectrum of the ejecta 7 seconds after impact. The black histogram are the observed data, and the red curve is a best fit model. The model is based on pure water ice grains that are 0.5 micrometers in diameter. The two spikes on the right, inside the absorption trough, are CH emission features. The slight misfit on the left side of the trough is due to water ice emission.

grains 0.5 micrometers in diameter. This is the best observational evidence so far to indicate water ice on comets, and this feature also indicates that the water ice grains are free of impurities. Spectroscopic observations also show water vapor, carbon dioxide and the C-H radical in the comet ejecta, showing that there are organic molecules in the comet, besides silicates and water. We are also able to see how the water ice crystals sublimate into water vapor in the ejecta plumes.

Deep Impact is just one of many planned close up visits to comets. The European Space Agency's Rosetta mission, launched in 2004, is still on its way to encounter comet 67P/Churyumov-Gerasimenko, where it should finally arrive in 2014. Its complex trajectory includes three earth gravity assists, and one from Mars. The spacecraft was mistakenly identified by the minor planet center as a new near earth asteroid making, the closest encounter to Earth ever recorded, in November 2007, and received the temporary designation 2007 VN84, until the mistake was discovered. ✧



Time evolution of the impact flash, in milliseconds. The arrow in frame A shows the path of the impactor. The arrows in frames E – I highlight the rapidly expanding cold gas ejecta, separate from the dense plume below, which expands more slowly, and casts a shadow. The image is a negative of the original.



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Time evolution of the impact flash, in milliseconds. The arrow in frame A shows the path of the impactor. The arrows in frames E – I highlight the rapidly expanding cold gas ejecta, separate from the dense plume below, which expands more slowly, and casts a shadow.

This is the society's newest telescope, a 26-inch reflector that was originally designed and built to go on a spacecraft, then used at the Big Bear Solar Observatory for solar work. We think the truss is steel, aluminum and titanium, and was designed to focus view motors (hence the wiring). To get some idea of the size of this thing, see the image below.

This is the mirror box for the 26-inch reflector. It weights considerably more than the truss does, despite its much smaller size! Some idea of how heavy it was is gauged by the image below; four guys had to lift it.
All these images were supplied by Bob Deubler who helped to move the scope from Big Bear to Monterey Park. The camera was supplied by Minghua Nie who also assisted in moving this beast.
The society's plans for the telescope are still being determined. One option is to make it into the large traveling telescope that the 31-inch was supposed to be but never was.

And here are the telescope movers, caught in the main mirror for the scope. They are Bob Deubler, Peter DeHoff, Minghua Nei behind the flash of the camera, Virginia and Ken Ward, and Norman Vargas. As can be seen, the telescope is probably a Cassegrain or Ritchie-Chretien, but we'll know more soon. The telescope is currently housed at Garvey Ranch Park. You can see it in person on Wednesday nights when the observatory is open.

Telescope for Sale

CG-5 on a GoTo mount with tripod in excellent condition. It will support up to a 35lb OTA. It's 2 years old and I'm asking $400. Please contact Ed Smither at (818) 845-6914, or at **twopilots2@mindspring.com**

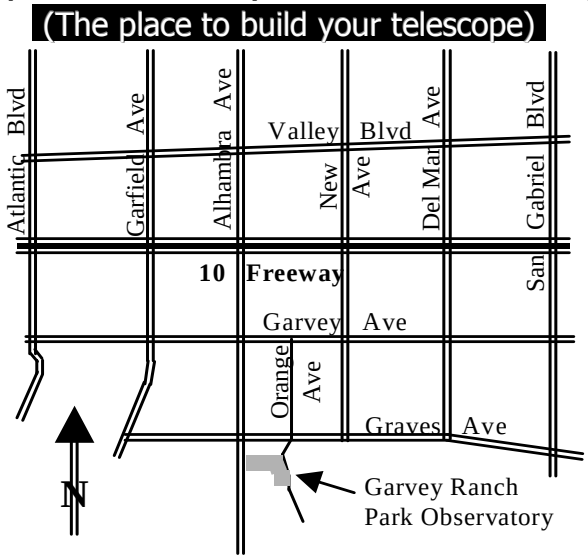
SCT for Sale

Meade 10" SCT— 2 stands, one that bolts to the ground. Complete set of Televue lens. SBIG digital imaging CCD system.
$4600.00 OBO. Call Ray @ (661) 264 - 6627

This image of the early morning lunar eclipse in August 28th of this year was taken by David Beraru. The reports are that this was a particularly dark eclipse, which this image shows to good effect.

Map to Monterey Park Observatory

(The place to build your telescope)



LOANER CORNER

Mars in the constellation of Gemini will be rising late in the evening and is coming into opposition this month. The winter constellation of Orion, the king of winter, is in good position for observation all evening. For those new members that do not have a telescope of their own or members that would like to try out other types, the LAAS has a large selection of telescopes that can be borrowed.

LAAS-1: Celestron 4.5" f/8 Newtonian reflector on a Polaris equatorial mount.

LAAS-2: Upgraded Tasco 4.5" f/8 Newtonian reflector on a driven Edmund equatorial mount.

LAAS-4

LAAS-4: Telescopics 6" f/5 Newtonian reflector on a Dobsonian mount.

LAAS-5: Parks 6" f/6 Newtonian reflector on an equatorial mount equipped with a clock drive.

LAAS-7: 80mm Meade f/15 refractor on an Orion Sky View Deluxe mount.

LAAS-8: 80mm f/11.4 refractor on an equatorial mount.

LAAS-2

LAAS-9: 80mm f/6.25 refractor on a home made equatorial mount. This RFT is a new addition to the loaner program and was donated by our recording secretary, PJ Goldfinger, who used it to complete the Messier catalog of deep sky objects.

All telescopes come equipped with a set of three eyepieces. In the case of reflectors, a collimation tool is included and in the case of refractors a star diagonal is included.

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

EVENTS CALENDAR

Date	Event	Location and Information
Jan 5th (Sat)	Dark Sky Night	Lockwood Valley. Check for weather conditions.
Jan 12th (Sat)	Public Star Party	Griffith Observatory. See pg 3 for details on how to attend.
	General Meeting	**NO GENERAL MEETING IN JANUARY**
Feb 9th	Dark Sky Party	Lockwood Valley Check for weather conditions.
Feb 11th	General Mtg	Griffith Observatory Speaker undetermined.
Feb 16th	Public Star Party	Griffith Observatory. See pg 3 for details on how to attend.
Feb 17th	Annual Banquet	Monterey Hills restaurant Monterey Park Directions next month

The board meeting is held at 8pm on the Wednesday night prior to the general meeting, at Garvey Ranch Park. The Monday general meetings start at 7:30 pm unless otherwise noted. See each month's bulletin for updates.

LAAS Home Page: ***http://www.laas.org***
LAAS Bulletin Online: ***http://www.laas.org/Resources_Newsletter.htm***

LAAS Yahoo Group—how to join

The group is private, and therefore does not come up in a search. To join, send email to: LAAS-subscribe@yahoogroups.com. Include your full name so the moderator can verify your LAAS membership. Your full name is necessary so we can check our records to see if you really are a LAAS member. If approved, you will receive further instructions via email. ✧

Sky and Telescope Subscription News

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 Subscription Rate Changes

For those that subscribe to Astronomy Magazine through the LAAS, the rate has gone up to $35 a year. ✧

New Members Corner

Welcome to the Los Angeles Astronomical Society! Right now, we have lost our previous New Members Coordinator to college, so we're looking for someone to take over this position. If you're interested, please contact one of the board members on page 2. ✧

Email: <mailto:coordinator@laas.org> coordinator@laas.org

Membership Annual Dues:

Youth	$ 20.00
Regular (18-65)	$ 35.00
Senior Citizen (65 and up)	$ 20.00
Senior Family	$ 30.00
Family	$ 50.00
Group or Club	$ 50.00
Life	$ 500.00
Additional fees:	
Charter Star member	$ 30.00
Star member, with pad	$ 70.00
Star member, no pad	$ 60.00

(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