

PRIMEFOCUS

Tri-Valley Stargazers

May 2004



Meeting Info:

What

Dark Energy and the Accelerating Universe

Who

Alex Filippenko

When

May 21, 2004
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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May Meeting

Dark Energy and the Accelerating Universe

*Alex Filippenko,
Professor of Astronomy,
UC Berkeley*

In 1998, observations of very distant exploding stars (supernovae) provided intriguing evidence that the expansion of the Universe is speeding up with time, rather than slowing down due to gravity as expected. New, completely independent data greatly support this conclusion, which resurrects the idea of a long-range “antigravity” effect first proposed by Albert Einstein and later renounced as his “biggest blunder.” The vacuum appears to be filled with repulsive “dark energy,” perhaps consisting of quantum fluctuations out of nothing! Unless the effect changes in the future, the fate of the Universe is to expand forever, at progressively faster rates. The discovery of the accelerating universe, in which Alex Filippenko played a leading role, was voted the top “Science Breakthrough of 1998” by Science magazine, and it made the cover story in the 25 June 2001 issue of TIME magazine.

Alex Filippenko received his Ph.D. in Astronomy from Caltech in 1984 and joined the UC Berkeley faculty in 1986. An observational astronomer who makes frequent use of the Hubble Space Telescope and the Keck 10-meter telescopes, his primary areas of research are exploding stars, active galaxies, black holes, and the expansion of the Universe; he has also spearheaded efforts to develop robotic telescopes. He has coauthored over 420 publications on these topics, and has won numerous awards for his research, most recently a Guggenheim Fellowship. A dedicated and enthusiastic instructor, he has won the top teaching awards at UC Berkeley, and in 1995, 2001, and 2003 he was voted the “Best Professor” on campus in informal student polls. He has appeared in several TV documentaries, most recently “Runaway Universe.” In 1998 he produced a 40-lecture video course on introductory astronomy with The Teaching Company, and in 2003 he taped a 16-lecture update on recent discoveries. In 2000 he coauthored an award-winning introductory astronomy textbook; the second edition appeared in 2003.



News & Notes

Welcome

TVS welcomes our newest members—**Sailes** and **Sumedha Sengupta**, **Zakhary Alper**, and **Bart Hughes**.

2004 TVS Meeting Dates

Below are the TVS meeting dates for the rest of the year. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the July 4th deadline is for the July issue).

Lecture Meeting	Board Meeting	Prime Focus Deadline
May 21	May 24	May 9
June 18	June 21	June 6
July 16	July 19	July 4
Aug 20	Aug 23	Aug 8
Sept 17	Sept 20	Sept 5
Oct 15	Oct 18	Oct 3
Nov 19	Nov 22	Nov 7
Dec 17	Dec 20	Dec 5

Money Matters

At the April Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of April 18, 2004) of TVS's accounts:

Checking	\$1,132.95	
CD #1	\$3,930.46	matures 05/17/04
CD #2	\$2,425.63	matures 05/27/04
CD #3	\$2,069.58	matures 07/16/04

International Dark-Sky Association

TVS has renewed its membership in the International Dark-Sky Association (IDA) and would like to encourage TVS members to join this worthwhile organization. The IDA currently has over 10,000 members world wide.

The goal of the IDA is "To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting." The IDA helps its members fight the light pollution battle by providing a host of information in the form of information sheets and slides. You can find information about lighting ordinances, what to do about light trespass, and dark sky friendly light fixtures, among a host of other information.

Visit their web site for more information about what they do, what resources they provide, and how to become a member: <http://www.darksky.org/index.html>

"I have loved the stars too fondly to be fearful of the night." - Sarah Williams, *The Old Astronomer*.

H2O Combination

Our President wanted to remind all the key holders that the combination to the H2O lock is different than last year. Those going up there for the first time this year will need to get the new combination from a board member before they can get in. Non-board members are not authorized to give out the combination. Look to the box at the bottom of page 3 for contact information.

White Mountain High Altitude Star Party

It is official, the White Mountain Star Party trip for this year takes place Sunday August 8 through Sunday August 16th. The dates were chosen to maximize vacation potential for those who are participating at the TVS public star parties in Yosemite on August 6th and 7th.

The first night of the trip will be at the Grandview Campground (8,600') for altitude acclimation. If you don't like to camp, you may spend the night at Mammoth Lakes (8,000'). On Monday the 9th, everyone makes their way to the Barcroft High Altitude Research Station (altitude 12,435'). Most people will stay there for a just a few nights and then return home, but you do have the option of staying until the following Monday the 16th.

The cost information for this year has not been set. The past few years the costs have been around \$55 per person per night. This gets you a bunk bed in a dorm, all meals, and some of the darkest skies you'll ever see. Unless the thunderstorms are in full bloom.

The White Mountains are located northeast of Bishop, CA. It's about an eight hour drive, with the last leg of the trip (to the research station) on 12 miles of dirt road. Due to the high altitude this is an adults only trip (kids are more susceptible to the effects of high altitude).

This is a joint activity of TVS and the EAS (Eastbay Astronomical Society). We are limited as to the number of people that can participate. If you have any questions, contact Dave Rodrigues at 510-483-9191 or davevrod@aol.com.

Newsletter header image: Ring Galaxy AM 0644-741

Resembling a diamond-encrusted bracelet, a ring of brilliant blue star clusters wraps around the yellowish nucleus of what was once a normal spiral galaxy in this new image from NASA's Hubble Space Telescope (HST). This image is being released to commemorate the 14th anniversary of Hubble's launch on April 24, 1990 and its deployment from the space shuttle Discovery on April 25, 1990. The galaxy, cataloged as AM 0644-741, is a member of the class of so-called "ring galaxies." It lies 300 million light-years away in the direction of the southern constellation Dorado.

Image Credit: NASA, ESA, and The Hubble Heritage Team (AURA/STScI)

Calendar of Events

May 19, 7:00 p.m.

What: *In the Heat of the Night: Searching for the Heat of Infant Stars, Comets, and the Building Blocks of Life*

Who: Dr. Yvonne Pendleton (NASA Ames)

Where: Smithwick Theater, Foothill College, Los Altos

Cost: Free, but there is a \$2 parking fee

Dr. Pendleton, who specializes in the study of “stardust”, the raw materials of planets and stars, will highlight the first images and data from the Spitzer Telescope, a new orbiting instrument similar to the Hubble, which reveals the universe’s secrets using heat rays.

Seating is on a first-come, first-served basis. Arrive early to locate parking. Visitors must purchase a required campus parking permit for \$2 (eight quarters). Parking lots 1, 5, 6 and 7 provide easy access to the theater. Foothill College is located on El Monte Road off Interstate 280. For more information, call 650-949-7888.

May 22, 6:00 p.m.

What: *Spaceships: Will We Ever Build One?*

Who: Dr. Gibor Basri (U.C. Berkeley)

Where: Chabot Space & Science Center, Oakland

Cost: \$5

Join space and science fiction enthusiast Dr. Gibor Basri for an evening discussing the fantasies and realities of human spaceflight. We grew up reading science fiction that promised easy, faster-than-light flight between the stars. But will this dream ever become reality?

July 20-24

What: *AstroCon 2004*

Who: ASP, AANC, ALPO, AAVSO

Where: Doubletree Hotel, Berkeley

Cost: Varies

An historic conjunction of organizations that surround, serve, and support amateur astronomers.

The conference starts on July 20th with a reception and a talk by Gibor Basri. The following day has various presentations and an optional tour of the Lick Observatory. On the 22nd, more presentations and an optional star party at the Chabot Space & Science Center. Events for Friday the 23rd include more paper presentations, lunch with David Levy and the optional ASP Awards Banquet featuring Dr. Geoff Marcy. The conference concludes on Saturday the 24th, with more papers and the optional closing banquet on board the USS Hornet, with former astronaut Alan Bean as speaker.

If you sign up before June 15th, full conference registration is \$80; after June 15th it’s \$95. One-day registration can be purchased for \$25 prior to June 15th, \$30 after.

The following special events and outings are charged separately. Conference registration is required for all events except the ASP Awards Banquet and the Gray Line tours.

A visit to Chabot Space & Science Center on Thursday, including a planetarium show and observing through their fine collection of telescopes (weather permitting). Transportation to and from Chabot is included: \$25.

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Mailing:

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Lecture Meeting:

Unitarian Universalist Church
1893 N. Vasco Road, Livermore

Board & Discussion Meetings:

Round Table Pizza
1024 E. Stanley Blvd., Livermore

Web & E-mail

www.trivalleystargazers.org
tvs@trivalleystargazers.org

Eyes on the Skies

Eyes on the Skies is a robotic solar telescope run by Mike Rushford (rushford@eyes-on-the-skies.org). You may access it by visiting www.eyes-on-the-skies.org.

TVS E-Group

So how do you join the TVS e-group you ask? Just send an e-mail message to the TVS e-mail address (tvs@trivalleystargazers.org) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

Astro Events

Jupiter Transits

Below is a listing of transit times for various Jupiter related objects. The abbreviations are fairly straight forward: G=Ganymede, C=Callisto, I=Io, E=Europa, GRS=Great Red Spot, and if you see a 's' next to one of the moons, it means its shadow (e.g., Cs=Callisto's shadow); na means Jupiter is below the horizon or it is daylight at that time.

May

Date	Object	Starts	Transits	Ends
Thur 13	GRS	na	10:15p	12:15a
Fri 14	I	na	na	8:29p
	Is	na	8:20p	9:40p
	E	9:52p	12:15a	12:42a
Sat 15	Es	12:20a	1:25a	3:08a
	GRS	2:20a	4:00a	na
	GRS	10:15p	12:00a	2:00a
Tue 18	GRS	na	9:30p	11:30p
Thur 20	GRS	9:30p	11:05p	1:05a
Fri 21	I	na	9:15p	10:22p
	Is	9:21p	10:15p	11:35p
Sat 22	E	12:26a	1:45a	3:15a
	Es	2:58a	4:00a	na
	GRS	3:00a	4:55a	na
	GRS	10:55p	12:35a	2:35a
Tue 25	GRS	8:45p	10:15p	12:15a
Fri 28	I	10:02p	11:05p	12:16a
	Is	11:15p	12:10a	1:29a
Sat 29	E	3:00a	3:20a	na
	GRS	3:45a	na	na
	GRS	11:50p	1:30a	na
Sun 30	GRS	na	9:25p	11:25p

June

Tue 1	GRS	9:25p	11:00p	1:00a
Wed 2	Cs	10:10p	11:15p	1:00a
Fri 4	I	11:56p	1:00a	na
Sat 5	Is	1:10a	na	na
Sun 6	GRS	12:30a	na	na
	GRS	na	10:15p	12:15a
Tue 8	Es	na	10:35p	12:16a
	GRS	9:50p	11:50p	na
Fri 11	GRS	na	9:20p	11:20p
Sun 13	I	na	9:25p	10:35p
	GRS	9:15p	11:00p	na
	Is	9:33p	10:28p	11:47p

Collection of Comets

As mentioned in last month's newsletter and in this month's Astronomical Insights, there are several comets visible right now. The easiest comet to see right now is NEAT (Near Earth Asteroid Tracking)—it was easily visible with binoculars on May 11th. It made it's closest approach to the Earth on the 7th, and will make it's closest approach to the Sun on May 15. NEAT will pass by the Beehive Cluster in Cancer on the 14th and 15th.

Comet LINEAR (Lincoln Laboratory Near Earth Asteroid Research) is beginning to head around the sun and should become an early evening object towards the end of May. Comet Bradfield is at 10th mag and will be getting fainter.

NEAT C/2001 Q4

Date	Mag.	Constel.	Rise	Transits	Sets
May 15	1.5	Cancer	10:59a	6:12p	1:31a
May 19	2.0	Cancer	10:24a	6:16p	2:14a
May 22	2.3	Lynx	9:58a	6:17p	2:41a
May 26	2.7	Lynx	9:24a	6:14p	3:10a
May 30	3.1	U. Maj	8:51a	6:10p	3:35a

LINEAR C/2002 T7

Date	Mag.	Constel.	Rise	Transits	Sets
May 19	0.4	Lepus	9:11a	2:16p	7:20p
May 22	0.9	C. Maj	10:46a	3:50p	8:54p
May 26	1.9	Hydra	11:46a	4:59p	10:13p
May 30	2.7	Hydra	12:06p	5:28p	10:49p

Calendar of Events *continued*

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Tour and observing at Lick Observatory (weather permitting) on Wednesday evening, including transportation to and from: \$70 (space limited!)

Gray Line tours from the conference hotel: Muir Woods on Wednesday, \$45 per person. Napa/Sonoma wine country on Friday, \$55 per person.

The ASP Awards Banquet is open to all conference attendees, including a talk by Dr. Geoff Marcy. \$65 for ASP members, or \$75 for non-members.

Gala banquet on the USS Hornet, honoring 35 years since the Apollo lunar landings. Special guest speaker is Alan Bean, Lunar Module Pilot from Apollo 12. \$65 through June 15, \$75 after June 15.

For more information and an application form, visit the AstroCon website at www.astrocon2004.org.

Astronomical Insights

by David Feindel

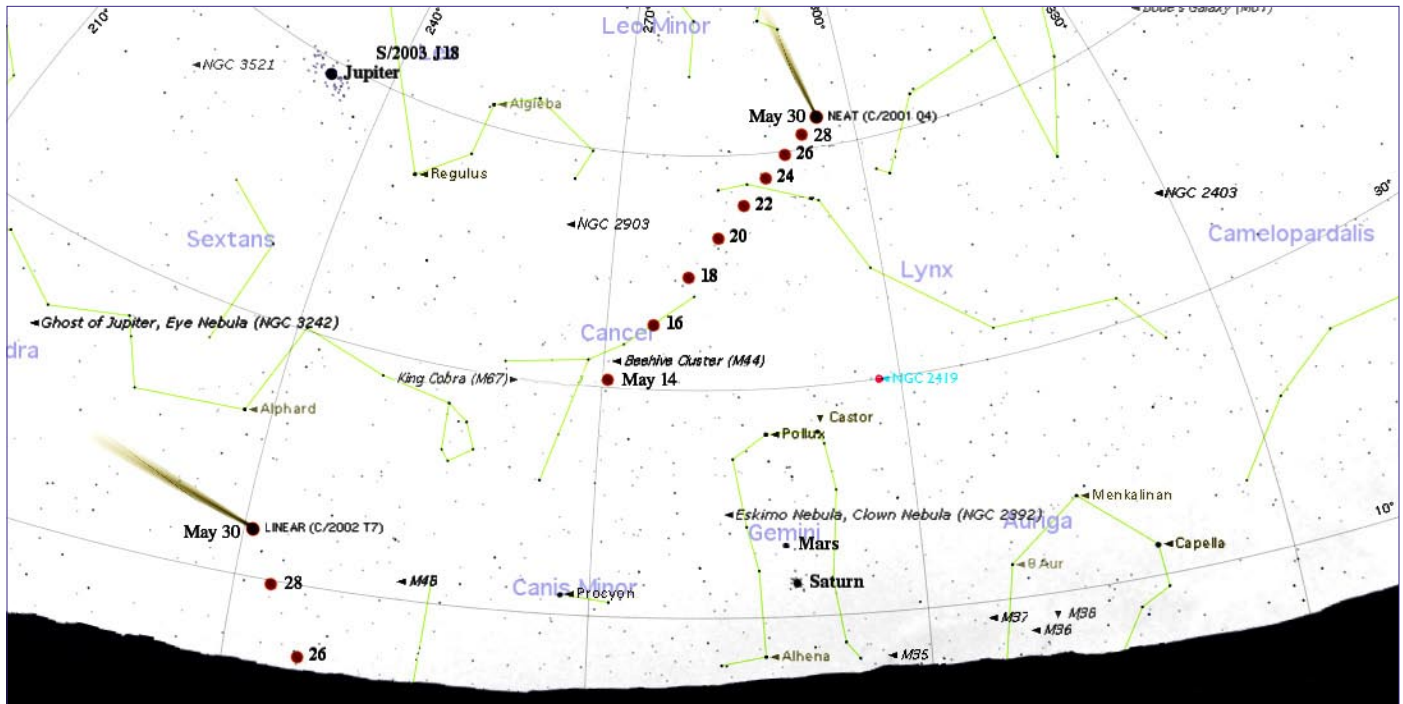
This month's highlight has to be the comets. That's tonight's observing project. Or rather, two of them (C2002 T7 LINEAR is a early morning object at this time). The hoped-for-but-apparently-not bright comet is C2001 Q4 NEAT, visible in the southwest sky at dusk and rising rapidly as May progresses.

Tonight, May 9th, NEAT should be just about even with Procyon, about 5 degrees to the S, making it easy to find. But yesterday's efforts were for naught; I didn't see it in 8x42 bins. So I loaded up for tonight's attempt. My new planetarium program, *The Sky 6*, makes it easy to update orbital elements for comets, asteroids, and satellites; you just connect to the 'net, tell it what items you want, and it gets the current elements and then plots them. I also updated my telescope's database, using Meade's automated update program. You can find the TLEs (Two Line Element files, which completely describe an object's orbit relative to the earth's) at <http://cfa-www.harvard.edu/iau/Ephemerides/Comets/SoftwareComets.html> in a variety of formats for most planetarium and telescope formats. NEAT is supposed to be around magnitude 3.0, which should make it visible in somewhat light-polluted suburban skies (i.e. Pleasanton-Livermore) when using binoculars or a telescope. NEAT should remain visible for many weeks yet, although fading in magnitude as it exits our region (it reaches perihelion on May 15).

LINEAR should become an evening sky object in late May, giving us two comets visible at once. Given its been so long since we had any visible comets, that qualifies as a treat. As of May 9, it's a difficult early morning target for us, just a few degrees above the horizon as the sun rises.

My new astro "toy" is *The Sky* version 6, released a couple of weeks ago. In comparison to *Starry Night* and *Cartes de Ceil*, it is a winner (although a bit pricier; the "Serious Astronomer" version is \$129 vs. \$149 for SN Pro and \$0 for CdC.) As much as anything, it's the graphics display that amazes me; it has a photo-realistic display of the Milky Way, haloes around the moon and sun, colorings on the planets and stars, embedded images of most of the NGC and IC objects, and as rich a catalog of stars as you could want. I'm still learning how to use it—that process may take years, the program is so rich—but its fairly easy to get the basics straight out of the box. And surprisingly, it doesn't take a real fast computer; I'm running it on a 733MHz laptop and its performance is acceptable to me (turning off some of the display rendering helps).

Hope you can somehow figure out a way to get to the East Coast, if not Europe or Asia for June 8, and the Venus transit. Unfortunately, it appears I'll have to wait until 2012 to catch it here in California...



The predicted positions of Comet NEAT (C/2001 Q4) and Comet LINEAR (C/2002 T7) for the month of May. Each dot represents where that particular comet will be in the sky at 9:00 p.m. on that date. Chart generated by *Starry Night Pro*.

What's Up *by Debbie Dyke*

All times Pacific Daylight Time unless otherwise noted.

May

- 11 Tues **Last Quarter Moon** 4:04 a.m.
- 12 Wed Uranus 5° N of the Moon 4:00 a.m.
Vesta 6° to the North of the Moon 4:00 a.m.
- 14 Fri Mercury at greatest elongation W (26°) 2:00 p.m.
Tonight and tomorrow night, look for Comet NEAT near the Beehive Cluster in Cancer.
Sun goes into Taurus.
- 16 Sun Texas Star Party at Fort Davis, TX. TSP runs through the 23rd.
1969 Venera 5 impacts Venus.
- 17 Mon 1969 Venera 6 impacts Venus.
- 18 Tues 1910 Earth passes safely through tail of Comet Halley.
- 19 Wed **New Moon** 9:52 p.m.
- 21 Fri **Tri-Valley Stargazers general meeting.** 7:30 p.m. at the Unitarian Universalist Church,
1893 N. Vasco Road, Livermore.
Venus 0.3° S of the Moon 5:00 a.m.
Moon at apogee (251,883 mi/406,264 km) 5:00 a.m.
After sunset look to the west to see Venus, Mars, Saturn and the crescent Moon grouped together.
- 23 Sun **Tri-Valley Stargazers discussion meeting.** 2:00 p.m. at the Round Table Pizza on 1024
E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
1980 The Tri-Valley Stargazers becomes incorporated as a non-profit organization.
- 24 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
Saturn and Mars just 1.5° from each other in the West at 10:00 pm.
- 26 Tues Jupiter 5.5° N of the Moon in the evening.
- 27 Thurs **First Quarter Moon** 12:57 a.m.
- 28 Fri Riverside Telescope Makers Conference (RTMC) begins. Conference ends on Sunday, 30th.
1959 First primates in Space – Able and Baker.
- 29 Sat 1919 Einstein's theory of general relativity is tested for the first time during a total solar eclipse.
- 30 Sun 1966 Surveyor 1 makes the first soft landing on the Moon.
- 31 Mon **Memorial Day**
1935 Robert Goddard's rocket reaches 7,500'.

June

- 1 Tues 1858 Lick Observatory dedicated
- 2 Wed **Full Moon** (largest of 2004) 9:20 p.m.
1858 G. Donati at Florence, Italy discovers one of the comets of the century, named Donati's Comet
in his honor.
- 3 Thurs Moon at perigee (221,493 mi/357,247 km) 6:00 a.m. Expect large tides.
1948 Dedication of the 200-inch Hale telescope at Palomar. Full time use of the scope doesn't take
place until the following January.
- 4 Fri 1965 Ed White becomes first American to walk in space. His walk lasted 22 minutes.
- 7 Mon Neptune 5° N of the Moon in the early morning.
- 8 Tues Transit of Venus. You'll have to head to the east coast, or better yet, Europe, to view the transit.

Voyage to a Double Planet

by Patrick L. Barry and Dr. Tony Phillips

Download a “nine planets” screensaver for your computer with spectacular photos of our solar system, and you’ll notice that one planet is conspicuously missing: Pluto. Icy and mysterious, Pluto is the only planet never visited and photographed by NASA space probes.

In fact, the clearest image we have of Pluto is a tiny, pixelated blob of light and dark patches taken by the Hubble Space Telescope in 1994. It’s tantalizing, but not much more. Earth-based telescopes have succeeded, however, in discovering one amazing fact: Pluto is not a lone world, but a double-planet system. Its companion, measuring about half the size of Pluto itself, is named Charon.

Work is underway to launch a robotic probe to visit and photograph Pluto and Charon. The project, called New Horizons, will map both worlds. Sensors will chart surface minerals and ices, and catalog the gases that make up Pluto’s wispy atmosphere.

“It’s the second epoch in the exploration of the planets,” says Alan Stern, the principal investigator for New Horizons at the Southwest Research Institute in Colorado. “We’re going to the very edge of the solar system.”

The probe is scheduled to launch in January 2006. Its journey will be a long one. Pluto is more than 30 times further away from the Sun than Earth is! Even with a speed boost from a flyby of Jupiter, the probe won’t arrive at Pluto until July 2015. Afterward, the probe will venture on to explore the Kuiper Belt, a distant “halo” of small, frozen objects surrounding the solar system, from which comets originate.

Aside from sheer curiosity about these distant worlds, sci-

tists are motivated by questions about the formation of the solar system. Orbiting in the deep freeze far from the sun, Pluto and Charon have undergone less change than the inner planets during the solar system’s 4.5 billion year history. These two worlds will provide a glimpse into the past.

Pluto could also shed light on the origin of our own Moon. Earth, with its single, large moon, is unusual. The Pluto-Charon system is the only other pair like it in the solar system. In fact, some astronomers consider Earth and the Moon to be a double planet, too. So knowing more about Pluto and Charon could give clues about how the Earth-Moon system formed.

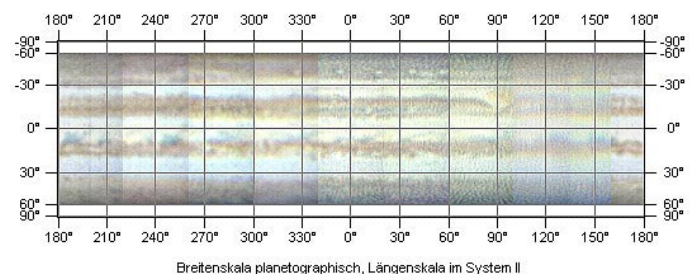
And, of course, the spectacular, up-close photos of Pluto and Charon are going to look great as a screensaver!

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Astro Events *continued*



Triple Shadow transit on Jupiter. Photo taken on March 28th at 8:00 UT (1:00 a.m. PDT) using an 11" f/5 Newt with a 2.5x barlow, a Philips ToUCam 740k camera, 400 exp.
Photo by Gert Gottschalk and Sibylle Fröhlich.



A full rotation map of Jupiter generated in the computer from a sequence of images obtained by observers in Berlin, Germany and Fremont, CA. The map shows longitude in system II.
Photos by Gert Gottschalk, Sibylle Fröhlich, Christian Kowalek, and Roman Rogozynski.



Artist's idea of the New Horizons spacecraft flying by Pluto and its moon, Charon. (Credit: Dan Durda.)

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551



PRIMEFOCUS

Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

- Membership category: _____ \$5 Student.
_____ \$25 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ \$30 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ \$32.95 One year subscription to *Sky & Telescope* magazine.
_____ \$29 One year subscription to *Astronomy* magazine.
_____ \$55 Two year subscription to *Astronomy* magazine.
_____ \$20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
\$ _____ Tax deductible contribution to Tri-Valley Stargazers.
\$ _____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.