

PRIME FOCUS

Tri-Valley Stargazers

September 2007



Meeting Info:

What

Gravitational Lensing

Who

Marina Shmakova

When

September 21, 2007
Doors open 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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September Meeting

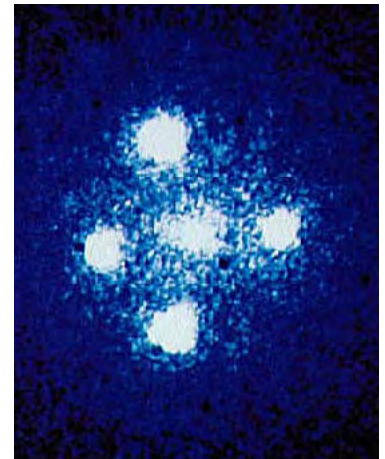
Gravitational Lensing
Marina Shmakova

In 1936, Albert Einstein published his famous paper on the general theory of relativity. In the paper, he predicted gravitational lensing—the bending of light due to the gravitational effect of a large mass object (like a galaxy).

Gravitational lensing works similarly to a refracting telescope. The light from a bright distant object is bent and magnified by a massive foreground object (the lens). The shape and size of the distortion is dependent on the type of object, its distance to us, and how close the light from the source object passes by the lensing object.

Many examples of gravitational lensing have been found in the last few decades. In the image to the right, known as Einstein's Cross, the light from a quasar eight billion light years away is split into four separate images due to a large galaxy sitting 400 million light years away (the galaxy is the circle in the center).

The image below of the Abell galaxy cluster shows a slightly different effect from gravitational lensing. Instead of a distant object being broken into circles, it's broken into arcs of light.



Einstein's Cross. A quasar is split into four images by a galaxy that sits in between the quasar and the observer.

Photo by NASA / ESA



The galaxy cluster Abell 2218 shows the arc effect of gravitational lensing.

Photo by NASA / A. Fruchter / STScI

News & Notes



The Total Lunar Eclipse of August 28th. This is a composite photo showing the different stages of the eclipse. *Photo: Conrad Jung*

Welcome!

TVS would like to welcome our newest member, **Dhiru Patel**.

2007 TVS Meeting Dates

The following lists the TVS meeting dates for the next few months. 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 November 4th deadline is for the November issue).

Lecture Meeting	Board Meeting	Prime Focus Deadline
Sept. 21	Sept. 24	Sept. 9
Oct 19	Oct 22	Oct 7
Nov 16	Nov 19	Nov 4
Dec 21	Dec 17	Dec 9

Money Matters

At our August board meeting, Treasurer **David Feindel** presented the TVS account balances (as of August 18, 2007):

Checking	\$3,389.57	
CD #1	\$3,656.36	matures 11/17/07
CD #2	\$2,557.42	matured 08/27/07

Final H2O Open House - October 6th

Back by popular demand, TVS will have one more open house at our observing site, Hidden Hill Observatory (H2O). All interested parties are to meet at the caravan meeting point of Mines and Tesla in Livermore at 5:30 p.m. on Saturday, October 6th. The caravan will proceed to the site so that there will be time to set up scopes before it gets dark. There is a \$3 per car entrance fee (exact change). For more information, visit the TVS web site.

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Newsletter header image: Variable star Mira sports a tail.

This is the first time a tail has been seen coming from a star. Material blowing off the star Mira is forming a tail 13 light-years long. There is also a bow shock of hot gas in front of the star, and two streams of material coming out of the star's front and back. The hot gas is causing the tail to glow in ultraviolet light.

Mira is a red giant that's losing massive amounts of surface material. Mira's tail is shedding carbon, oxygen and other elements. This tail material, visible now for the first time, has been released over the past 30,000 years. *Credit: GALEX*

Calendar of Events

September 15, 8:00 p.m.

What: *When Astronomy Became a Science*
Who: John Dillon (Randall Museum)
Where: Mt. Tam Mountain Theatre
Cost: Free

John Dillon is science curator of San Francisco's Randall Museum and lecturer at UC Berkeley and Santa Cruz Extensions. He has studied history and philosophy of science at Cambridge University, is a member of the History of Science Society and a past president of the San Francisco Amateur Astronomers. His talk will examine the amazingly sophisticated astronomy that flowered more than 2000 years ago at the legendary Museum of Alexandria.

The talk will take place in the Mountain Theatre at 8:00 p.m., followed by observing through telescopes in the Rock Springs parking lot, weather permitting, until about 11:00 p.m. This program is FREE and open to the general public and families and students are encouraged to attend. Dress warmly, it can get cold, and bring a flashlight. Car pool if possible as parking is limited.

If the weather is questionable on the event day, call the hotline 415-455-5370 which is updated (if there is a change) after 3:00 p.m. The lecture usually takes place even if observing is doubtful. Only full rain or mountain closure due to fire danger cancels the entire event.

These programs are sponsored by the Mt Tamalpais State Park, organized and run by the Mt Tamalpais Interpretive Association and the observing session is courtesy of the San Francisco Amateur Astronomers. More information and directions are at www.mttam.net.

September 17, 7:30 p.m.

What: *A Brief Tour of the Universe*
Who: Ryan Wyatt (Morrison Planetarium)
Where: Kanbar Hall, Jewish Community Center
Cost: \$4.00

Modern planetariums have transformed into digital domes projecting three-dimensional astronomical datasets, transporting audiences from our solar system out to the edge of the observable universe. Get a glimpse of the new Morrison Planetarium's capabilities by taking a guided tour through charted space—an experience that will redefine your sense of “home.”

Ryan Wyatt is the Director of Morrison Planetarium and Science Visualization at the California Academy of Sciences in San Francisco.

You can purchase tickets online at <http://www.calacademy.org/lectures/tickets> or buy them at the door. For more information, call 415-321-8000.

The Dean Lectures have temporarily moved to the San Francisco Jewish Community Center at 3200 California Street (at Presidio Avenue) during the reconstruction of the Academy.

Parking is available across the street in the UCSF Laurel Heights campus parking lot for \$1.25 per night. Parking in the JCC garage is \$1.25 per half-hour. The #1 California, #3 Jackson, #4 Sutter, and #43 Masonic MUNI lines stop directly in front of the building. The #38 Geary and #24 Divisadero buses stop only a few blocks away.

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Livermore, CA 94551

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
tvst@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 (tvst@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.

Calendar of Events *continued*

September 18, 8:00 - 11:00 p.m.

What: *Lunar Lounge Express*

Who: You

Where: Chabot Space & Science Center, Oakland

Cost: Lunar Lounge: \$15 Adult, \$10 Student, \$8 Member

Lunar Lounge + Mission: \$23 Adult, \$18 Student, \$16 Member.

For reservations, call 510-336-7373

Bring your friends and come party under the stars at Chabot's monthly nocturnal celebration—The Lunar Lounge Express!

The Lunar Lounge Express

Featuring live music, refreshments, activities and fun! The Lunar Lounge Express gives you full access to the Chabot Space & Science Center's interactive exhibits and includes the Planetarium program SonicVision (a new alternative music show), as well as telescope viewing at the Observatory Complex.

Special coffee tastings provided by the AfricaJack Foundation. The AfricaJack Foundation provides resources and funding to build Learning Centers at HIV orphanages in Sub-Saharan Africa.

The musical act for the evening is CoverGriz. The Bay Area's most rockalicious all-woman cover band. Come hear them deliver their "Rock Hits with Glitz!"

You can purchase food from the Celestial Café, and enjoy \$3 micro-brews from Buffalo Bill's Brewery and \$3 wine from the cash bar.

September 29, 11:00 a.m. to Midnight

What: *AANC Conference 2007*

Who: You

Where: College of San Mateo

Cost: Varies by Package

Join us for a fun-filled day and night of astronomy events. From workshops, talks and telescopes to raffles and kid's activities, there are stellar treats for everyone!

Astronomy clubs from all over northern California are bringing their enthusiasm, know-how and telescopes to share with the public. Equipment vendors will demonstrate the latest astronomy products to everyone, including people seeking to get started in astronomy.

Planetarium shows, updates from NASA scientists, hands-on astronomy activities for all ages, a raffle of great astronomy gear, telescope making, solar telescopes, and finishing the night off... "Jazz Under the Stars" Star Party hosted by the San Mateo County Astronomical Society and KCSM from 7:45 p.m. until midnight.

The "Reach for the Stars" conference is sponsored by the Astronomical Association of Northern California, the

Astronomy Department of the College of San Mateo, and the San Mateo County Astronomical Society

The AANC is the Astronomical Association of Northern California. It's an umbrella organization which encompasses the astronomy clubs in Northern California (TVS included). For more information, visit the conference web site: <http://aanstars2007.org>.

October 3, 7:00 p.m.

What: *Taking a Hit: Asteroid Impacts and Evolution*

Who: David Morrison (NASA Ames Research Center)

Where: Foothill College, Los Altos

Cost: Free (parking is \$2 in quarters)

Astronomer David Morrison of NASA's Ames Research Center will give a non-technical, illustrated talk on *Taking a Hit: Asteroid Impacts and Evolution* as part of the Silicon Valley Astronomy Lectures in the Smithwick Theater, Foothill College, El Monte Road and Freeway 280, in Los Altos Hills.

Call the series hot-line at 650-949-7888 for more information and driving directions. No background in science will be required for this talk.

Asteroids have hit the Earth many times in the past, and they will continue to hit in the future, whether we are prepared or not. Collisions with our planet over 4.5 billion years have profoundly influenced the evolution of life. In fact, were it not for the impact of a 15-km wide asteroid 65 million years ago, it is likely humanity would not be here.

Impacts are important for our future as well as our past. In the last two decades we have learned not only how to evaluate the impact hazard but also (in principle) how to defend ourselves. The astronomers operating the Spaceguard Survey of Near Earth Asteroids have already reduced the risk of fatality from unknown asteroids by at least 75%. Unlike other natural hazards, we now have the capability of removing most of the impact risk within the next generation. However, the government still does not have a plan of action for when an asteroid is discovered heading our way or when an impact happens without any warning.

David Morrison is one of the world's experts on the study of asteroid impacts. He is the Senior Scientist at the NASA Astrobiology Institute, where he participates in a variety of research programs in the study of the living universe. Dr. Morrison is the author of more than 155 technical papers and has published a dozen books (including several widely used college textbooks in astronomy.) He is the recipient of numerous awards for his scientific and his educational work, including the Sagan Medal of the American Astronomical Society for public communication. Dr. Morrison was a founder of the multi-disciplinary field

of astrobiology. Asteroid 2410 Morrison is named in his honor, but he assures us that it is not one of those that might hit the Earth.

The lecture is co-sponsored by: NASA Ames Research Center, The Foothill College Astronomy Program, The SETI Institute, The Astronomical Society of the Pacific.

Past Silicon Valley Astronomy Lectures are now available in MP3 format at: www.astrosociety.org/education/podcast/index.html

Astro Events



"Wingardium leviosa" says our AstroWizard Dave Rodrigues, as he practices his wizardry while at the TVS Glacier Point star party.

Jupiter Transits

The following are a few listings 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.

September

Thur 13	GRS	na	8:43p	10:47p
Sat 15	GRS	8:30p	10:19p	na

	E	9:02p	10:18p	na
Mon 17	GRS	10:15p	na	na
	I	10:19p	na	na
Tue 18	GRS	na	7:58p	10:00p
Wed 19	Is	na	na	8:10p
Thur 20	GRS	7:40p	9:35p	na
Tue 25	GRS	na	8:40p	na
Wed 26	I	na	7:50p	8:57p
	Is	7:57p	8:50p	10:05p
Thur 27	GRS	8:25p	10:16p	na
Sun 30	GRS	na	7:51p	10:00p

October

Tue 2	GRS	7:50p	9:32p	na
Wed 3	Es	na	na	8:41p
	I	8:45p	9:45p	na
	Is	9:51p	na	na
Sun 7	GRS	na	8:45p	na
Mon 8	Gs	8:33p	9:33p	na
Wed 10	E	na	7:50p	9:12p
	GRS	na	na	8:12p
	Es	8:47p	na	na
Fri 12	I	na	na	7:24p
	Is	na	7:10p	8:24p
	GRS	na	7:50p	na



TVSers Get Mooned

Here are a couple of Lunar Eclipse shots taken by TVS members. On the top is one from David Feindel. To the right is one by Gert Gottschalk.



What's Up *by Debbie Dyke*

All times Pacific Daylight Time.

September

- 12 Wed 1758 Messier sees the Crab Nebula, making it the first item in his list of fuzzy comet-like objects. Rosh Hashanah begins at sunset. Hebrew year 5768.
- 13 Thur Look for Mercury low in the west just after sunset. The thin crescent Moon will be 7° south (to the left) of Mercury. 7:30 p.m. Mercury will be an early evening object for the next week.
- 14 Fri 1915 John Dobson born in China.
- 15 Sat Moon at apogee (251,498 miles). 2:00 p.m.
- 17 Mon The Moon 3° from the reddish star Antares. 8:00 p.m.
- 18 Tue 1819 Léon Foucault (Mr. Pendulum) born.
- 19 Wed **First Quarter Moon.** 9:48 a.m.
- 20 Thur The Moon occults Tau Sagittarii (mag. 3.31). Tau disappears behind the Moon at 9:47 p.m. and reappears at 10:33 p.m.
- 21 Fri **Tri-Valley Stargazers general meeting.** 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore. Zodiacal Light visible in the east before morning twilight for next two weeks. Yom Kippur starts at sunset.
- 22 Sat Mercury less than one degree away from Spica just before they set in the west. 7:30 p.m.
- 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. **Autumnal Equinox.** 2:51 a.m. Venus at greatest brilliancy. 4:00 p.m. 1846 Gale and d'Arrest discover Neptune near the locations predicated by Adams and Le Verrier.
- 24 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
- 26 Wed **Full Moon.** 12:45 p.m.
- 27 Thur Moon at perigee (222,839 miles). 7:00 p.m.
- 29 Sat Mercury at greatest elongation east (26°). 9:00 a.m.
- 30 Sun Moon 2° north of the Pleiades (M45). 5:00 a.m.
- 30 Sun 1880 Using an 11-inch Alvan Clark, Henry Draper takes the first photograph of the Orion Nebula.

October

- 1 Mon 1958 NASA established by an act of Congress.
- 2 Tue The Moon is 6° north from Mars. 6:00 a.m. 1608 J. Lippershey patents the telescope.
- 3 Wed **Last Quarter Moon.** 3:06 a.m. Mars 1° south of M35. 2:00 a.m.
- 4 Thur 1957 Sputnik 1 is launched by the Soviet Union, becoming the first artificial satellite to orbit the Earth.
- 5 Fri The Moon 1.2° from the Beehive Cluster (M44). 6:00 a.m.
- 6 Sat The crescent Moon 8° above Venus in the early morning sky. 1923 Edwin Hubble discovers a Cepheid Variable in the Andromeda Galaxy. 1995 Discovery of the first extrasolar planet (orbiting 51 Pegasi) announced.
- 7 Sun The Moon 1.5° from Saturn. 5:00 a.m. 1959 First photo of the "dark side" of the Moon taken by the Soviet Luna 3.

Cosmic Cockroaches

by Dr. Tony Phillips

Cockroaches are supposed to be tough, able to survive anything from a good stomping to a nuclear blast. But roaches are wimps compared to a little molecule that has recently caught the eye of biologists and astronomers—the polycyclic aromatic hydrocarbon.

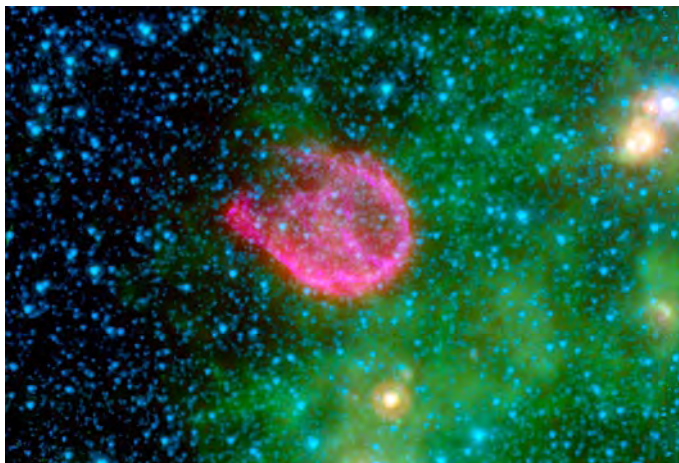
Polycyclic aromatic hydrocarbons (PAHs for short) are ring-shaped molecules made of carbon and hydrogen. “They’re all around us,” says Achim Tappe of the Harvard Center for Astrophysics. “PAHs are present in mineral oils, coal, tar, tobacco smoke and automobile exhaust.” Aromatic, ring-shaped molecules structurally akin to PAHs are found in DNA itself!

That’s why Tappe’s recent discovery may be so important. “PAHs are so tough, they can survive a supernova.”

The story begins a few thousand years ago when a massive star in the Large Magellanic Cloud exploded, blasting nearby star systems and interstellar clouds with hot gas and deadly radiation. The expanding shell, still visible from Earth after all these years and catalogued by astronomers as “N132D,” spans 80 light years and has swept up some 600 Suns worth of mass.

Last year “we observed N132D using NASA’s Spitzer Space Telescope,” says Tappe. Spitzer is an infrared (IR) telescope, and it has a spectrometer onboard sensitive to the IR emissions of PAHs. One look at N132D revealed “PAHs all around the supernova’s expanding shell. They appear to be swept up by a shock wave of 8 million degree gas. This is causing some damage to the molecules, but many of the PAHs are surviving.”

Astronomers have long known that PAHs are abundant not only on Earth but throughout the cosmos—they’ve been found in comet dust, meteorites and many cold interstellar clouds—but who knew they were so tough?



Using the IR spectrometer on the Spitzer Space Telescope, scientists found organic molecules in supernova remnant N132D.

“This is our first evidence that PAHs can withstand a supernova blast,” he says.

Their ability to survive may be key to life on Earth. Many astronomers are convinced that a supernova exploded in our corner of the galaxy 4-to-5 billion years ago just as the solar system was coalescing from primitive interstellar gas. In one scenario of life’s origins, PAHs survived and made their way to our planet. It turns out that stacks of PAHs can form in water—think, primordial seas—and provide a scaffold for nucleic acids with architectural properties akin to RNA and DNA. PAHs may be just tough enough for genesis.

Cockroaches, eat your hearts out.

Find out about other Spitzer discoveries at www.spitzer.caltech.edu.

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

News & Notes *continued*

November Elections

Our annual election is fast approaching. At the November meeting, club members will vote for who they want for the various officer positions and board of directors.

The club highly encourages anyone interested to nominate themselves for any of the positions. Members can put their name in the hat for *any* of the positions—President, Vice-President, Secretary or Treasurer. All club officer positions require attending the majority of the board meetings (we meet in Livermore on the Monday following the lecture meeting).

The Secretary takes the minutes of the board meeting and handles all club correspondence (which is minimal). The President presides over the lecture and board meetings. The Vice President takes over when the President is not available. The Treasurer takes care of all the financial matters (club dues, paying bills, etc.).

We also have plenty of room available on the Board of Directors and could use more input from club members in that capacity. Board members need to show up at the monthly board meetings and vote on items presented at the meeting.

Also, some of the volunteer positions could use new volunteers to take on the job responsibilities. We’re looking for a Program Director (finds speakers for the meetings) and for the Refreshments Coordinator (who brings the refreshments to the meetings and makes the coffee and tea).



AANC-CON 2007

SEPTEMBER 29, 2007 • CSM CAMPUS

1700 West Hillsdale Boulevard, San Mateo CA

11:00am – Midnight



Hosted by San Mateo County Astronomical Society & College of San Mateo
Sponsored by AANC. This year's theme: "Reach For The Stars."

Speakers include: Jane Houston Jones- "Cassini Mission To Saturn"

Dr. Pamela Gay- "What's New in Astronomy" (live video/audio feed)

Vivian White- ASP "Night Sky Network/Project Astro"

Richard Crisp- "Two New Astroimaging Techniques"

Christopher Go- "Secrets Of Planetary Imaging"

KEYNOTE SPEAKER: Prof. Imke de Pater – UC Berkeley
"Dusty Rings In Our Solar System"

Activities: ▲ Planetarium shows by Prof. Darryl Stanford

▲ SMCAS activities for kids (*adults too*)

▲ Daytime viewing of solar prominences / nighttime views through SMCAS scopes and CSM's 20" RC

▲ CCD imaging

▲ Astro Vendors / *Raffle!*

▲ AANC Awards Presentation

▲ Ewell Observatory presents: "*Real Sky Show!*"

▲ Mirror Grinding - Chabot Telescope Makers Workshop

▲ KCSM-FM / CSM, SMCAS: "Jazz Under The Stars"

▲ Jeff Adkins & students of Deer Valley HS / ESPACE

▲ ASP Hands-On Astronomy Activities



For registration and other information visit: <http://www.aancstars2007.org/>

The AANC acts as a forum for communication to the Astronomy Community, funds public outreach events, and provides seed money for educational programs. We invite everyone to AANC-Con 2007!

<http://www.aancstars2007.org/> ▲ <http://www.smcas.com/> ▲ <http://www.smccd.net/accounts/csmastronomy/home.html>

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.
_____ \$30 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ \$40 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ \$32.95 One year subscription to *Sky & Telescope* magazine.
_____ \$34 One year subscription to *Astronomy* magazine.
_____ \$60 Two year subscription to *Astronomy* magazine.
_____ \$10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ \$20 H2O key holder fee. (A refundable key *deposit*—key property of TVS).
_____ \$40 Patron Membership. Must be a member for at least a year and a key holder.
\$ _____ 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.