

PRIMEFOCUS

Tri-Valley Stargazers

February 2005



Meeting Info:

What

3D Geometry of the Large Magellanic Cloud

Who

Sergei Nikolaev

When

February 18, 2005
Conversation 7:00 p.m.
Lecture 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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February Meeting

3D Geometry of the Large Magellanic Cloud
Sergei Nikolaev

The Large Magellanic Cloud (LMC) galaxy is one of our closest extragalactic neighbors. It has been extensively studied for the past 100 years, but we still do not have a clear picture of its three-dimensional structure. Viewed in a telescope, the LMC has an elongated appearance ("disk"), with a concentration of stars ("bar") near the center.

Sergei will present the latest results for the 3-D geometry of the Large Magellanic Cloud, derived from Cepheid variable stars using a technique called "standard candle" method. By analyzing the patterns in the Cepheid magnitudes, we are able to measure the orientation of the LMC disk plane relative to our line of sight, and obtain evidence for disk and bar not being co-planar.

Sergei Nikolaev got his M.S. in Astronomy & Mathematics from St. Petersburg University, Russia, and his PhD in Astronomy from University of Massachusetts, Amherst. His scientific interests include variable stars (Cepheids, AGB, RR Lyr), galactic structure and development of astronomical pipelines. He is currently working at the Institute for Geophysics and Planetary Physics, at LLNL.



The Large Magellanic Cloud

Membership Renewal Time

The TVS membership year runs from January to December—which means it's time to renew! You'll find the membership form on the back of this newsletter. You can also download it off our web site.

The membership categories are:

Student (18 years old or younger) - \$5

Basic - \$25 (download your copy of *Prime Focus*.)

Regular - \$30 (receive a paper version of *Prime Focus* in the mail.)

You can also subscribe to *Sky & Telescope* and/or *Astronomy* magazine at a discounted club rate—*S&T* is \$32.95/year, *Astronomy* is \$29/year.

For those who have held Patron membership in the past, we are still holding off collecting Patron dues until the Marling scope is back on line (which hopefully will be in the next few months).

Calendar of Events

February 12, 2005, 3:30 & 5:30 p.m.

What: *Love Mission to Mars*

Who: You and a loved one

Where: Chabot Space & Science Center, Oakland

Cost: \$50.00 per couple

Celebrate with your Valentine and take a simulated space mission to the Red Planet. Includes chocolates, fizzy beverage and a souvenir of your trip to outer space.

Tickets available at the Box Office, 510-336-7373.

March 1, 2005, 7:30 p.m.

What: *Where Do We Go From Here? A Search for Other Earths*

Who: Dr. Debra Fischer (U.C. Berkeley)

Where: Kanbar Hall, Jewish Community Center, S.F.

Cost: \$3.00

Since the mid-1990's, astronomers have detected more than 100 planets orbiting nearby stars. How do these planets form? Is our solar system unusual? Why didn't the first stars in our Galaxy have any planets? What are NASA's plans for the next generation of planet searches?

During the reconstruction of the Academy, the Dean Lectures have temporarily moved to the San Francisco Jewish Community Center, located at 3200 California Street at the corner of Presidio Avenue. Parking is available across the street in the UCSF Laurel Heights campus parking lot for \$1.25 per night. Parking in the Community Center's garage is \$1.25 per half hour.

March 2, 2005, 7:00 p.m.

What: *Bad Astronomy (In Everyday Life and the Movies)*

Who: Phil Plait (Sonoma State University)

Where: Smithwick Theater, Foothill College

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

Location: Smithwick Theater, Foothill College, El Monte Road and Freeway 280, in Los Altos Hills, California

Will a giant asteroid soon destroy civilization? Can an egg stand on its end only during the spring equinox? Were the Apollo Moon Landings the biggest hoax of all time? Do toilets flush one way just north of the equator and the other way just south of it? Astronomer, popular author, and web-master Phil Plait will take the audience on a good-humored guided tour through some of the misconceptions and mistakes people (particularly people in Hollywood) have about science.

Dr. Plait is an astronomer and a NASA Educational Resource Director (which, he points out, spells NERD) at Sonoma State University. He worked on Hubble Space Telescope data for 10 years, studying such astronomical phenomena as black holes, quasars, and the birth and death of stars. He runs the popular web site *Bad Astronomy* (www.badastronomy.com) and has written a book by that name, published by John Wiley. He has debated Moon Hoax believers in print, on the radio, and television and is regular columnist for *Night Sky* magazine.

Call the series hotline at 650-949-7888 for more info.

Officers

President:

Chuck Grant
cg@fx4m.com
925-422-7278

Vice-President:

Rich Campbell
r_photo@hotmail.com

Treasurer:

Gary Steinhour
steinhour1@juno.com

Secretary:

Maggie Halberg
925-736-8627

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Volunteer Positions

Librarian:

Jim Alves
jim_alves_engr@yahoo.com
925-634-0220

Newsletter Editor:

Debbie Dyke
ddfam@pacbell.net
925-461-3003

Program Director: unfilled

Loaner Scope Manager:

John Swenson
johnswenson1@comcast.net

Webmaster:

Chuck Grant

Observatory Director/

Key Master:

Chuck Grant

School Star Party Chair:

Rich Campbell
r_photo@hotmail.com
925-586-6453 (after 9 p.m.)

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Historians:

Paul Caswell & Debbie Dyke

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Mike Rushford
rushford@eyes-on-the-skies.org

Addresses

Mailing:

Tri-Valley Stargazers
P.O. Box 2476
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.

NASA Fellowship for College Students

The NASA Institute for Advanced Concepts (NIAC) seeks to identify creative and innovative students who possess an extraordinary potential for developing advanced concepts in the fields of aeronautics, space and the sciences. Each Student Fellow will receive a total of \$9,000 for the Academic year 2005-2006. NIAC intends for these awards to benefit talented individuals who have shown extraordinary originality and dedication in their academic pursuits and a marked capacity for self-direction. The Fellowship seeks exceptional creativity, and the promise for important future advances based on a track record of significant accomplishment, and potential for the fellowship to facilitate subsequent creative work.

- Applicant must be in a U.S. institution of higher education
- Applicant must be a U.S. Person
- Applicant must apply no later than their junior year of college

Please visit <http://niac.usra.edu/students/call.html> for more information.

Proposals are due April 15, 2005.

EAS Annual Dinner

Yes, I know this is the TVS newsletter and not the EAS' newsletter, but I know that some TVS members would be interested in the EAS's annual dinner meeting.

The Eastbay Astronomical Society's Annual Awards Dinner will be on Sunday evening, March 13, at the Chabot Space and Science Center in Oakland. The guest speaker is Dr. Chris McKay, who will talk about the Cassini-Huygens mission to Saturn and Saturn's moon, Titan. Cost for the dinner is \$33 per person. Doors open at 5:45, dinner is at 6:45. You can find more information on the EAS web site www.eastbayastro.org/2005/0503/dinner.htm.

Dr. McKay is currently a planetary scientist with the Space Science Division of NASA Ames Research Center. He is one of the world's leading researchers studying Titan, and has been involved in numerical modeling of planetary atmospheres for many years. He is currently working on models of Titan's thick atmosphere in support of the joint NASA/ESA mission to the Saturn system. Dr. McKay is co-Investigator on the Titan probe atmospheric structure experiment (HASI). His broader interests focus on understanding the relationship between the chemical and physical evolution of the solar system and the origin of life. He has been actively involved in planning for future Mars missions including human settlements.



The RA and Dec shafts of the Marling scope. The silvery metal pieces are the newly machined parts.

Marling Scope Status

Some newer members may not be aware of it, but TVS has a 17.5" scope at our dark sky site, H2O. This scope has been available to our Patron Members. However, for the last few years the scope has been out of commission as the mount has been in need of upgrades and repairs.

A few months ago, TVS persuaded Leonard Higgins to take on the formidable task of machining all the needed parts and getting the mount back into working order.

Leonard has had to improvise a bit, in that he's had to machine some special tools in order to machine parts for the mount. (The declination housing was too long to fit on his rotary table and he didn't have enough clearance for the cutting tool he had.)

The work on the Marling scope is progressing, and we are optimistic that the scope will be back on line in the next few months.

Hooray For Huygens

Undoubtedly you have all seen the images the Huygens probe sent back from Titan. But for those who have just crawled out from a rock, the image on the right is what Titan's surface looks like.

For more images, and the latest status on the Cassini mission, visit www.nasa.gov/mission_pages/cassini/main/index.html and www.esa.int/SPECIALS/Cassini-Huygens/index.html



First Light: Beginners' Astronomy

by Richard Campbell

Poetry and You

I had the privilege of browsing the Astronomical Society of the Pacific's (ASP) voluminous library in San Francisco recently. They must have *every single* astronomical publication produced in the last 100 years. Not just final copies, but drafts, research papers, little known newsletters...and books that have been out of print for generations.

Out of all these gems, one truly stood out from the pack—David Levy's poetry book, *Starry Night: How Astronomers and Poets Read the Sky*. I thought, "Why hasn't anyone thought of this before? Certainly Carl Sagan and others have smattered poetic quotations in their works, but what about a whole book of AstroPoetry?" I was reminded of the scene in Carl Sagan's *Contact* where the heroine Ellie Arroway travels to a newfound galaxy, and mutters, "Should have brought a poet...."

Levy's book is amazing. We find a universe of expression, from comets to current research and the gentle pleasures of the night sky. As you might imagine, every culture has saluted the night sky with wonder. There is a wealth of Chinese and Arab Astro poems to compare with the traditional verse of the west. Levy covers it all magnificently.

Imagine driving up to Hidden Hill, radio off, and thinking of how amateur astronomers in Livermore experienced the night sky 150 years ago. It might have felt like this:

The curfew tolls the knell of the parting day,
The lowing herd wind slowly o'er the lea,
The plowman homeward plods his weary way,
And leaves the world to darkness, and to me.
~ David Gray, mid 1700's, quoted in Levy

As amazing as Gray was, only we Tri-Valley Stargazers can describe *our* observing experience. Are there any Tri-Valley *Starpoets* out there? We have painted in colors on our telescopes, but can we paint with words in the newsletter?

If the muse sings to you, and you create something new, send it to: r_photon@yahoo.com and I'll publish it here. If you're searching for inspiration, look no further than *Burnham's Celestial Handbook* (in our own library), to a passage for warmer nights:

"...with its celestial keys,
Its chords of air, its frets of fire,
The Samian's great Aeolian lyre,
Rising through all its sevenfold bars,
From Earth unto the fix'ed stars."
~ Longfellow on the constellation Lyra, from his poem *The Occultation of Orion*

Astronomical insights

by David Feindel

Given the frequent cloudy weather and unstable atmosphere, my binoculars are getting more use than my telescope these days. It has also given me an opportunity to get some experience with a new acquisition, a pair of used Canon 10x30 IS (Image Stabilizer) binos.

In the past, I've borrowed my wife's Pentax 8x42s, which are well-regarded, at least in birding circles. Physically, they are within a half inch in size and within an ounce or two in weight of each other at around 26 oz. They offer about the same field of view, 6 degrees. But there is no ambiguity when you look through them. The Canons have a much flatter field of view; stars are sharp almost to the edge, whereas in the Pentax, they start growing tails about the last 10-15% of the field of view. In daylight views, the Canons seem to present colors a bit more intensely (higher contrast?), an effect that puzzles me, given their 50% less aperture.

And then, there's the IS function—image stabilizer. It works. Well. Spectacularly well. When Jay Freeman talked to TVS last year, he recommended holding binos close to the eyes, using your hands to help brace them against your face. It helps steady the view. But IS is noticeably better. Yes, the image still moves. But it now moves slowly enough so that your brain can process the image. I can see the small ring of white around a chickadee's eyes at 30 feet with the Canons, whereas it's a detail that's not noticed with the Pentax. As an absurd case, they are almost usable from the passenger's seat while driving down I-680. Closer to our interests, it's noticeably easier to trace the large rilles on the Moon, and to split stars in the 15-20" range (hey, this is 10x we're talking about, not 200x).

The one obvious weakness—for both of these binos, actually—is light grasp. 30mm of aperture doesn't collect enough light to let you see the 9th and 10th mag stars in open clusters, at least in Pleasanton. Perhaps under darker skies, they might. So for purely astronomical use, I think I'd go with the conventional wisdom that aperture wins, even with binos. But the IS function is a winner.

On the reading list this month: *The Book Nobody Read*, by Owen Gingerich, a history of Copernicus' *De revolutionibus*, and *The Moons of Jupiter*, a coffee-table book, primarily of the images the Galileo orbiter took of Jupiter and its moons from 1990-2003. Both have come recommended; I'll report back next month. In the meantime, does anyone have recommendations on planetary observing to recommend? With Jupiter now high enough for good viewing by midnight and Mars now almost in range of all-nighter observing sessions...

What's Up *by Debbie Dyke*

All times Pacific Standard Time unless otherwise noted.

February

- 7 Mon Moon at perigee (222,310 mi). 2:00 p.m. Large tides expected.
1984 First untethered spacewalk performed by astronauts Bruce McCandless and Robert Stewart.
1889 The Astronomical Society of the Pacific is formed.
- 8 Tues **New Moon** 2:28 p.m.
1677 Jacques Cassini born.
- 9 Wed Kung (Gung) Hei (Hay) Fat Choy! Today starts Year 4702, the Year of the Rooster, in the Chinese Lunar calendar.
- 10 Thurs Muharram, Islamic New Year 1426.
- 12 Sat Mercury at greatest heliocentric latitude North.
1809 Charles Darwin born.
- 13 Sun 1852 Johann Dreyer, compiler of the NGC catalogue, born.
- 14 Mon Valentine's Day.
- 15 Tues **First Quarter Moon.** 4:16 p.m.
The Moon passes 1.2° from the Pleiades (M45).
1564 Galileo Galilei born.
- 16 Wed Moon at perigee (228,360 mi/368,322 km)
1948 Gerard Kuiper discovers Miranda, a moon of Uranus.
- 17 Thurs Jupiter at greatest heliocentric latitude North.
- 18 Fri **Tri-Valley Stargazers general meeting.** 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
1930 Clyde Tombaugh discovers Pluto using the 13-inch scope at Lowell Observatory.
1977 The Enterprise (first Space Shuttle) takes a ride on the back of a 747.
- 19 Sat Moon at apogee (251,599 miles). 9:00 p.m.
Saturn 5.5° South of the Moon. 10:00 p.m.
1473 Nicolaus Copernicus born.
- 20 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.
1962 John Glenn becomes the first American in orbit.
- 21 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
President's Day.
- 22 Tues Venus at aphelion.
- 23 Wed **Full Moon** 8:54 p.m.
- 24 Thurs Uranus in conjunction with the Sun. 11:00 p.m.
1968 Cambridge University astronomers publish their discovery of pulsars in *Nature*.
- 25 Fri 1972 Luna 20 goes to the Moon and brings back rock samples.
- 26 Sat For the next two weeks the **Zodiacal Light** might be visible in the West after evening twilight.
1994 Clementine spacecraft begins mapping the lunar surface.
- 27 Sun Jupiter just over 2° from the Moon. 1:30 a.m.
1919 First performance of Holst's *The Planets*.

Stardust Up Close

by Patrick L. Barry and Dr. Tony Phillips

Like discarded lumber and broken bricks around a construction site, comets scattered at the edge of our solar system are left-over bits from the “construction” of our solar system.

Studying comets, then, can help scientists understand how our solar system formed, and how it gave rise to a life-bearing planet like Earth.

But comets have long been frustratingly out of reach—until recently. In January 2004 NASA’s Stardust probe made a fly-by of the comet Wild 2 (pronounced “vilt”). This fly-by captured some of the best images and data on comets yet...and the most surprising.

Scientists had thought that comets were basically “rubble piles” of ice and dust—leftover “construction materials” held together by the comet’s feeble gravity. But that’s not what Stardust found. Photos of Wild 2 reveal a bizarre landscape of odd-shaped craters, tall cliffs, and overhangs. The comet looks like an alien world in miniature, not construction debris. To support these shapes against the pull of gravity, the comet must have a different consistency than scientists thought:

“Now we think the comet’s surface might have a texture like freeze-dried ice cream, so-called ‘astronaut ice cream’: It’s solid and can assume odd, gravity-defying shapes, but it’s basically soft and crumbles easily,” says Donald Brownlee of the University of Washington, principal investigator for Stardust.

Scientists are currently assembling a 3-D computer model of this surface from the photos that Stardust took. Those photos show the sunlit side of the comet from many angles, so its 3-dimensional shape can be inferred by analyzing the images. The result will be a “virtual comet” that scientists can examine from any angle. They can even perform a virtual fly-by. Using this 3-D model to study the comet’s shape in detail, the scientists will learn a lot about the material from which the comet is made: how strong or dense or brittle it is, for example.

Soon, the Stardust team will get their hands on some of that material. In January 2006, a capsule from Stardust will parachute down to Earth carrying samples of comet dust captured during the flyby. Once scientists get these tiny grains under their microscopes, they’ll get their first glimpse at the primordial makings of the solar system.

It’s heading our way: ancient, hard-won, possibly surprising and definitely precious dust from the construction zone.

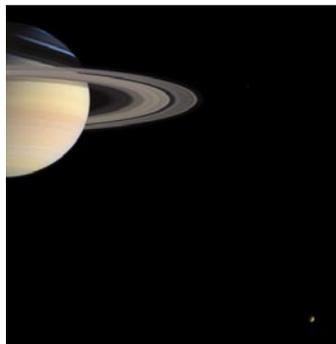
Find out more about the Stardust mission at stardust.jpl.nasa.gov. Kids can read about comets, play the “Tails of

Wonder” game about comets, and hear a rhyming story about aerogel at <http://spaceplace.nasa.gov/en/kids/stardust>.

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



The Stardust spacecraft used a grid holding aerogel to capture dust particles from comet Wild 2. In this test, high velocity dust particles are stopped unharmed at the end of cone shaped tracks in a sample of aerogel



A Parting Shot

Saturn, with a very tiny Titan in the lower right corner. The image was taken by the Cassini spacecraft while it was 447,000 miles from Saturn.

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 _____

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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.