

PRIMEFOCUS

Tri-Valley Stargazers

March 2007



Meeting Info:

What

*All Those Organics up
in the Night Sky*

Who

Friedemann Freund

When

March 16, 2007
Doors open 7:00 p.m.
Lecture at 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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March Meeting

All Those Organics up in the Night Sky

*Friedemann Freund (NASA Ames Associate and Principal Investigator,
Carl Sagan Center, SETI Institute)*

About 1/10th of the mass of the dust in the diffuse InterStellar Medium (ISM) consists of organics. Most of the organics are of a very delicate kind: saturated hydrocarbons where the C atoms carry two or three H. Those organics persist for the lifetime of these dust clouds, hundreds of millions of years, even though the ISM is a hostile environment, cold but with lots of hard UV radiation in addition to the ever-present cosmic rays.

Studying gem-quality olivine crystals in the laboratory has revealed some secrets that may help us understand what those delicate organics are and why they can survive in the hostile environment of the diffuse ISM¹.

¹ M.M. Freund and F.T. Freund: Solid Solution Model for Interstellar Dust Grains and their Organics, *Astrophysical Journal* 639, 210-226 (2006)



Can you find the InterStellar Medium in this picture?

This NASA Hubble Space Telescope image shows the diverse collection of galaxies in a galaxy cluster called Abell S0740, located more than 450 million light-years away in the constellation Centaurus. The giant elliptical galaxy ESO 325-G004 looms large at the cluster's center. This galaxy is as massive as 100 billion suns. Hubble resolves thousands of globular star clusters orbiting ESO 325-G004. Globular clusters are compact groups of hundreds of thousands of stars that are gravitationally bound

together. At the galaxy's distance they appear as pinpoints of light contained within the diffuse halo. Other elliptical and spiral galaxies appear in the image. The photo was made from images taken using Hubble's Advanced Camera for Surveys in January 2005 and February 2006.

Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA). Acknowledgment: J. Blakeslee (Washington State University)

News & Notes

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 April 8th deadline is for the April issue).

Lecture Meeting	Board Meeting	Prime Focus Deadline
Mar. 16	Mar. 19	Mar. 4
Apr. 20	Apr. 23	Apr. 8
May 18	May 21	May 6
June 15	June 18	June 3

Money Matters

Treasurer **David Feindel** reports the TVS account balances (as of February 19, 2007):

Checking	\$3,236.17	
CD #1	\$3,605.29	matures 05/17/07
CD #2	\$2,548.14	matures 05/27/07

School Star Parties

We've got a bunch of school star parties coming up:

Saturday, March 10th: The GATE programs at Christensen Middle School, Croce, and Altamont Creek schools would like us to do star party for them at the Altamont Creek school, located at 6500 Garaventa Ranch Road in Livermore (not far from where TVS has its monthly meetings).

Wednesday, March 28th: The Pleasanton School District's Science Fun Fair. at the Alameda Co. Fairgrounds in Pleasanton. This is the big one—around 10,000 are expected. We usually get a few hundred at the scopes. We'll need two volunteers to be inside at our "booth", with as many outside with scopes as possible. If it's cloudy, we'll still need two inside, but won't need any scopes outside. Debbie Dyke is the coordinator for this event - astrodeb [at] comcast [dot] net.

Wednesday, April 4th: 6:30 to 8:00 p.m. at the Jackson Ave. Elementary school in Livermore. They are having their Sandia Family Science Night. About 100 people are expected. Location is at 554 Jackson Ave.

If anyone wishes to participate and/or to be the contact person for a star party, please contact our School Star Party coordinator, Rich Campbell at r_photon [at] yahoo [dot] com.

New Combo for H2O

The combination of the gate to the club's observing site has been changed. If you hold a key and have paid the \$10 annual H2O use fee you can get the combination

from a board member, preferably the treasurer who maintains the fee information. Some users already know the new combination, they are not authorized to share it.



Project Astro

Volunteer Astronomer Information
2007-2008

BE A VISITING ASTRONOMER IN A LOCAL SCHOOL

Get Free Training and Materials with Project ASTRO™

Project ASTRO is looking for amateur and professional astronomers throughout the Bay Area interested in an incredible opportunity to work with teachers and students in 3rd - 9th grade classrooms. This is a great chance to help kids learn science, sharing your love of astronomy with the most enthusiastic audience you can find (and sharpening your teaching or communication skills in the process).

Through Project ASTRO, you will be paired in a one-on-one partnership with a Bay Area teacher at a school near you. Together, astronomer and teacher partners attend a free two-day summer training workshop where they learn effective hands-on astronomy activities. You will also be given a copy of Project ASTRO's rich curriculum resource book, *The Universe at Your Fingertips*, materials to lead hands-on activities, invitations to additional workshops, and access to the Project ASTRO lending library. The project emphasizes ongoing partnerships, not just one-time class visits.

During the school year, astronomers make at least four visits to their adopted classroom at mutually convenient times. The program has been operating for over 13 years in the Bay Area, and previous participants often report that it has been one of the most satisfying volunteer endeavors they have undertaken.

Astronomer applications are now being accepted for the 2007 - 2008 school year. **Application deadline is May 4th.** Space is limited to 30 partnerships.

All participants must attend a hands-on training workshop, which will be held August 3 & 4, 2007, at the San Mateo County Office of Education in Redwood City.

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Newsletter header image: The Helix Nebula / NGC 7293

The Helix is a Planetary Nebula in the constellation Aquarius, about 650 light-years away. This infrared image was taken with the Spitzer Space Telescope. The red color in the middle are the final layers of gas blown out when the star died. The blue and green colors represent the outer gaseous layers.

Photo: NASA, JPL-Caltech, K. Su (Univ. of Arizona)

Calendar of Events

March 19, 7:30 p.m.

What: *New Worlds in the Making: Origins of Planets and Brown Dwarfs*

Who: Dr. Ray Jayawardhana (Univ. of Toronto)

Where: Jewish Community Center, San Francisco

Cost: \$4.00 at the door or by mail

Astronomers have detected over 200 planets around Sun-like stars, as well as hundreds of “brown dwarfs” too puny to light up as stars. Intriguingly, some brown dwarfs may harbor planetary companions. Astronomers are deciphering the birth and early evolution of planets and brown dwarfs using remarkable new observations and sophisticated computer simulations.

All programs begin at 7:30 pm in Kanbar Hall at the Jewish Community Center of San Francisco, 3200 California Street. 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. For more information, call 415-321-8000.

March 23, 8:00 - 11:00 p.m.

What: *Lunar Lounge Express & Comet Collision*

Who: Sentinel & You

Where: Chabot Space & Science Center, Oakland

Cost: Lunar Lounge: \$15 Adult, \$10 Student, \$8 Member
Lunar Lounge + Mission: \$30 Adult, \$25 Student, \$23 Member.

Space is limited! Call the Box Office at 510-336-7311 for reservations.

Bring your friends and come party under the stars at Chabot’s monthly nocturnal celebration—The Lunar

Lounge Express! Featuring live music, refreshments, activities and fun!

- Full access to Chabot Space & Science Center interactive exhibits
- SonicVision — a new alternative music Planetarium show
- Telescope viewing in our Observatory Complex
- Food for purchase from our Celestial Café
- Enjoy \$3 micro-brews from Buffalo Bill’s Brewery and \$3 wine from our cash bar!
- And much more!

FEATURING: Sentinel

Bay Area dream pop, featuring stable rock grooves surrounded by pretty counterpoint melodies, a mix of U2 and the Cardigans.

NEW!!! Add A Mission!

Comet Collision

Don’t miss your chance to embark on a daring exploration of comets aboard the C.L.C. Spacecraft! The mission’s objective is to plot a course to rendezvous with a comet and launch a probe to collect scientific data. Drinks will be served during the mission briefing. To complete your mission, your team of astronauts must overcome any unforeseen challenges and unexpected emergencies.

- Mission briefing including 2 drinks
- 1 hour simulated mission

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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

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.

What's Up *by Debbie Dyke*

All times Pacific Daylight Time.

March

- 11 Sun **Daylight Saving Time begins.** 2:00 a.m.
Last Quarter Moon. 8:54 p.m.
- 13 Tue 1781 Wilhelm Herschel discovers Uranus using a 6-inch scope he built himself.
1855 Percival Lowell born.
- 14 Wed 1879 Albert Einstein born.
1986 Giotto spacecraft encounters Comet Halley.
- 15 Thur Mercury at descending node.
- 16 Fri In the early morning twilight look low to the SE to find a thin crescent Moon, with Mars 7.25° to the south and Mercury 8° to the east of the Moon. Neptune is 3° north of the Moon.
Tri-Valley Stargazers general meeting. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
1750 Caroline Herschel born.
1926 Robert Goddard launches first liquid-fuel rocket.
- 17 Sat **St. Patrick's Day.**
- 18 Sun **New Moon.** 7:43 p.m.
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.
1965 First walk in space by Cosmonaut Alexei Leonov from the Voskhod 2.
- 19 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
Moon at perigee (221,844 miles). 12:00 p.m. Expect large tides.
- 20 Tue **Vernal Equinox.** Spring has sprung! 5:07 p.m.
Venus 7° from the thin crescent Moon as they set in the west. 9:00 p.m.
- 21 Wed Mercury at greatest elongation west (28°). 7:00 p.m.
- 22 Thur Moon just 2.5° north of the Pleiades (M45). 9:00 p.m. They get closer and closer as the evening progresses, but set before occultation occurs.
- 23 Fri 1840 First photo of the Moon taken.
- 24 Sat 1993 Eugene and Carolyn Shoemaker and David Levy take a picture of what turns out to be comet Shoemaker-Levy 9.
- 25 Sun **First Quarter Moon.** 10:16 a.m.
1655 Christiaan Huygens discovers Saturn's largest moon, Titan.
- 27 Tue Moon just 2.5° north of the Beehive Cluster (M44). 9:00 p.m.
- 28 Wed Saturn less than 1° south of the Moon. 9:00 p.m.
- 29 Thur 1974 Mariner 10 makes first flyby of Mercury and sends pictures home.

April

- 2 Mon 1845 First photo taken of the sun by Louis Fizeau and Leon Foucault.
- 6 Fri 1852 Sir Edward Sabine announces that the 11 year sunspot cycle coincides with the geomagnetic cycle.
- 9 Mon Moon at apogee (251,441 miles).
- 12 Thur 1961 Yuri Gagarin becomes the first man to orbit the Earth (orbit lasted 1h 48m)
"Circling the Earth in the orbital spaceship I marvelled at the beauty of our planet.
People of the world! Let us safeguard and enhance this beauty—not destroy it!"
1981 First space shuttle, Columbia, launched.
- 13 Fri 1970 Apollo 13 disaster strikes.

Even Solar Sails Need a Mast

by Patrick L. Barry

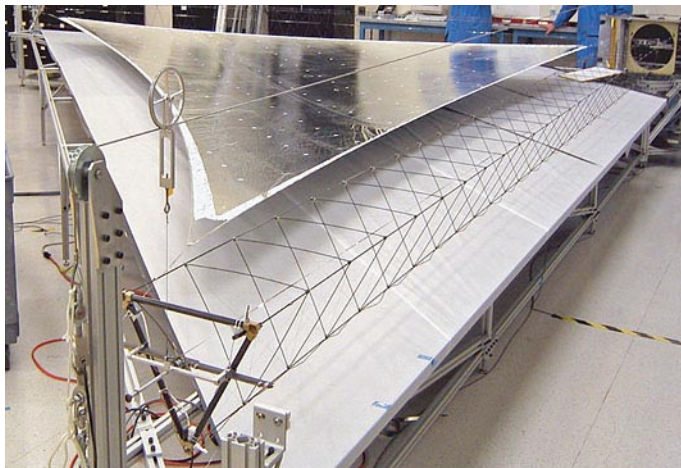
Like the explorers of centuries past who set sail for new lands, humans may someday sail across deep space to visit other stars. Only it won't be wind pushing their sails, but the slight pressure of sunlight.

Solar sails, as they're called, hold great promise for providing propulsion in space without the need for heavy propellant. But building a solar sail will be hard; to make the most of sunlight's tiny push, the sail must be as large as several football fields, yet weigh next to nothing. Creating a super-lightweight material for the sail itself is tricky enough, but how do you build a "mast" for that sail that's equally light and strong?

Enter SAILMAST, a program to build and test-fly a mast light enough for future solar sails. With support from NASA's In-Space Propulsion Program to mature the technology and perform ground demonstrator tests, SAILMAST's engineers were ready to produce a truss suitable for validation in space that's 40 meters (about 130 feet) long, yet weighs only 1.4 kilograms (about 3 pounds)!

In spite of its light weight, this truss is surprisingly rigid. "It's a revelation when people come in and actually play with one of the demo versions—it's like, whoa, this is really strong!" says Michael McEachen, principal investigator for SAILMAST at ATK Space Systems in Goleta, California.

SAILMAST will fly aboard NASA's Space Technology 8 (ST8) mission, scheduled to launch in February 2009. The mission is part of NASA's New Millennium Program, which flight tests cutting-edge technologies so that they can be used reliably for future space exploration. While



SAILMAST is the thin triangular truss in front of the picture. It is attached to a section of a silver foil solar sail section shown here in a laboratory test. The mast in the picture is 2m (6 ft) long. The Space Technology 8 mission will test the SAILMAST, which is 20 times longer.

actually flying to nearby stars is probably decades away, solar sails may come in handy close to home. Engineers are eyeing this technology for "solar sentinels," spacecraft that orbit the Sun to provide early warning of solar flares.

Once in space, ST8 will slowly deploy SAILMAST by uncoiling it. The truss consists of three very thin, 40-meter-long rods connected by short cross-members. The engineers used high-strength graphite for these structural members so that they could make them very thin and light.

The key question is how straight SAILMAST will be after it deploys in space. The smaller the curve of the mast the more load it can support. "That's really why we need to fly it in space, to see how straight it is when it's floating weightlessly," McEachen says.

It's an important step toward building a sail for the space-mariners of the future.

Find out more about SAILMAST at nmp.nasa.gov/st8. Kids can visit spaceplace.nasa.gov/en/kids/st8/sailmast to see how SAILMAST is like a Slinky® toy in space.

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*

Although applications are sometimes accepted after the deadline, we encourage you to submit them on time for first consideration.

Project ASTRO, a program of the nonprofit Astronomical Society of the Pacific, began with support from the National Science Foundation and the NASA Office of Space Science. It has now expanded to 12 other sites around the country and has trained over 2,000 astronomer-teacher partnerships.

More information and astronomer application forms are available online at www.astrosociety.org/baprojectastro.

Questions? Contact Vivian White, our Bay Area Coordinator, at 415-337-1100 x101 or email to [bayareaastro \[at\] astrosociety.org](mailto:bayareaastro@astrosociety.org)

Home Observatory Complete!

TVS member Hilary Jones reports that at long last his home sliding-roof observatory (a Sky Shed) is complete. You can visit his web site to see the work in progress (and see what problems he encountered) as well as the completed observatory. The observatory houses his Meade 10" RCX400 (which he won in an astrophotography contest by Meade), and an Orion ED80.

www.muffycat.org/astronomy/observatory/index.htm

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.