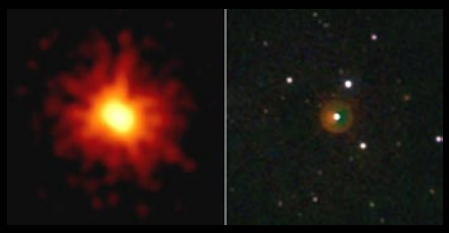
PRIMEFOCUS

Tri-Valley Stargazers

November 2011



November Meeting

Asterisms and Other Binocular Showpieces

Hugh Bartlett

Hugh Bartlett, long-time TVS member, enjoys, as most of us do, sharing the night sky with the public. He is an observatory deck volunteer at Chabot Space and Science Center, shares views through his scopes and binoculars at star parties, and has taught a hands-on astronomy program to elementary school students in his home town of Oakland. He has written several articles for our newsletter, and has gone on to publish series of four seasonal articles in Sky and Telescope last year highlighting binocular objects that can be seen with ordinary field glasses from light-polluted locations. Hugh is going to present a tour of the best binocular showpieces for urban stargazers from the list featured in Sky and Telescope (including some new unpublished ones submitted by readers of the magazine).

Caption: Bright objects such as the Orion Nebula, seen here rising against the foothills and trees of Joshua Tree National Park, are best observed under dark skies. Photo: Ken Sperber

The range of astronomical objects that can be seen through binoculars is very diverse. Of course, there is the Moon, which can be observed during different phases. Near the terminator the relief of craters and mountain ranges is emphasized with the low Sun-angle, providing magnificent views. In terms of the deep-sky observing, there are a multitude of galaxies and nebulae that can be seen, such as the Andromeda Galaxy (M31), the Lagoon Nebula (M8), and Globular Clusters (M22, M13, M15). But the best binocular objects for the urban observer feature brighter stars, such as large open clusters (M44, M45), double stars, and asterisms, chance alignments of stars, that form familiar patterns. And don't forget, just lay back and sweep along the Milky Way for endless hours of fascination.

Meeting Info

What:
Asterisms and Other Binocular Showpieces

Who:
Hugh Bartlett

When:
November 18, 2011
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

Where:
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

News & Notes

2011/2012 TVS Meeting Dates

The following lists the TVS meeting dates for 2011/2012. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting.

Lecture Meeting	**Board Meeting**	Prime Focus **Deadline**
Nov. 18	Nov. 21	
Dec. 16	Dec. 19	Nov. 25
Jan. 20	Jan. 23	Dec. 30
Feb. 17	Feb. 20	Jan. 27
Mar. 16	Mar. 19	Feb. 24
Apr. 20	Apr. 23	Mar. 30
May 18	May 21	Apr. 27
Jun. 15	Jun. 18	May. 25
Jul. 20	Jul. 23	Jun. 29
Aug. 17	Aug. 20	Jul. 27
Sep. 21	Sep. 24	Aug. 31
Oct. 19	Oct. 22	Sep. 28
Nov. 16	Nov. 19	Oct. 26
Dec. 21	Dec. 24	Nov. 30

Money Matters

Treasurer David Feindel indicates that as of July 18, 2011 the TVS account balances are:

Checking	$5,420.09
CD #1	$3,764.24 rolled over 5/17/2011
CD #2	$2,657.00 rolled over 5/27/2011

TVS Elections

Just a reminder, at the November meeting TVS will hold elections. Please consider running for one of the officer positions, all of which are open for interested candidates.

TVS Positions: To be Filled

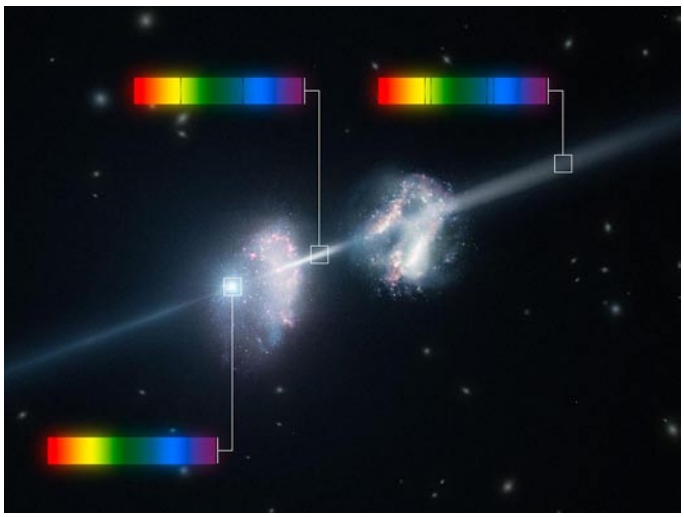
Jim Alves will vacate the Program Director position in January 2012, but for the next two months he will continue to book as many speakers as possible for the next year and develop leads for future speakers. He will also be available to assist in transitioning someone into that role, including providing contact information, examples of communications, etc. If you would like to take on this important club position, please contact Jim and/or any TVS officer or board member.

Journal Club by Ken Sperber

Music of the Spheres: Rock and Metal

We owe our existence to Supernovae, which expel copious amounts of heavy elements when they explode. The first generation stars were composed of hydrogen, helium, and a bit of lithium, all of which were created during the Big Bang. As such, there was no material from which planets as we know them could form around the first generation stars. One of the key questions in cosmology is: When was the cosmos sufficiently enriched with metals (elements heavier than hydrogen and helium) to allow the formation of solar systems? Relative to the concentration of metals in the Sun, observations indicate concentrations less than 1/10 solar at z=4 (Universe ~ 1.5 billion years old), while at about z=2.1-2.4 (Universe ~ 2.7-3.0 billion years old) concentrations are similar to the Sun. The conventional idea is that abundances increase with the age of the universe as more and more supernovae explode over time.

In 2009 a long duration Gamma-Ray burst, GRB090323, was detected by the Fermi Gamma-Ray Telescope. Long duration GRB's are believed to be associated with supernova explosions of massive stars. Quickly, a plethora of satellites and Earthbound telescopes were trained on the burst location with X-Ray, visible, and IR afterglows evident. Just one day after the GRB, the ESO Very Large Telescope (VLT) was trained on this location, with Savaglio et al. (2011, MNRAS, http://www.eso.org/public/archives/releases/sciencepapers/eso1143/eso1143.pdf) obtaining optical spectra, totaling 2 hours and 45 minutes duration, at red and blue wavelengths. From analysis of these data, the authors discovered that the light from the GRB passed through two galaxies, as seen in the artist impression below:



Caption: This artist's impression shows two galaxies in the early Universe. The brilliant explosion on the left is a gamma-ray burst. As the light from the burst passes through the two galaxies on the way to Earth (outside the frame to the right) some colors are absorbed by the cool gas in the galaxies, leaving characteristic dark lines in the spectrum. Careful study of these spectra has allowed astronomers to discover that these two galaxies are remarkably rich in heavier chemical elements. Credit: ESO/L. Calçada

Header Image: GRB080319B produced the brightest GRB afterglow ever seen, as imaged here by the X-Ray (left) and UV/Optical (right) telescopes of SWIFT. For more infomation see: http://en.wikipedia.org/wiki/File:218810main_grb_20080320_HI.jpg

Journal Club (continued)

As the GRB light passed thorough the galaxies some it was absorbed by the consistent elements of the galaxies. Based on the redshift of the spectral lines, these galaxies were found the be located at z = 3.577 and 3.567, respectively, with the GRB light passing through them when the universe was only about 1.8 billion years old.

The spectra revealed that a wide variety of ionized elements, including Zinc, Sulfur, Nickel, Silicon, Iron, and Aluminum, present in these two galaxies. Amazingly, the ratio of Zinc/Hydrogen and Sulfur/Hydrogen indicated abundances that are in excess of those of our Sun! The enhancement of these elements in both galaxies suggests that the galaxies may be in the process of interacting and/or merging. Such mergers and interactions are known to cause increases in star formation, which includes massive stars that can enrich the interstellar medium, and possibly be the source of many of the GRB's that we observe.

For more information see: http://www.eso.org/public/news/eso1143/ and http://www.universetoday.com/90580/early-galaxy-chemistry-vlt-observes-gamma-ray-burst/

Calendar of Events

November 16, Noon - 1pm

What: Jupiter Picture of the Day
Who: Mike Wong, UC Berkeley
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

The rich history of time-domain Jupiter data is of great value because it provides a whole new angle of attack, distinct from spatial-domain (imaging) data or from spectral-domain data. Time-domain Jupiter data provides a unique way to learn more about processes such as heat transport, atmospheric structure and evolution, composition, the formation of clouds and hazes, impact processes, and impactor populations. Dr. Wong will discuss three recent changes in Jupiter's atmosphere: the reddening of Oval BA (and how vortices probe the deep atmosphere), shifts in the upper tropospheric haze layer (discovered with an experimental multi-conjugate adaptive optics technique), and the 2009 and 2010 impacts discovered by amateur astronomers.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

November 19, 11am

What: From Gas into Galaxies: Just Add Gravity!
Who: Dr. Genevieve Graves, UC Berkeley
Where: UC Berkeley, Genetics and Plant Biology Building, Room 100
Cost: Free

Galaxies, like our own Milky Way, are not eternal or changeless. They are born in the early universe out of massive clouds of gas. In their early years, they experience rapid growth, forming lots of new stars out of the matter that streams in to feed them. As teenagers, they collide with other galaxies, setting off massive new bursts of star formation and growing large black holes at their centers. From there, they settle down into a sustainable mode, forming stars reliably (to pay the mortgage!) and only occasionally having a run-in with another galaxy. Finally, in their old age, they retire from the star-formation business and relax, coasting out the rest of time with their dwindling supply of stars. This talk will trace the life-cycle of galaxies, large and small, from the early universe

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Officers

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Mentor:
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Refreshment Coordinator:
Laurie Grefsheim

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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 (trivalleystargazers@gmail.com) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

to the present. Come learn about the origins and the ultimate fate of this "island universe" we call the Milky Way!

For more information see: http://scienceatcal.berkeley.edu/lectures

November 30, Noon - 1pm

What: Inefficient Collisions, Hit-and-Runs, and Splats
Who: Erik Asphaug, UC Santa Cruz
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

In pairwise accretion -- that is, the formation of bigger planets hierarchically from smaller ones -- the typical encounter speeds are comparable to the escape velocities of the dominant bodies, and the colliding bodies are of comparable size. This is a far cry from the two most commonly considered regimes: hypervelocity bullets hitting a much larger target (a.k.a. impact cratering), and the perfect mergers (sometimes with a disruption threshold) assumed in nearly every N-body simulation of planetesimal/planetary growth. The best studied case is the Moon's formation by a giant impact. Direct modeling of pairwise accretion -- which is not always accretionary -- has led to several new models that will be presented: (1) the origin of chondrules by relatively slow collisions between similar-sized molten planetesimals (Asphaug et al. 2011), (2) the origin of the lunar farside highlands by a low-velocity 'big splat' (Jutzi and Asphaug 2011), and (3) the stripping of mantles from asteroids and planets (for instance Mercury) when they almost but not quite accrete with a larger body (Asphaug 2010).

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

December 7, Noon - 1pm

What: The Search for Habitable Exoplanets in the Kepler Era and Beyond
Who: Sara Seager, MIT
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

For centuries people have wondered, "Are we alone?" With hundreds of planets now known to orbit other stars, we are finally able to begin answering the ancient questions, "Do other Earths exist? Are they common? Do any have signs of life? NASA's Kepler space telescope will soon tell us the statistical numbers of Earth-size planets orbiting sun-size stars. Beyond Kepler is the search for potentially habitable worlds around nearby, sun-like stars. Professor Seager will discuss how astrobiology and space engineering research will come together to enable us to discover and identify other Earth-like worlds

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

December 14, Noon - 1:00pm

What: Resonances and the Angular Momentum of the Earth-Moon System
Who: Matija Cuk, SETI Institute
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview
Cost: Free

The prevailing theory for the formation of the Moon is a giant collision between proto-Earth and a Mars-sized protoplanet, with the Moon being mainly made from the impactor's material. It is now known that the composition of the Moon is too similar to Earth's mantle to be derived from the impactor, seriously questioning the giant impact theory. However, this is a problem only if we assume that little or no angular momentum was lost from the system since its formation. While lunar tides keep the angular momentum in the system, certain resonances can transfer angular momentum to Earth's heliocentric orbit. These resonances are important if the Earth-Moon system formed with a much larger angular momentum, and can evolve the system to the present state. Dr. Cuk will show how it is likely that the Moon likely formed in a impact-triggered fission different from the "classical" giant impact scenario

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

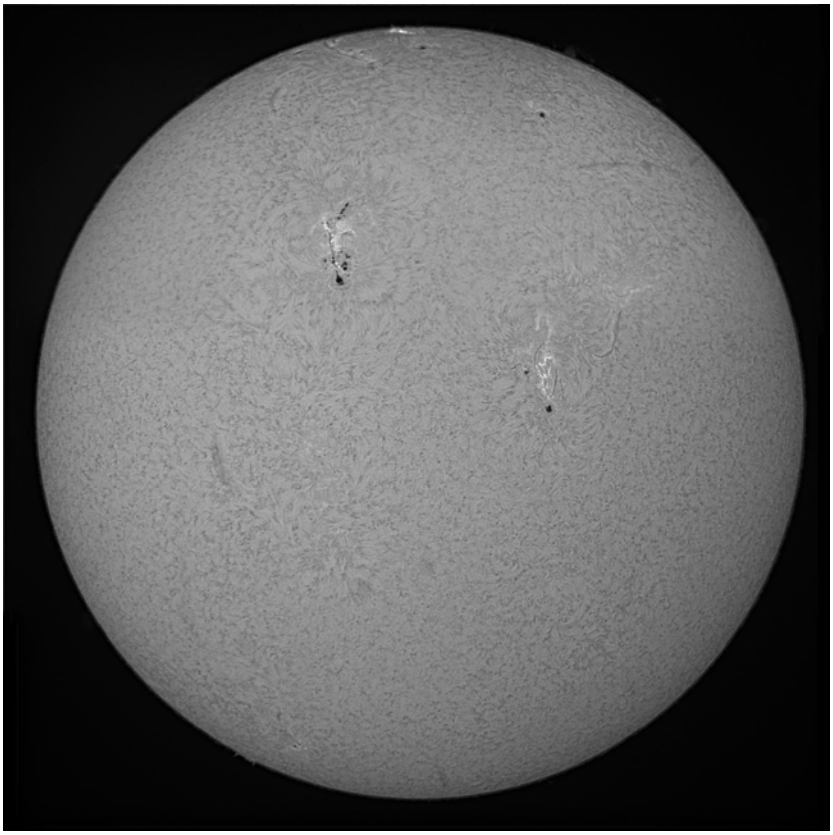
December 5, 7:30pm

What: The Dark Side of the Milky Way
Who: Dr. Leo Blitz, UC Berkeley
Where: California Academy of Science, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA
Cost: Adults $12, Seniors $10, Academy members $6. Reserve a Space Online or call 800-794-7576

The Milky Way is both a beautiful sight in the night sky and the nearest galaxy that astronomers can study. It is also home to many of the most spectacular images coming from the Hubble Space Telescope. But in its heart of darkness lurks a black hole with a mass millions of times greater than that of the Sun. In its outermost parts, the Milky Way is cloaked by dark matter: mysterious material of unknown, probably exotic composition that produces strange, observable effects at the Galaxy's periphery. Dr. Blitz will describe the Galaxy we know and see, as well as the black core and dark mantle of the Milky Way we cannot.

See http://www.calacademy.org/events/lectures/ for lecture and reservation information.

Caption: Jupiter and Ganymede imaged on November 1, 2011 by Sibylle Fröhlich with an 8" f/5 Zambuto mirror and The-Imaging-Source color CCD AVI camera + IR block filter. This was a night of very good seeing combined with a favorable view of Jupiter's Red Spot and Ganymede. The photo was taken from the roof of her and Gert Gottschalk's Berlin condo.



Caption: H-Alpha view of the Sun imaged on November 6, 2011 by Sibylle Fröhlich with the Lunt 60mm Front etalon on an 80mm Orion ED with The-Imaging-Source b/w CCD AVI camera. This is a 2 frame mosaic to fit the whole Sun into the frame of the CCD AVI camera. This was only a test image for the Lunt filter as it just came back service at the manufacturer. Sibylle and Gert hope to have more and even better images as solar activity ramps up. The photo was taken from the roof of her and Gert Gottschalk's Berlin condo.

What's Up by Ken Sperber (adapted from The Year in Space and S&T)

All times Pacific Standard Time.

November

18	Fri	Leonid meteor shower peaks before dawn, but the Moon's glow will reduce the number of observable meteors
18	Fri	Last-Quarter Moon (7:09am)
22	Tue	Saturn, Spica, and the crescent Moon align in the southeast (Dawn)
24	Thu	New Moon (11:10pm)
26	Sat	A thin crescent Moon and Venus are low in the southwest (30-60 minutes after sunset)

December

2	Fri	First-Quarter Moon (1:52am)
6	Tue	Jupiter to the right of the Moon (Evening)
7	Wed	Algol at minimum brightness for ~2 hours centered on 8:56pm
10	Thu	Full Moon (6:36am) totally eclipsed as seen from the west coast (sets while leaving umbra)
13-14	Tue-	The Geminid meteor shower is visible both nights, though a bright Moon will compromise visibility
14-28	Wed-	Mercury visible 8-10 degrees above the horizon in the southeast (Dawn)
17	Sat	Last-Quarter Moon (4:48pm)

The Gray Cubicle You Want to Work In

By Dr. Tony Phillips

It's another day at the office.

You're sitting in a gray cubicle, tap-tap-taping away on your keyboard, when suddenly your neighbor lets out a whoop of delight.

Over the top of the carpeted divider you see a star exploding on the computer screen. An unauthorized video game? No, this explosion is real. A massive star just went supernova in the Whirlpool Galaxy, and the first images from Hubble are popping up on your office-mate's screen.

It's another day at the office ... at NASA.

Just down the hall, another office-mate is analyzing global temperature trends. On the floor below, a team of engineers gathers to decode signals from a spaceship that entered "safe mode" when it was hit by a solar flare. And three floors above, a financial analyst snaps her pencil-tip as she tries to figure out how to afford just one more sensor for a new robotic spacecraft.

These are just a few of the things going on every day at NASA headquarters in Washington DC and more than a dozen other NASA centers scattered around the country. The variety of NASA research and, moreover, the variety of NASA people required to carry it out often comes as a surprise. Consider the following:

NASA's Science Mission Directorate (SMD) supports research in four main areas: Earth Science, Heliophysics, Astrophysics, and Planetary Science. Read that list one more time. It includes everything in the cosmos from the ground beneath our feet to the Sun in the sky to the most distant galaxies at the edge of the Universe. Walking among the cubicles in NASA's science offices, you are likely to meet people working on climate change, extraterrestrial life, Earth-threatening asteroids, black holes or a hundred other things guaranteed to give a curious-minded person goose bumps. Truly, no other government agency has a bigger job description.

And it's not just scientists doing the work. NASA needs engineers to design its observatories and build its spacecraft, mathematicians to analyze orbits and decipher signals, and financial wizards to manage the accounts and figure out how to pay for everything NASA dreamers want to do. Even writers and artists have a place in the NASA scheme of things. Someone has to explain it all to the general public.

Clearly, some cubicles are more interesting than others. For more information about the Science Mission Directorate, visit science.nasa.gov. And for another way to reach the Space Place, go to http://science.nasa.gov/kids.

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

Caption: Some of the employees of NASA's Science Mission Directorate may work in gray cubicles, but their jobs are anything but dull. They get to study Earth, the Sun, the Solar System, and the Universe!

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.
_____ $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.
_____ $34 One year subscription to Astronomy magazine.
_____ $60 Two year subscription to Astronomy magazine.
_____ $32.95 One year subscription to Sky & Telescope magazine. Note: Subscription to S&T is for new subscribers only. Existing subscribers please renew directly through S&T.
$ _____ 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.