

Sonoma Skies

Newsletter of the Sonoma County

A nonprofit scientific and

www.sonomaskies.org



Astronomical Society

educational organization

June 2004

Volume XXVII No. 6



PUBLIC ASTRONOMY AT GLACIER POINT

July 9 and 10

My how time flies! In only five weeks or so, SCAS members will be heading to Yosemite for a public astronomy adventure at Glacier Point. There are yet some vacancies on our list. If you have a good telescope and would like to entertain people from around the world for two evenings, this is the trip you will not want to miss.

If the sky conditions are good, the view is breathtaking, and when the Moon rises to our east over the Sierra around midnight the sight is one that you will treasure for a lifetime.

This year, the planets we will endeavor to find are Uranus and Neptune. They will be to our SE amongst the host of Messier objects that heavily populate the summer sky. Pluto will be there too. I might try to photograph its location on two consecutive nights to see if I can identify it later at home.

As a reward for providing public astronomy at this remarkable National Park, we are allowed free entry to the park and free camping at Bridalveil Creek Campground about 8.5 miles from Glacier Point.

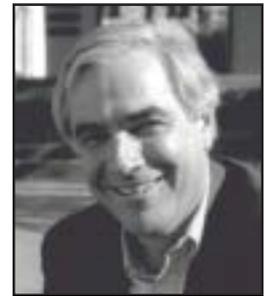
Are you interested in joining us? If so, contact me, Len Nelson, at lennelsn@comcast.net

New Horizons in Radio Astronomy

with Leo Blitz

SCAS June 9 Meeting, Proctor Terrace School

Leo Blitz is professor of astronomy and director of the Radio Astronomy Laboratory at the University of California in Berkeley. He obtained his Ph.D. in astronomy from Columbia University in 1979 and was a postdoctoral fellow at Berkeley and professor of astronomy at the University of Maryland before assuming his current posts at Berkeley. At Maryland, he founded and directed the Laboratory for Millimeter-wave Astronomy.



Professor Blitz's current research interests focus mainly on how galaxies (including the Milky Way) form and evolve and how interstellar gas with galaxies is converted into stars (including the Sun and Solar System).

Several years ago, Dr. Blitz was featured in a series on astronomy made for American public television called "The Astronomers." "Stardust," the segment on which he appeared, also featured Australian astronomers Mike Dopita and the late David Allen.

Join us Wednesday, June 9, at the SCAS general meeting to learn about the intriguing world of radio astronomy.

MAY STAR PICNIC CANCELLATION

As most of you know by now, we had to cancel our May 22 event at the RFO with less than a day's notice. If Len Nelson hadn't checked with the rangers Friday night, we wouldn't have had *any* notice. We've had May 22 reserved on the RFO calendar since the first of the year, but through some kind of mix-up the State accepted a reservation from a group of campers for Friday and Saturday night that same weekend. We on your Board of Directors apologize for this problem, and we will attempt to find out why it happened in the first place.

—Keith Payea, President

Young Astronomers: See page 7

SCAS MEMBERSHIP

MEETINGS AND STAR PARTIES

Membership Meetings take place at 7:30 PM on the second Wednesday of each month, in the Multipurpose Room of Proctor Terrace Elementary School on Bryden Lane near Fourth Street in Santa Rosa, unless otherwise announced in this publication. The public is invited.

Star Parties are held monthly on the Saturday nearest the 1st quarter moon at Youth Community Park in Santa Rosa.

Access to Geysers Observing Site: The site is locked to public access. For use during monthly star parties, SCAS members can obtain the combination to the gate lock to the site by contacting any board member listed to the right.

DUES

Membership dues are \$25, renewable June 1 of each year. New members joining between December 1 and May 31 may pay partial-year dues of \$12.50.

DISCOUNT SUBSCRIPTIONS

SCAS offers discount subscriptions to *Sky & Telescope Magazine*. New subscribers, send a check for \$32.95 payable to "SCAS", along with your complete mailing address, directly to: Larry McCune, 544 Thyme Place, San Rafael, CA 94903. For renewals, send him your check with the completed renewal card and return envelope.

Discount subscriptions to *Astronomy Magazine* occur yearly in October. Check *Sonoma Skies* for details.

RENTAL TELESCOPES

SCAS members are eligible to borrow telescopes for a \$5 per week donation. Five telescopes are available: 8" and 5" Celestron SCTs, each complete with clock drive and inverter; 8" and 12.5" Newtonians on Dobsonian mounts; an 80mm refractor on motorized equatorial mount. Contact Joan Thornton at 707-762-0594.

NEWSLETTER

Sonoma Skies is the newsletter of the **Sonoma County Astronomical Society (SCAS)** and is published each month. Subscription is included as part of membership to the Society.

Articles, news items and member announcements for *Sonoma Skies* are welcome. Submissions must be typed or, if on computer media, in a commonly used word processing and/or graphics format, and may include graphics (pictures, drawings, etc.) They are published on a FCFS basis, space permitting, and may be edited.

The deadline for submissions is the last Wednesday of each month.

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LIBRARY

SCAS has a library of astronomy books that may be checked out by members at SCAS meetings. College textbooks donated by Joe Tenn of SSU are available. Books may be borrowed for a period of one month and returned at the next meeting. Videotaped lectures on astronomy are available for rent at \$3 per month. Requirements: SCAS membership and your name and phone number.

For more information, contact Joan Thornton at 762-0594, phonyjoanie@earthlink.net

SCAS EGROUP URL

Any SCAS member is welcome to join. Hosted by Robert Leyland at r.leyland@verizon.net the majority of traffic is about going observing, observing reports and astronomy-related news. We get news items from AANC and Sky & Telescope and chat about astronomy.

To join, either visit <http://groups.yahoo.com/group/scas> and click the "Join" button, or send an email to scas-subscribe@yahoogroups.com

Public Transit of Venus

by Keith Payea

No, I don't mean trains and buses on another planet, I mean ways that the public can take advantage of government and academic programs to watch the Transit of Venus without leaving home.

For those of you new to Astronomy, the Transit of Venus refers to a rare astronomical event during which the planet Venus passes between the Earth and the Sun, visible as a spot moving across the face of the Sun. The last Transit occurred in 1882, 122 years ago.

Here in Sonoma County, the transit starts at around 10:13 PM on the 7th of June, peaks at just after midnight, and ends at around 4:25 AM on the 8th of June. By the time the sun rises, it will be all over. If you want to watch this historic event, you have two choices: travel to the east coast of the US (or to Europe if you want to see the whole thing); or watch it on the TV or the web.



I've found a few sites that will be doing live web-casts of the event. One of the best is run by the European Southern Observatory (ESO) at <http://www.vt-2004.org/>. The ESO has a network of observatories set up to make measurements of the transit and to web-cast images. The odds of at least one of the observatories having clear skies is pretty good.

Another excellent site is run by the Exploratorium in San Francisco at <http://www.exploratorium.com/venus/index.html>. They have a link to an observatory in Athens, Greece so that they can webcast the transit as it happens.

With any web cast, it's a good idea to visit the site well in advance of the event to make sure you will be able to connect. It's not unusual to need to download new software, or at least update something. If you are on a dial-up connection, the transit could be over before the software download is complete.

I haven't been able to confirm this, but on the local cable channel 69, they often show "NASA TV" for live space events. It's worth checking as we get closer to June 7th to see if they will be showing anything at that time.

For good basic information about the transit, including maps and times, visit the official NASA web site on the transit at <http://sunearth.gsfc.nasa.gov/eclipse/OH/transit04.html>. There's also a site aimed at teachers, with a focus on providing educational materials at <http://www.transitofvenus.org/>.

I hope a few of you will check out this rare astronomical event even if international travel is out of the question. Maybe even have a Transit Party! If not, you have to wait until 2012 for the next opportunity.

MEMBERSHIP NEWS

We are pleased to welcome as new members: David Simons, Colleen Ferguson and Kathleen Barry. This brings our dues-paying membership to 160, in addition to the 20 Striking Sparks winners for 2003 and 2004.

If you have address or email changes, contact our Membership Director, Harry Linder, at 542-9167 or via email at harry@sonic.net

New Member Bonus!

Scope City at 350 Bay Street, San Francisco, is offering a **\$25 merchandise discount to new members** when joining SCAS. Sam Sweiss, Manager of Scope City, has been a supporter of SCAS and the Striking Sparks project by donating merchandise for the awards. Scope City offers a huge selection of telescopes, binoculars, microscopes and accessories.

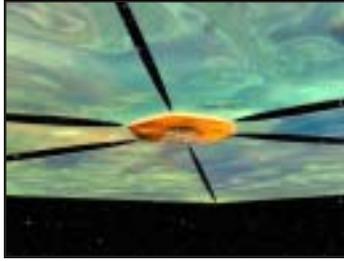
Obtain a receipt from Harry Linder, Membership Director, to show that you have paid the \$25 SCAS membership dues. To arrange for your merchandise discount at the store, contact Sam at 415/421-8800, or email sanfrancisco@scopecity.com

Far-out Ideas

by Patrick L. Barry

Ever had a great idea for a new spacecraft propulsion system, or for a new kind of Mars rover? Have you ever wondered how such “dinner napkin sketches” evolve into real hardware flying real missions out in the cold blackness of space?

The road to reality for each idea is a unique story, but NASA has defined some common steps and stages that all fledgling space technologies must go through as they’re nursed from infancy to ignition and liftoff.



This is just one idea of how a solar sail could be used to power an interstellar probe. A solar sail is one possible type of new technology that NASA’s New Millennium Program would test in space before it would be risked on a scientific mission.

Suppose, for example, that you’ve thought of a new way to shield astronauts from harmful radiation during long space missions. In the first stage, you would simply “flesh out” the idea: Write it down, check the physics, and do some quick experiments to test your assumptions. If the idea still looks good, the next step is to build a “proof of concept.” This is the “science fair project” stage, where you put together a nifty demonstration on a low budget—just to show that the idea can work.

For your radiation-shielding idea, for example, you might show how a Geiger counter inside a miniature mock-up doesn’t start clicking when some radioactive cobalt-60 is held nearby. The shielding really works! Once that hurdle is cleared, development shifts into a higher gear. In this stage, explains Dr. Christopher Stevens of JPL, the challenge isn’t just making it work, but making it work in space.

“Some conditions of space flight cannot be adequately simulated here on Earth,” Stevens says. Cobalt-60 doesn’t truly mimic the diverse mixture of radiation in space, for example, and the true microgravity of orbit is needed to test some technologies, such as the delicate unfolding of a vast, gossamer solar sail. Other technologies, such as artificial intelligence control systems, must be flight tested just because they’re so radically new that mission commanders won’t trust them based solely on lab tests.

Stevens is the manager of NASA’s New Millennium Program (NMP), which does this sort of testing: Sending things to space and seeing if they work. In recent years the NMP has tested ion engines and autonomous navigation on the Deep Space 1 spacecraft, a new “hyperspectral” imager on the Earth Observing 1 satellite, and dozens of other “high risk” technologies.

Thanks to the NMP, lots of dinner napkin sketches have become real, and they’re heading for space. You can learn more at the NMP website, nmp.nasa.gov/.

This article was provided by the Jet Propulsion Laboratory/NASA

Dome Sweet Dome

by Jane Houston-Jones

The 12-day-old waxing Moon brings sunrise to western Oceanus Procellarum, the ocean of storms. That means Aristarchus and Vallis Schroteri are near their visible best on this night, a night that Mojo and I set up our two sidewalk telescopes on a Monrovia corner sidewalk. We were joined by members of the Los Angeles Astronomical Society and Sidewalk Astronomers. Mark Rooney set up his Meade LX200 next to us. Dave Nakamoto and Tim Thompson provided telescope nudging relief and astronomical interpretation to the nearly 200 visitors to our eyepieces over the next 2 hours. Mojo aimed at Jupiter. Mark aimed at Saturn, and I got dibs on the Moon.

If you are a lunatic like me, the Vallis Schroteri region is an area of never-ending awe. This part of Oceanus Procellarum is rich in volcanic structures. Selected as a landing site for the Apollo missions, it lost out to Hadley Rille as the Apollo 15 landing site. Among the many interesting features is the bright young crater, Aristarchus. You’ve all seen a bright white crater north west of Copernicus. That’s Aristarchus! It almost looks like a dab of white-out on a crater. Aristarchus is even visible on the night side of the moon during Earthshine!



Eighth-grader Joey points out Mojo, while James observes Saturn

Telescopes of all sizes can pick out Vallis Schroteri, the largest sinuous valley on the moon. At the beginning of the snakelike valley is the cobra head feature, a 10 km widening just north of a tiny crater. The valley meanders in a “U” shape for 160 kilometers from the crater Herodotus to the south. At some points the valley narrows to only 500 meters wide. It terminates at a 1,000-meter-high precipice on the edge of an uplifted tetragonal-shaped continent called the Aristarchus Plateau. Dave commented that the plateau really did appear elevated compared to the surrounding lunar landscape.

That’s the beauty of frequent lunar observing. You really see amazing details when the sun angle is just right, and hour by hour, the angle shows favorite features in a new light, literally.

Another unusual landscape that was starkly lit by sunrise was the Marius Hills. This area, like all the features I mention here, looks best at sunrise, four days after first quarter or at sunset, four days after last quarter. This is an area of 300 small steep-sided hills and domes.

The best way for me to describe it is that it looked like shadows over a piece of pebbly laminate. Pretending the laminate is the surface of the moon near the terminator and shining a flashlight across it at a low angle to mimic a rising sun, the raised “bumps” look like the Marius Hills, with shadows pointing away from the flashlight (sunrise). That’s what the Marius

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Events

THE GEYSERS STAR PARTY

Saturday, June 19

Excellent dark sky observing for members and their guests. Dress warmly, and take your Thermos bottles! Almanac data for June 19-20:

Sunset: 8:38 PM PDT

Moonset: 10:39 PM PDT

End Astronomical Twilight: 10:35 PM PDT

Begin Twilight: 3:49 AM PDT 6/20

Location: Palmieri Observatory, Mercuryville, CA (on the slopes of Geysers Peak near The Geysers)

Altitude: ~2700 feet

Longitude: 122deg 49min

Latitude: 38deg 46min

If you plan to attend, especially if you are going for the first time, please contact our coordinator, Mario Zelaya, at (707) 539-6423, zelayadesigns@sbcglobal.net

SCAS PUBLIC STAR PARTY

Saturday, June 26

These are public events—all are invited. Members with scopes are encouraged to attend. It is an opportunity to do some planetary astronomy with fellow observers at an easily accessible site.

Sunset: 8:39 PM PDT

End Astronomical Twilight: 10:36 PM PDT

Moonset: 1:30 AM PDT

Youth Community Park in Santa Rosa, on the west side of Fulton Road, between Guerneville Road and Piner Road, just opposite Piner High School. Contact: Bruce Lotz, Coordinator (707) 576-7833, ablotz@sonic.net

INTERNATIONAL SPACE STATION EXHIBIT COMING TO NASA AMES

Through June 8 only

NASA has a special exhibit of the ISS through June 8. Visitors will board an interactive exhibit, "Space Station Imagination," to catch a glimpse of how astronauts live and work in space.

The exhibit will be on display through June 8 in the parking lot adjacent to the Exploration Center at NASA Ames, Moffett Field, open to the public from 10 AM to 4 PM Tuesdays through Fridays and from noon to 4 PM on Saturdays and Sundays.

For more information visit: <http://www.jsc.nasa.gov/programs/exhibits/trailers/>

ROBERT H. FERGUSON

OBSERVATORY

Public Viewing: June 12 and June 19

Solar Viewing Noon - 4:00 PM

Night viewing Begins 9:00 PM

Three scopes are operating: The 14-inch SCT with CCD camera in the east wing, the 8-inch refractor under the dome and the 24-inch Dobsonian in the west wing.

There is no admission fee for the solar viewing, but donations are appreciated. The Park charges \$4 per vehicle for entry. A \$2 donation is requested for admission to the observatory during the night viewing sessions. SCAS members are welcome to set up telescopes in the observatory parking lot to assist with public viewing. Automobile access closes at dusk, so arrivals after dusk need to carry their equipment in from the parking area by the horse stables.

Classes

June 8: Night Sky Spring/Summer Series, 7:30 PM

June 15: Night Sky Spring/Summer Series, 7:30 PM

July 6: Night Sky Spring/Summer Series, 7:30 PM

July 13: Night Sky Spring/Summer Series, 7:30 PM

Classes are held at the Observatory. Reservations required for classes. Contact: (707) 833-6979, or visit <http://www.rfo.org>

TUMMY SPECTRUM AT RFO

As part of Solar Observing last month, we set up an exhibit with a prism to project a visible spectrum of the Sun. The youngsters really seem to get a kick out of this, especially when they can see the image on their clothing.

One little girl, about three years old, especially enjoyed this activity. When the spectrum illuminated the front of her shirt, she immediately pulled it up to see if the light was coming from underneath. (Ed. Note: Download the newsletter to see this in color).

—Merlin Combs



YOSEMITE PUBLIC STAR PARTY

July 9 and 10

See cover article. Contact Len Nelson at 763-8007 lenneln@comcast.net for more information.

Lunar Domes *continued from page 4*

Hills looked like to me—like hundreds of small bumps, each with a shadow facing the terminator. Quite an amazing sight! I hope this article encourages you to observe familiar areas of the moon and to look for the amazing lunar domes.

Links: Spectral Properties of the Marius Hills: <http://www.agu.org/pubs/abs/je/1998JE000630/1998JE000630.html>

The Hitchhiker's Guide to the Moon: <http://www.shallowsky.com/moon/hitchhiker.html> - click on the numbered sections, which correspond to the Rukl *Atlas of the Moon* maps. Aristarchus Map 18, Marius Hills Map 29.

More on lunar domes: http://www.uai.it/sez_lun/domes.htm

Prospective Apollo landing sites, including the Marius Hills: <http://www.lpi.usra.edu/expmoon/orbiter/orbiter-sites.html>

Photographing NEAT

by Len Nelson

I wanted very badly to photograph Comet Neat when it slid by the Beehive in Cancer on May 14. The sky conditions looked terrible from where I live in Petaluma, but I was packed and ready to go and at 7:50 PM decided to head up to the Geysers area just in case, knowing in my gut that it was a total waste of time and that I would soon be heading back home again.

On the way up, I noticed that the sky to the WSW had a large clear area so I continued on, arriving at 8:40PM. The sky to the west was thick with clouds and fog two finger-widths (at arms length) up from the horizon, and bad to 45 degrees up in the NW, but the area near the comet was clear. I set up quickly and by 9:38 was on my first of six images of the comet.

I piggybacked my 35mm Olympus OM1 and 180mm f2.8 Zuiko lens on my refractor, framed the Comet and M44, and guided on the stars with a 12mm illuminated reticle eyepiece. I used Kodak High Definition ASA 200 film and shot six images from 3 - 6 minutes. I liked the 5-minute one the best.

By 10:45, I had switched to my 300mm telephoto lens and was taking a 5-minute image when I found that I could not see my guide star. Where was it?! Behind one of the cross hairs? Perplexed, I stopped the image since I was near the end of the 5-minute exposure anyway. I changed eyepieces to see the stars and still could not. Finally, I went to my finder and saw that the whole sky near the Comet was now blanketed in clouds.

That did it! Done! I was relieved that the clouds had not marched in any sooner, and packed up and left delighted that I had come despite the odds of finding 'Clear Skies' under which to photograph Comet Neat.



June Observing Notes

June 9: Last-quarter Moon.

June 17: New Moon.

June 20: Summer Solstice occurs at 5:58 PM PDT, marking the beginning of Summer in the Northern Hemisphere. The Sun rises and sets at its most northerly point and makes its highest arc across the sky, spending the greatest amount of time above the horizon.

A new image of **M82**, the Cigar Galaxy in Ursa Major, was released last week. It was created by combining Hubble details of the inner part of the galaxy with a view from the WIYN Telescope on Kitt Peak that shows the extended winds. M82 is noted for its superwinds, or bipolar outflows which extend in opposite directions and travel for thousands of light-years, at a rate of more than a million miles an hour, into intergalactic space. These are gas jets that may originate from individual star-forming clumps within M82.



It's thought that collision with M81, Bode's Galaxy, triggered the intense star formation about 300 million years ago.

M82 is located about 10 degrees north of Dubhe in Ursa Major and near M81, in a fine grouping of galaxies. Scan slightly up and West for a view of departing Comet NEAT.

Binocular Highlight: M13, the spectacular Hercules star cluster. To find it, face north and find the Big Dipper's handle. A line extended to the East will find the bright star Vega. About two-thirds of the way and a little South is the "H" or "keystone" formation of Hercules. M13 is along the keystone's western edge near the northernmost star. In 7x binoculars it looks slightly fuzzy. 15x binoculars show some detail.

Hunting for the ISS: I'd love to publish best dates and times for viewing the space station, but forecasts extend only 7 to 10 days. Here are some websites to check for ISS and other satellite passes, and how to wow your friends by predicting Iridium flares:

<http://www.heavens-above.com/>

www.jsc.nasa.gov/iss sightings/

<http://spaceflight.nasa.gov/realdata/sightings/cities/index.cgi>

Look for ISS altitudes of at least 20°, and preferably 45°. The higher the pass, the longer, up to 5 minutes. It's also best to view 45 to 60 minutes after sunset and before sunrise.

Special Links:

More on the Gravity Probe featured last month:

http://einstein.stanford.edu/content/story_of_gpb/gpbsty1.html

Cassini enters Saturn's orbit July 1. The following site will launch that day and will have updates and photos:

<http://www.exploratorium.edu/saturn>

Young Astronomers



2004 National Young Astronomer Awards

Each year since 1993 the Astronomical League has recognized outstanding astronomy achievements by US high-school students through its National Young Astronomer Award. This year's top winner is John Davis, a senior at Penfield High School in Penfield, New York.

A member of the Rochester Astronomy Club, Davis is cited for his accomplishments in telescope making and astrophotography. In addition to grinding 10- and 12.5-inch primary mirrors and building a backyard observatory, at age 14 he began to machine telescope parts and mounts from scrap in his school's workshop and his family's basement. Soon he turned this after-school hobby into a successful commercial enterprise. His company, Gemini Instruments, has sold custom-made equipment to amateur astronomers in the US, Hong Kong, Canada, and Australia.



John Davis is seen here with one of his custom-machined German equatorial telescope mounts.

Davis' NYAA prize consists of a plaque, an all-expense-paid trip to the League's 57th national convention in Berkeley, CA, this July, a 10-inch LX200 GPS telescope donated by Meade Instruments Corp., a lifetime observing pass to McDonald Observatory courtesy the University of Texas, and membership to the International Dark-Sky Association.

The Second-Place honor went to Morgan MacLeod, a junior at Greely High School, Cumberland, ME. Morgan became interested in astronomy while in the sixth grade when his class took a field trip to the Southworth Planetarium in Portland, Maine. He built a 4.25"



Morgan MacLeod

f/8 Dobsonian telescope in 9th grade. Morgan has been very interested in astrophotography, including the use of CCD imaging. He built a few barn door tracking devices, which use the rotation of a bolt to follow the night sky. In 10th grade, he and his dad built an observatory.

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He has done extensive research with variable stars, including his work on the "Light Curves of Variable Stars" which won first place in the Maine State Science and Technology Fair, Physics and Chemistry division. He has also done CCD photometry of the star V377 Cas. Even though this star is classified as a variable, his research casts some doubt regarding its long-held classification as a variable star. His goal is to collect further data to refine this analysis.

Third Place honors went to Yvette Cendes, a senior at The Ellis School, Pittsburgh PA. Yvette became interested in astronomy in the 8th grade. She learned the constellations and the locations of bright sky objects with a pair of binoculars. In ninth grade Yvette received an 8" telescope as a Christmas present. Since then she has spent hundreds of hours logging observations. Her primary viewing interest is in multiple star systems.



Yvette Cendes

Yvette and other teenage amateur astronomers met on the internet and formed the Astronomy Club for Teens, a club for young astronomers around the world. During the 2003 Martian opposition, she researched a region known as Nilosyrtis. Entitled "An Areological Study of the Martian Region Nilosyrtis" her project was entered in the Intel Science Talent Search competition. She is a member of the Planetary Society.

YA Members: It's not too early think about entering the NYAA contest for 2005. Check out the prizes on their website! Dues-paying members of SCAS are automatically members of the Astronomical League. For more information about the competition, contact Mr. Carroll Iorg, at carroll-iorg@kc.rr.com (phone: 816-444-4878). Information is also available on the League's website <http://www.astroleague.org/>

—adapted from *Sky & Telescope* and *Astronomy League* postings

YOUNG ASTRONOMERS CALENDAR

The Young Astronomers April meeting was our last scheduled meeting for this school year. Regular meetings will resume in September and will be announced in *Sonoma Skies*. Members will also be notified by email or telephone. Come to the annual SCAS Star-B-Que this summer. Bring your telescope. We hope to see you!

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**Sonoma County
Astronomical Society**

P.O. Box 183
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June 2004 *Sonoma Skies*

June 9 Meeting
Leo Blitz
*New Horizons in
Radio Astronomy*

Reminder:

It's Membership Renewal Time!

**IT'S TIME TO RENEW
YOUR MEMBERSHIP!**

The \$25.00 Annual Membership dues for 2004-2005 were due June 1. Please give your cash or check to Harry Linder at the June meeting, or send a check with this completed form to:

SCAS, P.O. Box 183, Santa Rosa, CA 95402

Name: _____

Address: _____

City: _____ Zip: _____

Phone: _____ email: _____

Your renewal dues include membership in the Astronomical League, our monthly newsletter *Sonoma Skies*, access to the Palmieri Observing site at the New Moon, discounted subscription costs for *Sky and Telescope* and *Astronomy* magazines, great guest speakers at our monthly meetings, and opportunities to meet new and exciting people who share your interest in many aspects of astronomy.



Attend A Conjunction!

AstroCon 2004

July 20-24, 2004

San Francisco Bay Area

Here's a conjunction you can actually attend—not just observe: a truly once-in-a-lifetime conjunction of the Astronomical League, the American Association of Variable Star Observers, the Association of Lunar and Planetary Observers, and the Astronomical Society of the Pacific.

Highlights :

- AAVSO and ALPO member sessions open to all attendees
- Top professional astronomers
- Great new public outreach tips and techniques
- Field trip to the world-famous Lick Observatory

AstroCon 2004—the Astronomical League's annual convention—is co-hosted by the Astronomical Association of Northern California, the Eastbay Astronomical Society, and the San Jose Astronomical Association.

www.astrocon2004.org
visit the website for complete details, including secure on-line registration and payment

1-415-337-1100 x 109
leave us a message to request a printed registration form, or to ask a question

