

Sonoma Skies

Newsletter of the Sonoma County

A nonprofit scientific and

www.sonomaskies.org



Astronomical Society

educational organization

July 2004

Volume XXVII No. 7

Radio Astronomy

by June Ferguson

Radio astronomy is the study of distant objects in the universe by collecting radio waves from space. Radio astronomers make images using radio waves emitted by objects, as well as gas, dust, and very energetic particles in the space between the stars.

Dean Knight, teacher at Sonoma High School, sets up his radio telescope equipment at RFO on the Saturday afternoons when the Observatory is open to the public. Dean explains the sensitivity of the string of wires and antenna, to capture a radio wave at a particular frequency, 20.1 megahertz. The antenna length determines what radio wave is received. The frequency is transmitted immediately to his radio and computer in the West wing. The computer monitors the frequency over time.



Artist's rendering of completed Hat Creek Observatory near Mount Lassen.

The basic components of a radio telescope are a large radio antenna and a sensitive radio receiver. Radio waves coming to Earth from astronomical sources are very weak.

For example, a cellular telephone located on the moon would produce a signal on earth that radio astronomers consider quite strong. A number of frequency bands are allocated to radio astronomy. With more and more man-made objects transmitting in space there can be some spill-over into radio astronomy frequencies. To minimize interference, radio astronomy laboratories are set up in remote locations.

The Arecibo radio telescope in Puerto Rico, with an antenna diameter of 1000 feet covering 20 acres of valley surrounded by trees, is the largest single-dish radio telescope. It first opened in 1963 and was given an upgrade in 1996. Well-worn, it fades from aerial view. Multi-used, it has broadcast messages to areas that might reach intelligent extraterrestrial life.

Leo Blitz, professor and radio astronomer, spoke at the SCAS June meeting. Near the conclusion of his very interesting

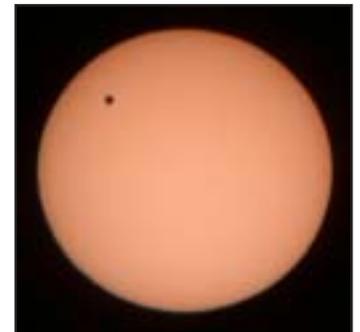
continued page 4

THE TRANSIT OF VENUS FROM DOWN EAST MAINE

by Larry McCune

We often make a summer trip to the Maine coast for a week of ocean canoeing, lobster pounds and visiting friends at B&Bs that we have come to know. This year with the transit Venus scheduled for June 8, 2004 we planned an earlier visit prior to the usual Maine Lobster Festival held in August.

The *Observers Handbook* indicated that Venus would be visible at sunrise and continue to 4th contact at an elevation of about 20 degrees above the horizon. Cadillac Mountain, Acadia National Park, at Bar Harbor, Maine was chosen because it is noted for the earliest sunrise in the continental US. Cadillac Mountain is 44+ degrees North Longitude and 68+ degrees Latitude at the extension of the Eastern Time Zone. When we arrived in Bar Harbor on June 7, it was overcast and raining but weather reports hinted that it might clear.



The morning wasn't much better but we decided to take the half-hour trip to the 1500-foot mountain top to await the sunrise at 4:45 ET. We could barely make out the signs through the fog to find the correct turns. Then about 400 feet from the top we passed into clear skies. What a relief. When we looked out in all directions there was an endless blanket of fog below us.

By the time I set up the digital camera with a telephoto lens, eyepiece projection and a filter, sunrise was moments away. About a dozen others from as far as California joined us for the event. Many were excited just to see Venus with a solar filter. In comparing experiences with others I feel lucky to have witnessed the rare Transit of Venus.

WE ARE SAD TO REPORT THAT LESS THAN HALF OF OUR MEMBERS HAVE YET RENEWED THEIR MEMBERSHIPS.

Dues were due on June 1st. **If you haven't paid your dues yet**, please send \$25 to SCAS, Box 183, Santa Rosa, CA 95402. You'll be glad you did.

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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PUBLIC STAR PARTY COORDINATOR

Bruce Lotz 576-7833 ablotz@sonic.net

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@yahoo.com



*It's confirmed, Sir.
Phoebe is a rather large
golf ball.*

MEMBERSHIP NEWS

We are pleased to welcome the following new members: Howard Hansen, Goeff Lusk and Shirley White, Eric Swanson, Tery Noe, and Mary Leiker.

We now have 174 dues-paying members. (This does not include the ten Striking Sparks Telescope winners for 2004).

We are sad to report that less than half of our members have yet renewed their memberships. (Dues were due on June 1st). Those who have not renewed will soon be getting a call from a Board member to inquire why. But we recognize that it's easy to lose track of time measured in days and months, when you are used to thinking in terms of lifetimes of stars.

If you haven't paid your dues yet, please make a note to send \$25 to SCAS, Box 183, Santa Rosa, CA 95402. You'll be glad you did.

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

FOR SALE

8" Celestron Star Hopper Dobsonian Telescope with Telrad Finderscope. Good condition. \$300. Call to see in Sonoma (707) 996-5898.



Happiness Through Sleep Deprivation At Shingletown

by John Whitehouse

The New Moon in June looked down at hundreds of happy amateur astronomers for the third, now annual, Shingletown Star Party of 2004. Shingletown came through again, despite weather "iffies", to offer up dark, transparent skies for friendly folk suffering from a genetic defect that causes them to stare at deep sky wonders. They came from as far away as Sheffield, U.K., to escape our industrialized society's light pollution to indulge their life lists of Faint Fuzzies, satisfy their desire for eye candy, or show off their latest light buckets and star cannons—or just to camp out and enjoy the company of their fellows who sympathize with their mutual stellar addictions.

With the entrancing celestial wonders, camaraderie and big gun equipment to sample, it was hard not to stay up until the eastern graying heralded the dawn of Sol, our nearest star. Sol not only offered up its wonders for inspection, but also illuminated the many beauties of the earthly world nearby. After several days of this, I wonder, "Who needs sleep, anyway?"

This nicely organized West Coast star party grew out of an annual meeting in Mt. Lassen National Park that outgrew its parking lots and campgrounds. The organizers, Mark Wagner and slave labor (read: volunteer) honcho Stacy Jo McDermott and others loosely united by The Astronomy Connection, primarily out of the South Bay, are to be commended for their selfless, cheerful efforts. They found an enthusiastic community in the little hamlet of Shingletown, near Mt. Lassen, who were having a coincident town festival, "Volcano Days." With the cooperation local officials and civic groups, combined with the asset of a decommissioned airport runway offering thousands of feet of smooth tarmac to set up telescopes within sight of the lovely mountain, a happy marriage was born that became Shingletown Star Party.



Cumulus and high clouds around Mt. Lassen seemed to threaten the viewing each day, and the first day did cloud over after midnight. Thursday, Steve Gottlieb, well known to *Sky &*

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Titan

Captain's Log, Star Date: 2004.346

Today, we have reached a turning point in our travels on approach to the ringed planet. We have at last glimpsed the surface of the fabled world, Titan, Saturn's largest moon and the greatest single expanse of unexplored territory remaining in

the Solar System today. What wondrous sights now await us on this remarkable journey we can only imagine.

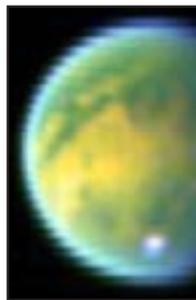
Titan has long intrigued those who watch the planets. It is a Mercury-sized icy body whose surface environment may be, in some respects, more like Earth's than any other in the Solar System. Like Earth's, its atmosphere is thick and largely molecular nitrogen. Unlike Earth's, it is lacking free oxygen and is suffused with small but significant amounts of gaseous methane, ethane, propane, and other simple and not-so-simple organic materials containing hydrogen and carbon. Some of these compounds, methane and ethane, may be liquid at the surface, despite the unimaginable cold of -300 degrees Fahrenheit. Though there is no liquid water, what water does on Earth, methane does on Titan. The presence of this simple hydrocarbon as a liquid on the surface and a gas in the atmosphere gives Titan a terrestrial-like greenhouse cycle and a boost in temperature, warming its lower atmosphere.

If present-day Titan could be warmed enough to melt its icy exterior, its atmosphere would bear a striking resemblance to that of early Earth, billions of years ago, prior to the emergence of life. Might Titan be a frozen, prebiotic Earth, telling a tale littered with clues to the origins of terrestrial life long ago?

Despite the Voyager explorations of the early 1980s, the details of Titan's story remain unknown, hidden beneath an atmosphere impenetrable to the Voyager cameras. At the moment, what lies on its surface exists only in the mind's eye.

And in the mind's eye, it is a strange place indeed. Patchy methane clouds float several miles above the icy ground. In places, large, slow-moving droplets of methane mixed with other liquid organics fall to the surface in cold but gentle rains, cutting gullies, forming rivers and cataracts, carving canyons, and filling basins, craters and other surface depressions. Imagine Lake Michigan brimming with paint thinner.

Above the methane clouds and rain lies two hundred kilometers worth of globe-enveloping red smog, making the Titan nights starless and the days eerie dark, where high noon is as dim as deep Earth twilight. Over eons, smog particles have drifted downwards, growing as they fell, to coat the surface in a blanket of organic matter. On high, steep slopes, methane rains have washed away this sludge, revealing the bright bedrock of ice. Could Xanadu, the brightest



Titan's surface in visual and infrared mapping spectrometer

feature on Titan, be a high, methane-washed, mountain range of ice?

Occasional bolts of lightning momentarily brighten the gloomy landscape, and windblown waves lap the shores of hydrocarbon lakes and seas dotting the scene. This is a rich, complex environment, where oddly familiar terrain is carved by odd and unfamiliar substances...a fascinating, virgin world whose only rival may be the Earth itself, with sights still unseen by human eyes.

Anticipation is at its greatest. The pulse quickens, the mind races, the soul is grateful. It is a singular privilege to be standing on the threshold separating ignorance and knowing. And that's exactly where we are. This is exploration at its finest and is precisely why we have come to this strange and faraway place. Step aside, Captain Kirk. This one belongs to us.

—by Carolyn Porco, Cassini Imaging Team Leader,
CICLOPS cpccomments@ciclops.org



Bright field of clouds, 280 miles across, near south pole.

Radio Astronomy *continued from page 1*

program, he talked about the Allen Telescope Array (ATA) that will be built at Hat Creek on the north side of Mt. Lassen. He invited people to take a look at the site before it is closed for major construction. The existing ten-millimeter wave radio telescopes at Hat Creek will be combined with the six dishes from Owens Valley at a new high site. Paul Allen, cofounder of Microsoft, and Nathan Myhrvold, former chief of technology officer for Microsoft, are major funders of the ATA project.

New, better, and speedier than any radio telescope used today, the ATA with its three hundred fifty 6.1-meter dishes, will be used to research dark matter and faint low-mass galaxies, and provide a powerful new probe of black holes. Surveying the universe, it will be sensitive to dark galaxies, those that contain only atomic hydrogen and dark matter, but no stars. A high-resolution image of a typical dark galaxy could be produced at the ATA in 5 minutes, compared to 10 days of time at the Arecibo telescope. Additionally, it will be used by SETI in continued research for intelligence "out of this world." For ATA tours: Susie Jorgensen at susie@hcro.berkeley.edu. ATA Website: <http://astron.berkeley.edu/ral/home.html>. Leo Blitz: blitz@astro.berkeley.edu

For the basics visit RFO on public viewing days and see an entry-level radio telescope. Dean's radio telescope compliments Merlin Combs' (and crew) solar viewing. Always seeking to learn, radio astronomers look forward to new knowledge of the vast and exciting universe. Throughout history people have benefited from astronomical knowledge and technological progress as they ponder our imponderable place in the universe.

Events

SCAS STAR-B-QUE AUGUST 7

Come to our annual outing at the Robert Ferguson Observatory at Sugarloaf Ridge State Park! This event is one of our most fun-filled activities of the year. There will be a sky tour, pointing out the different constellations and many interesting features and names in our Summer Sky. We'll have a sky quiz with prizes for the kids, so bring a clipboard, pencil and red flashlight.

It's a good time for beginners to get help learning the sky or using a telescope. Striking Sparks winners are especially invited. Bring your telescope and its instruction manual, your planisphere, a list of questions you'd like to ask, and some red cellophane for your flashlight.

We are allowed in at noon. Solar viewing will begin at 2 PM. The barbecue fire will be started about 5 PM so we can begin cooking around 6 PM. SCAS will provide the barbecue fire and marshmallows. You bring the marshmallow sticks, food to barbecue, a favorite potluck dish to share, other food, drinks and utensils, and a measure of good cheer.

To find Sugarloaf Ridge State Park, take Hwy. 12 from Santa Rosa toward Sonoma. Turn left onto Adobe Canyon Rd. just

before you reach Kenwood. It is 8.6 miles from Fourth and Farmer's to the Adobe Canyon Rd. turnoff. From Sonoma, it's a right turn after Kenwood. The Park is 3.4 miles farther.

At the entrance kiosk identify yourself as part of the Sonoma County Astronomical Society headed for the Star-B-Que at the Observatory. There will be no individual fees. Pets must be kept on a leash, with a \$1.00 charge for each animal. Parking is limited, so please carpool if possible. Park by backing in to minimize jarring white light from backup lights if you leave in the dark. Park close together, with just enough room to open your door. Parking on gravel areas is prohibited. If you arrive after 8:30 PM, or if campground parking is full, park next to the group campsite entrance gate, about 100 yards away.

Immediately around the Observatory is the Group Campground parking area, campsites, running water, large barbecue pits, and outhouses. You may camp overnight (no RV hookups). Everyone must leave by noon Sunday. Please remember the Star-B-Que is for SCAS members, their families and a few guests, and Striking Sparks winners, of course.

Call Len Nelson at 763-8007 or email lennelsn@comcast.net if you have questions.

THE GEYSERS STAR PARTY

Saturday, July 17

Excellent dark sky observing at ~2700 feet for members and their guests. **Location:** Palmieri Observatory, Mercuryville, CA (near The Geysers). Longitude: 122deg 49min., Latitude: 38deg 46min. Almanac data for July 17-18:

Sunset: 8:33 PM PDT

Moonset: 9:18 PM PDT

End Astronomical Twilight: 10:35 PM PDT

Begin Twilight: 4:11 AM PDT 7/18

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, July 24

These are public events—all are invited. Members with scopes are encouraged to attend. Great for planetary astronomy with fellow observers at an easily accessible site.

Sunset: 8:28 PM PDT

End Astronomical Twilight: 10:15 PM PDT

Moonset: 00:25 AM PDT 7/25

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

ROBERT H. FERGUSON OBSERVATORY

Public Viewing: July 10 and July 17

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

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

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

July 19: Observing Lab, 8:00 PM

Aug. 11: Perseid Meteor Shower, 9:00 PM

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

Shingletown *continued from page 3*

Telescope readers, offered us two “hunting” lists. The first, general, list, he called “eye candy”, gave me several nights of challenge for my 10" Schmidt-Newtonian. I did finally make it through that list. The second, the SSP Challenge list, featured objects all fainter than 12th magnitude, requiring hefty glass and patience: I didn't even try. Still, the fine skies let me distinctly view the Crescent Nebula in Cygnus, and clearly view the central star in the Blinking Planetary and other objects I've never been able to catch in my 10". The North American nebula was plainly visible in my 9X65 binocs.

Speaking of binoculars, my star party neighbor Bruce brought his new creation: a binocular consisting of two 22" telescopes on a tracking mount, bringing their twin views together in a backwards-viewing scope beyond compare. The view of M51, the Whirlpool galaxy, was the best I've ever seen! I must say, though, that the 30" StarMaster down the way gave comparable views. That and spectacular views of structure in the Veil, direct viewing of M57, the Ring nebula's central star, M27 Dumbbell's extended halo, and much more.

There was the usual contingent of vendors, Coronado telescopes offered incredible solar viewing to all passersby, Sun River Nature Center with their offerings, and others, but SSP remains a primarily viewing party, not a spending junket.



Saturday was the public night, when SSP is open to all. Events were offered all day long and live music and a barbecue led into the evening's entertainment. This year the keynote speaker was none other than Vic Maris, creator of Stellarvue telescopes. In addition to bringing his newest 6" apochromat, he gave a great talk about the wonders of astronomy and the night sky. He even managed to conjure up Galileo himself, who talked about some history of astronomy in perfect pizza Italian-American! You may know of Vic and his relationship to RFO. He was the park ranger superintendent for the Silverado district and helped pave the way for Sugarloaf State Park to open up to the idea of having an observatory to include the universe as part of a naturalist interpretive program there. With his help, George Loyer and VMOA were able to bring about Ferguson observatory there.

I stayed until Monday drinking in all the great night skies I could get, putting off catching up on my sleep until later, when I could dream about going back to Shingletown in 2005.

NEW CLEAR SKY CLOCK URL

The new “Clear Sky Clock” URL for the RFO location is: <http://www.cleardarksky.com/c/RobFerObCAkey.html?1>

Space Elevator: Momentum Building

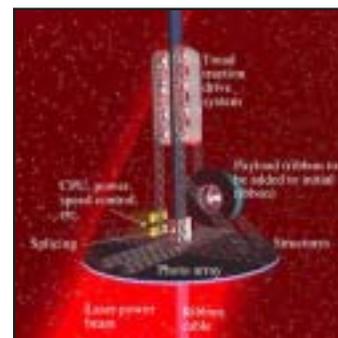
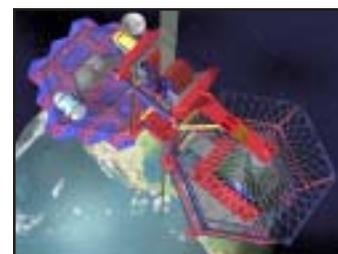
Leading scientists and engineers met last month at the third annual international conference in Washington, DC, to tackle the hurdles that must be overcome to develop a space elevator. The concept is a stretch, with plenty of work to do before travelers have push-button, top-floor access to space. The first thing that's needed is a supertough ribbon that does an about-face—it hangs from the ground and falls into the sky thanks to the Earth's spin and centripetal force. Anchored in geosynchronous orbit, a ribbon 62,000 miles long would be made of carbon nanotubes. The other end would be attached to a floating platform located in the equatorial Pacific. A “climber” would haul cargo and passenger modules up and down the length of ribbon.

“It's a mega project...things are moving about as quickly and as well as could be expected,” said Bradley Edwards, Director of Research for the Institute for Scientific Research based in Fairmont, West Virginia and a leading authority on the space elevator concept. He listed the challenges, from carbon nanotube technology, power beaming and climber hardware to space debris impacts on the ribbon, health and safety issues, cost, politics and regulations.

Research points to a space elevator being capable of lifting five-ton payloads every day to all Earth orbits within 15 years after formal go-ahead. Once operational, the elevator could ferry satellites, spaceships, and various structures into space using electric lifts clamped to the ribbon. The first space elevator would reduce lift costs immediately and drastically, compared to current launch costs.

Though years of research are required to turn this pipedream into space hardware, it is clear that the meeting's sponsors—Los Alamos National Laboratory, NASA's Marshall Space Flight Center, NASA Institute for Advanced Concepts, and the National Space Society—are taking the notion seriously.

—adapted from an article by Leonard David,
Senior Space Writer, *Space.com*



*Schematic breakdown of the climber.
Courtesy: Brad Edwards/ISR*

Young Astronomers



Strange Universe: The Stuff of Darkness

It isn't easy to study darkness. Try it. The next time you're outside on a clear night, look up. You might see the winking lights of an airplane, the glow of an orbiting satellite, or even the bright trail of a meteor. You'll see lots of stars, but what about all the space between the stars? Is something hidden out there in the darkness, or is it just empty? There's nothing for the human eye to see, but astronomers are finding ways to detect what lies between the stars, and they're discovering that most of the universe is made out of mysterious, invisible stuff. They call it dark matter and dark energy. They can't see it directly, but scientists are pretty sure this weird stuff exists. Figuring out exactly what it is, however, remains a work in progress.

Everything you see is a type of matter. This is the ordinary stuff of the universe, from a grain of salt to a drop of water to a candy bar. You are matter. So is Earth, the moon, the sun, and our own Milky Way galaxy. Simple enough, right? Until about 1970, our picture of the universe seemed this straightforward. But then Jeremiah Ostriker of Princeton University and other astronomers started to notice something curious. Gravity provided the hint.



The force of gravity keeps us stuck to the ground, the moon in orbit around Earth, and Earth in orbit around the sun. Without gravity, these bodies would fly off on their own. The force of gravity between two objects depends on the distance between them and the amount of matter, or mass, in each object. The sun contains a lot more matter than Earth, so it has a much larger mass and exerts a much greater gravitational force. Astronomers can estimate how much ordinary, visible matter a star or a galaxy contains. Then they can figure out how the gravity of one galaxy should affect another, nearby galaxy.

When astronomers compared their calculations to what really happens in our own galaxy, they were surprised to find that the Milky Way acts as if it has much more mass than it should. It's like going to the carnival where someone guesses from your appearance that you weigh 100 pounds but the scale says you

weigh 1,000 pounds. Measurements of other galaxies produced the same puzzling result. The only logical conclusion, Ostriker says, was that there's lots of stuff out there that's invisible yet still has mass. Scientists named it "dark matter." Ordinary matter can give off or reflect light; dark matter does not.

The concept was too strange for many people to believe at first, Ostriker says, "but every measurement you make gives the same answer. Now, we have to believe it." Calculations show there may be 10 times as much dark matter as ordinary matter. What we see is only a small fraction. So what is dark matter? "We have no more clue now than we did 30 years ago," Ostriker says. Scientists have been trying out all sorts of ideas. One is that dark matter is made of tiny particles that give off no light and can't be detected by telescopes. But it's hard to decide what sort of particle fits the bill, and once astronomers accepted the idea of dark matter, another mystery turned up.

According to the Big Bang theory, the universe started with a huge explosion that pushed all the stars and galaxies away from each other. Based on their measurements of matter and dark matter, scientists concluded that gravity should eventually make the universe collapse back in on itself billions of years from now. It came as a huge surprise when powerful telescope observations revealed that the opposite seems to be happening. By measuring and analyzing light from distant supernovas, astronomers discovered the universe may be expanding outward faster and faster, suggesting that the universe has an additional force pushing stars and galaxies apart, countering the force of gravity. The effect of this mysterious force, "dark energy," must be larger than that of all the ordinary matter and dark matter in the universe.

Using telescopes on the ground and in space, researchers are now hard at work looking for clues that will tell them more about dark matter and dark energy. Meanwhile, we can take pleasure in the fact that we're made from a very small minority of the kinds of stuff that exist in the universe. Studying dark matter and dark energy gives us a sense of how valuable and unusual this "ordinary" sort of matter is. There's a lot more to darkness than meets the eye. It's worth taking a closer look.

—Adapted from an article by Emily Sohn in *Science News*.

YA CALENDAR

The Young Astronomers regular meetings will resume in September and will be announced in *Sonoma Skies* and by email or telephone. Bring your telescope to the SCAS Star-B-Que in August. We hope to see you!

YA OFFICERS

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Recorder: Darren Davis 575-8369
Newsletter Editor: Mark Bellinger 763-7554
Librarian: Clayton Alderson 833-6423
Adult Adviser: Gary Jordan 829-5288

**Sonoma County
Astronomical Society**

P.O. Box 183
Santa Rosa, CA 95402



July 2004 *Sonoma Skies*

July 14 Meeting

Al Stern

**Unraveling Mysteries
of Hubble Photos**

Reminder:

It's Membership Renewal Time!

Unraveling Mysteries of Hubble Photos

SCAS July 14 Meeting, Proctor Terrace School

Join Al Stern as he investigates some of the unexpected patterns revealed by Hubble's photographs. Al is a self-taught amateur astronomer who learned celestial navigation in the service. He has been a Sky Lab presenter and is currently presenter for the Academy of Science. Won't you join us for this interesting exploration at the SCAS monthly meeting, July 14 at 7:30PM.



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.