



EPHEMERIS

October 2011

SJAA Activities Calendar

Jim Van Nuland

NASA at the Turning Point

Paul Kohlmeier

October

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| <p>1 Dark-Sky weekend. Sunset 6:51 p.m., 29% moon sets 10:02 p.m. Henry Coe Park's "Astronomy" lot has been reserved.</p> <p>7 Houge Park star party. Sunset 6:42 p.m., 87% moon sets 4:05 a.m. Star party hours: 7:30 until 10:30 p.m.</p> <p>8 General Meeting. Board meeting at 6:30; General Meeting at 8:00. Our speaker is Dr. Puragra Guhathakurta of Lick Observatory, on "Our Place In The Cosmos".</p> <p>21 Astronomy Class at Houge Park. 7:00 p.m. The topic: Fall Constellation / Highlight Objects. (outdoors)</p> <p>21 Houge Park star party. Sunset 6:23 p.m., 28% moon rises 2:32 a.m. Star party hours: 7:15 until 10:15 p.m.</p> <p>22 Dark-Sky weekend. Sunset 6:22 p.m., 19% moon rises 3:42 a.m.</p> <p>29 Dark-Sky weekend. Sunset 6:13 p.m., 15% moon sets 10:48 p.m. Henry Coe Park's "Astronomy" lot has been reserved.</p> | <p>6 DST ends at 2 a.m. Retard clocks to 1 a.m.</p> <p>12 General Meeting. Board meeting at 6:30; General Meeting at 8:00. Our speaker is Dr. Lynn Rothschild, on Life at the Edge: Life in Extreme Environments on Earth and the Search for Life in the Universe.</p> <p>13 Astronomical Swap Meet. Noon to late afternoon.</p> <p>18 Astronomy Class at Houge Park. 7:00 p.m. The topic: Amateur telescope making, why, how and where. With members of the Chabot Science Center's Telescope Maker's Workshop.</p> <p>18 Houge Park star party. Sunset 4:56 p.m., 44% moon rises 12:25 a.m. Star party hours: 7:00 until 10:00 p.m.</p> <p>19 Houge Park star party. Star party for students of Live Oak Academy, Conducted by the School star party team. Others welcome too.</p> <p>19 Dark-Sky weekend. Sunset 4:55 p.m., 33% moon rises 1:33 a.m.</p> <p>26 Dark-Sky weekend. Sunset 4:52 p.m., 5% moon sets 6:30 p.m. Henry Coe Park's "Astronomy" lot has been reserved</p> |
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The Board of Directors meets before each general meeting at 6:30 p.m. All are welcome to attend.

On August 30, 2011 the AAAS (the publishers of Science magazine) held a webinar entitled "NASA at a Turning Point". The expert panel included Wayne Hale former manager of the Space Shuttle program, John Grunfeld former astronaut who performed some of the ETA's during the last Hubble repair mission, and Pat Duggins a writer known as the voice of NASA on NPR.

A major issue tackled by this group was the use of robotic science missions versus manned exploration. Grunfeld said that a manned Mars mission, if possible today, would cost \$100 billion compared to about \$1 billion for the Mars Rover mission. But when you compare the scientific return per dollar spent the missions are comparable. That's because there is so much a geologist on the surface could do. Wayne Hale compared the few grams of lunar rock that the Soviet Union succeeded in returning to earth compared to the 850 pounds the U.S. returned during the 6 successful Apollo landings. "We got a bargain" according to Hale.

There was some concern voiced by questions from the webinar viewers

24 hour news and information hotline:
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Continued on page 2

regarding the resupply of the Space Station. Wayne Hale said that the Progress launch vehicle that failed in August is the most reliable rocket in the world. The ISS has supplies for a full year but that the Soyuz spacecraft currently docked at the ISS have a kind of freshness date and those dates expire around the end of November. Another questioner wondered why the shuttles couldn't be pushed back into service. Hale says that people have been laid off, there aren't any external tanks that are available and "you can't go buy one on EBay". It would take 2-3 years to put the shuttles back in service.

It is interesting to hear people argue over the success or the failure of the Space Shuttle program. You can hear people like Amos Zeeberg compare the shuttle launch rate compared to the original objective of once per month - falling short by a factor of 13 (<http://discovermagazine.com/2011/jul-aug/22-how-to-avoid-repeating-debacle-of-space-shuttle>). But Wayne Hale says the problem is that the shuttle worked too well. It was only supposed to last for 10 years. There was little incentive to develop something better. The result is that the spacecraft didn't evolve. Instead, the developers of the space shuttle starting as early as 1972 were building a spacecraft that would still be in service almost 40 years later. "That's like asking the Wright brothers to build a DC-3" said Wayne Hale. That's actually an understatement. The DC-3 was built only 30 years after the Wright brothers. Grunfeld said the Space Shuttle program achieved every objective except for cost per flight. Certainly the Hubble/Space Shuttle combination exceeded all expectations. Grunfeld is looking forward to the Webb Space Telescope which he calls Hubble 2.0.

Wayne Hale went through some shuttle numbers: 135 launches, 852 filled seats, 355 different people from a total of 22 nations. Yes, the program should have done more but it did do a lot.

The ultimate question on this day was "What should NASA be doing?" Wayne Hale didn't hesitate, send people to Mars. Pat Duggins said NASA should be building bigger heavy lift rockets. John Grunfeld said "Hit the simple button". Do what NASA can do now with Mars missions in the future.

A Dread Doomsday ... Faint Comet. Or Two.

Akkana Peck

We were graced with a comet last month! Okay, Comet C/2009 P1 Garradd wasn't history's most impressive comet. But it was fun watching it fly past the Coathanger asterism, an eighth-magnitude splotch that was easy to find even from the light pollution of San Jose.

We don't get comets that often that are easily visible from the backyard, so it's nice to see one at all.

I didn't manage Garradd in binoculars — did you?

Well, usually we don't get to see comets that often. But after September's comet, October brings us not one but two more.

Comet C/2010 X1 Elenin makes its closest approach to Earth on October 16, though that's still about 35 million kilometers (22 million miles) away. And no, that's still not all that close — it's like Venus at opposition. Elenin's perihelion, its closest approach to the sun, is about a week earlier on October 10; the comet should be brightest between those two dates.

Elenin is a relatively small comet, but some initially hoped it would brighten enough to be visible with the naked eye. That doesn't look likely now. Back around the end of August Elenin was hit by a coronal mass ejection from the sun, and as I write this it looks like it's started to break up. The most optimistic estimates now for its brightness at closest approach are down around 9th magnitude, dimmer than Garradd. At worst, it may break up completely and not be visible at all, at least not in amateur telescopes.

Modest little Comet Elenin has another claim to fame, though.

Apparently there was speculation earlier this year that unknown forces would alter Elenin's orbit and pull the comet much closer to Earth, causing much destruction and mayhem. Apparently there are even those who say little Elenin is the dread object Nibiru, prophesied by doomsayers to have a disastrous encounter with the Earth in 2012 (or 2003, or various other years that change as the years pass and nothing happens).

Though strangely, when I went to look up the details of these predictions, I didn't have much luck in finding doomsayer websites warning us about Elenin. All I could find is astronomers debunking the theory, without finding the bunk itself. (Must be a conspiracy.)

Of course Elenin is too small to cause any problems unless it hits us directly, which it certainly isn't going to do.

JPL's Donald Yeomans calculated the gravitational force we'll see from Elenin at its closest:

"So you've got a modest-sized icy dirtball that is getting no closer than 35 million kilometers," said Yeomans. "It will have an immeasurably minuscule influence on our planet. By comparison, my subcompact automobile exerts a greater influence on the ocean's tides than comet Elenin ever will."

By the way, Leonid Elenin was working from Lyubertsy, Russia when he

discovered the comet last December ... but he was using the International Scientific Optical Network's observatory near Mayhill, New Mexico. It's pretty cool that you can discover a comet from that far away. Technology is wonderful — even to an old-fashioned dob-driving girl like me.

But remember I said there were two comets, not one. On October 8, a few days before Elenin's closest approach to the sun, it will appear very near short-period comet 45P/Honda–Mrkos–Pajdušáková (and you thought Hyakutake had a tough name!) This comet will be just past its September 30 perihelion, when it's expected to reach magnitude 7.3 — so with luck, it may be brighter than either Elenin or Garradd.

Incidentally, Honda–Mrkos–Pajdušáková passed 9 million kilometers (under 6 million miles) from us this past August, far closer than Elenin will ever get. And it's been making regular close passes for years (it was discovered in 1948). It's strange that doomsday soothsayers would focus on Elenin when Honda–Mrkos–Pajdušáková is so nearby.

Go figure.

What if you want to look at something besides comets? Well, Jupiter is at opposition on Oct 29, and also fairly high in the sky, transiting at 65 degrees. Not only that — it's was also at perihelion this year (back in March), so this will be an unusually close opposition, with Jupiter's disk spanning almost 50". We should get fantastic views of this beautiful and complex planet over the next few months.

Uranus and Neptune are well placed and visible all night, in Pisces and Aquarius (off the left horn of Capricornus), respectively.

You can also catch Pluto, but start as soon as it gets dark — on the edge of M24 in Sagittarius, Plutu sets around 11 p.m.

Venus is low in the dusk sky, joined by Mercury late in the month.

Mars is in the morning sky; by month's end Saturn emerges from behind the sun to join it.

Contact (The Reel and the Real): Humanity's Search for Extra-terrestrial Intelligence A film and talk with Dr. Jill Tarter of the SETI Institute Wednesday evening, Nov. 2, at 6 - 9:30 pm

Andrew Fraknoi

McKenna Theater at San Francisco State University,
Holloway Avenue and Tapia Drive, San Francisco, CA 94132 (For a map and parking links, see: <http://www.sfsu.edu/~sfsuemap/>)

Co-sponsored by the SF State Department of Physics and Astronomy. Free and Open to the Public (seats are available first come, first served)

Join astronomer Jill Tarter, whose work and life was a key model for the character Jodie Foster plays in the film Contact, for a very special evening of science fiction and cutting-edge science. We will screen the full-length film about the discovery of intelligent life among the stars, and then hear Dr. Tarter discuss her ongoing work at the SETI Institute to find radio signals from alien civilizations. After her film and the talk, there will be time for questions from the audience.

ASTRONOMY magazine renewal time!

Jim Van Nuland

It's time to renew our group subscription to Astronomy magazine. The rate for 2012 is still \$34, or \$60 for two years. Please send a check payable to me: Jim Van Nuland, 3509 Calico Ave., San Jose CA 95124.

SUBSCRIBERS — you should have gotten an e-mail from me, with particulars of your subscription. If not, write me, address below.

If you subscribe independently, and your subscription ends during 2011 or 12, you may convert to the group rate. Send a check and the renewal card or a copy of a mailing label to me, and you'll be added to the group for an additional 12/24 months.

If you do not subscribe and wish to do so, send the \$34/60 and your subscription will begin with the January 2012 issue.

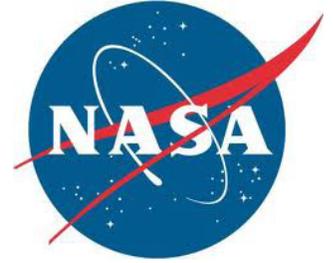
I will hold your checks until early October, when the renewal package must be sent in. So don't worry that your check doesn't clear promptly. I will acknowledge receipt of your checks.

If you subscribe but do not wish to continue, tell me that too, so I don't continue to ask you about it.

Any questions? Call me at 408.371.1307 from 11 a.m. to 11 p.m., or e-mail at <jvn@svpal.org>.

PLEASE NOTE: this applies to Astronomy magazine, not Sky & Telescope! The latter subscription is paid to the treasurer as part of your SJAA dues.

Good Reading!



Dark Clues to the Universe

Dr. Marc Rayman

Urban astronomers are always wishing for darker skies. But that complaint is due to light from Earth. What about the light coming from the night sky itself? When you think about it, why is the sky dark at all?

Of course, space appears dark at night because that is when our side of Earth faces away from the Sun. But what about all those other suns? Our own Milky Way galaxy contains over 200 billion stars, and the entire universe probably contains over 100 billion galaxies. You might suppose that that

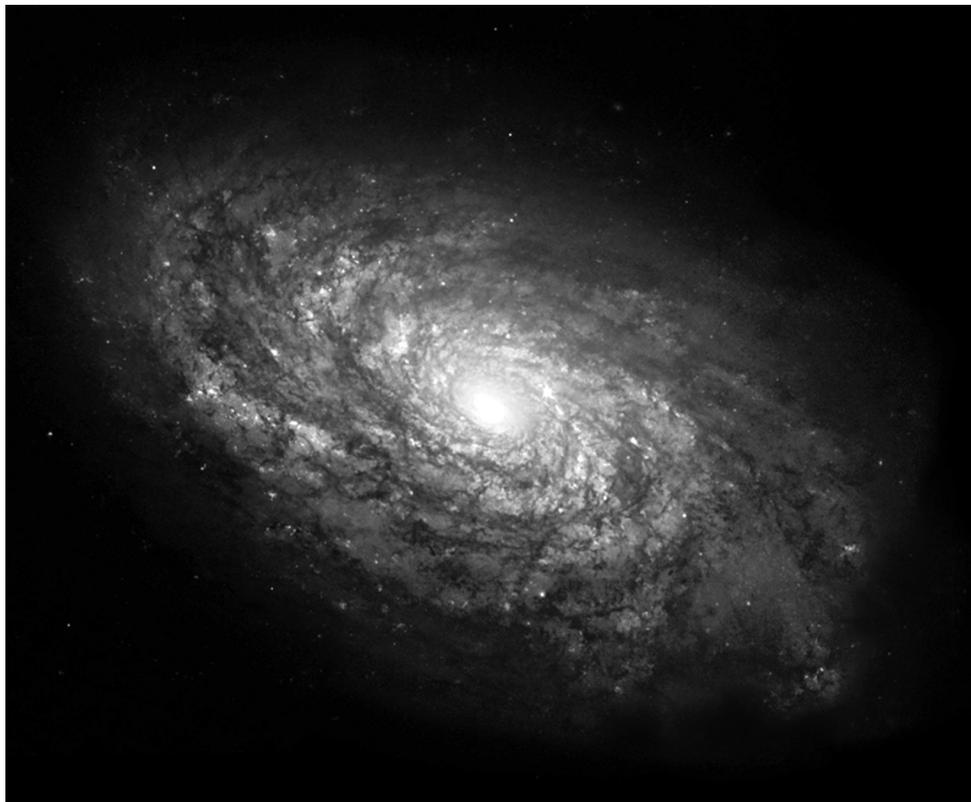
many stars would light up the night like daytime!

Until the 20th century, astronomers didn't think it was even possible to count all the stars in the universe. They thought the universe was infinite and unchanging.

Besides being very hard to imagine, the trouble with an infinite universe is that no matter where you look in the night sky, you should see a star. Stars should overlap each other in the sky like tree trunks in the middle of a very

thick forest. But, if this were the case, the sky would be blazing with light. This problem greatly troubled astronomers and became known as "Olbers' Paradox" after the 19th century astronomer Heinrich Olbers who wrote about it, although he was not the first to raise this astronomical mystery.

To try to explain the paradox, some 19th century scientists thought that dust clouds between the stars must be absorbing a lot of the starlight so it wouldn't shine through to us. But later scientists realized that the dust itself



This Hubble Space Telescope image of Galaxy NGC 4414 was used to help calculate the expansion rate of the universe. The galaxy is about 60 million light-years away. Credit: NASA and The Hubble Heritage Team (STScI/AURA)

would absorb so much energy from the starlight that eventually it would glow as hot and bright as the stars themselves.

Astronomers now realize that the universe is not infinite. A finite universe—that is, a universe of limited size—even one with trillions of stars, just wouldn't have enough stars to light up all of space.

Although the idea of a finite universe explains why Earth's sky is dark at night, other factors work to make it even darker.

The universe is expanding. As a result, the light that leaves a distant galaxy today will have much farther to travel to our eyes than the light that left it a million years ago or even one year ago. That means the amount of light energy reaching us from distant stars dwindles all the time. And the farther away the star, the less bright it will look to us.

Also, because space is expanding, the wavelengths of the light passing through it are expanding. Thus, the farther the light has traveled, the more red-shifted (and lower in energy) it becomes, perhaps red-shifting right out of the visible range. So, even darker skies prevail.

The universe, both finite in size and finite in age, is full of wonderful sights. See some bright, beautiful images of faraway galaxies against the blackness of space at the Space Place image galleries. Visit <http://spaceplace.nasa.gov/search/?q=gallery>.

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

Samples from Itokawa

Paul Kohlmler

The Hayabusa spacecraft returned samples of asteroid Itokawa in June of 2010. The first results of the study of these samples was presented in March of 2011. The first wide release of papers by the Japanese researchers appear in the August 26, 2011 issue of Science. Some of their findings are listed here.

The most typical meteorite found on Earth is an ordinary chondrite. It was believed that these came from the most common type of asteroid, the S-type. That makes sense but they aren't the same color. Instead the asteroids, such as Itokawa, were redder than expected. Study of the returned samples solved the problem. The asteroid has "nanoblobs" on the surface, opaque little bits that are about the size of the wavelength of light and that causes light to scatter. In essence, the asteroids are redder in the same way that a sunset is redder than high noon. The cause of these nanoblobs is not certain but it appears that solar winds are the cause. The analogy isn't perfect but it seems that S-type asteroids have a sun burn.

Other research solidifies the connection between ordinary chondrite meteorites and S-type asteroids. One way to demonstrate this is to look at the detailed mineral chemistry of the returned samples. This included scanning electron microscope analyses and synchrotron-radiation x-ray diffraction. This research also shows that Itokawa is actually a "reformed" asteroid, an amalgam of pieces from the interior of a (formerly) larger asteroid.

If you are still not convinced of the source of chondrites, another study used the oxygen isotopic composition to create a kind of signature. This signature is found both in the asteroid samples and in samples from chondrites. Both are depleted in the isotope ^{16}O relative to earth materials. Another kind of signature involved the abundance of iridium, depleted on Itokawa and ordinary chondrites compared to carbonaceous chondrites. This suggests that S-type asteroids condensed from the original solar nebula after elements like Iridium had already condensed and thus were somewhat removed from that part of the nebula. This leads one to think that the lifetime of Itokawa is something less than the age of the solar system. This is confirmed by measurements showing Itokawa loses between 10 and 100 centimeters of its surface every one million years.

Directions to Houge Park

Houge (rhymes with "Yogi") Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three blocks, cross Sunrise Drive, then turn left into the park.

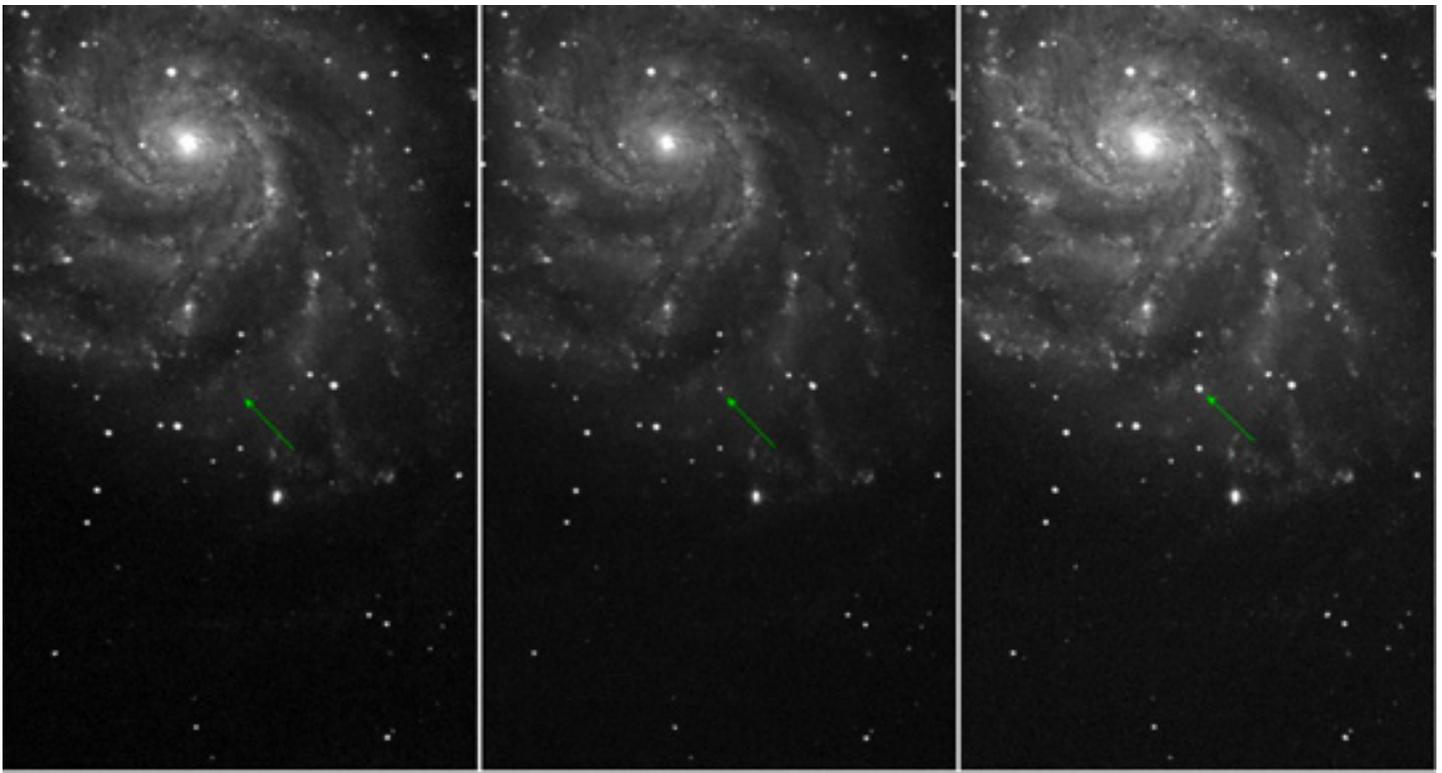
From Hwy. 85, take the Bascom Avenue exit. Go north, and turn right at the first traffic light, onto White Oaks Road. At the first stop sign, turn left onto Twilight Drive. You will now be passing the park. Turn right at the first driveway, into the parking lot.

The Last Month In Astronomy

SEP-10-2011 **GRAIL Launches** The NASA spacecraft launched toward the moon. GRAIL is taking the slow route, taking 3 and a half months. GRAIL is an acronym for Gravity Recovery and Interior Laboratory. Its mission is to study the interior of the moon by careful measurements including detailed mapping of the lunar gravity. It will do this by deploying two spacecraft in the same orbit and measuring relative velocity differences. This same technique has been used in Earth orbit by the GRACE mission since 2002. http://www.nasa.gov/mission_pages/grail/overview/index.html

SEP-07-2011 **Heads Up for UARS** The satellite UARS (Upper Atmosphere Research Satellite) was launched via the Space Shuttle in 1991. It is now ready to come home. But it won't be an easy landing. Instead, it will break up and partially burn up in the atmosphere, probably before Halloween. This satellite measured ozone depletion, climate change and other atmospheric phenomena. It provided conclusive evidence of the role of chlorofluorocarbons in the creation of the ozone hole. It was decommissioned in 2005 and it was put into a "disposal" orbit so that it would not be a long-term navigation hazard for other spacecraft. The 7 ton satellite will break up into many pieces but some of those pieces will make it to the surface somewhere between 57 degrees North and 57 degrees South, i.e. almost anywhere. If you find a piece of the satellite do not try to sell it on EBay, don't make it into a coffee table, in fact, don't even touch it. <http://cosmiclog.msnbc.msn.com/news/2011/09/07/7651951-7-ton-nasa-satellite-set-to-fall>

SEP-07-2011 **SN 2011fe** The supernova PTF 11kly (aka SN 2011fe) is the brightest SN visible in the Northern Hemisphere in about 40 years. It is in the Pinwheel Galaxy, M101. This galaxy is near Alkaid, the last star in the handle of the Big Dipper. As this is written it is between 11 and 10 magnitude and it may get brighter. An astronomer on the PBS news hour says that a 6 inch telescope can see it and binoculars with 20mm optics can also see it. (see photos below) http://www.pbs.org/newshour/bb/science/july-dec11/supernova_09-07.html



SEP-02-2011 **Eyes on the Solar System** NASA has released a new tool called "Eyes on the Solar System". This web application gives the user a way to experience the solar system as they are on a NASA spacecraft. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-277>

AUG-26-2011 **Hyperion Viewed** The Cassini spacecraft took new pictures of the irregularly shaped Saturnian moon Hyperion. This was Cassini's second closest approach of this moon, a distance of 15,000 miles. The moon tumbles so chaotically that it was impossible to predict what face of Hyperion would be viewed during this encounter. The closest encounter was back in September of 2005. It's next flyby will be twice as far as way and it will have occurred by the time you read this. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-266>

It Must Be Astronomical ...

New Planets

As this issue went to press we learned that a European exoplanet study has found 50 new planets. Of these, 16 are in the so-called "super earth" category and one appears to be in a habitable zone. These planets were found using the same radial velocity technique that has found most exoplanets but it is from HARPS, a European project using a telescope in southern Chile. For more information see <http://www.eso.org/public/news/eso1134/>. NASA/JPL PlanetQuest says that 564 planets have been found but the number of earthlike planets is still 0. Note, this planet count does not include the planetary candidates found by the Kepler project. That project claimed about 1000 candidates last spring. Because of the location of the sky surveyed, HARPS and Kepler cannot look at the same stars. Viewing an exoplanet using both radial velocity and transiting techniques allows astronomers to better characterize the planet.

School Star Parties

Completed Events					
	Total Sched.	Good Sky	Partial Success	Cloudy Fail	Cancel at noon
Jul	0				
Aug	1	1			
Sep	0				
Total	1	1			
Scheduled					
Sep	1				
Oct	5				
Nov	12				
Dec	2				
Jan	1				
Feb	3				
Mar	2				
Total	26				

As of mid-September

SVALS Hiatus

Andrew Fraknoi says the Silicon Valley Astronomy Lecture Series is taking a year off while the Foothill College's Smithwick Theatre is being renovated. The Series will resume with the 2012-2013 school year.

Loaners

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. For more information please see the loaner program web page: <http://www.sjaa.net/loaners.shtml>

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