SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late) October

24 Astronomy Class at Houge Park. 7:30 p.m. TBA

24 Houge Park star party. Sunset 6:18 p.m., 12% moon rises 4:14 a.m. Star party hours: 7:30 until 10:30.

25 Dark Sky weekend. Sunset 6:17 p.m., 6% moon rises 5:17 a.m.

November

1 Dark Sky weekend. Sunset 6:09 p.m., 15% moon sets 8:31 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

2 DST ends at 2 a.m. Set clocks back 1 hour.

7 Houge Park star party. Sunset 5:03 p.m., 70% moon sets 1:32 a.m. Star party hours: 7:00 until 10:00.

8 **General Meeting at Houge Park**. 8 p.m. Our speaker is Dr. Helen Quinn of SLAC: her topic: "The Mystery of the Missing Antimatter".

9 Fall Swap. TBA

21 Astronomy Class at Houge Park. 7:30 p.m. TBA

22 Houge Park star party. Sunset 4:54 p.m., 25% moon rises 2:11 a.m. Star party hours: 7:00 until 10:00.

22 Dark Sky weekend. Sunset 4:53 p.m., 16% moon rises 3:12 a.m.

29 Dark Sky weekend. Sunset 4:51 p.m., 5% moon sets 6:20 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

December

5 Houge Park star party. Sunset 4:50 p.m., 53% moon sets 12:20 a.m. Star party hours: 7:00 until 10:00.

13 **General Meeting at Houge Park**. 8 p.m. Our speaker is Dr. Robert Sabin of UCSC: his topic: "The Red Giant Phase".

19 Astronomy Class at Houge Park. 7:30 p.m. TBA

19 Houge Park star party. Sunset 4:53 p.m., 41% moon rises 1:05 a.m. Star party hours: 7:00 until 10:00.

20 Dark Sky weekend. Sunset 4:54 p.m., 31% moon rises 2:07 a.m.

21 Winter begins 4:04 a.m.

27 Dark Sky weekend. Sunset 4:58 p.m., new moon sets 5:11 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

The Board of Directors meets before each general meeting. Call the hotline for the exact time.

November General Meeting

Dr. Helen Quinn

November 8, 2008 – 8 p.m.

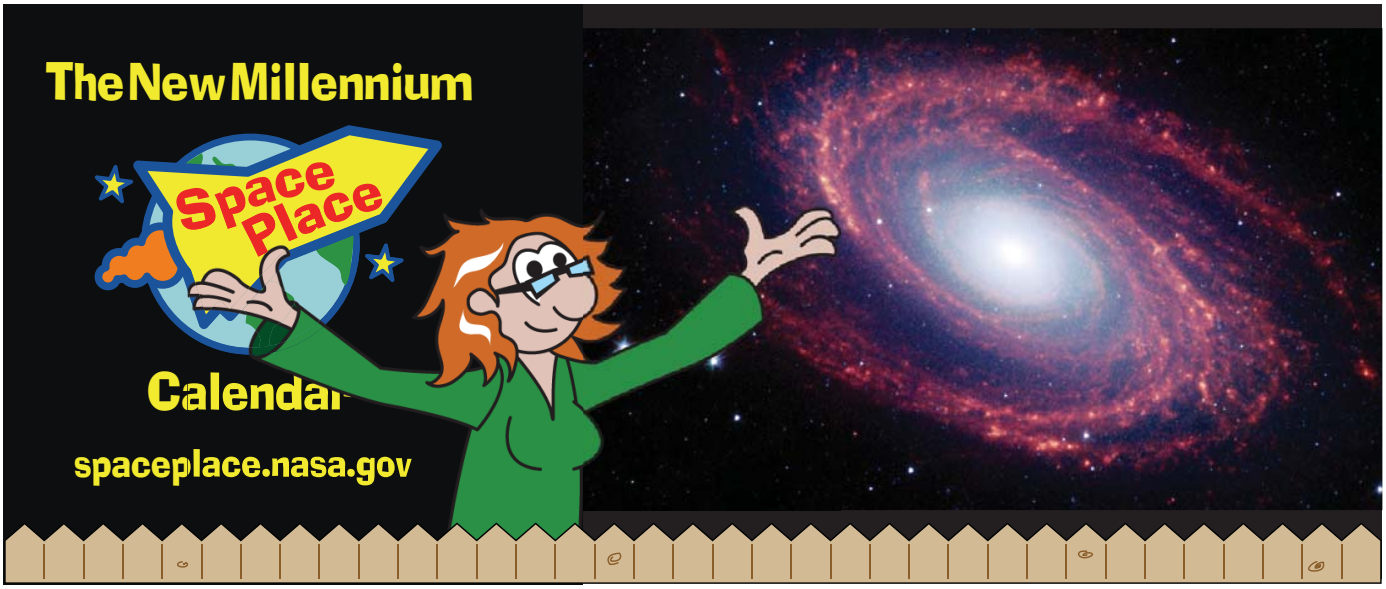
Rob Hawley

When scientists first discovered antimatter it appeared to be identical to regular matter. Same charges, same forces. It was just like looking in a mirror. A high energy photon (which were copiously produced during the big bang) produces equal amounts of matter and antimatter. And yet there is no detectable antimatter in the universe today. Where did it go? Maybe antimatter and matter are not true mirror images of each other.

During the General Meeting on November 8, Dr. Helen Quinn will talk about the search to find out if matter and antimatter are really identical (they are not) and what effect is large enough to explain why all the antimatter disappeared.

Dr. Quinn is a professor of Physics at Stanford Linear Accelerator at Stanford. She is co-author of the book "The Mystery of the Missing Antimatter".

24 hour news and information hotline:
(408) 559-1221
http://www.sjaa.net



This is the Whirlpool Galaxy, M81, in infrared light, as seen by the Spitzer Space Telescope. This galaxy has old stars at its center and lots of dust, along with younger stars, in its spiral arms. See familiar things in infrared light at spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml.

NOVEMBER 2008

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Aviation History Month. Technologies such as flight develop bit by bit. Explore how technologies evolve.						1
2 **Daylight Savings Time ends.** How did clocks, hours, minutes, and time-keeping in general ever get started?	3	4 **Use Your Common Sense Day.** Try the New and Improved Space Place Trivia Game. If you use common sense, you will do well!	FIRST QUARTER 5 **Gunpowder Day.** How much "virtual gun-power" would it take to shoot a cannon-ball into orbit?	6	7	8 **National Parents as Teachers Day.** The Space Place is great for parents and kids to explore space and Earth science together.
9	10	11 **National Young Readers Day.** Read Professor Starr's Dream Trip out loud and enjoy the whimsical rhythms and rhymes.	FULL MOON 12	**World Kindness Day.** 13 Good Scouts practice acts of kindness every day. See what else they can do to earn badges at The Space Place.	14	15 **I Love to Write Day.** How about trying a cosmic poem?
National Geography Awareness Week. 16 Do you know how to read, or, better yet, make a topographical map?	17	18	LAST QUARTER 19 **Have a Bad Day Day.** One way to have a bad day is to tour the solar system looking for a better place to live!	20	21	22
23 30	24 **National Game and Puzzle Week.** You will find lots of games and puzzles at The Space Place.	25	26	NEW MOON 27 **Thanksgiving Day.** Do you think the pilgrims on the Mayflower could have navigated by the stars?	28	29

Month of November: spaceplace.nasa.gov/en/educators/teachers_page2.shtml#history
Nov. 2: spaceplace.nasa.gov/en/educators/teachers_page2.shtml#time
Nov. 4: spaceplace.nasa.gov/en/kids/trivia/trivia.shtml
Nov. 13: spaceplace.nasa.gov/en/kids/scouts.shtml
Nov. 15: spaceplace.nasa.gov/en/kids/cosmic_poetry.shtml
Nov. 16: spaceplace.nasa.gov/en/kids/srtm_makemap.shtml

Crepuscular Rays

Akkana Peck

On Sunday November 2, Daylight Savings Time ends, and evening observing starts an hour earlier. Don't forget to set your clocks back an hour.

Venus is still high in the early evening sky, outshining everything else at magnitude -4.2. On the night of the 30th, Venus and Jupiter stand only two degrees apart, with a three-day old slim crescent moon only seven degrees away. If you have a good western horizon, it might be a good time to dust off that camera.

Saturn is a morning object, rising an hour or two after midnight. But if you do stay up for it, check out the rings — they're only a degree and a half from being edge-on. What an amazing difference from the wide-open rings we saw just a few years ago! I'm looking forward to this Saturn pass.

Mercury is visible in the morning in early November, disappearing into the sun's glare by midmonth.

Uranus makes a good target, still sitting in Aquarius, transits about the time the sky gets dark and doesn't set until after midnight. Neptune, a bubble above the top left of the "champagne glass" of Capricornus, is a more difficult target, running two hours ahead of Uranus and setting a little after 10pm, so if you want to find it, start early in the evening, soon after it gets dark. Pluto rises and sets even earlier, and is too close to the sun to find this month.

Mars, like Pluto, is too close to the sun to be visible this month.Too bad! But if your mind is still on the red planet, you can always seek out a lecture. A few months from now, the Feb. 7 SJAA meeting will feature Dr. Chris McKay speaking on "What We Have Learned From the Mars Phoenix Lander?"

If you need a Mars fix sooner than that, our neighbor club PAS has been featuring a series of speakers about current Mars missions. Their speaker last month was Brian Day (a past SJAA member, board member and vice president), talking about places on Earth that are good analogues for conditions on the Martian surface. In addition to exotic locales like Antarctica and the high Andes, he showed sites right here in California, like the Desert Studies Center on the dry lakebed at Zzyzx, and the nearby Cima basalt lava fields in Mojave National Preserve.

" ...a crepuscular ray is similar to the rays that lunar observers love seeing ... "

Dave and I visited those Mojave basalt fields last year, and in particular, the same lava tube Brian Day showed in his talk. Mojave is one of the nearest places you can go and explore geologic features similar to those you might see on Mars, the Moon, or Mercury.

The lava tube in the Cima lava fields is well marked on the map and accessed off a dirt road. You can walk the trace of the lava tube for several hundred yards, following the occasional collapsed zones (think Schroter's Valley on the moon — another partially collapsed lava tube you might have seen) and "skylights", small holes letting you peek down into the tube. But there is one large opening where you can go down into the tube. There's a rickety ladder chained in place leading down into the tube. Once down, there are several "rooms" you can explore, most of them already lit with skylights so you don't need a flashlight like you do for the longer lava tubes of Lassen and the Modoc.

But when you're there, you discover another fascinating effect of the skylights. The floor of the lava tube is covered with fine dust, which gets stirred up as soon as you walk through it. Turn around ... and see the swirling dust create a beam of light coming from the skylight. Brian Day showed a slide showing the same effect. Each room has its own skylight, and thus its own beam of light ...beckoning you to the place where the secret treasure is hidden (Ed. note, see photo on page 6). The secret treasure, in this case, is just the patterned basalt walls and floor of the lava tube ... treasure enough!

These beams of light are sometimes called "God rays," more formally known as "crepuscular rays". I saw one in a forest above Woodside a few weeks ago. We were climbing a trail that switchbacked its way up a hillside. As we climbed higher and tried to re-find the ray, we discovered an interesting phenomenon:it was invisible when we were standing near it, or looking down it to where we could see it striking the forest floor. The ray was only visible when it was backlit, coming from more or less the same direction as the sun.

But that wasn't true of the rays in the Cima lava tube. And it's almost exactly the opposite of the effect you see with a green laser used to point out constellations at star parties, where you can only see the laser beam when you're right next to the laser. Is the difference due to a difference in the size of the dust particles in Mojave vs. the redwood forest vs. Houge park, or simply due to the amount of dust in the air at each place? I haven't found an answer; more research required.

"Crepuscular", by the way, means something that happens at dawn or dusk. So a "crepuscular ray" is similar in some ways to the sunrise and sunset rays that lunar observers love seeing. Of course, on the moon there's no dust-filled atmosphere to light up the ray itself; you can only see the places it hits on the lunar surface. Wouldn't it be marvellous to be able to descend into Schroter's Valley and see the crepuscular rays caused by stirring up the ancient lunar dust?

Extreme Starburst

Dr. Tony Phillips

A star is born. A star is born. A star is born.

Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436.

Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

"We call it the 'Baby Boom galaxy," says Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."

Capak is lead author of a paper entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of Astrophysical Journal Letters.

The galaxy appears to be a merger, a "train wreck" of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn't the first time astronomers have witnessed a galaxy producing so many stars. "There are some other extreme starburst galaxies in the local universe," says Capek. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years from Earth, which means we are seeing it as it was 12.3 billion years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they produced correspondingly small bursts of star formation when they merged. "Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large."

Capak and colleagues are busy looking for more Baby Boomers "to see if this is a one-off case or a common occurrence." The theory of evolution of galaxies hangs in the balance.

Meanwhile... A star is born. A star is born. A star is born.

See more breathtaking Spitzer images at http://www.spitzer.caltech.edu/Media/mediaimages .

Kids can play the new Spitzer "Sign Here!" game at http://spaceplace.nasa.gov/en/kids/spitzer/signs

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

The "Baby Boom" galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image. This galaxy is only 500 million light-years away, while the Baby Boom galaxy is 12.3 billion light-years away.

Spacecraft find gamma-ray bursts

Paul Kohlmiller

A gamma-ray burst (GRB) can occur when a nuclear bomb is detonated. But even more powerful GRBs may occur when neutron stars merge and a black hole is the result. Here is how cosmological GRBs were first detected.

After the nuclear test ban treaty was signed, the U.S. Air Force launched a satellite to detect cheating. A number of these Vela satellites were launched with each version more sophisticated than the previous. Detections that were clearly not nuclear blasts were saved for later research. In 1973, a paper was written which listed 16 GRBs detected between 1969 and 1972 by the Vela 5 and 6 satellites. The direction of these GRBs could be determined by comparing the time deltas between when two (or more) spacecraft made the detection. This showed that the GRBs were clearly not from earth or solar origins.

An even earlier GRB was detected on July 2, 1967 but the satellites (Vela 4 at this time) did not have the ability to make the critical timing comparison so it could not determine the direction that it came from. In retrospect, it appeared very similar to the GRBs from 1973 and this was written up in 1976. Some say that the work on GRB research was kept secret for cold-war reasons but the reality appears to be less dramatic.

In 1991, NASA launched the second of the "great observatories" as the Compton Gamma Ray Observatory. Compton was used to determine that GRBs come in two varieties, short duration and long duration. BeppoSAX was an X-ray astronomy satellite, a project of the Italian Space Agency. It found some of the first GRB locations. The Swift spacecraft is the most recent and most sophisticated GRB observatory ever constructed. It has three instruments that allow Swift to inspect a GRB across a wide part of the EMR spectrum. Swift detected GRB080319 in March of 2008 and it is the brightest GRB to date. The star brightened for 15 seconds and was as bright as magnitude 5.3. The star had a look-back time of 7.5 billion years.

Below is a chart of some of the major spacecraft used in GRB research.

Spacecraft	Mission Launch	Mission End	Claim to fame
Vela	1963	1984	Detected first GRBs with cosmological origin
Compton	1991	2000	Found two classes of GRBs: short and long duration
RXTE	1995	Ongoing	First fast follow-up of X-ray after a GRB
BeppoSAX	1996	2003	Determined location and energy of GRBs (Costa 2002)
HETE-2	2000	Ongoing	Found that no long duration GRB is optically dark but at least one short duration GRB appears to be so (Butler, 2003).
Integral	2002	Ongoing	Very sensitive detector of soft gamma-ray repeaters; wider field of view than Swift (Hurley 2008)
Swift	2004	Ongoing	Combine burst detection and followup; detect unusual GRBs.

Membership can no longer supply S&T reminders

Rob Hawley

Since S&T was purchased a couple of years ago their service to the club program has steadily declined. They used to supply me with subscription lists twice a year. I used these to update our membership database. That in turn was used for the reminder renewals.

The last update I received was over a year ago. We asked for an update 6 months ago and the request went nowhere. Thus I no longer have reliable info on when members subscriptions expire.

Therefore, I am discontinuing the service of sending out reminders for S&T renewals.Anything I did would just be a guess. Sky and Tel will send ample reminders by letter. When you get one of these you can either respond directly or renew through the club at a more favorable rate.

We will continue to process renewals as we always have. If you wait until your membership is due that may or may not be in time for your subscription.

For those that know when their subscription renews I will be happy to work out the cost of adjusting your membership so both agree.

Sorry for the inconvenience. I hope I receive some new info this month so we can restore the notification service.

The Last 31 Days In Astronomy

OCT-06-2008 ***Hubble Update*** Weeks before the Shuttle repair mission was to launch, the Hubble had a major failure in the hardware that sends information back to Earth. As a result, another piece of hardware needs to be added to STS-125 (also called Servicing Mission 4). The Hubble may be able to go back to work in late October using some backup hardware that hasn't been activated since Hubble was tested on Earth before its launch. http://www.nasa.gov/mission_pages/hubble/servicing/SM4/main/index.html

SEP-29-2008 ***Snow on Mars*** The Phoenix lander has detected snow falling from Martian clouds. However, before planning for schussing you should know that the snow vaporized before hitting the ground. The lander has detected water-ice, calcium carbonate and clay-like material on the surface. It's possible that some of the snow eventually does hit the ground. Still not known - whether the surface ice ever melts.http://jpl.nasa.gov/news/news.cfm?release=2008-183

SEP-25-2008 ***Kepler Baked*** The Kepler spacecraft, set to launch in 2009, has been baked. No, that's not a cute way of saying it is assembled. It had to undergo high temperature tests before it is determined that it is ready to go into space. It survived the tests. http://jpl.nasa.gov/news/news.cfm?release=2008-179

SEP-23-2008 ***Sun winded?*** The sun is apparently producing the smallest solar wind than at any time that we have been able to measure it - about 50 years worth. The Ulysses spacecraft has made these measurements. The lack of a solar wind may mean that the heliopause, a boundary layer at the edge of the solar system that helps protect us from some cosmic rays, may become less effective. http://jpl.nasa.gov/news/news.cfm?release=2008-178

An example of crepuscular rays are shown in this image, courtesy of Akkana Peck. See "Shallow Sky" on page 3 for more information.

Telescope Loaner Program

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. It is one of the real jewels of being a member of the club. Scopes are available for all experience levels.

The inventory is constantly changing. As of this writing (early October) these scopes were available.

Scope Number	Scope Description
42	11x80 Binoculars
43	4.5" f/8 Orion XT Dob
44	4.5" f/8 Orion Skyview Newt
37	4" Celestron Flourite Refractor
32	5.5" f/7.6 Signature Dob
23	6" f/8 Edmund Newt on EQ Mount
11	6" f/8 Orion XT Dob
13	6" f/8 Orion XT Dob
34	8" f/10 Dynamax S/C
29	8" Celestron S/C Astrophoto
14	8" f/8.5 Homemade Dob
35	8" f/6 Meade Newt on EQ Mount
40	8" Celestron Super C8+ S/C
45	10" f/5 Dob (Earletron)
33	10" f/4.5 Orion DSE Dob
47	12" Meade Lightbridge
7	12.5" f/7 Homemade Dob
39	17" f/4.5 Zeiders Truss Dob
10	Star Spectroscope

For up to date information please see the loaner program web page: http://www.sjaa.net/loaners

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San Jose Astronomical Association Membership Form

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☐ **New** ☐ **Renewal** (Name only if no corrections)

Membership Type:

☐ Regular — $20
☐ Regular with Sky & Telescope — $53
☐ Junior (under 18) — $10
☐ Junior with Sky & Telescope — $43

Subscribing to Sky & Telescope magazine through the SJAA saves you $10 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

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