The Prairie Astronomer

September, 2012 Volume 53, Issue #9

The Official Newsletter of the Prairie Astronomy Club

September Program

In This Issue:

Funny in Astronomy

By: Jack Dunn

Gyulbudaghian's Nebula is a highly variable nebula lit up by PV Cephi. The star is also the source of HH-215. No two images of this one look the same. Sometimes it is just a faint, rather white jet, other times there's a very obvious reflection nebula. Sometimes it is somewhat diffuse and blue other times rather white and detailed.

Image Credit: Rick Johnson

Featured Photo

The Bad Astronomer Fact of the Month

I was trying to put some sort of statistical likelihood on how often the Sun plows into a dense cloud of dust called a molecular cloud. These clouds orbit the Milky Way like the Sun does, and were we to smash into one, it could, in theory, deposit enough dust in the Earth's atmosphere to darken our skies somewhat. This would lower the Earth's albedo (reflectivity), preventing prevent sunlight from reaching the surface, which in turn would cause a global drop in temperature and trigger an Ice Age.

Clouds like this are pretty rare, and tend to hang out in the spiral arms of galaxies. So how close are we to a spiral arm? I did some searching and found out that the Sun is about 6400 light years from the nearest arm, called the Perseus Arm.

I didn't know that! Interesting.

The Sun orbits the center of the Milky Way at about 200 km/sec. Assuming the arm is just sitting out there like a cosmic traffic jam, we'll enter it in about 10 million years or so. In reality, the arms move around the center as well, so it'll actually take us a bit longer. That sounds like a safe enough buffer for me! Also, entering an arm doesn't guarantee smacking into a cloud, which are actually small as astronomical objects go. We probably don't do this except once every billion years or so.

So the odds of being killed by entering a molecular cloud are essentially zero for the next few megayears, but then sharply increase (but are still very low) after that. I find this is true a lot in astronomical doomsday scenarios; the odds of dying because the Sun turns into a red giant are zero for the next 6 billion years, but then go to 100% as soon as it expands. However, the Sun is slowly getting hotter with time (as helium builds up in its core due to nuclear fusion), and by my rough calculations the Earth will be too hot for life in a mere 200 million years or so (in 100 million the Earth's temperature will increase by 10 degrees Fahrenheit, causing a giant global warming, and in one billion years our temperature will be the boiling point of water). So again, we're safe… for now.

Visit the Bad Astronomer at his website http://blogs.discovermagazine.com/badastronomy/

Club Events

Newsletter submission deadline October 15, 2012

PAC Meeting
Tuesday September 25, 2012 @Hyde Observatory
Fun with Astronomy

PAC Meeting
Tuesday October 30, 2012 @Hyde Observatory
Computer Astronomy

PAC Meeting
Tuesday November 27, 2012 @Hyde Observatory
How To Buy a Telescope

2012 PAC Star Party Dates - Dates in bold are closest to the new moon

January		**Jan 20th**
February	Feb 17th	**Feb 24th**
March	Mar 16th	**Mar 23rd**
April	Apr 13th	**Apr 20th**
May	May 11th	**May 18th**
June	Jun 15th	**Jun 22nd**
July	Jul 13th	**Jul 20th**
NSP	**July 15-20**	
August	Aug 10th	**Aug 17th**
September	Sep 7th	**Sep 14th**
October	Oct 5th	**Oct 12th**
November	Nov 9th	**Nov 16th**
December	Dec 7th	**Dec 14th**

Lunar Party Dates:

Apr 27th
May 25th

Jul 27th

Aug 24th
Sep 21st

Internet Links of Interest

http://www.universetoday.com/

http://www.thespacereview.com

http://www.thespacereview.com/article/1945/1

http://space.flatoday.net/

http://www.spaceportamerica.com/

http://www.planetary.org/home/

http://www.nasaspaceflight.com/

http://www.spacex.com

ON THE NET

PAC:
www.prairieastronomyclub.org

PAC E-Mail:
info@prairieastronomyclub.org

NSP:
www.nebraskastarparty.org

NSP E-Mail:
info@nebraskastarparty.org

OAS
www.OmahaAstro.com

Hyde Observatory
www.hydeobservatory.info

Panhandle Astronomy Club
Panhandleastronomyclub.com

PAC-LIST: You may subscribe to the PAC listserv by sending an e-mail message to: imailsrv@prairieastronomyclub.org. In the body of the message, write "Subscribe PAC-List your-email-address@your-domain.com"

For example:
Subscribe pac-list me@myISP.com

To post messages to the list, send to the address

pac-list@prairieastronomyclub.org

PAC can also be found on Twitter and Facebook.

Buy club apparel through the club website. Shirts, hats, mugs, mouse pads and more.

September/October Observing: What to View--Jim Kvasnicka

Planets

Saturn: Lost in the Sun's afterglow.

Mars and Mercury: Both are very low in the southwest.

Venus: Rises about 3½ hours before the Sun at magnitude -4.1.

Jupiter: Rises around 8 pm to start the month and by 8 pm to end the month. It will increase in brightness from -25 to -2.7.

Uranus and Neptune: In Pisces and Aquarius.

Meteor Showers

Taurids: Long lasting from October to December. Expect only 6 per hour. They do have occasional bright fireballs. The Tunguska explosion in 1908 was a Taurid.
Orionids: October 20-24. Expect about 20 per hour.

Messier List

M11: The Wild Duck Cluster in Scutum.

M16: Open cluster in the Eagle Nebula in Serpens.

M17: The Swan or Omega Nebula in Sagittarius.

M24: The Small Sagittarius Star Cloud.

M18/M25: Open clusters in Sagittarius.

M26: Open cluster in Scutum.

M55/M75: Class XI and I globular clusters in Sagittarius.

Last Month: M13, M14, M22, M28, M54, M69, M70, M92

Next Month: M27, M30, M56, M57, M71, M72, M73

NGC and Other Deep Sky Objects

NGC 7009: The Saturn Nebula in Aquarius.

NGC 7184: Edge on galaxy in Aquarius.

NGC 7331: Elongated galaxy in Pegasus.

Double Star Club List

8 Lacerta: Four white stars.

Beta Cephei: White and blue stars.

Struve 2816: White primary with two blue stars.

Xi Cephei: Yellow pair.

Delta Cephei: Yellow primary with a pale blue secondary.

Eta Persei: Bright yellow and light blue stars.

Struve 331: White primary with a blue-white secondary.

Epsilon Pegasi: Bright yellow and white pair.

Focus on Observing Clubs

Planetary Nebula Program

Planetary Nebulae are some of the most beautiful and interesting objects in the heavens. They exhibit complex shapes and may even show vibrant colors. It is the hope of this program to inspire your appreciation of these magnificent objects.

For this program 110 planetary nebulae were selected. The list contains examples across the entire range of planetary nebula morphology. The program can be completed visually or by imaging. The program offers two levels of accomplishment, basic and advanced. The basic program should be achievable with modest equipment and from less than dark skies. To earn the certificate for the basic program you must observe at least 60 objects from the list.

For the advanced program you need to observe all 110 objects on the list. The Astronomical League acknowledges that a few of the objects may be beyond detection and will allow negative observations if you show evidence of diligent effort to observe the object. To complete the program by imaging you must image 90 objects.

To find the objects you may use any method including GO-TO and PUSH-TO. Your observing log should include the usual information. Your detailed description of the objects should include:

- Is the central star visible?
- Is a filter required to see the PN?
- How does the PN respond to different magnifications?
- Is averted vision required to see the PN?
- A detailed description or sketch of the object.

Once you complete the Planetary Nebula Program you will need to submit your observing logs to me for review. I will forward them to the Planetary Nebula Program chair for approval. Once I receive your certificate and pin I will present them to you at the next PAC meeting. If you have any questions regarding the Planetary Nebula Program or need help getting started in any observing program please ask me and I will be glad to assist you.

Planetary Nebula Program Awardees from PAC

No PAC members have completed the Planetary Nebula Program.

ANNUAL MEMBERSHIP

REGULAR MEMBER - $30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - $35.00 per year. Same as regular member except gets 2 votes at club meetings.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

Club Telescopes

To check out one of the club telescope contact **Jason Noelle.** If you keep a scope for more than a week, please check in with Jason once a week, to verify the location of the telescope and how long you plan to use it. The checkout time limit will be two weeks, but can be extended if no one else has requested use of a club scope.

100mm Orion refractor:
Available

10 inch Meade Dobsonian:
Available

13 inch Truss Dobsonian:
Available

Program Chair Minute - Dave Churilla

This month's PAC Meeting will be on Tuesday, September 25th.

Ever wonder what Mr. Spock was REALLY looking at on his Tricorder? Find out on September 25th with this fun program by Jack Dunn. Of course we'll also have a report from the world's best program chair, Jim Kvasnicka. Oh, and we'll have a few snacks for everyone too.

Hope to see everyone at the meeting.

Upcoming programs:

Oct 2012: ***Computer Astronomy (Brian Sivill)*** - Brian Sivill will give an informative presentation about some of the fun site things you can do on line with astronomy. This may be geared more for beginners but I have feeling from talking to Brian that there will be some things for everyone. Don't miss it.

Nov 2012: ***How to Buy a Telescope (Club Members)*** - This will be our Learn to Buy a Telescope Program for the public. More later.

Dec 2012: ***PAC Holiday Social*** - No public meeting (Club Holiday Get-Together). More later.

I'll try to keep you apprised of upcoming programs so you can plan to attend.

Challenge Observing Objects for September/October

Each month I will have two objects, one for the more seasoned observer and one for the beginning observer. Each object I hope will challenge you just a little bit. I will provide you with a little bit of information about the object. It is your job to find it and if you would write a little report or draw what you see. The first person to report back on each object will have their report published in the next issue of the newsletter. Happy Hunting!

Advanced Object

NGC 7721

This a very faint galaxy in Aquarius. It has an apparent mag. of 11.8 and a surface brightness 13.4. NGC 7721 is about 95 million light years away and has as size 3.5' x 1.4'.

Image courtesy of Courtney Seligman

Beginner Object

Theta Delphini Group

This is an asterism about 1 degree across located in Delphinus that looks like a bucking bronco. Theta Delphinus marks the spot where the rider and bronco meet. Theta is gold star in the center of the photograph below.

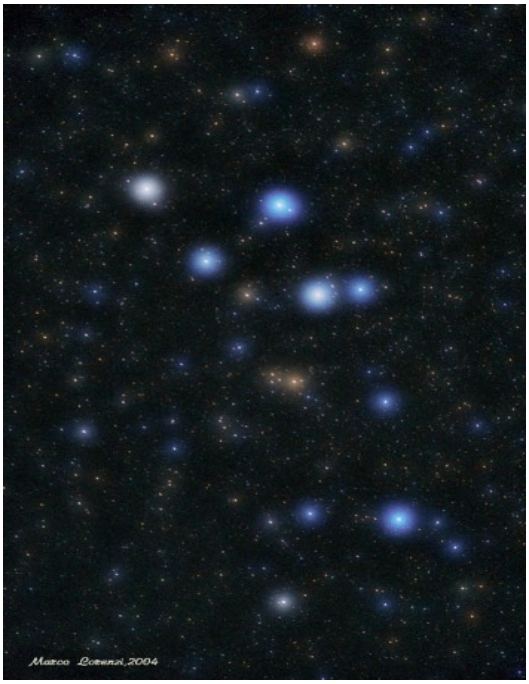

Image Credit: Roque del Los Muchachos - La Palma (Canary Island) - M.Lorenzi, M.Santinello, G.Favretto

Ultra-Distant Galaxy Discovered Amidst Cosmic 'Dark Ages': May Be Oldest Galaxy Ever

ScienceDaily.com

With the combined power of NASA's Spitzer and Hubble space telescopes as well as a cosmic magnification effect, a team of astronomers led by Wei Zheng of The Johns Hopkins University has spotted what could be the most distant galaxy ever detected. Light from the young galaxy captured by the orbiting observatories shone forth when the 13.7-billion-year-old universe was just 500 million years old. The far-off galaxy existed within an important era when the universe began to transit from the so-called "Dark Ages." During this period, the universe went from a dark, starless expanse to a recognizable cosmos full of galaxies. The discovery of the faint, small galaxy accordingly opens up a window into the deepest, remotest epochs of cosmic history.

"This galaxy is the most distant object we have ever observed with high confidence," said Zheng, a principal research scientist in The Henry A. Rowland Department of Physics and Astronomy at Johns Hopkins' Krieger School of Arts and Sciences and lead author of a paper appearing in Nature on Sept. 20. "Future work involving this galaxy -- as well as others like it that we hope to find -- will allow us to study the universe's earliest objects and how the Dark Ages ended." Light from the primordial galaxy traveled approximately 13.2 billion light-years before reaching NASA's telescopes. In other words, the starlight snagged by Spitzer and Hubble left the galaxy when the universe was just 3.6 percent of its present age. Technically speaking, the galaxy has a redshift, or "z," of 9.6. The term "redshift" refers to how much an object's light has shifted into longer wavelengths as a result of the expansion of the universe. Astronomers use "redshift" to describe cosmic distances.

Unlike previous detections of galaxy candidates in this age range, which were only glimpsed in a single color, or waveband, this newfound galaxy has been seen in five different wavebands. As part of the Cluster Lensing and Supernova Survey with Hubble program (CLASH), the Hubble Space Telescope registered the newly described far-flung galaxy in four wavelength bands. Spitzer located it in a fifth band with its Infrared Array Camera (IRAC), placing the discovery on firmer ground. Objects at these extreme distances are mostly beyond the detection sensitivity of today's largest telescopes. To catch sight of these early, distant galaxies, astronomers rely on "gravitational lensing." In this phenomenon -- predicted by Albert Einstein a century ago -- the gravity of foreground objects warps and magnifies the light from background objects. A massive galaxy cluster situated between our galaxy and the early galaxy magnified the latter's light, brightening the remote object some 15 times and bringing it into view.

Based on the Spitzer and Hubble observations, astronomers think the distant galaxy was spied at a time when it was less than 200 million years old. It also is small and compact, containing only about 1 percent of the Milky Way's mass. According to leading cosmological theories, the first galaxies should indeed have started out tiny. They then progressively merged, eventually accumulating into the sizable galaxies of the more modern universe.

These first galaxies likely played the dominant role in the epoch of reionization, the event that signaled the demise of the universe's Dark Ages. About 400,000 years after the Big Bang, neutral hydrogen gas formed from cooling particles. The first luminous stars and their host galaxies, however, did not emerge until a few hundred million years later. The energy released by these earliest galaxies is thought to have caused the neutral hydrogen strewn throughout the universe to ionize, or lose an electron, the state in which the gas has remained since that time. "In essence, during the epoch of reionization, the lights came on in the universe," said paper co-author Leonidas Moustakas, a research scientist at NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, Calif. Astronomers plan to study the rise of the first stars and galaxies and the epoch of reionization with the successor to both Spitzer and Hubble -- NASA's James Webb Telescope, slated for launch in 2018. The newly described distant galaxy will likely be a prime target. Holland Ford, one of Zheng's colleagues and a co-author on the paper, commented on the findings. "Science is very exciting when we explore the frontiers of knowledge," said Ford, a physics and astronomy professor at Johns Hopkins. "One of these frontiers is the first few hundred million years after the birth of our universe. Dr. Zheng's many years of searching for quasars and galaxies in the dawn of the universe has paid off with his discovery of a galaxy that we see as it was when the universe was less than 500 million years old."With his discovery, we are seeing a galaxy when it was not even a toddler," Ford said. "But this infant galaxy will in its future grow to be a galaxy like our own, hopefully hosting planetary systems with astronomers who will look back in time and see our galaxy in its infancy."

Click Here to the image of this distant galaxy

Curiosity Captures Martian Eclipse

Mars has two small, asteroid-sized moons named Phobos and Deimos. From the point of view of the rover, located near the equator of Mars, these moons occasionally pass in front of, or "transit," the disk of the sun. These transit events are the Martian equivalent of partial solar eclipses on Earth because the outline of the moons does not completely cover the sun (in contrast, Earth's moon does block the entire sun during a total solar eclipse). These eclipses, like those on Earth, occur in predictable "seasons" a few times each Mars year.

As part of a multi-mission campaign, NASA's Curiosity rover is observing these transits, the first of which involved the moon Phobos grazing the sun's disk. The event was observed on Martian day, or sol, 37 (September 13, 2012) using Curiosity's Mast Camera, or Mastcam, equipped with special filters for directly observing the sun. In a series of high-resolution video frames acquired at about three frames per second for about two minutes, the outline of part of Phobos blocked about five percent of the sun.

This animation shows the transit as viewed by the Mastcam 100-millimiter camera (M-100) in nine frames. Another version of the animation is available, consisting of 20 frames taken by the Mastcam 34-millimeter camera (M-34), which has about one-third the resolution of the M-100. In total, 256 frames were taken by the M-100 and 384 frames for the M-34.

The transit was also observed by Curiosity's Rover Environmental Monitoring Stations (REMS) instrument, which saw about a five percent drop in the sun's ultraviolet radiation during the event.

Mission scientists use these events to very accurately determine the orbital parameters of the Martian moons. Phobos, for example, orbits very close to Mars and is slowly spiraling in to Mars because of tidal forces. These forces change the orbital position of Phobos over time, and accurate measurements of those changes can provide information about the internal structure of that moon and how it dissipates energy. Deimos orbits much farther away and is slowly spiraling out.

NASA's Mars Exploration Rover Opportunity will also attempt to observe a different set of Phobos and Deimos transits, seen from the other side of the planet, in Meridiani Planum.

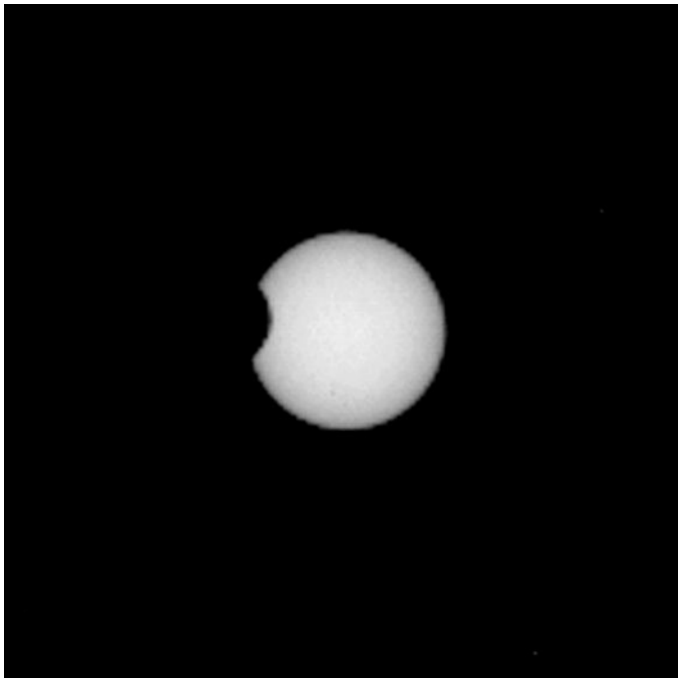

Image Credit: NASA/JPL-Caltech/MSSS

THE *Prairie Astronomy Club*

Amateur Astronomy --
A Hobby as Big as the Universe

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular $30/yr, Family $35/yr**. Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585**. For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Jason Noelle at jason.noelle@gmail.com,** no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

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FIRST CLASS MAIL

Next PAC Meeting
Tuesday
October 30, 2012
7:30 PM
Hyde Observatory