



The Prairie Astronomer

May, 2012

Volume 53, Issue #5

The Official Newsletter of the Prairie Astronomy Club

May Program

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Featured Photo

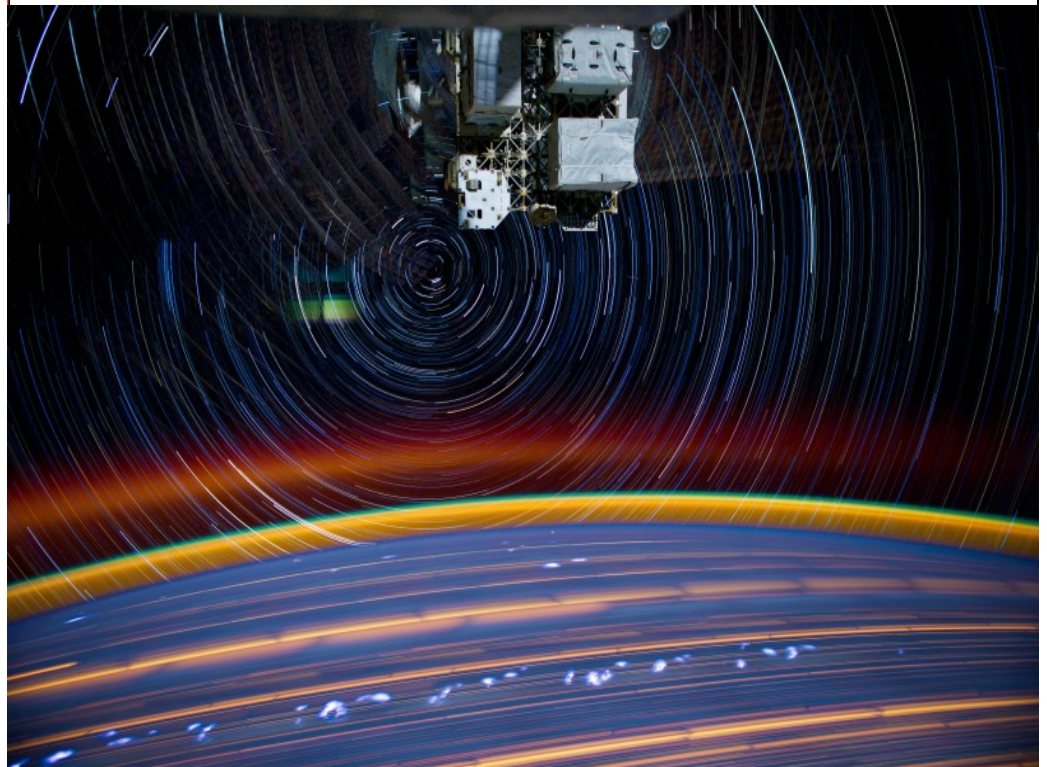
May 2012 PAC Program

Nearest Star Party

Hosted by Dave Churilla

This month's "Program" for the evening will be a Nearest Star Party so we'll change things up a bit providing the weather is clear. Dave will set up his telescope on the front lawn of Hyde Observatory between 6 PM and 6:30 PM and invite anyone else who would like to set up their telescope with solar filters on them to set up as well – the more the merrier. This will give us all a chance to view through each other's equipment. Dave and other experienced club members will be available to answer your questions about solar viewing.

This is a composite of a series of images photographed from a mounted camera on the Earth-orbiting International Space Station, from approximately 240 miles above Earth. Expedition 31 Flight Engineer Don Pettit said of the about photographic techniques used to achieve the images: "My star trail images are made by taking a time exposure of about 10 to 15 minutes. However, with modern digital cameras, 30 seconds is about the longest exposure possible, due to electronic detector noise effectively snowing out the image. To achieve the longer exposures I do what many amateur astronomers do. I take multiple 30-second exposures, then 'stack' them using imaging software, thus producing the longer exposure." A total of 18 images photographed by the astronaut-monitored stationary camera were combined to create this composite. Image Credit: NASA



Transit of Venus - June 5, 2012

What is a transit of Venus?

When the planet of Venus passes between the Earth and the Sun. We will see Venus as a small black dot crossing the face of the Sun.

Why is this such a big deal?

It is one of the rarest of astronomical events. Only 81 will occur between 2000 B.C. and A.D. 4000

Why is a transit of Venus so rare?

Because the orbit of Venus is inclined about 3.5 degrees (compared to Earth's). Venus passes above or below the solar disk at inferior conjunction – that point in its orbit where Venus passes out Earth's evening sky and into Earth's morning sky. They occur in a pattern that repeats every 243 years, with pairs of transits eight years apart separated by long gaps of up to 121.5 years. Before 2004, the last pair of transits were in December 1874 and December 1882.

What can I expect to see?

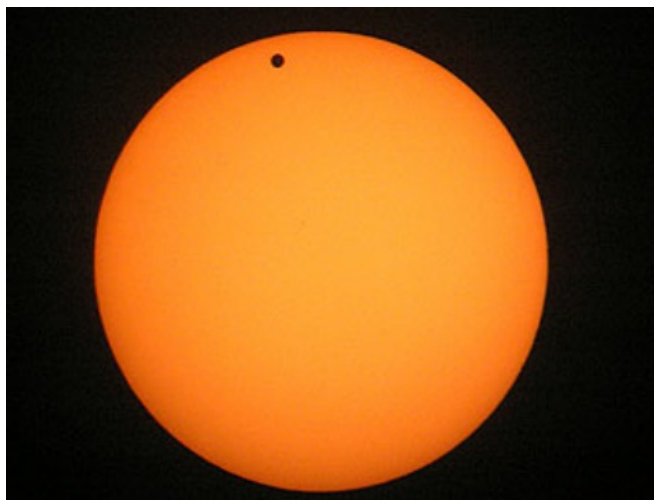


Image Credit: NASA

Transit times for Lincoln, Nebraska

ingress exterior 5:04:52 pm

ingress interior 5:22:20 pm

transit center 8:27:12 pm

egress interior After Sunset

egress exterior After Sunset

Visit here:

<http://transitofvenus.nl/wp/when-when/local-transit-times/> for your local times

How do I see it without going blind?

- Special Eclipse glasses or #14 welders glass
- Pinhole projectors - <http://www.exploratorium.edu/eclipse/how.html>
- A telescope with solar filter or H-Alpha filter
- A solar telescope
- If it's cloudy go here: <http://sunearthday.nasa.gov/2012/transit/webcast.php>
- COME TO HYDE OBSERVATORY!! - It will open approximately 4:30pm and will be open until sunset at around 9pm. Hope for clear skies!

Club Events

ON THE NET

Newsletter submission deadline, June 15, 2012

PAC Meeting

Tuesday May 29, 2012 7:30pm @Hyde Observatory

Program: Near Star Party

PAC Meeting

Tuesday June 26, 2012 7:30pm @Hyde Observatory

Program: BBQ/Social

Nebraska Star Party

July 15 - 20 Snake Campground, Merritt Reservoir

Valentine, Nebraska

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.



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>

May/June Observing: What to View--Jim Kvasnicka

Planets

Venus: Rises just 15 minutes before the Sun to start June. The big event is the transit of Venus on June 5th starting at 5:05 CDT. The transit will still be in progress at sunset.

Jupiter: Rises about 45 minutes before the Sun to start June and by the end of the month it will be rising more than two hours before the Sun.

Saturn: Look for Saturn less than 5° from Spica.

Mercury: The last half of June Mercury sets 1½ hours after the Sun.

Mars: Leaves Leo and enters into Virgo.

Uranus and Neptune: In Cetus and Aquarius.

Moon: There will be a partial eclipse of the Moon on June 4th starting at 5:00 am CDT. From our location the eclipse will be in progress as the moon sets.

Messier List (Virgo Galaxy Cluster)

M58: A slightly oval shaped patch of light.

M59/M60: Both fuzzy oval shapes fit in the same FOV.

M84/M86: A pair of round galaxies with brighter cores that fit in the same FOV.

M87: Another round galaxy with a brighter core.

M88: A small oval patch of light with a brighter core.

M89/M90: Both fit in the same FOV with M90 larger than M89.

M91: A faint oval patch of light.

M98: A bright streak of light.

M99: A bright round patch of light.

M100: A round hazy glow of light with a brighter core.

Last Month: M49, M51, M61, M63, M64, M85, 94, M101, M102, M104

Next Month: M3, M4, M5, M53, M68, M80, M83

NGC and Other Deep Sky Objects

NGC 4565: An edge on galaxy in Coma Berenices, elongated 12' x 1.5'.

NGC 4725: An oval shaped galaxy in Coma Berenices.

Double Star Club List

Sigma Corona Borealis: Equal pair of bright yellow stars.

16/17 Draconis: Equal pair of white stars.

Mu Draconis: Close pair of white stars.

Kappa Herculis: Yellow pair.

Alpha Herculis: Orange primary with a greenish colored secondary.

Delta Herculis: White primary with a blue-purple secondary.

Rho Herculis: Close pair of white stars.

95 Herculis: Equal yellow and white pair.

Alpha Librae: Wide pair of yellow and white stars.

Focus on Observing Clubs

Planetary Transit Special Award - Transit of Venus 2012

To capture the excitement of the Transit of Venus on June 5/6 the Transit of Venus 2012 Award has been created by the Astronomical League in collaboration with NASA. The award is designed to recognize all who participate. The Transit of Venus will end after sunset so we won't be able to observe the whole event.

There will be a general certificate available to download for anyone hosting a transit viewing. The certificates can be given to all who view the transit as a memento of their experience with this rare event. There will also be a special award for those who undertake the process to calculate the value of an Astronomical Unit. The special award will include a certificate and pin. To receive the special award from the Astronomical League, you must meet the following requirements.

- Be a member of the Astronomical League
- Observe as much of the transit as is visible
- Sketch the event, note the timings of the contact points
- Include your Latitude and Longitude
- Calculate the value of the AU, instructions on how to do the calculation will be available from the NASA website.

To do the AU calculations requires two distant observations. You can use your own observations and the data from another observer. This information will be available on the NASA Website.

To receive the special award from the Astronomical League you will need to follow the instructions for the Level 2 certification. For additional information on what is required go to the Astronomical League website. The Astronomical League website contains links to the NASA Website that are needed to do the AU calculation.

When you complete the Transit of Venus 2012 Program you will need to submit a copy of your observing logs along with the AU calculations to me for review. If the logs are accurate and complete I will submit your name to the Transit of Venus 2012 Program chair for approval. The chair will forward to me your certificate and pin that I will present to you at our monthly PAC meeting. If you have any questions regarding the Transit of Venus 2012 Award or need help getting started please ask me and I will be glad to assist you.

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:
Checked Out

13 inch Truss Dobsonian:
Available

Program Chair Minute - Dave Churilla

If you missed the April PAC meeting then you missed a unique and interesting program. Steve Rook of the University of the Nebraska Law School spoke on Space Law. I thought he did a very good job and the topic prompted quite a few questions. Our thanks go out to Steve for joining us last month and presenting such an innovative and interesting program.

This month's PAC Meeting will be on Tuesday, May 29th. The "Program" for the evening will be a Nearest Star Party so we'll change things up a bit providing the weather is clear. I will set up my telescope on the front lawn of Hyde Observatory between 6 PM and 6:30 PM and invite anyone else who would like to set up their telescope with solar filters on them to set up as well – the more the merrier. This will give us all a chance to view through each other's equipment and I along with other experienced club members will be available to answer your questions about solar viewing. After the star party, at about 8 PM everyone will adjourn to Hyde for a brief PAC meeting and Observing Chair Jim Kvasnicka's Observing Report.

The dynamics of a star are fascinating to say the least. Formed by coalescing hydrogen gas that is compressed as more and more gas accumulates in the accretion disc until nuclear fusion ignites within. Throughout their lives they create the elements, the building blocks of the universe – forming even heavier elements in their death throes or, if massive enough, creating arguably the most intriguing object in our universe – a Black Hole. A combination of energy and gravity, for the most part, holds the sun together in a fragile balancing act that changes over time.

Our sun is a modest star by cosmic standards but it's what gives us life here on earth. In the prime of its life (it is middle aged at about 4.5 billion years old) it's our life blood. But it has a sinister side as well. If our planet is not undone by some unforeseen force our life giving sun will also be Earth's executioner one day.

Over 800,000 miles across (you can line up 108 earth's across the sun's face and fit over 1,000,000 Earths inside it) is a roiling ball of hot gases and energy – certainly not a very hospitable place. The sun rotates just like all the planets. The sun's "day" however is approximately 30 earth days long. But keep in mind that the sun isn't solid so it rotates at different speeds (approximately 25 days at the equator and about 36 days at the poles). These differences cause problems with the magnetic fields and that makes viewing the sun lots of fun.

There are different types of filters that can be used to observe the sun. The most common for amateurs are White Light filters which are like looking with your own eyes but filtered down to make it safe (like wearing a welding mask) and much more expensive H-Alpha filters which allow us to see details of the sun's surface. I'll have my H-Alpha T-Scanner set up and there will be others who will have White Light filters set up for our Near Star Party. This will give everyone an opportunity to view through the different filters and talk to their owners.

Here are some links you might enjoy about the sun:

Solar Dynamic Observatory (SDO):
<http://sdo.gsfc.nasa.gov/> - you can see what the sun looks like now and kind of what you'll see in May.

Big Bear Solar Observatory (BBSO):
<http://www.bbso.njit.edu/>

Solar & Heliospheric Observatory (SOHO):
<http://sohowww.nascom.nasa.gov/>

ICSTARS:
<http://www.icstars.com/HTML/SolarSection/>

The activity on the sun has heated up this year which makes it a lot of fun to view. But it's knowing WHAT you're viewing and a little bit about the dynamics involved that really makes solar observing so fascinating. It's these dynamics and the tutelage of Dave Knisely and Rick Johnson (and many thanks to them) that have given me such an interest in our nearest star (and from there, in stars in general). So come join me and the other club members who will set up their scopes for our Nearest Star Party at the May PAC Meeting.

DISCLAIMER: If we have cloudy skies I will give a short (20-30 minute) presentation inside at our regular meeting time (7:30 PM) - so be forewarned!!!

Upcoming programs:

June 2012: BBQ Social

We will have our June Social again this year. Chef Cajon Bob has graciously agreed to smoke more pork for the BBQ pulled pork sandwiches. There will be a nominal fee of \$5 a head for the meal. We'll let you know more as we get closer.

Jul 2012: NSP 2012 Update

Get Jason your photos from NSP and we'll enjoy an evening of looking at the fun everyone had at there this year.

Aug 2012: Space Update

Jason Noelle and Ben Rush will give a program – NASA missions update and Iridium Flares

Challenge Observing Objects for May/June

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 5466

Located 51,800 light years from Earth and 52,800 light years from the Galactic center, it was discovered by William Herschel on May 17, 1784. It contains a certain blue horizontal branch of stars, as well as being unusually metal poor like ordinary globular clusters. It is thought to be the source of a stellar stream discovered in 2006, called the 45 Degree Tidal Stream. This star stream is an approximately 1.4° wide star lane extending from Boötes to Ursa Major. It has an apparent magnitude of 10.5 and is 6' in diameter.



Credit: NASA/STScI/WikiSky

Beginner Object

Markarian's Chain

One of the most popular "clusters" of galaxies is in the constellation Virgo, the heart of which is known as the "Markarian's Chain" of galaxies. The chain, named after an Armenian astronomer in the 1970s. Located about 70 million light years away, the Virgo cluster is a gigantic collection of several thousand galaxies that dominate our local part of the universe. It is the center of our local supercluster of galaxies which includes members of our local group, the Milky Way, M31, M32, M110, M33, the Magellanic clouds, and others.

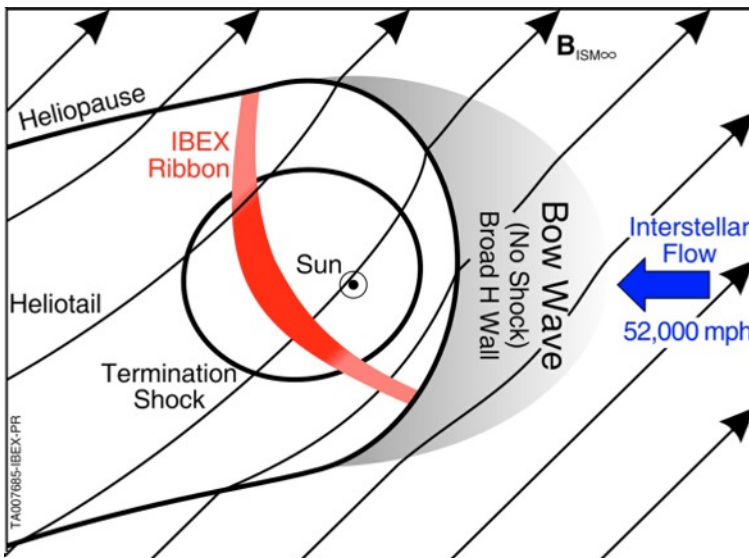


Credit: Jerry Lodriguss

IBEX Reveals a Missing Boundary At the Edge Of the Solar System

By Karen C. Fox of NASA's Goddard Space Flight Center

The two Voyager spacecraft have confirmed the existence of the first boundary, and have seen evidence for the second as they move toward it. However, each Voyager spacecraft has seen different things on their respective trips – one moving in a more northerly direction, one moving more to the south. They've encountered different regions at different distances from the sun, suggesting the very shape of the heliosphere is squashed and asymmetrical. Scientists believe this asymmetry is caused by the force and direction of magnetic fields ramming into the heliosphere from outside, the same way a hand pushing on a balloon will force it out of shape. This was the first clue that there's a strong magnetic field exerting pressure on the outskirts of the solar system. Independently, IBEX has seen a well-defined band, or ribbon, at the edge of the heliosphere, believed to be defined by this external magnetic field. Other studies from IBEX have helped quantify the magnitude of the magnetic field, showing that it is on the strong end of what was previously thought possible.



Stars travel through the galaxy surrounded by a bubble of charged gas and magnetic fields, rounded at the front and trailing into a long tail behind. The bubble is called an astrosphere, or -- in the case of the one around our sun -- a heliosphere. This image shows a few examples of astrospheres that are very strong and therefore visible. Credit: NASA/Goddard Space Flight Center "We've seen one after another signature of a very strong magnetic field in the galactic environment," says Nathan Schwadron, a space scientist at the University of New Hampshire in Durham who is one of the authors on the paper. "That magnetic field influences the structure of the heliosphere and the boundaries themselves. That leads to a whole new paradigm."

The heliosphere surrounding our solar system is buffeted by strong magnetic fields, shown here as the black, diagonal, upward-pointing arrows. The heliosphere and the interstellar material of the local cloud pass by each other at a speed of 52,000 miles per hour, as shown by the blue arrow. The density of the material and the ramming pressures of the magnetic field coupled with the relatively slow speed of the heliosphere add up to indicate that there is no bow shock at the front of the heliosphere. Credit: SWRI

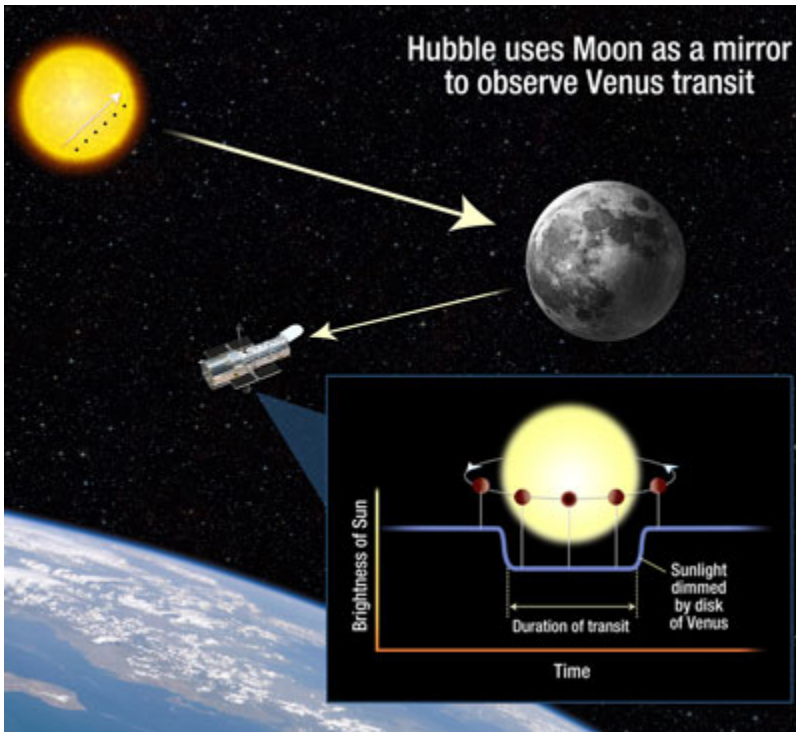
Along with increased evidence for a strong external magnetic field, IBEX has also provided a new measurement for the speed of the heliosphere itself with respect to the local cloud.

"We recently analyzed two years worth of IBEX data, and they showed that the speed of the heliosphere – with respect to the local cloud of material – is only 52,000 miles per hour, instead of the previously believed 59,000," says David McComas at the Southwest Research Institute in San Antonio, Texas, who is first author on this paper and also the principal investigator for IBEX. "That might not seem like a huge difference, but it translates to a quarter less pressure exerted on the boundaries of the heliosphere. This means there's a very different interaction, a much weaker interaction, than previously thought." In essence, it means that, like an airplane going too slowly to produce a sonic boom, the heliosphere isn't moving fast enough to create a bow shock, given the density and pressures of the material its moving through. The heliosphere's boundaries lie roughly 10 billion miles away from Earth, but are nonetheless crucial for understanding our place in the universe. Indeed, the heliopause provides some protection for our solar system from the harsh, radiation environment surrounding it. By knowing the nature of these boundaries, scientists can start to better understand the propagation of particles that do have enough energy and speed to make it into our environment.

As scientists incorporate this substantive new understanding into their physical models, they will also be waiting for more evidence from both IBEX and the Voyagers, which they hope will continue to send back observations for many years to come. "Imagine the point at which Voyager crosses the threshold of the heliopause and either does or does not see what IBEX is predicting," says Schwadron. "There will be enormous opportunities for scientific advancement."

Hubble turns Moon into a mirror for Venus transit

By Amanda Doyle of Astronomy Now

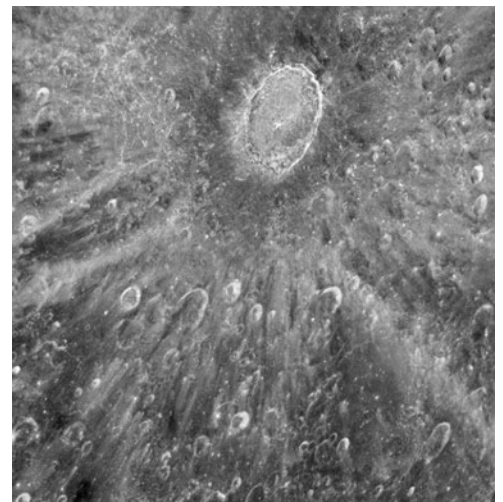


This June, many people on Earth will bear witness to the spectacular event that is the transit of Venus across the face of the Sun. The Hubble Space Telescope will be one of the numerous telescopes used to monitor the event - but it will do so using the Moon as a mirror. Telescopes on Earth can be used to view the transit of Venus directly, provided that a proper solar filter is used. However, Hubble was not designed to look straight at the Sun, and lacks the advantage of a solar filter. This is why astronomers are planning to look at the Moon instead. The Moon is only visible to us because it reflects light from the Sun. On 5/6 June, some of this sunlight will be passing through the atmosphere of Venus before bouncing off the lunar landscape. Details about the atmospheric composition of Venus will be nestled within this reflected light, allowing scientists a unique way of observing Venus' atmosphere.

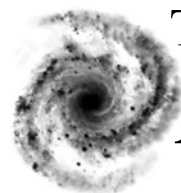
Astronomers are planning to use the Moon as a mirror to capture reflected sunlight and isolate the small fraction of the light that passes through Venus's atmosphere. Imprinted on that light are the fingerprints of the planet's atmospheric makeup. Illustration: NASA, ESA, and A. Feild (STScI)

The opaque atmosphere of Venus has already been studied intensely using instruments more suited to the job, such as ESA's Venus Express spacecraft. The purpose of the Hubble observations is not to gather information about Venus, but to see how precisely this indirect method can pick out details of the atmosphere. Many exoplanets have been seen transiting other stars in the Galaxy, and astronomers are eager to know if a small planet's atmospheric signature could be liberated from the stellar light. This has already been performed for giant exoplanets that have bloated atmospheres, but as Venus is similar in mass and size to Earth it will be interesting to see what Hubble's limitations are for terrestrial planets.

Venus' reflection on the Moon will be miniscule, comprising only 1/100,000th of the overall light, meaning that a long observation is needed. Hubble will observe the Moon before, during, and after the transit for a total of seven hours. Observing the Moon before and after the transit is necessary to get a baseline for comparison with the transit data. Although Hubble will be pointed towards the Moon continuously for the seven hours, 40 minutes out of each 96 minute Hubble orbit will be lost as the Earth obscures the Moon from the telescope's view. It is thus extremely important that after each 40 minute period, Hubble is still pointing at the correct location. The rarity of the Venus transit meant that astronomers needed to perform test observations of the Moon to ensure that this observation method is feasible. On 11 January 2012, Hubble captured an image of the 80 kilometer wide Tycho crater on the Moon and the entire image depicts an area 700 kilometers across. Rays are shown emanating from the crater that were caused by ejected material after an asteroid smashed into the Moon 100 million years ago. The test image was taken using the Advanced Camera for Surveys, but during the Venus transit the Wide Field Camera 3, and Space Telescope Imaging Spectrograph will also be utilized.



Hubble's test observations of the Moon included this image of the Tycho crater. Image: NASA/ESA/D. Ehrenreich.



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
June 26 , 2012
7:30 PM
Hyde Observatory