

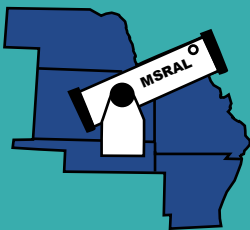


The Prairie Astronomer

The Official Newsletter of the Prairie Astronomy Club

IN THIS ISSUE:

- Growing the Club
- Citizen Science
- What to View in March
- NGC Objects
- Curiosity Sees Evening Star 'Earth'
- Coulter Odyssey Conversion
- Sochi from Space
- Iapetus



February Program

Remote Observatories. Brett Boller and Tom Miller will talk about the possible designs for a remote observatory that could be built and operated by the club.

Featured photo by Brett Boller: Sundog on February 5th, 2014. The image was taken on his way to work at the intersection of Highway 15 and Highway 6 at 7:50 am. Taken with a cell phone, 1/2000 second with an aperture of 2.4.



Night Sky Network

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: **Mark Dahmke, P. O. Box 5585, Lincoln, NE 68505** or mark@dahmke.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.



Meeting Minutes

PAC Meeting Minutes January 28, 2014

Jack Dunn called meeting to order at 7:32 PM.

Welcomed club members and visitors. Eleven visitors likely due to the program "How to Use a Telescope" by Dan Delzell. Jack asked visitors to stand up and introduce.

Mentioned that Hyde Observatory is open to public every Saturday.

Next PAC meeting February 28th, 2014 with program "Remote Observatories" by Brett Boller.

Next Star Part Jan 31st. Jack described Star Parties briefly.

Treasurer's report by Bob Kacvinsky. Reported financial report complete. Audit will be conducted in early February and will circulate next meeting. 39,000 approximately in accounts. Described memberships and costs (student, single, family) and some benefits including Astronomical League membership.

Observing report provided by Jim Kvasnicka. Star Party Jan 24 (too cloudy) and Jan 31. February 21 and February 28 upcoming star parties.

Other business:

Cassie Etmund mentioned outreach volunteers. 1-2 volunteers needed for Homestead Monument Feb 21 (pending) 7-9 PM. More details to follow. Issues with the light pollution at Homestead Monument were discussed. Donation from the organizers vs. the mission of PAC to promote dark skies will need to be discussed.

Eric Balcom from OPS mentioned the Nebraska Star Party dates. Details available at nebraskastarparty.org.

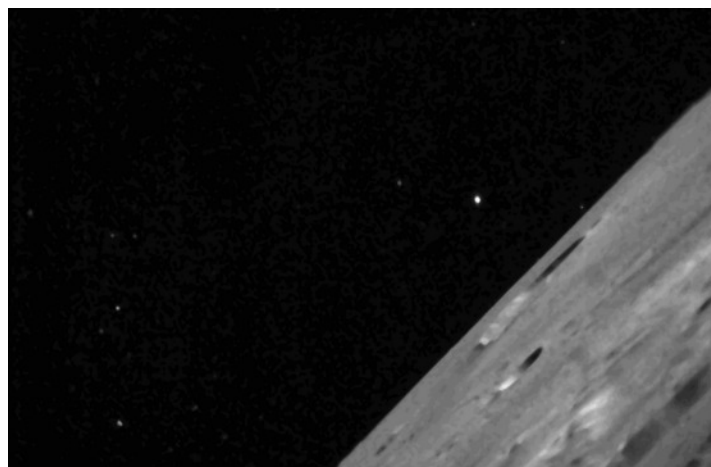
Jack adjourned meeting at 7:56.

Submitted by Dale Bazan.

Low-Flying Moon Probe Spies Craters And Mountains While Seeking Stars

"The main job of a star tracker is to snap images of the surrounding star field so that the spacecraft can internally calculate its orientation in space. It completes this task many times per minute," NASA explained. "The accuracy of each of LADEE's instruments' measurements depends on the star tracker calculating the precise orientation of the spacecraft."

"Star tracker cameras are actually not very good at taking ordinary images," added Butler Hine, LADEE project manager at NASA's Ames Research Center in California, in a statement. "But they can sometimes provide exciting glimpses of the lunar terrain."



Krieger crater (14 miles/23 km diameter) on horizon, and Toscanelli crater (4 miles/7 km) in front.

Read more at UniverseToday.com

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.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

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 telescopes, contact Cassie Etmund. If you keep a scope for more than a week, please check in 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

PAC Star Party Dates

Dates in bold are closest to the new moon

2014 Star Party Dates

January 24, **31**
February 21, **28**
March 21, **28**, April 25
May 2, 23, 30, June 20, **27**
July 18, **25**
NSP: July 27-Aug 1
August **22, 29**, Sept 19, **26**
Oct 17, **24**, Nov 14, **21**
Dec 12, **19**

Lunar Party Dates

May 9, June 6, Sept 5, Oct 3
* Lunar party dates are tentative, sites to be determined.

PAC E-Mail:

info@prairieastronomyclub.org

PAC-LIST:

To subscribe send a request to PAC. To post messages to the list, send to the address:

pac-list@prairieastronomyclub.org

Events

PAC Meeting
Tuesday Feb 25th, 2014
@Hyde Observatory
Program: Remote Observatories

PAC Meeting
Tuesday March 25th, 2014
@Hyde Observatory
Program: 3D Printing and Amateur Astronomy

Astronomy Day, April 26th
@Morrill Hall

PAC Meeting
Tuesday April 29th, 2014
@Hyde Observatory

PAC Meeting
Tuesday May 27th, 2014
@Hyde Observatory

Newsletter submission
deadline March 15, 2013

Links

PAC: www.prairieastronomyclub.org
Night Sky Network: <https://nightsky.jpl.nasa.gov/>
CafePress (club apparel) www.cafepress.com

www.hydeobservatory.info
www.nebraskastarparty.org
www.OmahaAstro.com
Panhandleastronomyclub.com
www.universetoday.com/
www.planetary.org/home/
<http://www.darksky.org/>

NGC4603 Credit: NASA



Growing the Club- Jack Dunn, PAC President

Practically every Amateur Astronomy Club I know has the same problem, the graying of the membership. There are long-time members who stick with the club and preserve its history. But attracting new members seems to be a slow process. And it seems more difficult to get kids interested in the days of the internet. Sky observing demands patience. That great bolide doesn't show up on a schedule. Deep sky objects don't look like the pictures in magazines or on the internet from Hubble. In talking to other club presidents across the midwest I hear the same thing everywhere. How do we attract that young person who has a lot of items (and devices) clammering for his or her time?

I was very encouraged by the turn-out for our annual "how to use your telescope" program. I believe we even picked up a member or two from that event. Therein lies our best direction. We need to be open and helpful to potential new members. Bring them into the hobby with a welcoming smile and a pledge that it doesn't all have to be so mysterious. We did a good job with that at the last meeting. That is one of the ways we can grow the club. Keep it up at future meetings.

Meanwhile, we are going to pursue Lincoln Public Schools to see if we can get them more aware of the club. And, I also would like to see discussion of what time would be good for the club to make a group trip to somewhere like the Cosmosphere or Kansas City. Will bring this up at the meeting.

Continue to keep in mind ideas of what we can do to encourage younger members to join. They are our future. Somewhere out there is a future Larry Stepp, Pete Schultz or Rick Johnson. He or she may be quite unlike them as an individual, but can still be one of the leaders of the club in the future.

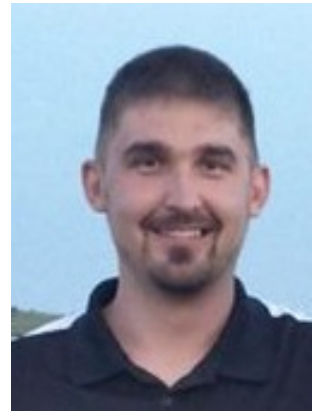


Proposal for a Remote Observatory—Brett Boller

At the upcoming club meeting I will be talking about all that is involved in building a remote observatory. This is a possible venture for the club to undertake. Topics will include possible land locations for the club to use, design types that are of interest, pro/cons of each design, what equipment we could use inside the observatory, costs for various pieces of equipment, and answer any questions that club members might have.

The added benefit of undertaking this project is the possibility of new members and publicity for the club. New members could include a wide range of individuals. People interested in photography, technology students, individuals interested in astrophotography. Another use is renting the scope out to schools/individuals for far less than companies like slooh.com or itelescope.net. It could be included in club membership or for a small extra fee per year for members only interested in using it.

Astrophotography would be the main use but, other uses could include: showing the differences in light pollution from inside Lincoln versus outside the city lights. Depending on equipment, a live feed for transits, eclipses and other celestial events. Hyde volunteers could use it on Saturday nights to show different objects inside the building and out of the elements. An all-sky camera could run at night and capture meteor showers. There are endless opportunities for a project like this, so I encourage you to come to the next PAC meeting on Tuesday February 25th at 7:30pm and bring your questions/suggestions to help improve this idea.



Night View of Sochi During The Olympics

One of the Expedition 38 crew members aboard the International Space Station downlinked this vertical 600mm night view of Sochi, Russia, which clearly shows the site of the 2014 Winter Olympics while they are just a few days under way. Fisht Stadium where the Opening Ceremonies were held on Feb. 7 is easily recognizable as the bright circular structure. Sochi is a city in Krasnodar Krai, Russia, located on the Black Sea coast near the border between Georgia/Abkhazia and Russia. It has an area of 1,353 square miles or 3,505 square kilometers. Photo credit: NASA.



Citizen Science: A Chance for You to Help Analyze Astronomical Data—Emily Moravec

The name of the game is Big Data in the professional astronomical world these days. Due to advances in technology, Astronomers now have quality data and lots of it. No longer are they trying to find one or two galaxies, but they are trying to find trends within a sample of thousands and thousands of galaxies. Some Astronomers have so much data that they themselves cannot physically analyze all the data in a timely fashion. Given this predicament, they have turned to us, the public, and give us all a chance to participate in their studies. Thus, the name Citizen Science emerges.

Zooniverse (<https://www.zooniverse.org>) is the main hub for this new area of science that has been recently developed. This website has many scientific projects available in areas such as astronomy, climate, humanities, nature, and biology. Astronomically speaking there are projects underneath the “Space” category where you can classify unclassified galaxies, identify new planet candidates, or categorize star clusters in a newly released Hubble image and much more. When you participate in these projects, you are looking at data that has not been viewed before. There have been citizens that have discovered new objects such as Hanny van Arkel who discovered ionization echoes that turned out to be signatures of a black hole that was active relatively recently.

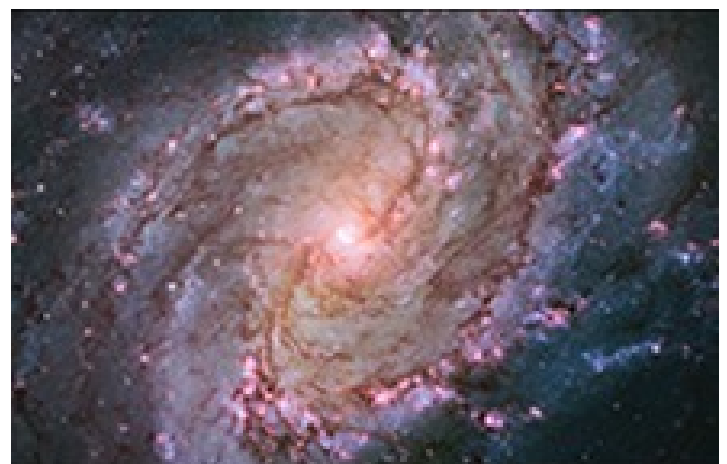
At a press conference at the 223rd American Astronomical Society meeting in Washington D.C., one of the astronomers announced a new citizen science project that was released Monday, January 13th -- along with a newly released

Hubble image of M83 (the Pinwheel Galaxy). The goal of this project is to survey M83 in order determine the type and approximate the age of thousands of star clusters in this galaxy. This sometimes requires identifying Hydrogen clouds which human brains are still superior to computers in identifying. You will go through a short training session and after that is complete, you will be able to classify the star clusters on your own. It is as simple as that! To access this specific project, go to Zooniverse and look under the space category for the project named “Help astronomers understand star clusters: Stardate M83” (<https://www.zooniverse.org/project/M83>).



Zooniverse image source:
<http://www.realscience.us/2012/04/18/chris-lintott-glactic-zookeeper/>

Hubble image source:
http://hubblesite.org/newscenter/archive/releases/2014/04/image/a/format/small_web/



NASA Mars Rover Curiosity Sees 'Evening Star' Earth

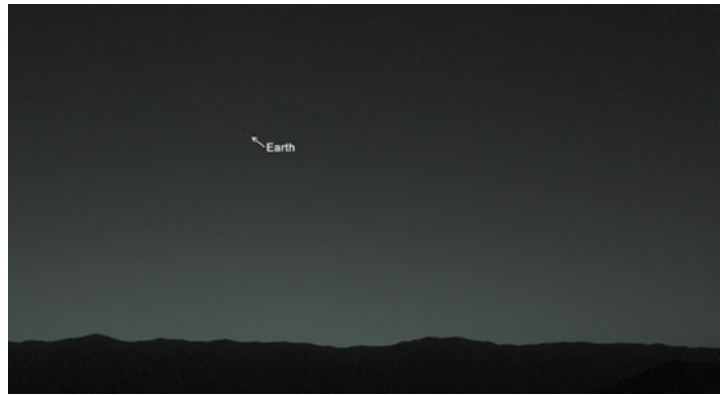
The rover's view of its original home planet even includes our moon, just below Earth.

The images, taken about 80 minutes after sunset during the rover's 529th Martian day (Jan. 31, 2014) are available at <http://photojournal.jpl.nasa.gov/catalog/PIA17936> for a broad scene of the evening sky, and at <http://photojournal.jpl.nasa.gov/catalog/PIA17935> for a zoomed-in view of Earth and the moon.

The distance between Earth and Mars when Curiosity took the photo was about 99 million miles (160 million kilometers).

NASA's Mars Science Laboratory Project is using Curiosity to assess ancient habitable environments and major changes in Martian environmental conditions. JPL, a division of the California Institute of Technology in Pasadena, built the rover and manages the project for NASA's Science Mission Directorate in Washington.

This view of the twilight sky and Martian horizon taken by NASA's Curiosity Mars rover includes Earth as the brightest point of light in the night sky. Earth is a little left of center in the image, and our moon is just below Earth. Researchers used the left eye camera of Curiosity's Mast Camera (Mastcam) to capture this scene about 80 minutes after sunset on the 529th Martian day, or

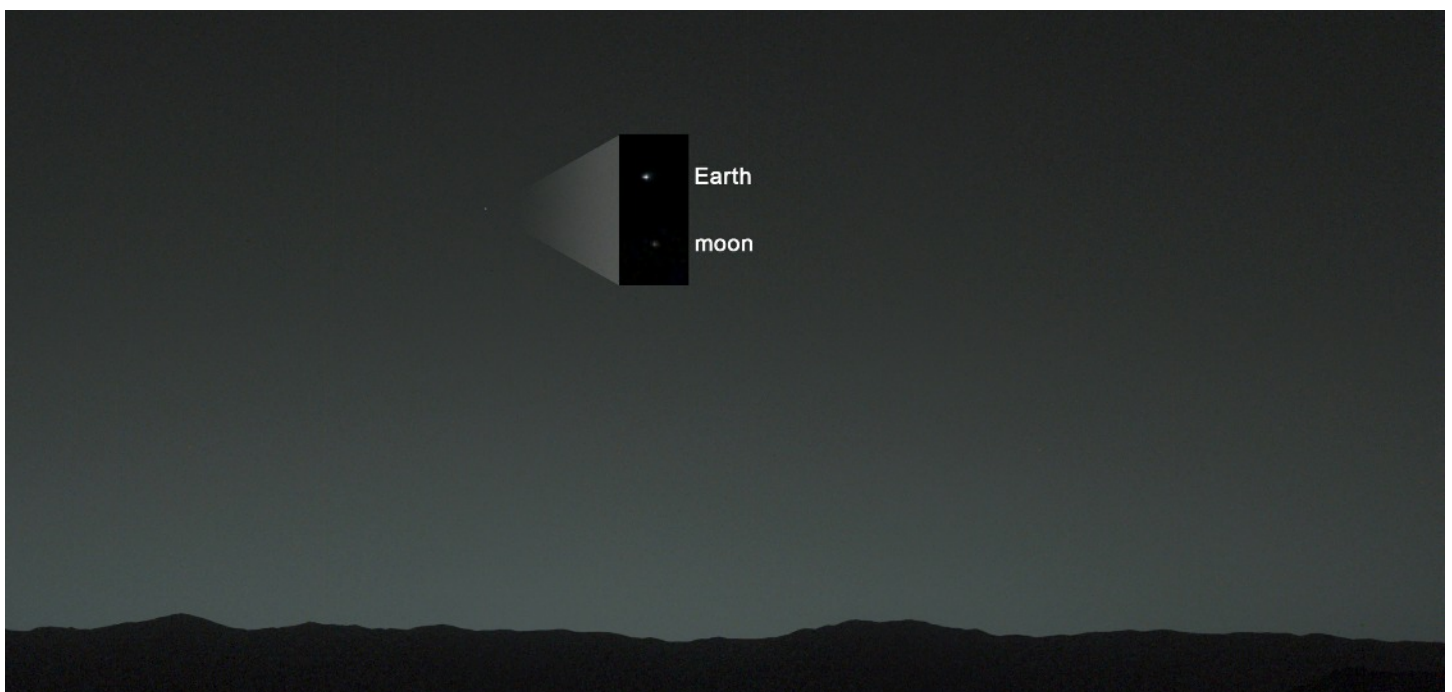


sol, of the rover's work on Mars (Jan. 31, 2014). The image has been processed to remove effects of cosmic rays.

A human observer with normal vision, if standing on Mars, could easily see Earth and the moon as two distinct, bright "evening stars."

The distance between Earth and Mars when Curiosity took the photo was about 99 million miles (160 million kilometers).

NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology, Pasadena, manages the Mars Science Laboratory Project for NASA's Science Mission Directorate, Washington. JPL designed and built the project's Curiosity rover. Malin Space Science Systems, San Diego, built and operates the rover's Mastcam.



March Observing—Jim Kvasnicka

This is a partial list of objects visible for the upcoming month.

Planets

Venus: Low in the east at dawn dimming from -4.8 to -4.4 magnitude.

Mercury: In the eastern dawn sky, it increases in brightness from 0.8 to -0.1.

Neptune: Too low to be seen.

Uranus: Very low in the evening and difficult to see.

Jupiter: Fades a little from -2.4 to -2.2, its disk is 39" wide.

Mars: Becomes much brighter in March increasing in brightness from -0.5 to -1.3. It rises about 3½ hours after sunset to start March and will be up at twilight to end March.

Saturn: Rises in Libra just before midnight at magnitude 0.3. Its rings are 22° open from edge-on.

Messier List

M41: Open cluster in Canis Major.

M44: The Beehive Cluster in Cancer.

M46/M47: Open clusters in Puppis.

M48: Open cluster in Hydra.

M50: Open cluster in Monoceros.

M67: Open cluster in Cancer.

M81/M82: Galaxy pair in Ursa Major.

M93: Open cluster in Puppis.

Last Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79

Next Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

NGC Objects—Jim Kvasnicka

NGC 2841 is a large spiral galaxy in Ursa Major. It is some 50 million light years distant and 150,000 light years across, larger than our own Milky Way Galaxy. It was discovered in 1788 by William Herschel. NGC 2841 has a large population of young blue stars. It also has a history of supernovas being visible. Through a telescope NGC 2841 has an apparent size of 8.1' and appears as a dim oval shape with a brighter core. NGC 2841 is one of the many galaxies in Ursa Major that are included in the Herschel 400 list of objects.

NGC and Other Deep Sky Objects

NGC 2539: Open cluster in Puppis.

NGC 2784: Elongated galaxy in Hydra.

NGC 2841: Elongated galaxy in Ursa Major.

NGC 2903: Elongated galaxy in Leo.

NGC 3079: Galaxy in Ursa Major.

NGC 3184: Galaxy in Ursa Major, thin streak.

Double Star Program List

Epsilon Canis Majoris: Bright white and blue-white stars.

Delta Geminorum: Wasat, Yellow primary with a pale rose colored secondary.

Alpha Geminorum: Castor, white and yellow pair.

12 Lyncis: Close yellow-white stars.

19 Lyncis: White pair.

38 Lyncis: White primary with a yellow secondary.

Zeta Cancri: Yellow and pale yellow pair.

Iota Cancri: Yellow primary with a pale blue secondary.

Challenge Object

NGC 3395 and NGC 3396: Interacting galaxy pair in Leo Minor made up of two elongated galaxies touching at their tips.



My Project to Convert My Old Coulter Odyssey 13.1— Bryan Schaaf

I modified my Odyssey 1 telescope in 2001 by installing a smaller secondary mirror and spider purchased from AstroSystems. The decision in 2012 to discard the sono tube body and rebuild it was threefold. First, my wife and I moved to a Lincoln home where there is extreme light pollution, so telescope portability became necessary. Second, my Voyager minivan used to transport the telescope to dark sites was sold and we bought a Honda Civic. Third, the telescope gradually became heavier with my advancing age.

I studied various truss tube designs on the Internet and Gary Seronik's Telescope Workshop columns in S & T magazines for well over a year before I plunged into the task of rebuilding. DobStuff.com was a major resource. My four-aluminum-tube design sprang from [My Travelscope](#). The eight inch telescope design featured in the

article, however, didn't scale up well. Stable collimation was impossible.

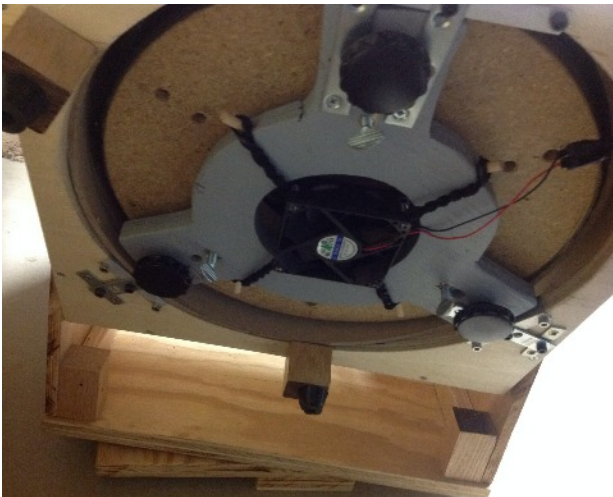
Later, adding cables to create a "string telescope" was no better. I constructed triangular bracing with angle aluminum and added "quick-release pins" to secure the tubes to the mirror box. That redesign modification was successful.

The birch wood, aluminum tubing, knobs and hardware were purchased from Menards and Ace Hardware stores. Some of the hardware and a mirror cooling fan were already attainable from other projects in my garage.

Some cosmetic changes are planned.



Coulter Odyssey, continued



A Two-Toned Wonder from the Saturnian Outskirts—Dr. Ethan Siegel

Although Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!

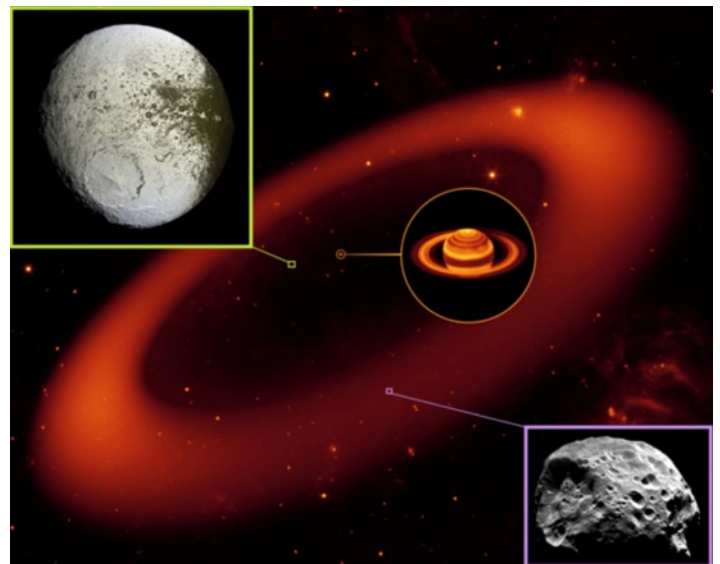
In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of 3.5 million km, but the culprit of the mysterious dark side is *four times* as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning *quadrillions* of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode the bright surface layer away, revealing a darker substrate?

In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain *just enough* extra heat from the Sun during Iapetus' day to sublimate the ice around it, which resolidifies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

Learn more about Iapetus here:
<http://saturn.jpl.nasa.gov/science/moons/iapetus>.

Kids can learn more about Saturn's rings at NASA's Space Place:
<http://spaceplace.nasa.gov/saturn-rings>.



Images credit: Saturn & the Phoebe Ring (middle) - NASA / JPL-Caltech / Keck; Iapetus (top left) - NASA / JPL / Space Science Institute / Cassini Imaging Team; Phoebe (bottom right) - NASA / ESA / JPL / Space Science Institute / Cassini Imaging Team.



THE *Prairie*
Astronomy
Club

**Amateur Astronomy —
A Hobby as Big as the
Universe**

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FIRST CLASS MAIL

**Next PAC Meeting
TUESDAY
February 25, 2013
7:30 PM
Hyde Observatory**