



The Prairie Astronomer

March, 2012

Volume 53, Issue #3

The Official Newsletter of the Prairie Astronomy Club

March Program

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Featured Photo

“Searching for Vulcanoids”

By Professor Nathaniel Cunningham
Nebraska Wesleyan University

A population of near-sun asteroids, dubbed *Vulcanoids*, was hypothesized over a century ago, as a means of explaining oddities of Mercury’s orbital path. He will discuss the history and challenges of searching for Vulcanoids, and the scientific interest in these possible objects.

This image, taken on March 6, 1969, shows the Apollo 9 Command and Service Modules docked with the Lunar Module. Apollo 9 astronaut Dave Scott stands in the open hatch of the Command Module, nicknamed "Gumdrop," docked to the Lunar Module "Spider" in Earth orbit. His crewmate Rusty Schweickart, lunar module pilot, took this photograph from the porch of the lunar module. Inside the lunar module was Apollo 9 commander Jim McDivitt. The crew tested the orbital rendezvous and docking procedures that made the lunar landings possible.

Image Credit: NASA



Astronomy Day

Welcome to the biggest season for those of us on a local level, Astronomy Day.

I'm writing this to you on the road, on vacation. That is how much I am committed to provide the people of Lincoln and greater parts a day for science, wonder, and amazement.

This year, I now have one Astronomy Day under my belt, and I will be doing more to help move things along smoothly. With the task of coordination of volunteers comes some worry, some headaches, and some indigestion. I'm going to do everything I can to prevent that from happening. This is where I need the club's help.

I am looking for people who are committed, punctual, and energetic to help out with this year's Astronomy Day. Smart and knowledgeable are good also, but they are not the main requirements I am looking for in volunteers this year. We have to remember that we are a PUBLIC group, and our first mission on Astronomy Day is to provide a nice day for the public.

Great! I fit that. Now what??

We are looking for volunteers to man some of the existing stations that we keep from year to year, such as the club table (where I will be most of the day, pushing our Facebook and Twitter pages/groups), scopes, and more. We are also looking for people to try some new stations, especially those that want to bring new ideas to the group. I'm open to anything space related, if you want to bring an idea to the table. If you want to bring a new table but do not have an idea, don't worry. Jack and I have some packets that can make good stations.

Each station should have 3 people volunteering for the entire day. We want 3 people because of lunch concerns (you get FREE LUNCH), restroom breaks, and this year we have Clay Anderson confirmed to speak twice. Clay means more traffic through the door, and I am positive that everyone already a member of the club would like to hear him speak.

I want people that will be committed to follow through with their promises, so this is why I am calling for volunteers now. Clay, new stations, and extra traffic means we need more manpower.

I would like to thank those of you that have already volunteered. To those of you that have not, this is your club also. In order for us to get new members, which is a concern for all of us, we need to show the public that the Prairie Astronomy Club does not need to have everyone be super-smart, or just concern themselves with observing. Astronomy covers many aspects of science, and I want to make sure that we can put on a happy face for our public.

Over the next few weeks, I will be talking to as many of you individually as I can. Please let me know if you can work a full day, half day, whatever you can work. If you want to get ahead of this, feel free to call me at 872-222-5747(KRIS) or e-mail me at krisguy@krisguy.com.

Thanks for taking a few minutes to read this, and I hope to hear from you before we get extremely busy.

Kris Gainsforth

Outreach Coordinator

Club Events

Newsletter submission deadline, April 15, 2012

PAC Meeting

Tuesday March 27, 2012 7:30pm @Hyde Observatory
Program: "Vulcanoids" by Dr. Nathaniel Cunningham

PAC Meeting

Tuesday April 24, 2012 7:30pm @Hyde Observatory
Program: Space Law by Steve Rook

Astronomy Day

Saturday April 28, 2012 @Morill Hall

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

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.



Internet Links of Interest

<http://www.spacenews.com/commentaries/111111-guest-blog-apollo-spirit-alive-and-well.html>

<http://www.thespacereview.com>

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

<http://space.flatoday.net/>

<http://www.spaceportamerica.com/>

<http://spacerefpress.com/2011/09/first-issue-of-space-quarterly-magazine-released.html>

<http://www.nasaspaceflight.com/>

<http://www.spacex.com>

March/April Observing: What to View--Jim Kvasnicka

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

Planets

Venus: High in the west at sunset setting 4 hours after the Sun. Venus will reach its brightest for the year at a brilliant -4.7 magnitude.

Jupiter: Below Venus at a -2.0 setting 2½ hours after the Sun to start the month.

Mercury: Rises less than an hour before the Sun and difficult to see.

Mars: In Leo, dims from -0.7 to -0.1 in April.

Saturn: Reaches opposition on April 15th. Saturn shines at 0.3 magnitude in Virgo.

Uranus and Neptune: Both are very low to the horizon and difficult to observe.

Meteor Showers

Lyrids: Peaks the morning of April 22nd. The modest shower usually produces around 12 visible meteors per hour. There will be no moonlight to interfere.

Messier List

M40: Multiple star in Ursa Major.

M65/M66: Galaxies in Leo, part of the Leo Triplet Group.

M95/M96: Galaxy pair in Leo.

M105: Small elliptical galaxy in Leo.

M106: Oval galaxy in Canes Venatici.

M108: Elongated galaxy in Ursa Major.

M109: Galaxy in Ursa Major.

Last Month: M41, M44, M46, M47, M48, M50, M67, M81, M82

Next Month: M49, M51, M61, M63, M64, M85, M94, M101, M102, M104

NGC and Other Deep Sky Objects

NGC 2841: Elongated galaxy in Ursa Major.

NGC 3184: Galaxy in Ursa Major.

NGC 3521: Oval shaped galaxy in Leo.

NGC 3628: Third member of the Leo Triplet Group.

Double Star Club List

Alpha Leonis: Regulus, white primary with a pale yellow secondary.

Gamma Leonis: Algieba, pair of yellow stars.

54 Leonis: Yellow primary with a greenish colored secondary.

Alpha Canum Venaticorum: Cor Caroli, blue-white and greenish stars.

Zeta Ursa Majoris: Mizar, pair of white stars.

Gamma Virginis: Close pair of yellow stars.

24 Comae Berenices: Yellow and pale blue pair.

Delta Corvi: White and rose colored stars.

Challenge Object

Focus on Observing Clubs

The Solar System Observers Program consists of 27 selected observing projects designed to introduce you to the pleasures of planetary observing. With the increase in light pollution, the wonders of our own solar system may take on an increased importance among amateur astronomers. Dark skies and moonless nights are not required for any of the listed projects.

The 27 observing projects are divided into three categories:

Sun and Moon Projects

Inner Solar System Projects

Outer Solar System Projects

The projects vary from simple observations to multiple observations over a period of months. They include special events such as solar and lunar eclipses. This year in June we have the Transit of Venus, which would be a spectacular project to include even though it is not listed as one of the 27 projects.

To qualify for the Solar System Observers Certificate you need to complete 25 of the 27 projects. Your observations need to include: name of the project, start and completion date, seeing conditions, telescope/binocular size, telescope type, magnification, and your observing notes. For a complete list of the 27 projects you can go to the Astronomical League website under Observing Programs / Solar System Observers Program. They also include an observing log that you can print and use.

When you complete the Solar System Observers Program you will need to submit a copy of your observing logs to me for review. If the logs are accurate and complete I will submit your name to the Solar System Observers 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 Solar System Observing Program or need help getting started please ask me and I will be glad to assist you.

Solar System Observers Program Awardees from PAC

No PAC member has completed the Solar System Observers 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:
Checked Out

13 inch Truss Dobsonian:
Available

Program Chair Minute - Dave Churilla

A family function had me miss the February meeting but I understand Jack had rave reviews of his program. Thanks to Jack for his presentation.

And remember, if you have something that you think the club might benefit from be it about space, NASA, observing, whatever, please let me know and we'll set up a time for you to give a presentation. They do NOT have to be long...20 minutes is sufficient and no more than 30 minutes tops. I think having club members talk about the things that really interest them is a great way for the rest of us to learn.

This month's PAC Meeting will be on Tuesday, March 27th. As usual we'll have a short business meeting at 7:30 PM which will include Observing Chair Jim Kvasnicka's Observing Report followed by the evening's program, "Searching for Vulcanoids", by Professor Nathaniel Cunningham of Nebraska Wesleyan University. Briefly, Professor Cunningham was featured in a Lincoln-Journal Star article (http://journalstar.com/news/local/education/wesleyan-team-works-on-pluto-study/article_a87d564a-441f-5c31-aff8-d7fb8215d6b8.html) in January. Here's what Nathaniel wrote about his presentation:

A population of near-sun asteroids, dubbed *Vulcanoids*, was hypothesized over a century ago, as a means of explaining oddities of Mercury's orbital path. Although general relativity has long since solved the problem of Mercury's orbital behavior, observations have been unable to rule out the presence of a population of small bodies in stable orbits interior to Mercury's orbit. I will discuss the history and challenges of searching for Vulcanoids, and the scientific interest in these possible objects. I will also talk about a recent project using data from a *NASA* space-based mission to perform the most sensitive search yet for this still-unknown population in the Sun's immediate neighborhood.

Nathaniel is a Lincoln native and an alumnus of Pius X High School. He attended the University of Notre Dame, where he majored in Physics with a minor in Philosophy, sang in the Glee Club, learned to play Ultimate Frisbee, and met his wife. He continued his studies (and Ultimate playing) with graduate work in astrophysics at the University of Colorado, where he earned a master's degree and Ph.D. His doctoral work focused on designing and building ground- and space-based astronomical instruments, and on understanding

how very young massive stars interacted with each other in the past, as shown by the powerful outflows of gas that they have launched. As a postdoc, he worked at UNL designing detector systems for the University's ultra-high-power laser system. Nathaniel joined the Department of Physics and Astronomy at Nebraska Wesleyan University in 2010. He currently teaches physics and astronomy, and studies Pluto and other objects in the Solar System using the Hubble Space telescope. He and his wife Staci have four children.

And in April we tentatively have planned another guest speaker, Steve Rook of the University of Nebraska Law School who will talk about the law and space – not something we generally think of. So be sure to join us.

Upcoming programs:

Apr 2012: *Space Law by Steve Rook:* Steve Rook, a soon to be graduate of the University of Nebraska College of Law, will give a presentation on some of the current aspects of space & astronomy and how they relate to the law.

May 2012: *Near Star Party:* I will set up my telescope at 6:30 PM until 8 PM for anyone who would like to view the sun in H-Alpha. Anyone who would like to join me with their telescope is welcome to do so. With the sun being quite active this should be a great opportunity (I know, I've jinxed it now) for everyone to experience the H-Alpha Filter. This will be only a star party so come casual, bring a lawn chair, and enjoy the evening. We'll go until about 8 PM when everyone can adjourn to the observatory for the PAC business meeting. If the weather is cloudy we'll have our normal meeting and I'll give a short presentation.

June 2012: *BBQ Social (tentative)* We will have our June Social again this year. At this point Chef Cajon Bob has graciously agreed to smoke more pork for the BBQ pulled pork sandwiches. There will be a nominal fee (likely \$5 like last year). 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 will give a program – subject yet to be determined.

Sep 2012: *Fun With Astronomy* The PAC Executive Board will put together a short collection of fun, humorous clips about space and astronomy. You don't want to miss the fun.

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

Challenge Observing Objects for March/April

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 3226/3227

NGC 3227 is a spiral galaxy that is interacting with the dwarf elliptical galaxy NGC 3226 in Leo. NGC 3227 contains a Seyfert nucleus, a type of active galactic nucleus. Such Seyfert nuclei typically contain supermassive black holes. The dimensions are 5.4×3.6 arc minutes and has an apparent magnitude 11.1.



Beginner Object

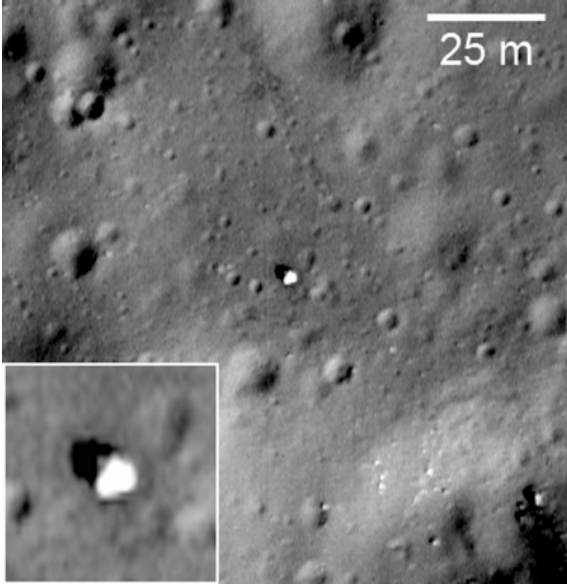
NGC 2261

Also known as Hubble's Variable Nebula or Caldwell 46. It is located in Monoceros in between the Rosette nebula and Cone nebula. It is a small, fairly bright, fan shaped nebula that looks like a comet. In the late 1800's it was discovered that it changes in both appearance and brightness over a period of a few weeks. It's apparent magnitude is 10 and is a small 2 arc seconds across.



Revisiting The First Rover

by Jason Major of Universe Today

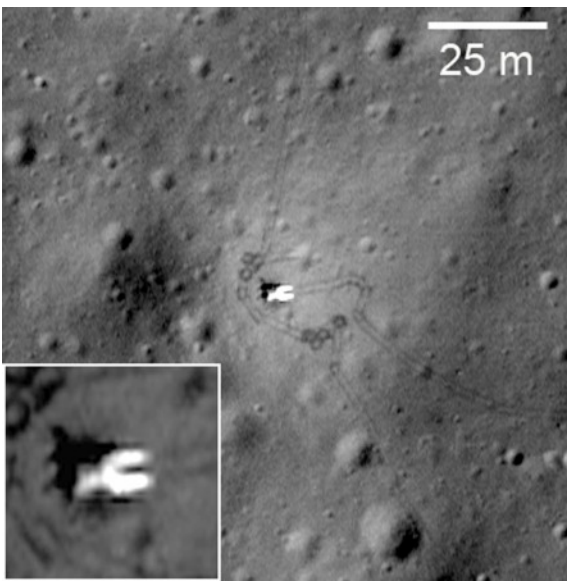


LROC image of Lunokhod 1 at rest in Mare Imbrium (NASA/GSFC/ASU)

Before there was Curiosity, before Spirit, and Opportunity, and even long before Sojourner, there was Lunokhod 1, the Soviet Union's lunar rover that explored Mare Imbrium from November of 1970 to September the following year. It was a curious-looking machine, a steampunk fantasy reminiscent of something out of a Jules Verne novel. But until the Mars Exploration Rovers nearly 40 years later, Lunokhod 1 held the record for the longest-operating robotic rover on the surface of another world.

These images from the Lunar Reconnaissance Orbiter Camera (LROC) are the most detailed yet of the now-silent Soviet rover and its lander, Luna 17.

The lander, Luna 17, was launched from Earth orbit on November 10, 1970, and entered lunar orbit five days later. It successfully soft-landed in Mare Imbrium on November 17 and deployed the Lunokhod ("moon walker" in Russian) rover, which was powered by batteries that were recharged via solar power during the lunar day.

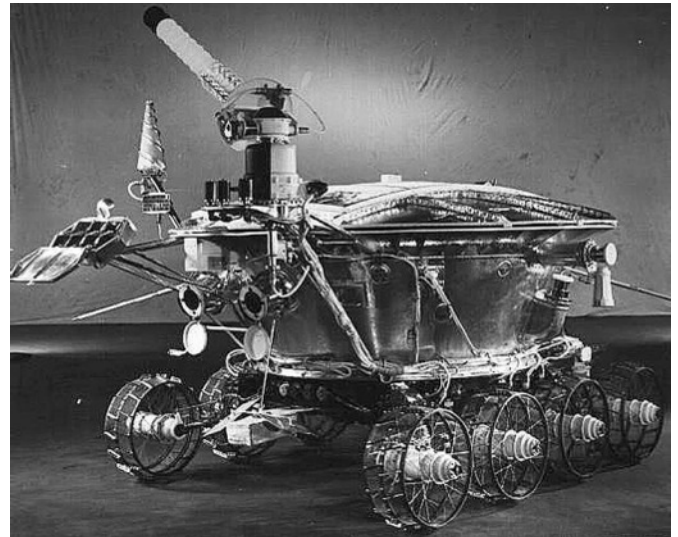


Luna 17 and Lunokhod 1's tracks (NASA/GSFC/ASU)

The 5600 kg (12,345 lb.) Lunokhod 1 boasted a suite of scientific tools for exploring the lunar surface. It was equipped with a cone-shaped antenna, a highly directional helical antenna, four television cameras, and special extendable devices to impact the lunar soil for soil density and mechanical property tests.

An x-ray spectrometer, an x-ray telescope, cosmic-ray detectors, and a laser device were also included.

The super-steampunk Lunokhod 1 rover. (NASA/GSFC)

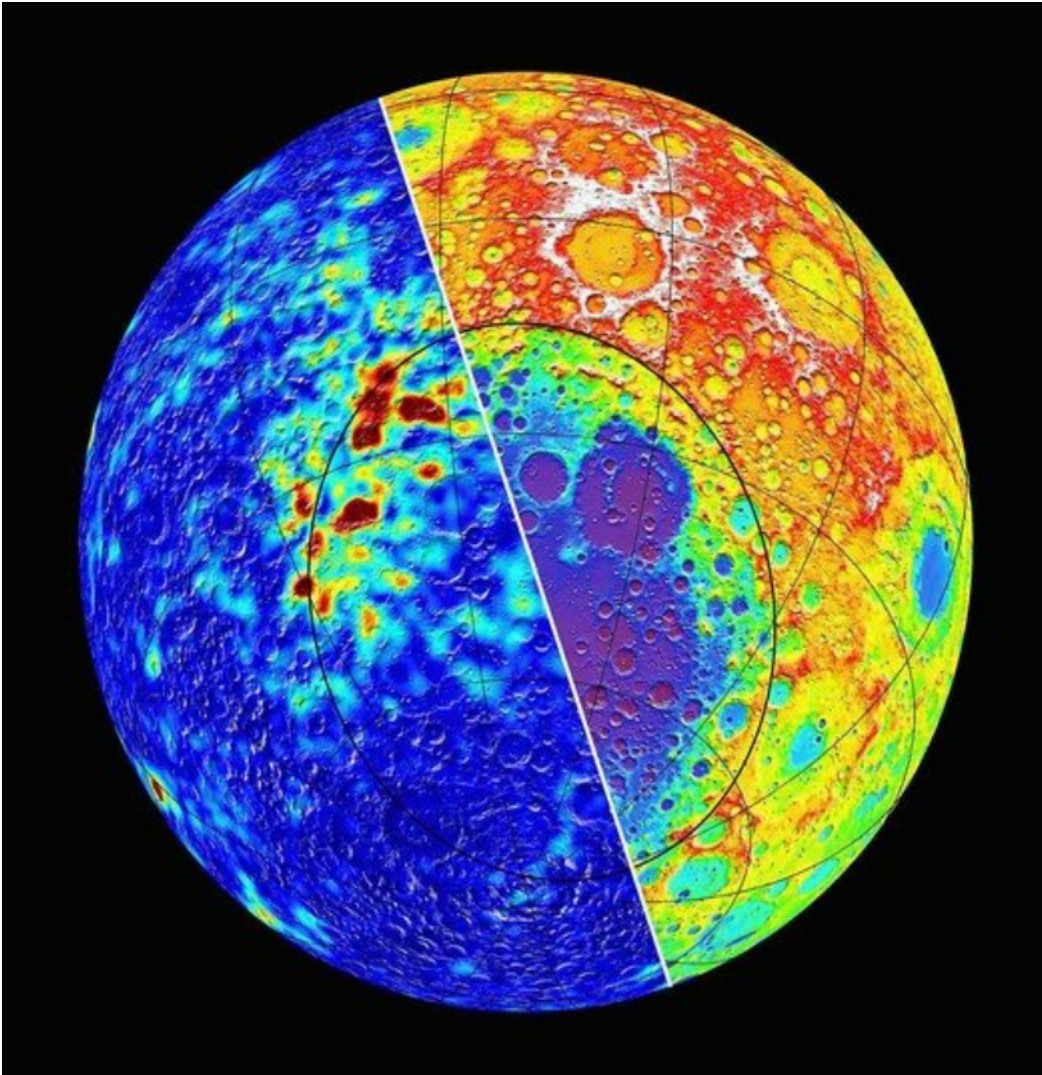


Operating for nearly 300 days — almost four times longer than planned — by the time it officially ceased operations in October 1971 Lunokhod 1 had traveled 10,540 meters and had transmitted more than 20,000 images, and had conducted over 500 lunar soil tests.

The images above were obtained during a low-altitude pass by LRO, which came within 33 km (20.5 miles) of the lunar surface.

Solving the Puzzle of Apollo 12's Mysterious Magnetic Moon Rocks

by Ray Sanders of Universe Today



Ever since their discovery by the Apollo 12 crew, scientists have been puzzled by strongly magnetized rocks found on the Moon. Most Moon rocks that were brought back by the Apollo missions have very little iron, and therefore lack the ability to be strongly magnetized. At first, the magnetic oddities didn't appear to be related to any lunar geology such as craters or lava flows. Over time, additional lunar missions have provided more data showing that only some portions of the Moon's crust have magnetic fields. A team of scientists now theorize that the magnetized "patches" on the lunar surface may be the remains of an asteroid that crashed into the Moon shortly after its formation nearly 4.5 billion years ago. The impact crater, known as the South Pole-Aitken basin is one of the largest known in our Solar System.

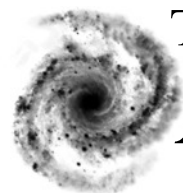
The moon's largest grouping of magnetic anomalies, on the left, is near the northern rim of the South Pole-Aitken basin, which scientists believe was created by the impact of a massive asteroid about 4.5 billion years ago. Image Credit: NASA/LRO/Science/AAAS

Mark Wieczorek, (Paris Institute for Global Physics) describes the South Pole-Aitken basin as, "this huge, whopping crater that's roughly half the size of the U.S.," and says it may hold the answers to the mystery of the Apollo 12 rocks.

Studies of the basin show that it is elliptical which suggests the impact was by a large object that hit at an oblique angle. Wieczorek speculates that the impactor was 10% to 30% iron by weight and about 100 times more magnetic than the lunar regolith. Interestingly enough, the theorized impact angle would have flung debris from the object in a pattern very similar to the observed magnetic anomalies. The material could have been magnetized as it cooled by a magnetic field that may have existed early in our Moon's history. Wieczorek and his team set out to test their theories with computer simulations of different types of impacts. The research led to a scenario where an object struck the Moon at about a 45 degree angle with a velocity of 9 meters per second. The team's best impact model was described as normal by Wieczorek who stated, "We don't require improbable conditions."

Now the team needs to address one other question: How and when did a magnetic field develop on the Moon?

Wieczorek offers a simple solution: Go back to the moon and collect samples.



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 oegrad2002@yahoo.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
March 27, 2012
7:30 PM
Hyde Observatory