

The Prairie Astronomer

July 2018 Volume 59, Issue #7

NGC 4183/FGC 1368

Rick Johnson



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT PAC MEETING: July 31 at 7:30pm

PROGRAM

Dwight Johns will talk about light pollution issues.

FUTURE PROGRAMS

August: NSP Review

September: To be announced

October: Club Viewing Night

November: How to Buy a Telescope

December: To be announced

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The Prairie Astronomy Club:
Fifty Years of Amateur Astronomy



COMPILED AND EDITED BY MARK DAHMKE

**Buy the book! The Prairie
Astronomy Club: Fifty Years
of Amateur Astronomy.**

Order online from [Amazon](https://www.amazon.com) or
[lulu.com](https://www.lulu.com).

EVENTS

PAC Meeting
Tuesday July 31, 2018, 7:30pm

Nebraska Star Party
August 5-10, 2018, Merritt Reservoir

PAC Meeting
Tuesday August 28, 2018, 7:30pm
Review of Nebraska Star Party

PAC Meeting
Tuesday September 25, 2018, 6:30pm

PAC Meeting
Tuesday October 30, 2018, 7:30pm

2018 STAR PARTY DATES



Photo by Brian Sivill

	Star Party Date	Star Party Date
January	Jan 12th	Jan 19th
February	Feb 9th	Feb 16th
March	Mar 9th	Mar 16th
April	Apr 6th	Apr 13th
May	May 4th	May 11th
June	Jun 8th	Jun 15th
July	Jul 6th	Jul 13th
August	Aug 3rd	Aug 10th
NSP	Aug 5th -10th	
September	Sep 7th	Sep 14th
October	Oct 5th	Oct 12th
November	Nov 2nd	Nov 9th
December	Nov 30th	Dec 7th

Dates in **BOLD** are closest to the New Moon.



PAC E-MAIL:

info@prairieastronomyclub.org

PAC-LIST:

Subscribe through [GoogleGroups](#).
To post messages to the list, send to the address:

pac-list@googlegroups.com

ADDRESS

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c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

WEBSITES

- www.prairieastronomyclub.org
- <https://nightsky.jpl.nasa.gov>
- www.hydeobservatory.info
- www.nebraskastarparty.org
- www.OmahaAstro.com
- Panhandleastronomyclub.com
- www.universetoday.com/
- www.planetary.org/home/
- <http://www.darksky.org/>



Night Sky Network

Meeting Minutes

President Jim Kvasnicka called the meeting to order at 7:31 p.m

He noted that election nominations for club officers will be opened at the September meeting which is still a few months away, but we need club members to step up and consider putting their name on the ballot. So, you have a few months to think about that.

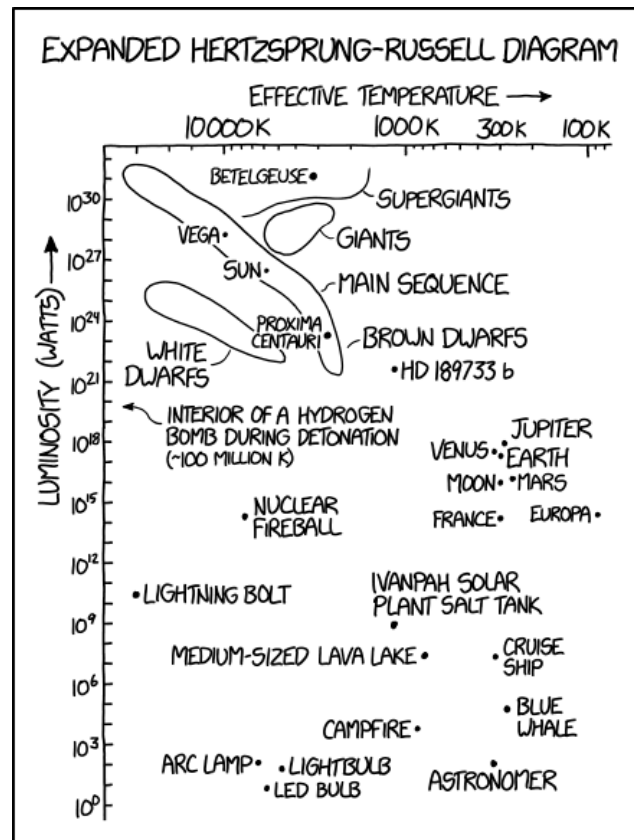
Brett Boller updated the concrete project at Branched Oak Observatory. Two quotes for laying concrete on a Club-donated pad came in: \$4,900 and \$2,700. The Club had voted to spend \$2,000 on the pad. The \$2,700 bid included all prep and ground work for a 30x30 pad. Moved that \$700 be added to the amount approved in prior vote. A question was raised about the thickness of the pad and whether the bid included wire mesh reinforcement because without that, Nebraska weather would quickly crack the concrete. The discussion paused to permit Brett to contact Michael Sibbersen regarding the bid specifications.

Also discussed was whether the thickness of the pad was adequate to support cars if they were driven over it, and it was concluded that, with a separate parking area, only foot traffic and telescopes would actually be allowed on the pad. Motion passed contingent on pad thickness of at least 4 inches and including wire mesh. Brett later reported that the bid specifications indicated thickness would vary because of the incline of the hill, but would most likely average 4 inches. The pad would consist of smaller pads with expansion gaps in between, probably 10x10-foot squares.

After much discussion ended in the conclusion that wire reinforcing mesh was a must for the project, Brett reported that Michael Sibbersen had confirmed mesh was included in the bid, so the vote for a total contribution of \$2,700 stood.

Jim adjourned the meeting at 7:53 p.m.

Submitted by Lee Thomas.



xkcd.com

NGC 3683 is a rather strange galaxy in the bowl of the Big Dipper. It's tilted dust lane is what first attracted me to this one. Later I realized it was in the Herschel 400 II observing program, another reason to be on the to-do list. I figured the odd dust lane is due to a merger with another galaxy or at least a close interaction with one. I found nothing in the literature even discussing this odd feature. It is noted in passing in over 100 papers but about the only ones giving it much time are those covering the supernova in 2004 that blew in the galaxy. But nothing on the odd dust lane that looks like it could be a polar ring or some other interaction result. Besides the tilted ring that seems to go up and over the northwest end of the galaxy there's dust lane at the southeast that also isn't aligned with the galaxy. This one runs more east-west than the galaxy does and quickly is lost when it goes off the galaxy's illuminated portion. Two interactions in its past. I found nothing on either. If anyone wants to dig through the more than 100 papers that mention the galaxy and finds something on this please let me know. I'm so short on time right now I can't spend as much time researching as I'd like.

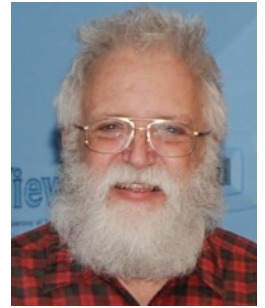
To the upper right is NGC 3674 a mostly featureless S0 galaxy. I thought I had it totally in the frame but see it extended further than NED indicated so I missed its northeastern ansae. Both galaxies were discovered by William Herschel but only 3683 is in either of the Astronomical League's observing programs. NGC 3683 was discovered first on March 18, 1790. NGC 3674 was discovered 3 years later on April 8, 1793.

There is a difference between redshift measurements and Tully-Fisher distance measurements. Redshift says 87 million light-years while Tully-Fisher says about 99 million light-years. By Redshift, I measure its size at about 55,600 light-years. By Tully-Fisher it is somewhat larger, about 63,300 light-years in size. Either way, it is a rather typically sized spiral galaxy. NGC 3674, whose redshift distance matches the Tully-Fisher distance to 3683 comes in at 45,600 light-years in size. I had to assume the northeast half of the galaxy is the same size as the southwest due to my framing error.

Below NGC 3683 is a quasar labeled FSRQ. That stands for Flat-Spectrum Radio Quasar. These may be similar or even identical to BL-Lac objects.

They aren't all that common, at least at NED.

A distant galaxy with a single drawn out arm lies to the west-southwest of NGC 3683. It is ASK 296263.0. Opposite the arm is a galaxy. Unfortunately, I found nothing on it. Could it be what created that odd arm or is it just a coincidence? Below and to the right of it is a strange blue galaxy, LEDA 2548235. It is made of two parts. The position at NED matches the gap between the two parts. Also, NED has two very different redshift distances for it. One puts it 150 million light-years away and one referred to in an essential note puts it at 700 million light-years. I used to think the main redshift they give is more likely correct but recently I found one that appears to be wrong and the essential note distance is right. In this case, flip a coin. I tend to favor the closer distance. I wish there was distance data for the blue galaxy to its west. It has much the same color and likely is related. No redshift is published for it that I found. But again, due to time issues, I didn't look beyond NED. If



someone finds something on it please let me know.

The blue star obliterating the lower left corner of the image is SAO 28035 a Magnitude 6.3 A4 star. I had one heck of a time

convincing it to let me see much of the image. When I framed the field excluding it, it sent in a horrid ghost image and blue ring. I finally found this position that got rid of those but I see

that cost a bit of NGC 3674. Hipparcos puts it at a distance of 221 light-years. I guess I should be glad it isn't closer.



Full image at 1" per pixel

August Observing: What to View

Jim Kvasnicka

Planets

Venus: Low in the west 15° above the horizon at magnitude -4.6.

Jupiter: Dims to magnitude -1.9 with a disk 35" wide.

Saturn: In Sagittarius at magnitude 0.4 with its rings tilted 26°.

Mars: Is brighter and bigger than it has been since 2003. It starts the month at magnitude -2.8 with a disk 24" wide.

Uranus and Neptune: Rise in the evening.

Mercury: Becomes visible after August 20th rising just before 5:00 am.

Meteor Showers

Perseids: Peaks the night of August 12-13, just after new Moon.

Messier List

M6/M7: Open clusters in Scorpius.

M8: The Lagoon Nebula in Sagittarius.

M9/M10: Class VIII and VII globular clusters in Ophiuchus.

M12/M19: Class IX and VIII globular clusters in Ophiuchus.

M20: The Trifid Nebula in Sagittarius.

M21/M23: Open clusters in Sagittarius.

M62/M107: Class IV and X globular clusters in Ophiuchus.

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

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

NGC and other Deep Sky Objects

NGC 6717: Palomar 9, Class VIII globular cluster in Sagittarius.

NGC 6741: Planetary nebula in Aquila.

NGC 6781: Planetary nebula in Aquila.

NGC 6818: Little Gem, planetary nebula in Sagittarius.

B86: The Ink Spot, dark nebula in Sagittarius.

Double Star Program List

Struve 2404: Close orange pair.

57 Aquilae: Pair of white stars.

Beta Cygni: Albireo, beautiful gold and blue stars.

31 Cygni: Yellow primary with a blue secondary.

61 Cygni: Two orange stars.

Epsilon Lyrae: The Double Double.

Zeta Lyrae: Yellow pair of stars.

Beta Lyrae: Shellak, yellow primary with multiple white secondary stars.



Challenge Object

NGC 6822: Barnard's Galaxy in Sagittarius.

xkcd.com

PAC's Solar Star Party



Solar Star Party



Club President Jim Kvasnicka was interviewed by the Emerging Media Division of Nebraska Educational Television for a documentary about the Nebraska Star Party. They will follow several PAC Club Members to NSP in August.

25th Nebraska Star Party - August 5-10, 2018



Photo Credit: Fred Hultstrand History in Pictures Collection, NDSU, Fargo, N.D.

Join us this summer as families from all over the US and around the world gather in the sparsely populated sand hills of North Central Nebraska to spend a good week under a galaxy of stars.

NSP Schedule of Events

Sunday: registration and check-in, optional dinner.

Monday: registration and check-in, field school, optional dinner.

Tuesday: registration and check-in, swap meet, field school, free “Cattle Country” hamburger dinner.

Wednesday: Brewer’s Niobrara Canoe or tube float, optional dinner.

Thursday: (All at Valentine High School) field school, registration, swap meet, speaker program, children’s program, dinner on your own.

Friday: public star party at 9pm.

For more information see the [NSP website](#).

Register online!

NASA's NuSTAR Mission Proves Superstar Eta Carinae Shoots Cosmic Rays

A new study using data from NASA's NuSTAR space telescope suggests that Eta Carinae, the most luminous and massive stellar system within 10,000 light-years of Earth, is accelerating particles to high energies - some of which may reach our planet as cosmic rays.

"We know the blast waves of exploded stars can accelerate cosmic ray particles to speeds comparable to that of light, an incredible energy boost," said Kenji Hamaguchi, an astrophysicist at NASA's Goddard Space Flight Center in Greenbelt, Maryland, and the lead author of the study. "Similar processes must occur in other extreme environments. Our analysis indicates Eta Carinae is one of them."

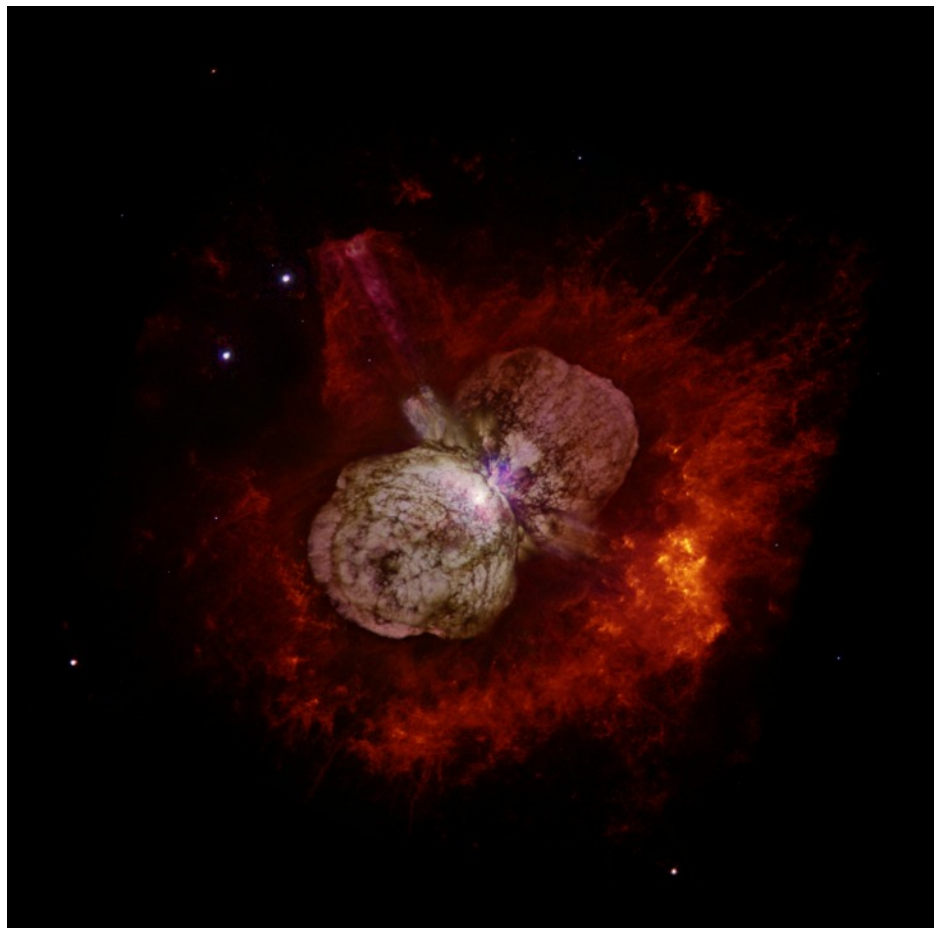
Astronomers know that cosmic rays with energies greater than 1 billion electron volts come to us from beyond our solar system. But because these particles -- electrons, protons and atomic nuclei -- all carry an electrical charge, they veer off course whenever they encounter magnetic fields. This scrambles their paths and masks their origins.

Eta Carinae, located about 7,500 light-years away in the southern constellation of Carina, is famous for a 19th century outburst that briefly made it the second-brightest star in the sky. This event also ejected a massive hourglass-shaped nebula, but the cause of the

eruption remains poorly understood.

The system contains a pair of massive stars whose eccentric orbits bring them unusually close every 5.5 years. The stars contain 90 and 30 times the mass of our Sun and pass 140 million miles (225 million kilometers) apart at their closest approach - about the average distance separating Mars and the Sun.

"Both of Eta Carinae's stars drive powerful outflows called stellar winds," said team member Michael Corcoran, also at Goddard. "[The location] where these winds clash changes during the orbital cycle, which produces a periodic signal in low-energy X-rays we've been tracking for more than two decades."



Eta Carinae's great eruption in the 1840s created the billowing Homunculus Nebula, imaged here by Hubble. Now about a light-year long, the expanding cloud contains enough material to make at least 10 copies of our Sun. Astronomers cannot yet explain what caused this eruption. Credit: NASA, ESA, and the Hubble SM4 ERO Team

NASA's Fermi Gamma-ray Space Telescope also observes a change in gamma rays -- light packing far more energy than X-rays -- from a source in the direction of Eta Carinae. But Fermi's vision isn't as sharp as that of X-ray telescopes, so astronomers couldn't confirm the connection.

To bridge the gap between low-energy X-ray monitoring and Fermi observations, Hamaguchi and his colleagues turned to NuSTAR. Launched in 2012, NuSTAR can focus X-rays of much greater energy than any previous telescope. Using both newly taken and archival data, the team examined NuSTAR observations acquired between March 2014 and June 2016, along with lower-energy X-ray observations from the European Space Agency's XMM-Newton satellite over the same period.

Eta Carinae's low-energy, or soft, X-rays come from gas at the interface of the colliding stellar winds, where temperatures exceed 70 million degrees Fahrenheit (40 million degrees Celsius). But NuSTAR detects a source emitting X-rays above 30,000 electron volts, some three times higher than can be explained by shock waves in the colliding winds. For comparison, the energy of visible light ranges from about 2 to 3 electron volts.

The team's analysis, presented in a paper published July 2 in *Nature Astronomy*, shows that these "hard" X-rays vary with the binary orbital period and show a

similar pattern of energy output to the gamma rays observed by Fermi.

The researchers say that the best explanation for both the hard X-ray and the gamma-ray emission is electrons accelerated in violent shock waves along the boundary of the colliding stellar winds. The X-rays detected by NuSTAR and the gamma rays detected by Fermi arise from starlight given a huge energy boost by interactions with these electrons.

Some of the superfast electrons, as well as other accelerated particles, must escape the system, and perhaps some eventually wander to Earth, where they may be detected as cosmic rays.

"We've known for some time that the region around Eta Carinae is the source of energetic emission in high-energy X-rays and gamma rays," said Fiona Harrison, the principal investigator of NuSTAR and a professor of astronomy at Caltech in Pasadena, California. "But until NuSTAR was able to pinpoint the radiation, show it comes from the binary and study its properties in detail, the origin was mysterious."

NuSTAR is a Small Explorer mission led by Caltech and managed by JPL for NASA's Science Mission Directorate in Washington. NuSTAR was developed in partnership with the Danish Technical University and the Italian Space Agency (ASI). The spacecraft was built

by Orbital Sciences Corp., Dulles, Virginia. NuSTAR's mission operations center is at UC Berkeley, and the official data archive is at NASA's High Energy Astrophysics Science Archive Research Center. ASI provides the mission's ground station and a mirror archive. Caltech manages JPL for NASA.

For more information on NuSTAR, visit:

<https://www.nasa.gov/nustar>

<https://www.nustar.caltech.edu>

Focus on Constellations: Scutum

Jim Kvasnicka

Scutum the Shield is a rectangle area in the Milky Way between Sagittarius on the south, Aquila to the NE and Serpens Cauda to the west. It has no individual stars as bright as 3rd magnitude and covers just 109 square degrees in the sky. Nevertheless because it is in the Milky Way it is rich in objects. The Scutum Star Cloud in the NE quadrant of the constellation is one of the most brilliant star clouds anywhere in the Milky Way. Scutum like most Milky Way constellations is rich in open clusters. Two of its open clusters are Messier objects, M11 and M26. M11 is one of the finest open clusters in the entire sky.

Showpiece Objects

Open Clusters: M11, M26
Planetary Nebulae: NGC 6302
Dark Nebulae: B55, B56

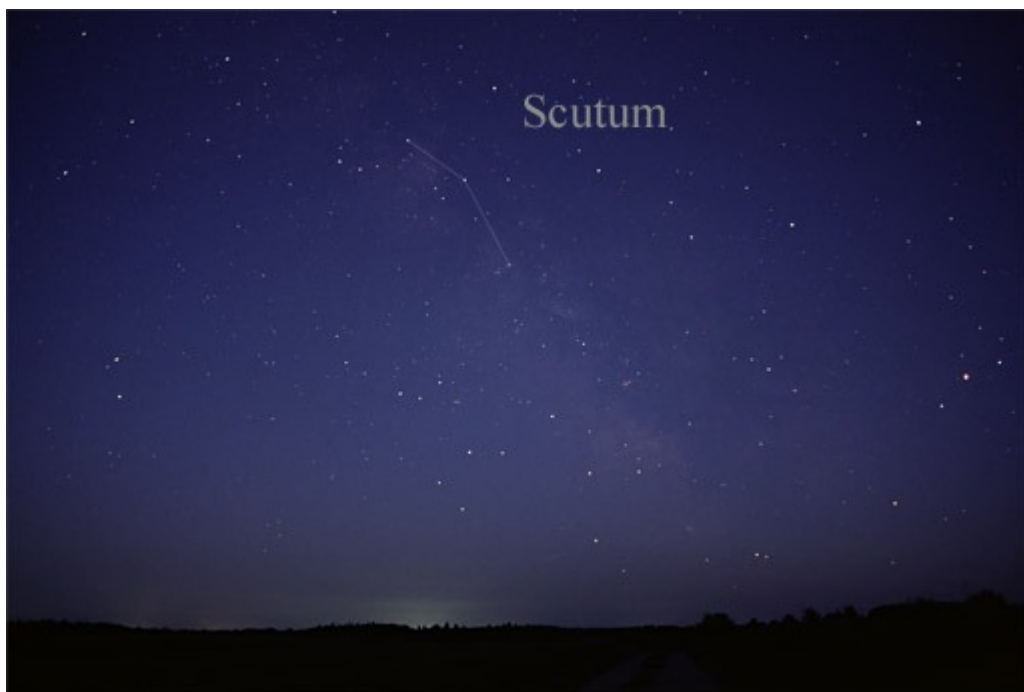
Mythology

Scutum was introduced in 1690 by Johannes Hevelius to honor John III Sobieski, the king of Poland who defeated the Turks when they besieged Vienna in 1683.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 0
Globular Clusters: 1
Open Clusters: 11
Planetary Nebulae: 1
Dark Nebulae: 18
Bright Nebulae: 0
SNREM: 0

*Till Credner - Own
work: AlltheSky.com
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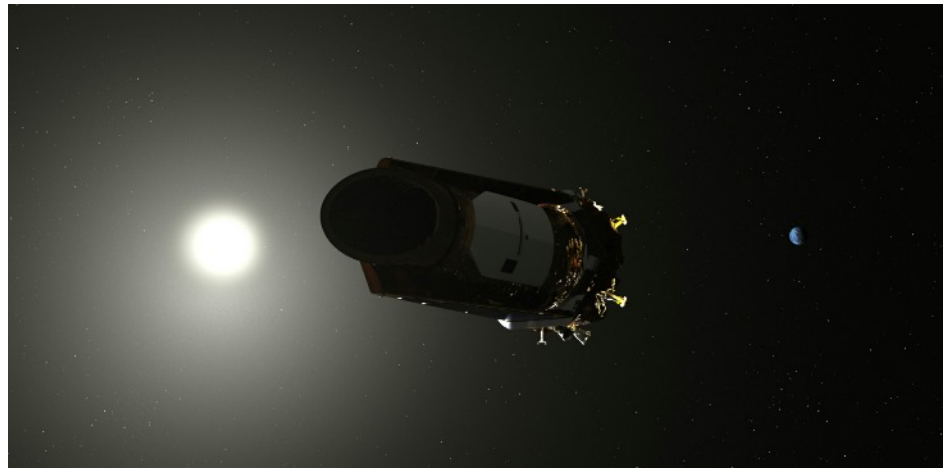


NASA's Kepler Spacecraft Pauses Science Observations to Download Science Data

Earlier this week, NASA's Kepler team received an indication that the spacecraft fuel tank is running very low. NASA has placed the spacecraft in a hibernation-like state in preparation to download the science data collected in its latest observation campaign. Once the data has been downloaded, the expectation is to start observations for the next campaign with any remaining fuel.

Since May 12, Kepler has been on its 18th observation campaign, staring at a patch of sky towards the constellation of Cancer it previously studied in 2015. The data from this second look will provide astronomers with an opportunity to confirm previous exoplanet candidates and discover new ones. Returning the data back to Earth is the highest priority for the remaining fuel.

To bring the data home, the spacecraft must point its large antenna back to Earth and transmit the data during its allotted Deep Space Network time, which is scheduled in early August. Until then, the spacecraft will remain stable and parked in a no-fuel-use safe mode. On August 2, the team will command the spacecraft to awaken from its no-fuel-use state and maneuver the



spacecraft to the correct orientation and downlink the data. If the maneuver and download are successful, the team will begin its 19th observation campaign on August 6 with the remaining fuel.

NASA will provide an update after the scheduled download. The agency has been monitoring the Kepler spacecraft closely for signs of low fuel, and expects it to run out of fuel in the next few months.

As engineers preserve the new data stored on the spacecraft, scientists are continuing to mine existing data already on the ground. Among other findings, recently 24 new planet discoveries were made using data from the 10th observation campaign, adding to the spacecraft's growing bounty of 2,650 confirmed planets.

NASA's Ames Research Center in California's Silicon Valley manages the Kepler mission and follow-up K2 mission for NASA's Science Mission Directorate. NASA's Jet Propulsion Laboratory in Pasadena, California, managed Kepler mission development. Ball Aerospace & Technologies Corporation in Boulder, Colorado, operates the flight system with support from the Laboratory for Atmospheric and Space Physics at the University of Colorado in Boulder.

From the Archives: July, 1965

-----July 2 1965-----

Our next meeting will be held July 2, at Union Savings and Loan, 56 and O St, from 7.30 to 10 P M.

Due to the weather we have been experiencing the past few weeks, we were unable to have our planned public Sky Show at Gateway, June 7. We have planned another one for Thursday, July 8, at Gateway Shopping Center, anytime after Dark.

Our next meeting will be mainly concerned with furthering the plans on our observatory.

**Astronomy
Innanae**

July 2-----



Club Meeting
(7.30)

July 8-----Public Sky Show
(Gateway)

-----Lincoln Nebr-----

July boasts at least three interesting objects.

In scorpius, there is a binary system observable only with at least a 4 inch scope. This is the binary system of the bright red star "Antares"

This isn't the only binary system in Scorpius, however. The other doubles are the stars Beta and Mu-Scorpii.

M60, a rich star cluster, is visible in July. It is globular in shape, and is one of the richest clusters because of the number of stars it contains.

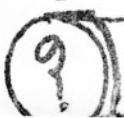
Many novae have appeared in this region of the sky. The first was observed more than 2000 years ago.

An interesting variable star can be observed in Corona Borealis. This star which is normally a 6th mag star. It may keep its brightness for many months, but it soon becomes a 14th or 15th mag star in a matter of weeks.

Come to the meeting July 2nd.

Editor's note: for those too young to remember stencils and Mimeograph machines, [see Wikipedia](https://en.wikipedia.org/wiki/Mimeograph).

Tom journey had a fine news letter, all ready for your Sec'y. The Stencil looked fine but when I put it on the machine to print I found it was Dried out. Wouldn't Print, So I copied his letter on a new Stencil. I went try to duplicate his art work. Jess.



CLUB MEMBERSHIP INFO

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, please contact a club officer. Scopes can be checked out at a regular club meeting and kept for one month. Checkout can be extended for another month if there are no other requests for the telescope, but you must notify a club officer in advance.

100mm Orion refractor: David Pennington
10 inch Meade Dobsonian: Lee Taylor
13 inch Truss Dobsonian: Available

CLUB APPAREL



Order club apparel from cafepress.com:



Shop through Amazon Smile to automatically donate to PAC:



CLUB OFFICERS

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