The Focal Point

The Atlanta Astronomy Club
Established 1947
February 2017

Vol. 29 No. 9

Editor: Tom Faber

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February AAC General Meeting

Editor's Note: Due to a last minute scheduling issue our January meeting had to be moved from the Fernbank Science Center to the AFS building and held in the evening. Phil was unable to be at the evening meeting so he will present his program about planets at our February meeting.

Please join us for the next general meeting of the Atlanta Astronomy Club, to be held on Saturday, February 18th at 3PM at the Fernbank Science Center. A short beginner's program will be presented at 2PM. Our speaker will be AAC member Phil Danneman. Phil will present a talk about planets - current, former, future, hypothetical, extrasolar and imaginary.

The Talk

Phil writes: "My program will be about Planets - current, former, future, hypothetical, extrasolar and imaginary. I will also talk briefly about the history of the Solar System. There are 8 bodies in the Solar System classified as planets today, but there have been as many as 23 at one time. There have also been a number of hypothetical planets, ether proven, unproven, disproven, or unprovable. Outside our Solar System, over 1300 planets have been discovered. I will give a presentation that includes each of these categories along with some history of our knowledge of the Solar System."

Speaker Bio

Phil first became interested in astronomy in the 5th grade when we covered the Solar System in science class. He has since followed astronomy in newspapers, magazines, and in visits to various Planetariums, and he has followed the space program through Apollo. Phil began observing just before joining the AAC in 1999.

Phil has a degree in electronics from Trident Technical College in North Charleston, SC and owns Atlanta Lab Systems, which he founded in 1987. Atlanta Lab Systems repairs and sells electronic instruments that are mainly used for environmental monitoring and worker safety.

WANTED!
Candidates for Board Positions

The elections for the new AAC Board take place in May 2017. Most of the current position holders have been serving for 7 years or more and are choosing not to run again.

We are asking Club members who have a little spare time, energy and fresh ideas to seriously consider running for a Board position. Experience not necessary!

Positions open are:

President - Runs the General Meetings, oversees all Club committees and activities.

Program (Speaker) Chair 1st VP - Gets speakers or arranges activities for the monthly General Meeting.

Observing Chair 2nd VP - Arranges the monthly Dark Sky observing events; manages the Club's observing sites and equipment.

Corresponding Secretary (Newsletter Editor) - Publishes the *Focal Point.*

Recording Secretary - Records the minutes of the Monthly Meetings and Board Meetings (approx 4 per year).

Board Members - Attends the Board Meetings (approx 4 per year).

If you are interested in running for one of these positions, ask the current Board member for information about their responsibilities.

March is Membership Renewal Month

The AAC has moved to a "one-date-for-all" membership renewal. ALL CLUB MEMBERS, with certain exceptions, should submit their $30 dues for 2016 by the end of March. Please send your renewals to AAC Treasurer Sharon Carruthers, renew online using PayPal, or you can bring your renewal to the March Meeting. For more information see: http://atlantaastronomy.org/?page_id=22

Thank You for your support of the AAC!

January Meeting Report

Photos by Tom Faber unless noted

Due to a last minute scheduling issue our January 21st meeting had to be moved from the Fernbank Science Center to the AFS building and held that evening. Our scheduled speaker, Phil Danneman, was unable to be at the evening meeting so he will present his program about planets at our February meeting. At 6PM Mark Banks provided a short beginners talk. The main meeting began at 7PM with about 40 members and guests present. Long time AAC member Richard Jakiel (photo right, on the right) presented a very interesting and informative talk titled "Great Comets in History." Rich talked about bright, spectacular, and famous comets throughout history and how they influenced people and even the course of historical events. After his talk Rich answered a number of questions. Club officers then announced upcoming AAC events and activities. Due to cloudy skies we were unable to do any observing after the meeting, but a number of us went to a nearby restaurant for dinner and more conversations.

The AAC Zombie Party

By Daniel Herron, AAC Observing Chair

This year's Zombie Party is scheduled for Thursday, April 27 thru Sunday, April 30 (3 nights) at the Deerlick Astronomy Village.

The Zombie party is a no-frills, open to the public, 3 night star party hosted by the Atlanta Astronomy Club. No speakers, workshops, or sessions - just observing. This event if open to all, beginners and experts alike, AAC members, and non-members (how else are we going to get you hooked!).

The event is $15 per person per night due upon arrival, no refunds for bad weather once paid. See you there!

Weather:

General rule if the weather looks to be rainy during the night we will just cancel for that night and start the party the next day. I will make the go/no-go decision for Thursday by Wednesday night.

Note:

The Zombie party got its name from the way we all look the next morning after staying awake all night observing and has nothing to do with the undead that are occasionally rumored to walk the area!

The Next Charlie Elliott Meeting

Meeting Details

Please join us on February 25, 2017 at 3:30 p.m. for our meeting! Details of the meeting and talk are TBA. Check here for updates: http://ceastronomy.org/blog/home

All of the Above!

Charlie Elliott Astronomy Observing Supervisor David Whalen will reprise his stand up comedy routine and might even talk about what you can expect to see in the sky this month with binoculars and small telescopes, as well as the monthly observing challenge.

Observing After the Meeting

All are invited to Jon Wood Astronomy Field immediately after the meeting (weather-permitting). The event is free and everyone is welcome.

Minutes & Handouts: The minutes, handouts, and presentations from past meetings of Charlie Elliott Astronomy are available for download on our Past Events web page, http://ceastronomy.org/blog/events. Monthly sky maps are available from skymaps.com.

Upcoming meeting dates are: February 25, March 25 (potluck), April 22, May 27, June 24 (potluck), July 22.

The Astronomical League

As a member of the **Atlanta Astronomy Club** you are automatically also a member of the **Astronomical League**, a nation wide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you. They include:

* You will receive *The Reflector*, the AL's quarterly newsletter.

* You can use the Book Service, through which you can buy astronomy-related books at a 10% discount.

* You can participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others.

To learn more about the Astronomical League and its benefits for you, visit http://www.astroleague.org

Atlanta Astronomy Club Board Meeting August 14, 2016

In attendance:

Brigette Fessele	Tom Faber	Sharon Carruthers
Dave Lumpkin	Mark Banks	Steve Phillips

Minutes of previous meeting read, moved and approved to accept.

President - Mark Banks

VR -finish removing stuff from VR after PSSG'16; disassemble 20" scope and 10" Cave; hardware from roll-off roof; piers & toilet - possibly of renting a truck to move stuff to DAV for storage

DAV - sign a contract ASAP for use of DAV site for PSSG; Mark presented a proposed Lease Contract, however as the PSSG Chair must run up alternative proposals for payment, and various stipulations i.e. exclusive use clause, this was tabled until Peter could write these up before the AAC approaches DAV

Van Macatee has site that he has offered for PSSG use - Club must see site to check out facilities & discuss issues of site upgrades and access and any share of costs for these

New Meeting site - seeking a site that we can have evening meetings with observing after wards

Program Chair - Rich Jakiel resigned this position - Mark is considering a three man committee to handle the position - talked to Annette Michel & Alex Langoussis

Summer Meetings - cancel meetings in June, July & August; have outreach programs instead (i.e. at East Cobb Park) or observing nights for members & public

Brookwood High School, Snellville - is looking for someone to help with their Science Club

PSSG'16 - Peter Macumber

Deadline for T-shirt orders is Sept 14th; registration is Sept 19th - to do

To Do - send e-mail to Club members; add Paypal link to AAC website; notices to public sites

Treasurer - financial report presented, Moved & approved to accept

Program Chair - see President notes

Observing Chair - absent - President reported on currently scheduled up coming events

Recording Secretary - Lilli Linbeck has offered to fill the position

New Business:

Order new business cards - Sharon Carruthers

Ken Olson has accepted positions as Board Member & AL rep

Eclipse Committee - Dave Lumpkin - to handle requests from Smyrna Library, Tellus & Fernbank, etc who have requested the AAC to help with their programs on that date - as many members will be leaving the state to observe the eclipse, there may not be many members in Atlanta to help them out

Meeting Adjourned - Next Meeting Date not set

NGC 248 in the Small Magellanic Cloud

NASA STScI News release - Dec 20, 2016

NASA's Hubble Space Telescope captured two festive-looking nebulas, situated so as to appear as one. They reside in the Small Magellanic Cloud, a dwarf galaxy that is a satellite of our Milky Way galaxy. Intense radiation from the brilliant central stars is heating hydrogen in each of the nebulas, causing them to glow red.

The nebulas, together, are called NGC 248. They were discovered in 1834 by the astronomer Sir John Herschel. NGC 248 is about 60 light-years long and 20 light-years wide. It is among a number of glowing hydrogen nebulas in the dwarf satellite galaxy, which is located approximately 200,000 light-years away in the southern constellation Tucana.

The image is part of a study called Small Magellanic Cloud Investigation of Dust and Gas Evolution (SMIDGE). Astronomers are using Hubble to probe the Milky Way satellite to understand how dust is different in galaxies that have a far lower supply of heavy elements needed to create dust. The Small Magellanic Cloud has between a fifth and a tenth of the amount of heavy elements that the Milky Way does. Because it is so close, astronomers can study its dust in great detail, and learn about what dust was like earlier in the history of the universe. "It is important for understanding the history of our own galaxy, too," explained the study's principal investigator, Dr. Karin Sandstrom of the University of California, San Diego. Most of the star formation happened earlier in the universe, at a time where there was a much lower percentage of heavy elements than there is now. "Dust is a really critical part of how a galaxy works, how it forms stars," said Sandstrom.

The data used in this image were taken with Hubble's Advanced Camera for Surveys in September 2015.

Credits: NASA, ESA, STScI, K. Sandstrom (University of California, San Diego), and the SMIDGE team

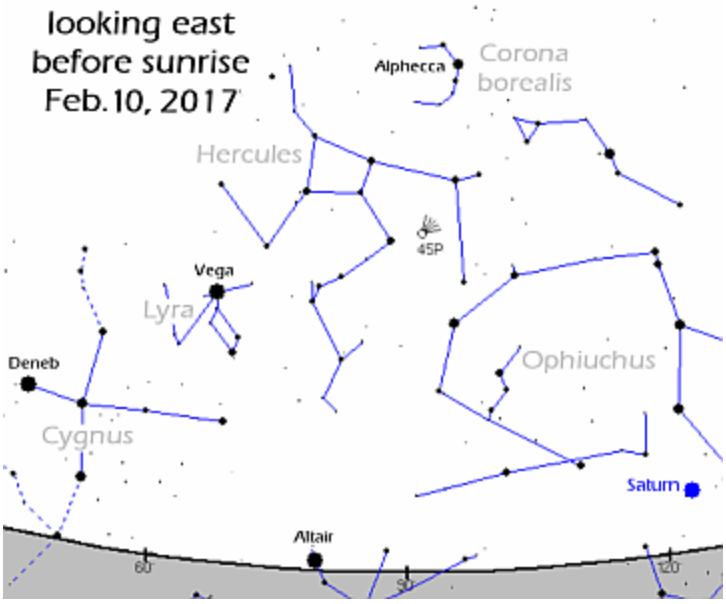
Disassembly of the VR 20-inch Scope

Work to disassemble the 20-inch reflector at the club's Villa Rica Observatory for its eventual move the AAC's site at the Deerlick Astronomy Village got underway on Saturday, February 4. This photo by Peter Macumber shows that the OTA has been removed from the fork mount. The photo shows (left-right) Ken Olson, Mark Banks, Sharon Carruthers, and Philip Johnson.

Green Comet Approaches Earth

Credit: http://www.spaceweather.com by Dr. Tony Phillips

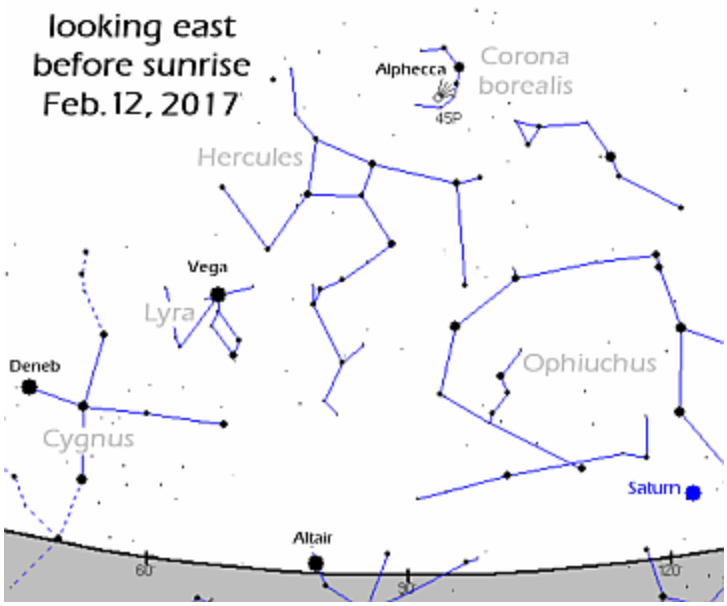
A small comet named 45P/Honda-Mrkos-Pajdusakova (45P for short) is approaching Earth. At closest approach on Feb. 11th, the comet will be 7.4 million miles from our planet, visible in binoculars and small telescopes.



According to the Minor Planet Center, this is the 8th closest pass of any comet in the modern era (since ~1950, when modern technology started being used to study comets). It will only be 31 times farther from Earth than the Moon. Interestingly, 45P made an even closer approach on its previous orbit (23 lunar distances), so it is also on the list as the 5th closest.

Continued on next page

Proximity makes the comet bright despite its small size. Forecasters say 45P could be on the verge of naked eye visibility (6th magnitude) when it emerges into the pre-dawn sky later this week. The best time to look is during the dark hours before sunrise between Feb 9th and 12th. The comet will be racing through the constellation Hercules high in the eastern sky.



XJ1500+0154: Black Hole Meal Sets Record for Length and Size

NASA/Chandra X-ray Center News Release - February 6, 2017

A giant black hole ripped apart a star and then gorged on its remains for about a decade, according to astronomers. This is more than ten times longer than any observed episode of a star's death by black hole.

Researchers made this discovery using data from NASA's Chandra X-ray Observatory and Swift satellite as well as ESA's XMM-Newton.

The trio of orbiting X-ray telescopes found evidence for a "tidal disruption event" (TDE), wherein the tidal forces due to the intense gravity from a black hole can destroy an object — such as a star — that wanders too close. During a TDE, some of the stellar debris is flung outward at high speeds, while the rest falls toward the black hole. As it travels inwards to be ingested by the black hole, the material heats up to millions of degrees and generates a distinct X-ray flare.

"We have witnessed a star's spectacular and prolonged demise," said Dacheng Lin from the University of New Hampshire in Durham, New Hampshire, who led the study. "Dozens of tidal disruption events have been detected since the 1990s, but none that remained bright for nearly as long as this one."

The extraordinary long bright phase of this event spanning over ten years means that among observed TDEs this was either the most massive star ever to be completely torn apart during one of these events, or the first where a smaller star was completely torn apart.

The X-ray source containing this force-fed black hole, known by its abbreviated name of XJ1500+0154, is located in a small galaxy about 1.8 billion light years from Earth.

The source was not detected in a Chandra observation on April 2nd, 2005, but was detected in an XMM-Newton observation on July 23rd, 2005, and reached peak brightness in a Chandra observation on June 5, 2008.

These observations show that the source became at least 100 times brighter in X-rays. Since then, Chandra, Swift, and XMM-Newton have observed it multiple times.

The sharp X-ray vision of Chandra data shows that XJ1500+0154 is located at the center of its host galaxy, the expected location for a supermassive black hole.

The X-ray data also indicate that radiation from material surrounding this black hole has consistently surpassed the so-called Eddington limit, defined by a balance between the outward pressure of radiation from the hot gas and the inward pull of the gravity of the black hole.

"For most of the time we've been looking at this object, it has been growing rapidly," said co-author James Guillochon of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. "This tells us something unusual — like a star twice as heavy as our Sun — is being fed into the black hole."

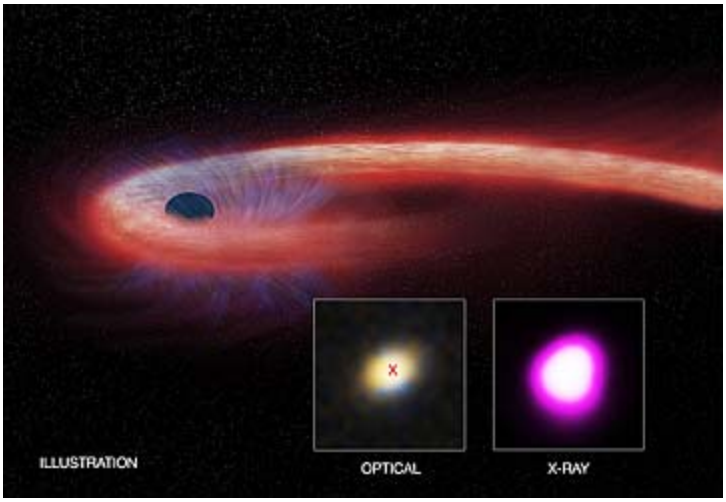
The conclusion that supermassive black holes can grow, from TDEs and perhaps other means, at rates above those corresponding to the Eddington limit has important implications. Such rapid growth may help explain how supermassive black holes were able to reach masses about a billion times higher than the sun when the universe was only about a billion years old.

"This event shows that black holes really can grow at extraordinarily high rates," said co-author Stefanie Komossa of QianNan Normal University for Nationalities in Duyun City, China. "This may help understand how precocious black holes came to be."

Based on the modeling by the researchers the black hole's feeding supply should be significantly reduced in the next decade. This would result in XJ1500+0154 fading in X-ray brightness over the next several years.

A paper describing these results appears on February 6th issue in Nature Astronomy and is available online https://arxiv.org/abs/1702.00792. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

A labeled image, a podcast, and a video about the findings are available at: http://chandra.si.edu



Credit: X-ray: NASA/CXC/UNH/D.Lin et al, Optical: CFHT, Illustration: NASA/CXC/M.Weiss

Geminga and B0355+54: Chandra Images Show That Geometry Solves a Pulsar Puzzle

NASA/Chandra X-ray Center News Release - January 18, 2017

NASA's Chandra X-ray Observatory has taken deep exposures of two nearby energetic pulsars flying through the Milky Way galaxy. The shape of their X-ray emission suggests there is a geometrical explanation for puzzling differences in behavior shown by some pulsars.

Pulsars - rapidly rotating, highly magnetized, neutron stars born in supernova explosions triggered by the collapse of massive stars- were discovered 50 years ago via their pulsed, highly regular, radio emission. Pulsars produce a lighthouse-like beam of radiation that astronomers detect as pulses as the pulsar's rotation sweeps the beam across the sky.

Since their discovery, thousands of pulsars have been discovered, many of which produce beams of radio waves and gamma rays. Some pulsars show only radio pulses and others show only gamma-ray pulses. Chandra observations have revealed steady X-ray emission from extensive clouds of high-energy particles, called pulsar wind nebulas, associated with both types of pulsars. New Chandra data on pulsar wind nebulas may explain the presence or absence of radio and gamma-ray pulses.

This four-panel graphic shows the two pulsars observed by Chandra. Geminga is in the upper left and B0355+54 is in the upper right. In both of these images, Chandra's X-rays, colored blue and purple, are combined with infrared data from NASA's Spitzer Space Telescope that shows stars in the field of view. Below each data image, an artist's illustration depicts more details of what astronomers think the structure of each pulsar wind nebula looks like.

For Geminga, a deep Chandra observation totaling nearly eight days over several years was analyzed to show sweeping, arced trails spanning half a light year and a narrow structure directly behind the pulsar. A five-day Chandra observation of the second pulsar, B0355+54, showed a cap of emission followed by a narrow double trail extending almost five light years.

The underlying pulsars are quite similar, both rotating about five times per second and both aged about half a million years. However, Geminga shows gamma-ray pulses with no bright radio emission, while B0355+54 is one of the brightest radio pulsars known yet not seen in gamma rays.

A likely interpretation of the Chandra images is that the long narrow trails to the side of Geminga and the double tail of B0355+54 represent narrow jets emanating from the pulsar's spin poles. Both pulsars also contain a torus, a disk-shaped region of emission spreading from the pulsar's spin equator. These donut-shaped structures and jets are crushed and swept back as the pulsars fly through the Galaxy at supersonic speeds.

In the case of Geminga, the view of the torus is close to edge-on, while the jets point out to the sides. B0355+54 has a similar structure, but with the torus viewed nearly face-on and the jets pointing nearly directly towards and away from Earth. In B0355+54, the swept-back jets appear to lie almost on top of each other, giving a doubled tail.

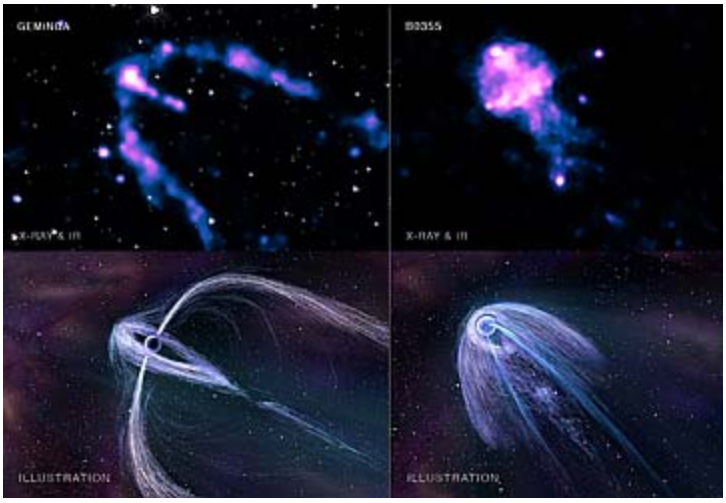
Both pulsars have magnetic poles quite close to their spin poles, as is the case for the Earth's magnetic field. These magnetic poles are the site of pulsar radio emission so astronomers expect the radio beams to point in a similar direction as the jets. By contrast the gamma-ray emission is mainly produced along the spin equator and so aligns with the torus.

For Geminga, astronomers view the bright gamma-ray pulses along the edge of the torus, but the radio beams near the jets point off to the sides and remain unseen. For B0355+54, a jet points almost along our line of sight towards the pulsar. This means astronomers see the bright radio pulses, while the torus and its associated gamma-ray emission are directed in a perpendicular direction to our line of sight, missing the Earth.

These two deep Chandra images have, therefore, exposed the spin orientation of these pulsars, helping to explain the presence, and absence, of the radio and gamma-ray pulses.

The Chandra observations of Geminga and B0355+54 are part of a large campaign, led by Roger Romani of Stanford University, to study six pulsars that have been seen to emit gamma-rays. The survey sample covers a range of ages, spin-down properties and expected inclinations, making it a powerful test of pulsar emission models.

A paper on Geminga led by Bettina Posselt of Penn State University was accepted for publication in The Astrophysical Journal and is available online [https://arxiv.org/abs/1611.03496]. A paper on B0355+54 led by Noel Klingler of the George Washington University was published in the December 20th, 2016 issue of The Astrophysical Journal and is available online [https://arxiv.org/abs/1610.06167]. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.



Credit: X-ray: NASA/CXC/PSU/B.Posselt et al; Infrared: NASA/JPL-Caltech; Illustration: Nahks TrEhnl

Images from Cassini's "Grand Finale"

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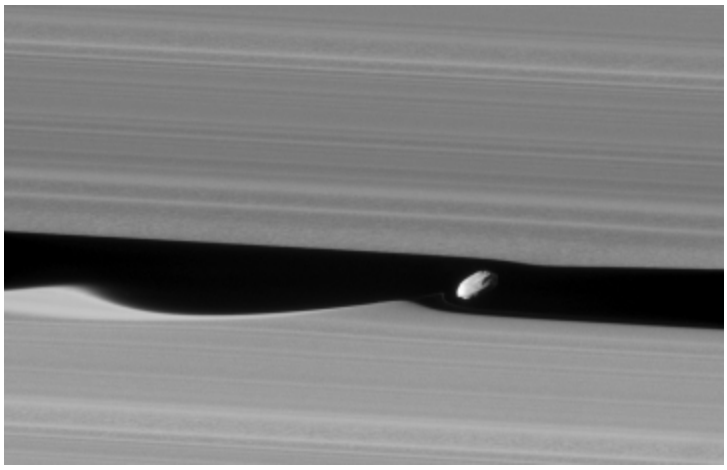
Image on previous page: The small Saturnian moon Epimetheus has grooves similar in appearance to the grooves of the Martian moon Phobos. This image was taken by Cassini on Jan. 30, 2017.



Daphnis, is featured in this view, taken as NASA's Cassini spacecraft made one of its ring-grazing passes over the outer edges of Saturn's rings on Jan. 16, 2017. This is the closest view of the small moon obtained yet.

Daphnis (5 miles or 8 kilometers across) orbits within the 42-kilometer (26-mile) wide Keeler Gap. Cassini's viewing angle causes the gap to appear narrower than it actually is, due to foreshorteneing.

The little moon's gravity raises waves in the edges of the gap in both the horizontal and vertical directions. Cassini was able to observe the vertical structures in 2009, around the time of Saturn's equinox.

Image Credits: NASA/JPL-Caltech/Space Science Institute

The **Atlanta Astronomy Club, Inc**., one of the South's largest and oldest astronomical society, meets at **3:00 P.M.** on the 2nd Saturday of each month at the Fernbank Science Center in Decatur, or occasionally at other locations or times. Membership fees are **$30** for a family or single person membership. College Students membership fee is **$15**. These fees are for a one year membership.

Magazine subscriptions to ***Sky & Telescope*** or ***Astronomy*** can be purchased through the club for a reduced rate. The fees are **$33** for Sky & Telescope and **$34** for Astronomy. Renewal forms will be sent to you by the magazines. Send the renewal form along with your check to the Atlanta Astronomy Club treasurer.

The Club address: Atlanta Astronomy Club, Inc., P.O. Box 76155, Atlanta, GA 30358-1155. AAC Web Page: **http://www.AtlantaAstronomy.org.** Send suggestions, comments, or ideas about the website to webmaster@AtlantaAstronomy.org. Also send information on upcoming observing events, meetings, and other events to the webmaster.

Atlanta Astronomy Club Online

While this newsletter is the official information source for the Atlanta Astronomy Club, it is only up to date the day it is posted. So if you want more up to date information, go to our club's website. The website contains pictures, directions, membership applications, events, updates, and other information. http://www.atlantaastronomy.org You can also follow the AAC on Facebook by joining the AAC group, and on Twitter at http://twitter.com/atlastro.

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PSSG Co-Chair: Open

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The Focal Point

Newsletter of The Atlanta Astronomy Club, Inc.

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We're here to help! Here's how how to reach us:

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Atlanta, GA 30358-1155
www.atlantaastronomy.org
On Twitter at http://twitter.com/atlastro

FIRST CLASS

www.beetagg.com

Calendar by Tom Faber (Times EDT/EST unless noted)

AAC Events are listed in BOLD

Feb 10th, Friday: Full Moon. Penumbral Lunar Eclipse: First visible ~6:14PM, Mid-eclipse 7:44PM, Last visible 9:14PM.
Feb 15th, Wednesday: Moon near Jupiter.
Feb 17th, Friday: Venus at greatest brilliancy magnitude -4.8
Feb 18th, Saturday: **AAC Meeting at Fernbank Science Center 3:00PM.** Moon Last Quarter.
Feb 20th, Monday: Moon near Saturn.
Feb 25th, Saturday: **CE Chapter Meeting.**
Feb 26th, Sunday: New Moon.
Feb 27th, Monday: Mars near Uranus.
Feb 28th, Tuesday: Moon near Venus.
Mar 2nd, Thursday: Neptune conjunction with Sun.
Mar 4th, Saturday: Moon in Hyades.
Mar 5th, Sunday: Moon First Quarter.
Mar 7th, Tuesday: Mercury at superior conjunction.
Mar 12th, Sunday: Full Moon. Daylight Saving Time begins at 2:00AM.
Mar 18th, Saturday: **AAC Meeting at Fernbank Science Center 3:00PM.**
Mar 20th, Monday: Moon Last Quarter. Equinox at 6:29AM.
Mar 25th, Saturday: **CE Chapter Meeting.** Venus at inferior conjunction. Try to see Venus in both the morning and evening sky!
Mar 27th, Monday: New Moon.
Mar 29th, Wednesday: Moon near Mercury.
Mar 30th, Thursday: Moon near Mars.
Apr 3rd, Monday: Moon First Quarter.
Apr 11th, Tuesday: Full Moon.

For more event listings see the calendar at www.atlantaastronomy.org

Atlanta Astronomy Club Listserv

Subscribe to the Atlanta Astronomy Club Mailing List**:** The name of the list is: AstroAtlanta. The address for messages is: AstroAtlanta@yahoogroups.com . To add a subscription, send a message to: AstroAtlanta-subscribe@yahoogroups.com .

Focal Point Deadline and Submission Information

Please send articles, pictures, and drawings in electronic format on anything astronomy, space, or sky related to Tom Faber at focalpoint@atlantaastronomy.org. Please send images separate from articles, not embedded in them. Articles are preferred as plain text files with image separate but Word documents or PDFs are okay. **The deadline for March is Saturday, February 25. Submissions received after the deadline will go in the following issue**.