The Focal Point

The Atlanta Astronomy Club
Established 1947
January 2017

Vol. 29 No. 8

Editor: Tom Faber

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January AAC General Meeting

Please join us for the next general meeting of the Atlanta Astronomy Club, to be held on Saturday, January 21st 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. I have since followed astronomy in newspapers, magazines, and in visits to various Planetariums, and followed the space program through Apollo. I began observing just before joining the AAC in 1999.
I have a degree in electronics from Trident Technical College in North Charleston, SC and own Atlanta Lab Systems, which I founded in 1987. We repair and sell electronic instruments that are mainly used for environmental monitoring and worker safety.

Remembering Mark Dove

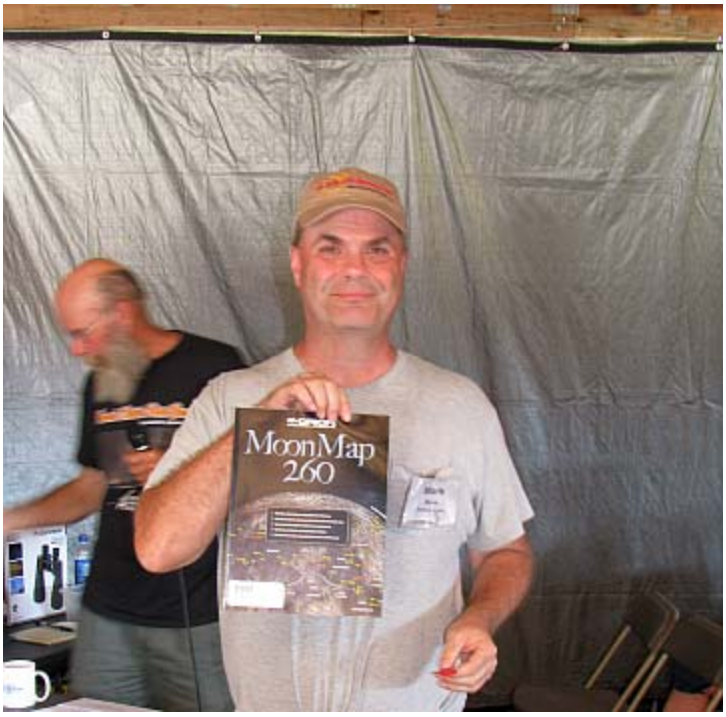
It is with shock and sadness that we learned of the passing of long time AAC member Mark Dove on December 11. Mark was a regular attendee of the Peach State Star Gaze, attending the most recent Peach State just 2 months earlier. He also helped out at many sidewalk and school astronomy events. Ad astra Mark - You will be greatly missed.

Here is Mark's obituary published in the Gainesville Times:

Mr. Mark David Dove, age 55, of Oakwood, passed away on Sunday, Dec. 11, 2016, while hiking on the Appalachian Trail following a sudden illness.

Mr. Dove was born Dec. 3, 1961, in Athens, Ga., to Julian Dove and Edith Mize Dove. He was the part owner and treasurer of North Georgia Supply and was of the Baptist faith. Mark loved hiking and was part of the Georgia Appalachian Trail Club. He was also a member of North Georgia Hiking Club, Atlanta Astronomer's Club and North Georgia Astronomers. Mark donated a lot of his time with schools studying astronomy. Mr. Dove is survived by his parents, Julian and Edith Dove of Gainesville; sister and brother-in-law, Amy and Jack Dooley of Gainesville; niece, Jaclyn Dooley of Gainesville; and many other family members.

Send online condolences to www.memorialparkfuneralhomes.com.



Mark at the 2016 Peach State Star Gaze

December Meeting & Holiday Potluck

Photos by Tom Faber unless noted

The Atlanta Astronomy Club held its annual Holiday Potluck dinner and meeting on Saturday, December 17 starting at 6PM at the AFS building in the Smyrna area. Approximately 40 members and guests attended. The AAC provided turkey, ham, soft drinks, and coffee. The attendees brought a number of yummy side dishes, appetizers, and desserts. Everyone had a great dinner. After the dinner Tom Faber gave a short presentation about upcoming astronomical events in 2017, including the long awaited August 21 solar eclipse. Club officers then announced upcoming AAC events. Unfortunately cloudy skies prevented any use of telescopes after the meeting.

The Next Charlie Elliott Meeting

Meeting Details

Please join us on January 28, 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.

College Night under the Stars

The Atlanta Astronomy Club and the Deerlick Group are hosting a "College Night Under the Stars" to introduce students to the wonders of the night sky. This event will be held on Saturday, January 28 starting at 3PM. The Rain/Cloud date will be Saturday February 25th 2017. The event is $20 if you pre-register by Sunday, January 22. After that date it will be $25 to be paid on-site. A Release and Hold Harmless must be signed by all attendees. Payment Options are: Check and Money Order can be mailed, but must be received by January 22, or payment can be made online using PayPal. You will fill out the Registration and email to the treasurer. The event schedule is: 3p.m. – Check In, 3 – 6 p.m. – Camp set-up & Dinner, 6 p.m – Lecture: An Introduction to the Sky, 7 p.m. – Observing & Telescoping with the help of Atlanta Astronomy Club members. See here for updates and registration:

http://atlantaastronomy.org/college-night-under-the-stars/

From the President's Desk

By Mark Banks, AAC President

It's that time of year again when all the schools are requesting our help with Astronomy related events and science projects. Please keep an eye on the club calendar and volunteer whenever possible. You don't need to be an expert. If you know some of the basic stuff, like the difference in a star and a planet, you know much more than most of the people you will be talking to. It's also a lot of fun and very rewarding to encourage the next generation of astronomers and science nerds. They will be very grateful for any help you can give them.

Help wanted: We need someone to take over as our Program Chair. As program chair you will schedule speakers for each monthly meeting and coordinate with them on their presentation. It's not a very difficult job. In the Atlanta area we have plenty of science professionals as well as graduate students that are happy to talk to us. If interested please contact any club officer.

The Next AAC Board Meeting

The next Board of Directors Meeting of the AAC is scheduled for Sunday, January 22nd, starting at 3PM at the home of Peter and Sharon, 1057 Trestle Drive, Austell. Contact AAC President Mark Banks or Board Chair Sharon Carruthers for more information. Any member of the club who has any questions, concerns, or issues about club operations is welcome to attend the meeting and address the Board.

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

Hubble Captures 'Shadow Play' Caused by Possible Planet

NASA/STScI News Release - January 7, 2017 at the American Astronomical Society Meeting

Searching for planets around other stars is a tricky business. They're so small and faint that it's hard to spot them. But a possible planet in a nearby stellar system may be betraying its presence in a unique way: by a shadow that is sweeping across the face of a vast pancake-shaped gas-and-dust disk surrounding a young star.

The planet itself is not casting the shadow. But it is doing some heavy lifting by gravitationally pulling on material near the star and warping the inner part of the disk. The twisted, misaligned inner disk is casting its shadow across the surface of the outer disk.

A team of astronomers led by John Debes of the Space Telescope Science Institute in Baltimore, Maryland, say this scenario is the most plausible explanation for the shadow they spotted in the stellar system TW Hydrae, located 192 light-years away in the constellation Hydra, also known as the Female Water Snake. The star is roughly 8 million years old and slightly less massive than our sun. The researchers uncovered the phenomenon while analyzing 18 years' worth of archival observations taken by NASA's Hubble Space Telescope.

"This is the very first disk where we have so many images over such a long period of time, therefore allowing us to see this interesting effect," Debes said. "That gives us hope that this shadow phenomenon may be fairly common in young stellar systems."

Debes will present his team's results Jan. 7 at the winter meeting of the American Astronomical Society in Grapevine, Texas.

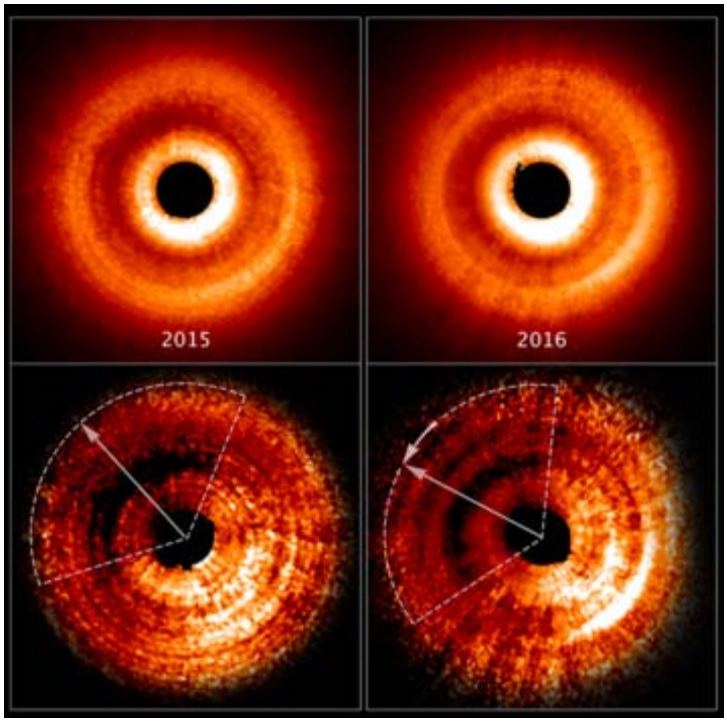
Debes' first clue to the phenomenon was a brightness in the disk that changed with position. Astronomers using Hubble's Space Telescope Imaging Spectrograph (STIS) first noted this brightness asymmetry in 2005. But they had only one set of observations, and could not make a definitive determination about the nature of the mystery feature.

Searching the archive, Debes' team put together six images from several different epochs. The observations were made by STIS and by Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS).

STIS is equipped with a coronagraph that blocks starlight to within about 1 billion miles from the star, allowing Hubble to look as close to the star as Saturn is to our sun. Over time, the structure appeared to move in counterclockwise fashion around the disk, until, in 2016, it was in the same position as it was in images taken in 2000.

This 16-year period puzzled the researchers. They originally thought the feature was part of the disk, but the short period meant that the feature was moving way too fast to be physically in the disk. Under the laws of gravity, disks rotate at glacial speeds. The outermost parts of the TW Hydrae disk would take centuries to complete one rotation.

"The fact that I saw the same motion over 10 billion miles from the star was pretty significant, and told me that I was seeing something that was imprinted on the outer disk rather than something that was happening directly in the disk itself," Debes said. "The best explanation is that the feature is a shadow moving across the surface of the disk."



These images, taken a year apart by NASA's Hubble Space Telescope, reveal a shadow moving counterclockwise around a gas-and-dust disk encircling the young star TW Hydrae. The two images at the top, taken by the Space Telescope Imaging Spectrograph, show an uneven brightness across the disk.

Through enhanced image processing (images at bottom), the darkening becomes even more apparent. These enhanced images allowed astronomers to determine the reason for the changes in brightness.

The dimmer areas of the disk, at top left, are caused by a shadow spreading across the outer disk. The dotted lines approximate the shadow's coverage. The long arrows show how far the shadow has moved in a year (from 2015-2016), which is roughly 20 degrees.

Based on Hubble archival data, astronomers determined that the shadow completes a rotation around the central star every 16 years. They know the feature is a shadow because dust and gas in the disk do not orbit the star nearly that quickly. So, the feature must not be part of the physical disk.

The shadow may be caused by the gravitational effect of an unseen planet orbiting close to the star. The planet pulls up material from the main disk, creating a warped inner disk. The twisted disk blocks light from the star and casts a shadow onto the disk's outer region.

Credits: NASA, ESA, and J. Debes (STScI)

The research team concluded that whatever was making the shadow must be deep inside the 41-billion-mile-wide disk, so close to the star it cannot be imaged by Hubble or any other present-day telescope. The most likely way to create a shadow is to have an inner disk that is tilted relative to the outer disk. In fact, submillimeter observations of TW Hydrae by the Atacama Large Millimeter Array (ALMA) in Chile suggested a possible warp in the inner disk.

But what causes disks to warp? "The most plausible scenario is the gravitational influence of an unseen planet, which is pulling material out of the plane of the disk and twisting the inner disk," Debes explained. "The misaligned disk is inside the planet's orbit."

Given the relatively short 16-year period of the clocklike moving shadow, the planet is estimated to be about 100 million miles from the star — about as close as Earth is from the sun. The planet would be roughly the size of Jupiter to have enough gravity to pull the material up out of the plane of the main disk. The planet's gravitational pull causes the disk to wobble, or precess, around the star, giving the shadow its 16-year rotational period.

Recent observations of TW Hydrae by ALMA in Chile add credence to the presence of a planet. ALMA revealed a gap in the disk roughly 9 million miles from TW Hydrae. A gap is significant, because it could be the signature of an unseen planet clearing away a path in the disk.

This new Hubble study offers a unique way to look for planets hiding in the inner part of the disk and probe what is happening very close to the star, which is not reachable in direct imaging by current telescopes. "What is surprising is that we can learn something about an unseen part of the disk by studying the disk's outer region and by measuring the motion, location, and behavior of a shadow," Debes said. "This study shows us that even these large disks, whose inner regions are unobservable, are still dynamic, or changing in detectable ways which we didn't imagine."

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore, Maryland, conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy in Washington, D.C.

Hubble Provides Interstellar Road Map for Voyagers' Galactic Trek

NASA/STScI News Release - January 6, 2017 at the AAS Meeting

NASA's two Voyager spacecraft are hurtling through unexplored territory on their road trip beyond our solar system. Along the way, they are measuring the interstellar medium, the mysterious environment between stars. NASA's Hubble Space Telescope is providing the road map — by measuring the material along the probes' trajectories as they move through space. Even after the Voyagers run out of electrical power and are unable to send back new data, which may happen in about a decade, astronomers can use Hubble observations to characterize the environment through which these silent ambassadors will glide.

A preliminary analysis of the Hubble observations reveals a rich, complex interstellar ecology, containing multiple clouds of hydrogen laced with other elements. Hubble data, combined with the Voyagers, have also provided new insights into how our sun travels through interstellar space.

"This is a great opportunity to compare data from in situ measurements of the space environment by the Voyager spacecraft and telescopic measurements by Hubble," said study leader Seth Redfield of Wesleyan University in Middletown, Connecticut. "The Voyagers are sampling tiny regions as they plow through space at roughly 38,000 miles per hour. But we have no idea if these small areas are typical or rare. The Hubble observations give

Continued on next page

us a broader view because the telescope is looking along a longer and wider path. So Hubble gives context to what each Voyager is passing through."

The astronomers hope that the Hubble observations will help them characterize the physical properties of the local interstellar medium. "Ideally, synthesizing these insights with in situ measurements from Voyager would provide an unprecedented overview of the local interstellar environment," said Hubble team member Julia Zachary of Wesleyan University.

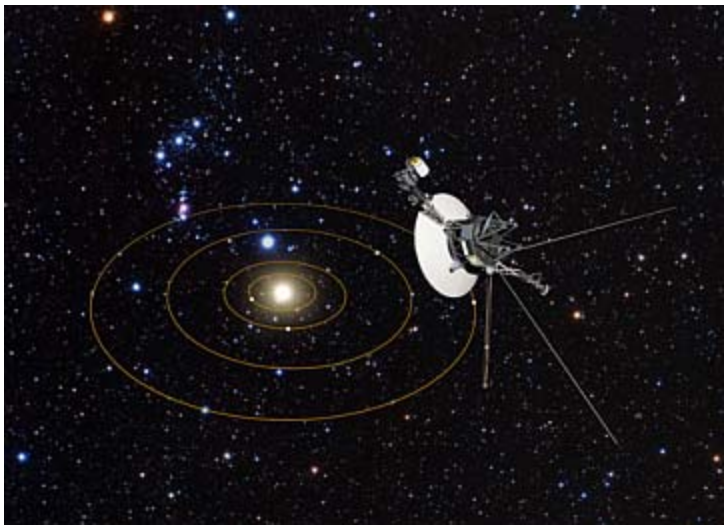
The team's results will be presented Jan. 6 at the winter meeting of the American Astronomical Society in Grapevine, Texas.

NASA launched the twin Voyager 1 and 2 spacecraft in 1977. Both explored the outer planets Jupiter and Saturn. Voyager 2 went on to visit Uranus and Neptune.

The pioneering Voyager spacecraft are currently exploring the outermost edge of the sun's domain. Voyager 1 is now zooming through interstellar space, the region between the stars that is filled with gas, dust, and material recycled from dying stars.

Voyager 1 is 13 billion miles from Earth, making it the farthest human-made object ever built. In about 40,000 years, after the spacecraft will no longer be operational and will not be able to gather new data, it will pass within 1.6 light-years of the star Gliese 445, in the constellation Camelopardalis. Its twin, Voyager 2, is 10.5 billion miles from Earth, and will pass 1.7 light-years from the star Ross 248 in about 40,000 years.

For the next 10 years, the Voyagers will be making measurements of interstellar material, magnetic fields, and cosmic rays along their trajectories. Hubble complements the Voyagers' observations by gazing at two sight lines along each spacecraft's path to map interstellar structure along their star-bound routes. Each sight line stretches several light-years to nearby stars. Sampling the light from those stars, Hubble's Space Telescope Imaging Spectrograph measured how interstellar material absorbed some of the starlight, leaving telltale spectral fingerprints.



In this artist's conception, NASA's Voyager 1 spacecraft has a bird's-eye view of the solar system. The circles represent the orbits of the major outer planets: Jupiter, Saturn, Uranus, and Neptune. Launched in 1977, Voyager 1 visited the planets Jupiter and Saturn. The spacecraft is now 13 billion miles from Earth, making it the farthest and fastest-moving human-made object ever built. In fact, Voyager 1 is now zooming through interstellar space, the region between the stars that is filled with gas, dust, and material recycled from dying stars.

NASA's Hubble Space Telescope is observing the material along Voyager's path through space.

Credits: NASA, ESA, and J. Zachary and S. Redfield (Wesleyan University);

Artist's Illustration Credit: NASA, ESA, and G. Bacon (STScI)

Hubble found that Voyager 2 will move out of the interstellar cloud that surrounds the solar system in a couple thousand years. The astronomers, based on Hubble data, predict that the spacecraft will spend 90,000 years in a second cloud before passing into a third interstellar cloud.

An inventory of the clouds' composition reveals slight variations in the abundances of the chemical elements contained in the structures. "These variations could mean the clouds formed in different ways, or from different areas, and then came together," Redfield said.

An initial look at the Hubble data also suggests that the sun is passing through clumpier material in nearby space, which may affect the heliosphere, the large bubble containing our solar system that is produced by our sun's powerful solar wind. At its boundary, called the heliopause, the solar wind pushes outward against the interstellar medium. Hubble and Voyager 1 made measurements of the interstellar environment beyond this boundary, where the wind comes from stars other than our sun.

"I'm really intrigued by the interaction between stars and the interstellar environment," Redfield said. "These kinds of interactions are happening around most stars, and it is a dynamic process." The heliosphere is compressed when the sun moves through dense material, but it expands back out when the star passes through low-density matter. This expansion and contraction is caused by the interaction between the outward pressure of the stellar wind, composed of a stream of charged particles, and the pressure of the interstellar material surrounding the star.

Hubble Detects 'Exocomets' Taking the Plunge into a Young Star

NASA/STScI News Release - January 6, 2017 at the AAS Meeting

Interstellar forecast for a nearby star: Raining comets! NASA's Hubble Space Telescope has discovered comets plunging into the star HD 172555, which is a youthful 23 million years old and resides 95 light-years from Earth.

The exocomets — comets outside our solar system — were not directly seen around the star, but their presence was inferred by detecting gas that is likely the vaporized remnants of their icy nuclei.

HD 172555 represents the third extrasolar system where astronomers have detected doomed, wayward comets. All of these systems are young, under 40 million years old.

The presence of these doomed comets provides circumstantial evidence for "gravitational stirring" by an unseen Jupiter-size planet, where comets deflected by the massive object's gravity are catapulted into the star. These events also provide new insights into the past and present activity of comets in our solar system. It's a mechanism where infalling comets could have transported water to Earth and the other inner planets of our solar system.

Astronomers have found similar plunges in our own solar system. Sun-grazing comets routinely fall into our sun. "Seeing these sun-grazing comets in our solar system and in three extrasolar systems means that this activity may be common in young star systems," said study leader Carol Grady of Eureka Scientific Inc., in Oakland, California, and NASA's Goddard Space Flight Center in Greenbelt, Maryland. "This activity at its peak represents a star's active teenage years. Watching these events gives us insight into what probably went on in the early days of our solar system, when comets were pelting the inner solar system bodies, including Earth. In fact, these star-grazing comets may make life possible, because they carry water and other life-forming elements, such as carbon, to terrestrial planets."

The star is part of the Beta Pictoris Moving Group, a collection of stars born from the same stellar nursery. It is the second group member found to

harbor such comets. Beta Pictoris, the group's namesake, also is feasting on exocomets travelling too close. A young gas-giant planet has been observed in that star's vast debris disk.

The Beta Pictoris Moving Group is important to study because it is the closest collection of young stars to Earth. At least 37.5 percent of the more massive stars in the group either have a directly imaged planet, such as 51 Eridani b in the 51 Eridani system, or infalling star-grazing bodies, or, in the case of Beta Pictoris, both types of objects. The grouping is around the age where it should be building terrestrial planets, Grady said.

A team of French astronomers first discovered exocomets transiting HD 172555 in archival data gathered between 2004 and 2011 by the European Southern Observatory's HARPS (High Accuracy Radial velocity Planet Searcher) spectrograph. A spectrograph divides light into its component colors, allowing astronomers to detect an object's chemical makeup. The HARPS spectrograph detected the chemical fingerprints of calcium imprinted in the starlight, evidence that comet-like objects were falling into the star.

As a follow-up to that discovery, Grady's team used Hubble's Space Telescope Imaging Spectrograph (STIS) and the Cosmic Origins Spectrograph (COS) in 2015 to conduct a spectrographic analysis in ultraviolet light, which allows Hubble to identify the signature of certain elements. Hubble made two observations, separated by six days.

Hubble detected silicon and carbon gas in the starlight. The gas was moving at about 360,000 miles per hour across the face of the star. The most likely explanation for the speedy gas is that Hubble is seeing material from comet-like objects that broke apart after streaking across the star's disk.

The gaseous debris from the disintegrating comets is vastly dispersed in front of the star. "As transiting features go, this vaporized material is easy to see because it contains very large structures," Grady said. "This is in marked contrast to trying to find a small, transiting exoplanet, where you're looking for tiny dips in the star's light." Hubble gleaned this information because the HD 172555 debris disk surrounding the star is viewed close to edge-on through the disk, giving the telescope a clear view of comet activity.

Grady's team hopes to use STIS again in follow-up observations to look for oxygen and hydrogen, which would confirm the identity of the disintegrating objects as comets. "Hubble shows that these star-grazers look and move like comets, but until we determine their composition, we cannot confirm they are comets," Grady said. "We need additional data to establish whether our star-grazers are icy like comets or more rocky like asteroids."

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.

AAC Officers and Contacts

President: Mark Banks President@AtlantaAstronomy.org

Program Chair: Richard Jakiel Programs@AtlantaAstronomy.org

Observing Chair: Daniel Herron Observing@AtlantaAstronomy.org

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PSSG Co-Chair: Open

Sidewalk Astronomy: Brad Isley sidewalkastronomy@AtlantaAstronomy.org

Light Tresspass: Ken Edwards, Contact info TBA

Woodruff Observ. Coordinator: Sharon Carruthers Treasurer@AtlantaAstronomy.org

AAC Webmaster: Daniel Herron

Observing@AtlantaAstronomy.org

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

AAC Events are listed in BOLD

Jan 4th, Wednesday: Earth at Aphelion. Latest Sunrise in Atlanta: ~7:42 AM.

Jan 5th, Thursday: Moon First Quarter

Jan 12th, Thursday: Full Moon. Venus at greatest elongation east.

Jan 19th, Thursday: Moon Last Quarter.

Jan 21st, Saturday: **AAC Meeting at Fernbank Science Center 3:00PM.**

Jan 22nd, Sunday: **AAC Board of Directors Meeting - see pg 4 for details.**

Jan 24th, Tuesday: Moon near Saturn in the morning.

Jan 25th, Wednesday: Thin crescent moon low in the SE at dawn.

Jan 27th, Friday: New Moon.

Jan 28th, Saturday: **CE Chapter Meeting.**

Feb 3rd, Friday: Moon First Quarter.

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 5th, Sunday: Moon First Quarter.

Mar 12th, Sunday: Full Moon.

Mar 18th, Saturday: **AAC Meeting at Fernbank Science Center 3:00PM.**

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 but Word documents or PDF's are okay. You can submit articles anytime up to the deadline. **The deadline for February is Saturday, January 28. Submissions after the deadline will go in the following issue**.

ATLANTA ASTRONOMY CLUB EST. 1947

The Focal Point

Newsletter of The Atlanta Astronomy Club, Inc.

FROM:
Tom Faber
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Alpharetta, GA 30022

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

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www.beetagg.com

FIRST CLASS