The Focal Point

The Atlanta Astronomy Club
Established 1947
February 2016

Vol. 28 No. 9

Editor: Tom Faber

Table of Contents

February AAC Meeting

Please join us for the next meeting of the Atlanta Astronomy Club, to be held on Saturday, February 20th at 3PM at the Fernbank Science Center. **(Note that out meetings are now held on the 3rd Saturday of the month).** A short beginner's program will be presented at 2PM. Our featured speaker will be Dr. Michael Covington, the former Associate Director of the Institute for Artificial Intelligence at the University of Georgia.

The Talk

Michael will present a talk entitled "The Missing Messier Objects and the Hunt for M102."

Speaker Bio

"Michael Covington has been an avid amateur astronomer since 1968, during which time he has seen Jupiter go around the Solar System four times. He is the author of Digital SLR Astrophotography and other books. By day he is a computational linguist, which means he uses computers to analyze human language. Until his recent retirement, he was Associate Director of the Institute for Artificial Intelligence at the University of Georgia. He is now an independent consultant, working largely in the defense sector but also helping businesses with data analysis challenges."

From the President's Desk

By Mark Banks, AAC President

*The elections procedure in the club by-laws has been changed by a vote of the members at the December meeting. Article 6 Section 3 now reads: The May elections will be done via email. Each member will receive a ballot via email on May 1st. Members will have until May 31st to vote via return email. It is important to all members to be sure your information in the club directory is up to date so you will be able to vote.

*The Georgia Science Teachers annual conference will be held Feb. 4th – 6th at the Stone Mountain Conference center. We will be doing a viewing event on Feb. 4th. We may also be having a discussion panel at some time during the day. This is a great opportunity for our club to connect with all of the Science teachers in Georgia. I want to donate books & magazines for the teachers. If you have any books or magazines (no older than 3 years) that you can donate please bring them to the January meeting.

*The Planetary Society is having a Congressional lobbying blitz on Feb. 21st – 23rd in Washington D.C. This would be a great opportunity to talk to your elected representatives about how important space exploration and related sciences are to the future of our country. They will provide training and make arrangements for you to meet your congressman. Please contact me for more information.

*Other upcoming major events are Anachrocon on Feb. 26th-28th and the Atlanta Science Festival March 16th thru 26th. We also have many other public events that need your help so please check the club calendar & volunteer. Please keep in mind that you don't need to be an expert because you already know much more than the general public.

January AAC Meeting Report

Photos by Tom Faber.

The January general meeting was held beginning at 3PM on Saturday, January 16th at Fernbank Science Center. There were about 60 members and guests present for the meeting.

Our guest speaker was Dr. Richard W. Schmude, Jr., professor of Chemistry at Gordon State College. Dr. Schmude talked about his research on measuring the brightness of the planet Mercury. Richard then answered a number of questions about his work.

After the talk, there were club announcements by Club officers about upcoming events and activities.

See the next page for photos of the meeting.


Purpose
• Report J and H filter brightness measurements
• Photometric constants of Mercury
• Compare results: Eastern/Western


Recent measurements of Mercury
Richard W. Schmude, Jr.
Gordon State College

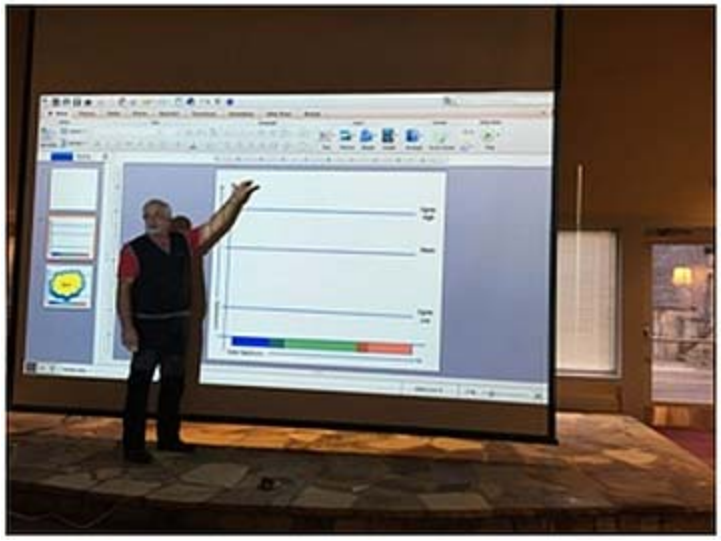
The January Charlie Elliott Meeting

By Valorie Whalen, Charlie Elliott Chapter Recording Secretary

All photos included are courtesy of Steve Siedentop.

The January monthly meeting for the Charlie Elliott Chapter of the Atlanta Astronomy Club was held on January 9 in the Dining Hall at the Charlie Elliott Wildlife Management property in Mansfield, Georgia.

Prior to the beginning of the meeting, our astrophotography committee co-chair, Van Macatee, hosted a workshop on PixInsight at 2:30 p.m. There were 9 members of the club present for this workshop. Some photos are included here of Van's instruction.



Jack Fitzmier, Chapter Director, called the meeting to order at 4:00 p.m. and welcomed everyone. There were twenty-one members and guests in attendance. He introduced fellow AAC member, Dan Llewellyn, who was our featured speaker this month. Dan told us about the new Sony A7S Camera for Deep Sky and Planetary imaging. After explaining an overview of Bayer filters and the demosaicing algorithm, he highlighted the features of the new camera. At roughly $2,700 for the camera alone, or $3,000 for the full kit, it is quite pricey. It can, however, eliminate the need for many of the telescope components necessary for long exposure imaging. He also presented many photos made with his Sony A7S, and compared those with other long exposure shots of the same target. It appears to be able to cut way back on the time needed to gather the images.

After the featured talk, Dan Thoman, Outreach Co-ordinator, mentioned several upcoming dates for outreach events, and asked for volunteers to please RSVP on the NSN website. If you would like to help out with any of these events, please be sure to note that on the events calendar.

Ken Poshedly gave a quick talk on some articles to be expected in the upcoming issues of ALPO.

David Whalen, Observing Director, treated us to another energetic "All of the Above", which gives a run-down of what you can expect to see in the sky in the coming weeks. Beginning with a wonderful "Star Wars" related theme, complete with a musical score, it included current weather conditions for the Jon Wood Astronomy Field, relative location of each of the planets, along with the sun and moon, and each of their respective rise and set times. He included H-alpha photos of the Sun as of 1/9/2016. Also discussed were several deep-sky targets in the categories of "Relaxing", "Intriguing", "Taxing" and a Challenge Object. The full list of targets for the month of January is available on the website.

This month's astrophotography targets are: Beginners - M42, the Great Orion Nebula, and Advanced - NGC 1316, the Fornax lenticular galaxy.

We were unable to observe on the Jon Wood Field after the meeting, due to inclement weather.

Upcoming Events:

Outreach Event: Trip Elementary School in Grayson on January 28, 2016 at 6:00 p.m.

CE Meeting: February 6th at 4:00 p.m. in the Conference Center Building.

The Next Charlie Elliott Meeting

The next meeting of the Charlie Elliott Chapter will be held on Saturday February, 6, 2016 at 4 pm in the DINING HALL. (This is the very last building of the Charlie Elliott Conference Center complex, at the end of Elliott Trail.) Dr. Michael Covington will present a talk entitled "The Missing Messier Objects and the Hunt for M102".

At sunset we will head over to Jon Wood Astronomy Field (33.468865, -83.735319) for a night of observing, weather permitting. All are welcome. Bring your scopes, binoculars, or just bring yourself – we enjoy sharing the night sky with our guests! Be sure to arrive before 10 pm, as that is when the security gate on Elliott Trail locks to new entry.

Meeting Day Schedule 2/6/16:

2:30 PM, PixInsight Workshop. Van Macatee will lead a second workshop on Pixinsight, the software many of us are learning to use in order to process astrophotos. Van's PI Workshop in January was a terrific success, and we hope all of you who are interested in processing your photos will join us for another session.

4:00 PM, CE meeting (awards, current observing targets, and guest speaker Dr. Covington)

6:11 PM (sunset), Observing on Jon Wood Field. Last month we were clouded out and had to forego our on-field workshop. But if the weather cooperates, Van will do an on-field, hands-on workshop about auto guiding – the art of using a small camera and software to precisely guide your scope while taking photos of the heavens.

Minutes and 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.

2016 Meeting Schedule: February 6, March 12 (potluck), April 9, May 7, June 4 (potluck), July 9, August 6, September 10 (potluck), October 29, November 19, December 10 (potluck)

Caltech Researchers Find Evidence of a Real Ninth Planet

by Kimm Fesenmaier

Caltech researchers have found evidence of a giant planet tracing a bizarre, highly elongated orbit in the outer solar system. The object, which the researchers have nicknamed Planet Nine, has a mass about 10 times that of Earth and orbits about 20 times farther from the sun on average than does Neptune (which orbits the sun at an average distance of 2.8 billion miles). In fact, it would take this new planet between 10,000 and 20,000 years to make just one full orbit around the sun.

The researchers, Konstantin Batygin and Mike Brown, discovered the planet's existence through mathematical modeling and computer simulations but have not yet observed the object directly.

"This would be a real ninth planet," says Brown, the Richard and Barbara Rosenberg Professor of Planetary Astronomy. "There have only been two true planets discovered since ancient times, and this would be a third. It's a pretty substantial chunk of our solar system that's still out there to be found, which is pretty exciting."

Brown notes that the putative ninth planet—at 5,000 times the mass of Pluto—is sufficiently large that there should be no debate about whether it is a true planet. Unlike the class of smaller objects now known as dwarf planets, Planet Nine gravitationally dominates its neighborhood of the solar system. In fact, it dominates a region larger than any of the other known planets—a fact that Brown says makes it "the most planet-y of the planets in the whole solar system."

This artistic rendering shows the distant view from Planet Nine back towards the sun. The planet is thought to be gaseous, similar to Uranus and Neptune. Hypothetical lightning lights up the night side. Credit: Caltech/R. Hurt (IPAC)

Batygin and Brown describe their work in the current issue of the *Astronomical Journal* and show how Planet Nine helps explain a number of mysterious features of the field of icy objects and debris beyond Neptune known as the Kuiper Belt.

"Although we were initially quite skeptical that this planet could exist, as we continued to investigate its orbit and what it would mean for the outer solar system, we become increasingly convinced that it is out there," says Batygin, an assistant professor of planetary science. "For the first time in over 150 years, there is solid evidence that the solar system's planetary census is incomplete."

The road to the theoretical discovery was not straightforward. In 2014, a former postdoc of Brown's, Chad Trujillo, and his colleague Scott Sheppard published a paper noting that 13 of the most distant objects in the Kuiper Belt are similar with respect to an obscure orbital feature *(Editor's Note: This "obscure orbital feature" is that all of these objects have very similar arguments of perihelion)*. To explain that similarity, they suggested the possible presence of a small planet. Brown thought the planet solution was unlikely, but his interest was piqued.

He took the problem down the hall to Batygin, and the two started what became a year-and-a-half-long collaboration to investigate the distant objects. As an observer and a theorist, respectively, the researchers approached the work from very different perspectives—Brown as someone who looks at the sky and tries to anchor everything in the context of what can be seen, and Batygin as someone who puts himself within the context of dynamics, considering how things might work from a physics standpoint. Those differences allowed the researchers to challenge each other's ideas and to consider new possibilities. "I would bring in some of these observational aspects; he would come back with arguments from theory, and we would push each other. I don't think the discovery would have happened without that back and forth," says Brown. "It was perhaps the most fun year of working on a problem in the solar system that I've ever had."

Fairly quickly Batygin and Brown realized that the six most distant objects from Trujillo and Sheppard's original collection all follow elliptical orbits that point in the same direction in physical space. That is particularly surprising because the outermost points of their orbits move around the solar system, and they travel at different rates.

"It's almost like having six hands on a clock all moving at different rates, and when you happen to look up, they're all in exactly the same place," says Brown. The odds of having that happen are something like 1 in 100,

Continued on next page

he says. But on top of that, the orbits of the six objects are also all tilted in the same way—pointing about 30 degrees downward in the same direction relative to the plane of the eight known planets. The probability of that happening is about 0.007 percent. "Basically it shouldn't happen randomly," Brown says. "So we thought something else must be shaping these orbits."

The first possibility they investigated was that perhaps there are enough distant Kuiper Belt objects—some of which have not yet been discovered—to exert the gravity needed to keep that subpopulation clustered together. The researchers quickly ruled this out when it turned out that such a scenario would require the Kuiper Belt to have about 100 times the mass it has today.

That left them with the idea of a planet. Their first instinct was to run simulations involving a planet in a distant orbit that encircled the orbits of the six Kuiper Belt objects, acting like a giant lasso to wrangle them into their alignment. Batygin says that almost works but does not provide the observed eccentricities precisely. "Close, but no cigar," he says.

Then, effectively by accident, Batygin and Brown noticed that if they ran their simulations with a massive planet in an anti-aligned orbit—an orbit in which the planet's closest approach to the sun, or perihelion, is 180 degrees across from the perihelion of all the other objects and known planets—the distant Kuiper Belt objects in the simulation assumed the alignment that is actually observed.

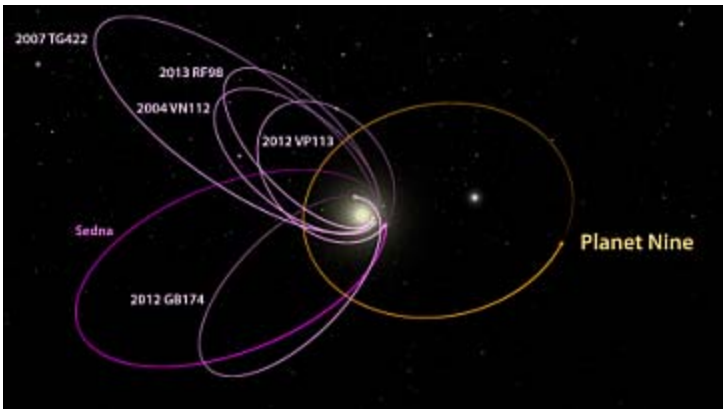
"Your natural response is 'This orbital geometry can't be right. This can't be stable over the long term because, after all, this would cause the planet and these objects to meet and eventually collide,'" says Batygin. But through a mechanism known as mean-motion resonance, the anti-aligned orbit of the ninth planet actually prevents the Kuiper Belt objects from colliding with it and keeps them aligned. As orbiting objects approach each other they exchange energy. So, for example, for every four orbits Planet Nine makes, a distant Kuiper Belt object might complete nine orbits. They never collide. Instead, like a parent maintaining the arc of a child on a swing with periodic pushes, Planet Nine nudges the orbits of distant Kuiper Belt objects such that their configuration with relation to the planet is preserved.

"Still, I was very skeptical," says Batygin. "I had never seen anything like this in celestial mechanics."

But little by little, as the researchers investigated additional features and consequences of the model, they became persuaded. "A good theory should not only explain things that you set out to explain. It should hopefully explain things that you didn't set out to explain and make predictions that are testable," says Batygin.

And indeed Planet Nine's existence helps explain more than just the alignment of the distant Kuiper Belt objects. It also provides an explanation for the mysterious orbits that two of them trace. The first of those objects, dubbed Sedna, was discovered by Brown in 2003. Unlike standard-variety Kuiper Belt objects, which get gravitationally "kicked out" by Neptune and then return back to it, Sedna never gets very close to Neptune. A second object like Sedna, known as 2012 VP113, was announced by Trujillo and Sheppard in 2014. Batygin and Brown found that the presence of Planet Nine in its proposed orbit naturally produces Sedna-like objects by taking a standard Kuiper Belt object and slowly pulling it away into an orbit less connected to Neptune.

But the real kicker for the researchers was the fact that their simulations also predicted that there would be objects in the Kuiper Belt on orbits inclined perpendicularly to the plane of the planets. Batygin kept finding evidence for these in his simulations and took them to Brown. "Suddenly I realized there are objects like that," recalls Brown. In the last three years, observers have identified four objects tracing orbits roughly along one perpendicular line from Neptune and one object along another. "We plotted



The six most distant known objects in the solar system with orbits exclusively beyond Neptune (magenta) all mysteriously line up in a single direction. Also, when viewed in three dimensions, they tilt nearly identically away from the plane of the solar system. Batygin and Brown show that a planet with 10 times the mass of the earth in a distant eccentric orbit anti-aligned with the other six objects (orange) is required to maintain this configuration. Credit: Caltech/R. Hurt (IPAC); [Diagram created using WorldWide Telescope.]

up the positions of those objects and their orbits, and they matched the simulations exactly," says Brown. "When we found that, my jaw sort of hit the floor."

"When the simulation aligned the distant Kuiper Belt objects and created objects like Sedna, we thought this is kind of awesome—you kill two birds with one stone," says Batygin. "But with the existence of the planet also explaining these perpendicular orbits, not only do you kill two birds, you also take down a bird that you didn't realize was sitting in a nearby tree."

Where did Planet Nine come from and how did it end up in the outer solar system? Scientists have long believed that the early solar system began with four planetary cores that went on to grab all of the gas around them, forming the four gas planets—Jupiter, Saturn, Uranus, and Neptune. Over time, collisions and ejections shaped them and moved them out to their present locations. "But there is no reason that there could not have been five cores, rather than four," says Brown. Planet Nine could represent that fifth core, and if it got too close to Jupiter or Saturn, it could have been ejected into its distant, eccentric orbit.

Batygin and Brown continue to refine their simulations and learn more about the planet's orbit and its influence on the distant solar system. Meanwhile, Brown and other colleagues have begun searching the skies for Planet Nine. Only the planet's rough orbit is known, not the precise location of the planet on that elliptical path. If the planet happens to be close to its perihelion, Brown says, astronomers should be able to spot it in images captured by previous surveys. If it is in the most distant part of its orbit, the world's largest telescopes—such as the twin 10-meter telescopes at the W. M. Keck Observatory and the Subaru Telescope, all on Mauna Kea in Hawaii—will be needed to see it. If, however, Planet Nine is now located anywhere in between, many telescopes have a shot at finding it.

"I would love to find it," says Brown. "But I'd also be perfectly happy if someone else found it. That is why we're publishing this paper. We hope that other people are going to get inspired and start searching."

In terms of understanding more about the solar system's context in the rest of the universe, Batygin says that in a couple of ways, this ninth planet that seems like such an oddball to us would actually make our solar system more similar to the other planetary systems that astronomers are finding around other stars. First, most of the planets around other sunlike stars

Continued on next page

have no single orbital range—that is, some orbit extremely close to their host stars while others follow exceptionally distant orbits. Second, the most common planets around other stars range between 1 and 10 Earth-masses.

"One of the most startling discoveries about other planetary systems has been that the most common type of planet out there has a mass between that of Earth and that of Neptune," says Batygin. "Until now, we've thought that the solar system was lacking in this most common type of planet. Maybe we're more normal after all."

Brown, well known for the significant role he played in the demotion of Pluto from a planet to a dwarf planet adds, "All those people who are mad that Pluto is no longer a planet can be thrilled to know that there is a real planet out there still to be found," he says. "Now we can go and find this planet and make the solar system have nine planets once again."

The paper is titled "Evidence for a Distant Giant Planet in the Solar System." (http://resolver.caltech.edu/CaltechAUTHORS:20160120-093551312).

Editor's Note: More information can be found here - http://www.sciencemag.org/news/2016/01/feature-astronomers-say-neptune-sized-planet-lurks-unseen-solar-system

Spitzer, Hubble Find 'Twins' of Superstar Eta Carinae in Other Galaxies

NASA/STScI News Release January 6, 2016

Eta Carinae, the most luminous and massive stellar system within 10,000 light-years, is best known for an enormous eruption seen in the mid-19th century that hurled an amount of material at least 10 times the sun's mass into space. This expanding veil of gas and dust, which still shrouds Eta Carinae, makes it the only object of its kind known in our galaxy. Now a study using archival data from NASA's Spitzer and Hubble space telescopes has found five similar objects in other galaxies for the first time.

"The most massive stars are always rare, but they have tremendous impact on the chemical and physical evolution of their host galaxy," said lead scientist Rubab Khan, a postdoctoral researcher at NASA's Goddard Space Flight Center in Greenbelt, Maryland. These stars produce and distribute large amounts of the chemical elements vital to life and eventually explode as supernovae.

Located about 7,500 light-years away in the southern constellation of Carina, Eta Carinae outshines our sun by 5 million times. The binary system consists of two massive stars in a tight 5.5-year orbit. Astronomers estimate that the more massive star has about 90 times the sun's mass, while the smaller companion may exceed 30 solar masses.

As one of the nearest laboratories for studying high-mass stars, Eta Carinae has been a unique, important astronomical touchstone since its eruption in the 1840s. To understand why the eruption occurred and how it relates to the evolution of massive stars, astronomers needed additional examples. Catching rare stars during the short-lived aftermath of a major outburst approaches needle-in-a-haystack levels of difficulty, and nothing matching Eta Carinae had been found prior to Khan's study.

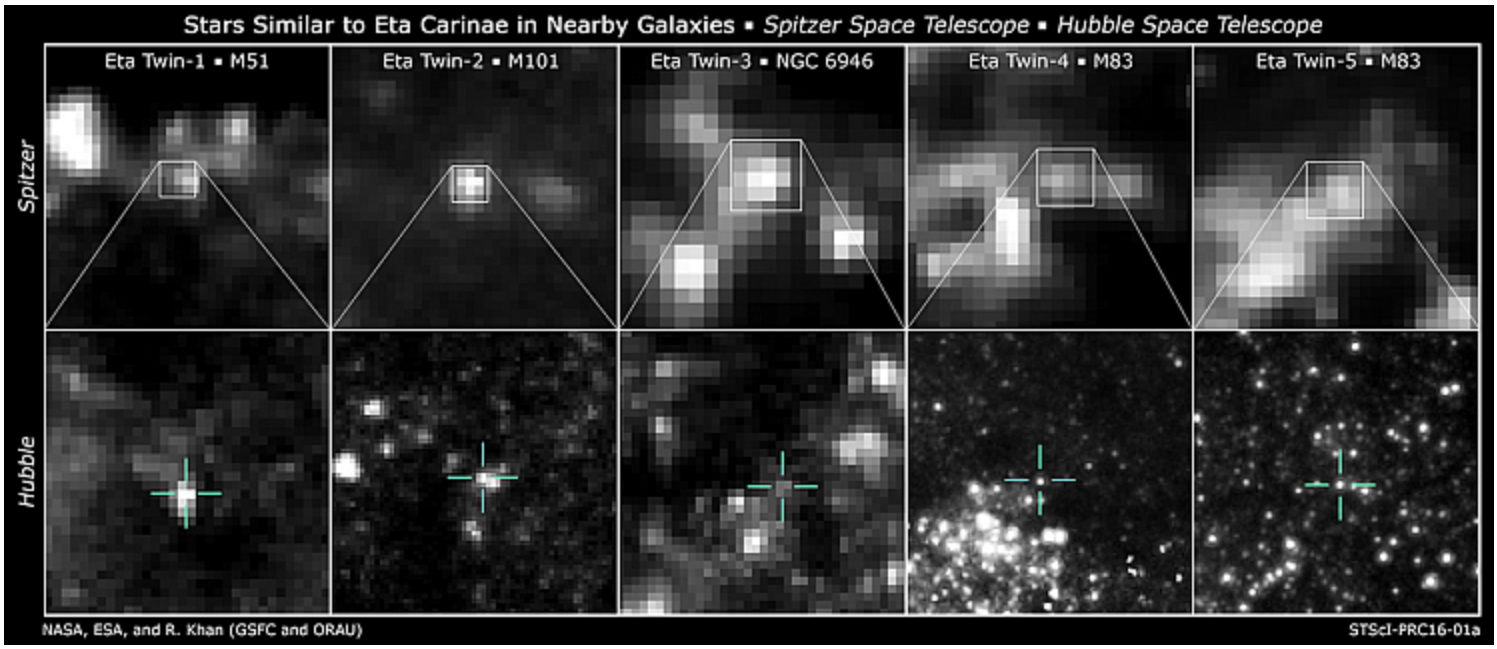
"We knew others were out there," said co-investigator Krzysztof Stanek, a professor of astronomy at Ohio State University in Columbus. "It was really a matter of figuring out what to look for and of being persistent."

Working with Scott Adams and Christopher Kochanek at Ohio State and George Sonneborn at Goddard, Khan developed a kind of optical and infrared fingerprint for identifying possible Eta Carinae twins, or "Eta twins" for short.

Dust forms in gas ejected by a massive star. This dust dims the star's ultraviolet and visible light, but it absorbs and reradiates this energy as heat at longer, mid-infrared wavelengths. "With Spitzer we see a steady increase in brightness starting at around 3 microns and peaking between 8 and 24 microns," explained Khan. "By comparing this emission to the dimming we see in Hubble's optical images, we could determine how much dust was present and compare it to the amount we see around Eta Carinae."

An initial survey of seven galaxies from 2012 to 2014 didn't turn up any Eta twins, underscoring their rarity. It did, however, identify a class of less

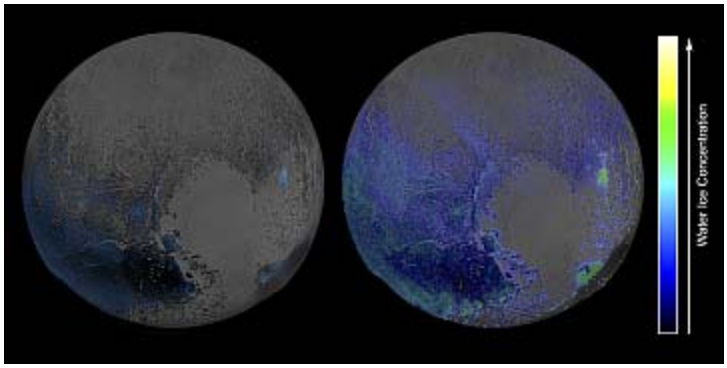
Researchers found likely Eta twins in four galaxies by comparing the infrared and optical brightness of each candidate source. Infrared images from NASA's Spitzer Space Telescope revealed the presence of warm dust surrounding the stars. Comparing this information with the brightness of each source at optical and near-infrared wavelengths as measured by instruments on Hubble, the team was able to identify candidate Eta Carinae–like objects. Top: 3.6-micron images of candidate Eta twins from Spitzer's IRAC instrument. Bottom: 800-nanometer images of the same sources from various Hubble instruments. Credit: NASA, ESA, and R. Khan (GSFC and ORAU)



massive and less luminous stars of scientific interest, demonstrating the search was sensitive enough to find Eta Carinae–like stars had they been present.

In a follow-on survey in 2015, the team found two candidate Eta twins in the galaxy M83, located 15 million light-years away, and one each in NGC 6946, M101, and M51, located between 18 million and 26 million light-years away. These five objects mimic the optical and infrared properties of Eta Carinae, indicating that each very likely contains a high-mass star buried in five to 10 solar masses of gas and dust. Further study will let astronomers more precisely determine their physical properties. The findings were published in the Dec. 20 edition of The Astrophysical Journal Letters.

NASA's James Webb Space Telescope (JWST), set to launch in late 2018, carries an instrument ideally suited for further study of these stars. The Mid-Infrared Instrument (MIRI) has 10 times the angular resolution of instruments aboard Spitzer and is most sensitive at the wavelengths where Eta twins shine brightest. "Combined with JWST's larger primary mirror, MIRI will enable astronomers to better study these rare stellar laboratories and to find additional sources in this fascinating phase of stellar evolution," said Sonneborn, NASA's project scientist for JWST operations. It will take JWST observations to confirm the Eta twins as true relatives of Eta Carinae.



Data from NASA's New Horizons spacecraft point to more prevalent water ice on Pluto's surface than previously thought. This false-color image, derived from observations in infrared light by the Ralph/Linear Etalon Imaging Spectral Array (LEISA) instrument, shows where the spectral features of water ice are abundant on Pluto's surface. It is based on two LEISA scans of Pluto obtained on July 14, 2015, from a range of about 108,000 kilometers. NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research 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 Scince 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

Corresponding Secretary: Tom Faber Focalpoint@AtlantaAstronomy.org

Treasurer: Sharon Carruthers Treasurer@AtlantaAstronomy.org

Recording Secretary: Alan Coffelt, Secretary@AtlantaAstronomy.org

Board Chair: Sharon Carruthers Treasurer@AtlantaAstronomy.org

Board: Brigitte Fessele, Contact info TBA

Board: David Lumpkin, Contact info TBA

Board: Steve Phillips sandsphillips@att.net

ALCor: Jamie Anderson, jamiea@bellsouth.net

Elliott Chapter Co-Directors: Jack Fitzmier director@ceastronomy.org

Elliott Observing Supervisor: David Whalen observing@ceastronomy.org

Elliott Recording Secretary: Valorie Whalen secretary@ceastronomy.org

Elliott Chapter ALCor: Jack Fitzmier

Elliott Coordinator: Alesia Rast Alesia_Rast@mail.dnr.state.ga.us

Elliott Webmaster: Larry Owens webmaster@CEastronomy.org

Elliott Outreach Coordinator: Position Open outreach@ceastronomy.org

Georgia Astronomy in State Parks: Sharon Carruthers Treasurer@AtlantaAstronomy.org

PSSG Chairman: Peter Macumber pmacumber@nightsky.org

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

Feb 6th, Saturday: **CE Chapter Meeting.** Moon near Mercury & Venus.
Feb 7th, Sunday: Mercury at Greatest Western Elongation. Mars at Western Quadrature.
Feb 8th, Monday: New Moon.
Feb 15th, Monday: Moon First Quarter.
Feb 20th, Saturday: **AAC Mtg at Fernbank Science Center 3:00PM.**
Feb 22nd, Monday: Full Moon.
Feb 23rd, Tuesday: Moon near Jupiter.
Feb 28th, Sunday: Neptune Conjunction with Sun.
Feb 29th, Monday: Leap Year Day.
Mar 1st, Tuesday: Moon Last Quarter.
Mar 8th, Tuesday: Jupiter at Opposition.
Mar 9th, Wednesday: New Moon.
Mar 12th, Saturday: **CE Chapter Meeting & Potluck.**
Mar 13th, Sunday: Daylight Saving Time begins 2:00AM.
Mar 14th, Monday: Moon First Quarter.
Mar 19th, Saturday: **AAC Mtg at Fernbank Science Center 3:00PM.**
Mar 20th, Sunday: Spring Equinox at 12:30AM.
Mar 23rd, Wednesday: Full Moon. Mercury at Superior Conjunction.
Mar 31st, Thursday: Moon Last Quarter.
Apr 7th, Thursday: New Moon.
Apr 9th, Saturday: **CE Chapter Meeting.**
Apr 14th, Thursday: Moon First Quarter.
Apr 16th, Saturday: **AAC Mtg at Fernbank Science Center 3:00PM.**
Apr 22nd, Friday: 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 but Word documents or PDFs are okay. You can submit articles anytime up to the deadline. **The deadline for March is Saturday, February 27. 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
2206 Treeridge Parkway
Alpharetta, GA 30022

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

Atlanta Astronomy Club
P.O. Box 76155
Atlanta, GA 30358-1155
www.atlantaastronomy.org
On Twitter at http://twitter.com/atlastro

www.beetagg.com

FIRST CLASS