



# Monthly Notices of the Everglades Astronomical Society



Naples, FL  
May 2016

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## President's Message

Now that the first meeting of my presidency is over, I sincerely want to thank everyone for your well wishes and support. The guest speaker, Eric Uthus, did a great job. He truly embodies the spirit of what it means to be an amateur astronomer. Grinding a mirror is on the top of my list of accomplishments in our hobby.

For those who participated in the Conservancy's Earth Day event, thank you. This event was so much fun. We had the perfect spot and the weather held out. We were at the entrance so no attendee missed us. There was a Blue Grass band across from us, the food truck was next to us, and the volunteer station that provided food, drinks, and washrooms was a short walk. Charlie has already requested that we occupy the same spot next year. I strongly urge you to participate in these events. Not only does it give us a chance to promote our society, but it allows the club members to have great conversations during slower times. It can't be said enough that the level of your knowledge of astronomy, or whether or not you have a telescope, is not a factor.

The guest speaker for our May meeting is Dennis Albright. He graciously agreed to give a talk on his theory on The Mechanism of Inflation. Dennis always presents a wealth of knowledge with his talks. The slot for the June program is still open. If you would like to give a presentation at the June meeting, please let Charlie or me know. Perhaps you are working on a project, or maybe you read an interesting article/book. If you think that the group would be interested, please don't be afraid to share it with us.

While I'm on the subject, it is never too late to start thinking about the programs for next year. There are so many topics that could be presented. Let me know if there is a particular subject that you'd like to have someone (or you) present. There has been some discussion regarding disseminating information for the upcoming eclipse in 2017. We will try to have at least one talk on this particular eclipse and eclipse

cycles in general. I found a website that lists almost every town, city, or 'anything with a name' that is in the path of totality. It may be very helpful in finding a place to observe it. Below is the link:

[http://www.eclipse2017.org/2017/in\\_the\\_path.htm#ILLINOIS](http://www.eclipse2017.org/2017/in_the_path.htm#ILLINOIS)

One more thing! I have been trying to set up group lists to better communicate with the members. I have already sent out one group mailing. If you did not get an e-mail from me, please let me know and I'll make sure you get on my list. (This is my problem as I'm not very fond of technology.)

Clear Skies,  
Denise Sabatini

## Dates for the "Fak"

Usually the best times to go out to the Fakahatchee Strand viewing site are moonless nights. Below is a list of upcoming Saturday nights that you will often find fellow club members out there enjoying the skies with you (weather permitting).

Date	Moonrise	Moonset
May 28		11:35 a.m.
June 4	5:16 a.m.	6:55 p.m.

## Sky Events

May 5 - New Moon  
May 5 - Eta Aquarids Meteor Shower  
May 9 - Mercury transit across the sun  
May 13 - First Quarter  
May 21 - Full Moon  
May 22 - Transit of Jupiter (Io)  
May 29 - Last Quarter  
May - Comet 9P/Tempel (11<sup>th</sup> Mag. in Leo)

## Next Meeting

**May 10, 2016: Time 7:00 – 9:00 pm**  
Norris Center, Cambier Park

# RED MOON, BLUE MOON, GREEN MOON, FULL MOON

By Jackie Richards

A friend posted a photo on Facebook that she took of the “green moon” on April 16<sup>th</sup> (see photo below) because she and many others saw the erroneous posts on Facebook and elsewhere stating that the full moon in April would appear green. According to the photographer, the photo was completely unedited and was the only photo that turned out green from a series of many photographs taken consecutively.



Photo by Sherry Straus of Orlando, Florida, taken on 4/16/16.

According to the Farmers’ Almanac, each month’s full moon has a name and a meaning behind it. The April full moon is noted to be the “full pink moon,” although it has nothing to do with the color of the moon. In fact, this name came from the herb moss pink, or wild ground phlox, which is one of the earliest widespread flowers of the spring. So the April full moon is neither green nor pink. Not sure how my friend got a green picture but it does look really cool.

Most of us get pictures of the moon similar to the one taken by EAS club member, Robyn Pritchard, below.



Photo by Robyn Pritchard taken on 4/15/16 with her phone camera through her telescope lens.

Even the “blue moon” is not blue. A blue moon is an additional full moon that is present in a season (being the third of four full moons when there are usually only three) or an additional moon appearing in one month. Since this is rare (occurring once every two to three years), the term “once in a blue moon” was borne.

“Blood moons” or “red moons” are often used to describe a total lunar eclipse. This is because a full moon often turns red when completely eclipsed. This happens because of Rayleigh scattering (the scattering of light by particles in a medium without change in wavelength) which is the same thing that causes colorful sunrises and sunsets. This also accounts for the moon’s red color when it is rising just above the horizon.

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## Fak and Other Photos



M64 (Black Eye Galaxy) taken by Chuck Pavlick 4/9/16; Camera: Starlight Xpress SX25C; Scope: Celestron Edge 9.25 w/Lepus 0.62 Reducer; 12@ 480 secs; captured in Nebulosity and processed in Pixinsight and Photoshop.

## Published Articles by EAS Members

Ted Wolfe’s article in the Naples News/Collier Citizen on April 30, 2016, Looking up: Pretty much flawless: The ‘perfect galaxy’ was not so easy to find.

<http://www.naplesnews.com/community/collier-citizen/looking-up-pretty-much-flawless-the-perfect-galaxy-was-not-so-easy-to-find-31510af4-14fd-1d76-e053-0-377161241.html>

TO VIEW THE ABOVE ARTICLE, PRESS “CTRL” AND LEFT CLICK BUTTON.

The below link provides previous articles in the Collier Citizen by Ted Wolfe that appeared over past years.

<http://search.naplesnews.com/jmg.aspx?k=looking+up+ted+wolfe>

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## MORE PHOTOS



Photo by Bart Thomas on Earth Day, 4/16/16, taken at the Conservancy. Todd Strackbein (front), Bob Frances (left) and Ted Wolfe (right).



M83 taken by Chuck Pavlick at the Fak on 5/7/16.

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### **A Mind Blown (AKA a Minimally Energetic Cosmological Event.) By Thomas J. Woosnam**

Well... I was reading an *Astronomy Magazine* article and the next thing I knew was my mind was BLOWN! I'm sure you'll all agree that the blowing of a mind is NOT a cosmologically significant event; much like a gnat is not a significant presence on an elephant's butt. The elephant in the room here is HUGE and the gnat teeny tiny, negligible as an engineer might point out; perhaps there's not enough room on earth to fit this size elephant. Bear with me on this analogy. Let me also remind you of the jet.com commercials playing now on a channel near you. This commercial allows you to observe realtime and in living color minds blowing (energy amounts represented by the size of the teeny tiny gnat.)

I have heard some representations of how energetic a supernova can be (not the elephant analogy yet). Those included here come from an internet source called RealClearScience.com using supernova power as a search argument. A supernova (SN) discovered last summer dubbed ASSASN-15<sup>th</sup> has been called by scientists the most powerful SN ever seen. So... my article revolves around a big one! The site mentioned talks about ergs and joules which most of us don't relate to well. The good news is that the site boils it all down to understandable stuff as you'll see in a minute. We'll be talking watts, as in a 100 watt light bulb.

1. A chunk of uranium the size of a pea leveled most of Hiroshima when converted to energy via  $E = MC^2$ . ASSASN-15<sup>th</sup>'s energy would be equivalent to a pea the size of the moon releasing energy. Our solar system and more would be obliterated. I know not the megatons?



Mars taken by Chuck Pavlick at the Fak on 5/7/16.

2. What about watts. We all know about watts but did you know that our sun produces  $3.8 \times 10^{26}$  watts of power? What... you say? ASSASN-15<sup>th</sup> was 580 billion times brighter than our sun. That **almost** blew my mind but the best is yet to come.
3. Our Milky Way galaxy burns with approximately  $8 \times 10^{36}$  watts. Say WHAT? For the days that it lived, ASSASN-15<sup>th</sup> burned with the energy of approximately 30 times our galaxy. **OUR GALAXY!!!**
4. A redlining Ferrari engine produces approximately 600 HP (1 HP = approximately 746 watts. WHAT?) Stay with me here. 600 HP is roughly equivalent to 450,000 watts. ASSASN-15<sup>th</sup> was like unto  $10^{32}$  Ferrari engines revving at full throttle.

Now, I don't have to tell you what those exponents mean. But I will: OK, this was a BIG SN! Maybe I shouldn't be using this one for my example but perhaps I can adjust a little, later. Stay with me. We're getting to the mind blowing part (incidentally, I have since recovered from having my mind blown... completely. I'm sure of it. Probably. Maybe. :-))

So a circuitous route to get back to *Astronomy Magazine*. I was reading an article on gravity waves. What... you say? They are very much in the news lately. CNBC even commented a bit on them, a finance channel!? I wrote this before I saw the newsletter article by Ethan Siegel (an excellent article; read it if you haven't), and you will see that Ethan and I have taken a little different approach to the topic.

There are two measurement observatories called Laser Interferometer Gravitational-wave Observatory (LIGO) intended to capture evidence of these waves: one in Hanford, Washington and another in Livingston, Louisiana. On September 14, 2015 ripples arrived at both, which scientists say caused the LIGOs to 'chirp' (that's a technical term).

What caused the 'chirp'? This is the good part! This is the maximally energetic cosmological event which caused the minimally energetic cosmological event.

Way, way out there, in fact, 1.3 billion light-years out there, two black holes were doing the tightly coupled deadly orbital dance; one was 29 solar masses in size and the other 36. The orbits were decaying. The outcome was inevitable. The two black holes merged with massive violence. Before the marriage the total number of solar masses was 65; after... the total was 62. Where, oh where, did that energy go. That energy took the form of a colossal ripple in the fabric of space-time, AKA created a colossal gravity wave event. This is a fantastic story. It lays groundwork for huge advances in a new field of research. It once again underscores the genius of Einstein.

It furthermore makes you proud to be a member of the species that was able to detect gravity waves.

Say WHAT? Oh yes, the missing 3 solar masses. This is the punch line. This is the piece de resistance. This is the monster elephant in the room. These three solar masses were equivalent to... wait for it... 5000 supernovas!! This was indeed a cosmologically significant event, to put it mildly. This is what **blew** my mind!!

Should I say another word? Most would say quit while you're ahead. But a little more work needs to be done. We were working with a BIG supernova. Even though, what about a SN  $\frac{1}{2}$  the size of ASSASN-15<sup>th</sup>, and therefore 2500 SNs. Still woulda blown my mind. The energy that pushed those waves 1.3 billion light-years and lit up our LIGOs was truly astonishing.

Please read the Ethan Siegel article. Also read the May *Astronomy Magazine* article.

Thanks to Jackie and her newsletter. It is an excellent source of astronomical information, photos, and more every month. I also look forward to the arrival of my *Astronomy Magazine* every month and thanks to them. Also thanks to the RealClearScience web site. And to you dear reader, most of all, thanks, Tom Woosnam.

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## Hubble Shatters The Cosmic Record For Most Distant Galaxy By Ethan Siegel

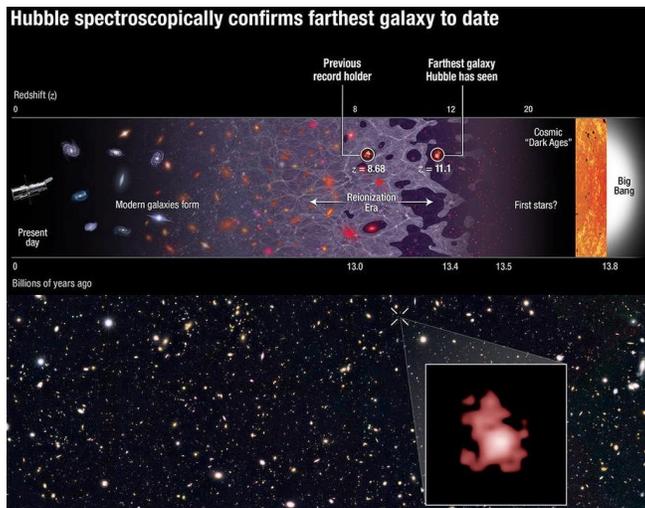
The farther away you look in the distant universe, the harder it is to see what's out there. This isn't simply because more distant objects appear fainter, although that's true. It isn't because the universe is expanding, and so the light has farther to go before it reaches you, although that's true, too. The reality is that if you built the largest optical telescope you could imagine -- even one that was the size of an entire planet -- you still wouldn't see the new cosmic record-holder that Hubble just discovered: galaxy GN-z11, whose light traveled

for 13.4 billion years, or 97% the age of the universe, before finally reaching our eyes.

There were two special coincidences that had to line up for Hubble to find this: one was a remarkable technical achievement, while the other was pure luck. By extending Hubble's vision away from the ultraviolet and optical and into the infrared, past 800 nanometers all the way out to 1.6

microns, Hubble became sensitive to light that was severely stretched and redshifted by the expansion of the universe. The most energetic light that hot, young, newly forming stars produce is the Lyman- $\alpha$  line, which is produced at an ultraviolet wavelength of just 121.567 nanometers. But at high redshifts, that line passed not just into the visible but all the way through to the infrared, and for the newly discovered galaxy, GN-z11, its whopping redshift of **11.1** pushed that line all the way out to 1471 nanometers, more than double the limit of visible light!

Hubble itself did the follow-up spectroscopic observations to confirm the existence of this galaxy, but it also got lucky: the only reason this light was visible is because the region of space between this galaxy and our eyes is mostly ionized, which *isn't true* of most locations in the universe at this early time! A redshift of 11.1 corresponds to just 400 million years after the Big Bang, and the hot radiation from young stars doesn't ionize the majority of the universe until 550 million years have passed. In most directions, this galaxy would be invisible, as the neutral gas would block this light, the same way the light from the center of our galaxy is blocked by the dust lanes in the galactic plane. To see farther back, to the universe's first true galaxies, it will take the James Webb Space Telescope. Webb's infrared eyes are much less sensitive to the light-extinction caused by neutral gas than instruments like Hubble. Webb may reach back to a redshift of 15 or even 20 or more, and discover the true answer to one of the universe's greatest mysteries: when the first galaxies came into existence!



Images credit: (top); NASA, ESA, P. Oesch (Yale University), G. Brammer (STScI), P. van Dokkum (Yale University), and G. Illingworth (University of California, Santa Cruz) (bottom), of the galaxy GN-z11, the most distant and highest-redshifted galaxy ever discovered and spectroscopically confirmed thus far.

**Items For Sale or Trade or Wanted:**

[http://www.naples.net/clubs/eas/equipment\\_sales.html](http://www.naples.net/clubs/eas/equipment_sales.html)

**Useful links (software, telescope making, telescope and equipment suppliers, astronomical data sources, iPhone and iPad Apps and more):**

<http://www.naples.net/clubs/eas/links.html>

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**EAS 2016 DUES**

For the bargain price of only \$20.00 per family, all this can be yours this year:

- Meet with your fellow astronomy enthusiasts at least 10 times a year;
- Learn about astronomy and telescopes. Check out our club scope;
- Many opportunities to view planets, nebulae and other celestial objects (even if you don't have your own telescope); and
- Enjoy the many astronomy programs at our regular monthly meetings.

**Don't miss out!** Fill out this form (please print clearly) and send it with your \$20 check to the

Everglades Astronomical Society, P. O. Box 1868, Marco Island, Florida, 34146.

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