



Monthly Notices of the Everglades Astronomical Society



Naples, FL
April 2016

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President's Message

As you probably know by now, as of March 8, 2016, I became the president of the EAS. I truly want to thank Todd for his service to this position. He did a great job.

For those of you who do not know me, here is a bit of my background in the amateur astronomical world. Like most people down here, I'm from up north. I call Syracuse, New York, my home. I began pursuing astronomy as a hobby around 1980. I took a course at the local community college. It was there that I met a member of the Syracuse Astronomical Society. (He was the teacher.) The class was invited to go to the SAS's observatory, so I went. I started attending meetings and met so many wonderful people. I was asked to join the Board of Directors, and eventually became the president and served for two years. I then moved up to Canada. I joined the Royal Astronomical Society of Canada-Kingston Centre, of Kingston, Ontario. You guessed it. Shortly after joining, I became president of that group. I am also a life member of the Royal Astronomical Society of Canada. My main interests in astronomy are archaeoastronomy and celestial mechanics.

As a club member, your opinion counts. In order to better serve you, let me know any ideas you may have. I look forward to meeting each of you. Please do not be offended if I forget your name. Lately, when I walk into a room, I often forget why.

We still have a couple of events coming up before some of you leave for the summer. Please check our calendar for those events. Thanks to Mr. Jack Berninger for his presentation on Einstein at the March meeting. It gave us a new insight to his work. Our next meeting will feature Eric Uthus as our guest speaker. The topic will be "Primar(il)y mirror making."

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 7	6:38 a.m.	8:12 p.m.
May 28		11:35 a.m.

Sky Events

April 7 - New Moon
April 13 - First Quarter
April 21 - Full Moon
April 29 - Last Quarter
April - Comet Ikeya-Murakami @ 10th mag. in Leo

Next Meeting

April 12, 2016: Time 7:00 – 9:00 pm
Norris Center, Cambier Park

THE EAS - THE GREATEST CLUB IN THE WORLD

Well at least that's my opinion. Since joining the EAS three and a half years ago, I have learned so much about astronomy



Photo of M82 taken by Rick Piper and Jackie Richards at the Fak 4/2/16.

and astrophotography and have made so many wonderful friends—friends that share the same passions that I do about astronomy and other things, too. I never thought I would be able to say that I participated in taking a picture of anything so far away like the above photo of M82.

One of the many great things about this club is the members who consistently help everyone no matter what level you are at as an amateur astronomer or astrophotographer. Some people know a lot about galaxies, our solar system, stars, astrophotography, etc. No matter who I talk to in the club, I always walk away with more information about astronomy and I continue to absorb knowledge. I have found that you never have to worry about what you ask or wonder what people might think of you because of what you don't know. Everyone shares information without hesitation because they want to and they can. Well those are just some of the many things I love about the EAS and plan to be in the club forever.

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Fak and Other Photos



Photo of Jupiter by Chuck Pavlick on 3/16/16 in Cape Coral; Scope: Edge 9.25 w/2X barlow; Camera: DMK 21 AU 618; Orion RGB filters.

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Published Articles by EAS Members

Ted Wolfe's article in the Naples News/Collier Citizen on March 23, 2016, Looking up: The great red storm: Jupiter is home to one of the most unique "Spots" in our galaxy

<http://www.naplesnews.com/community/collier-citizen/looking-up-the-great-red-storm-jupiter-is-home-to-one-of-the-most-unique-spots-in-our-galaxy-2eb89bc-373285591.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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Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

By Ethan Siegel

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

When a gravitational wave passes through an object, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular "arms," letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photo detector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-compressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's $E = mc^2$.

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radio

telescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.

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.

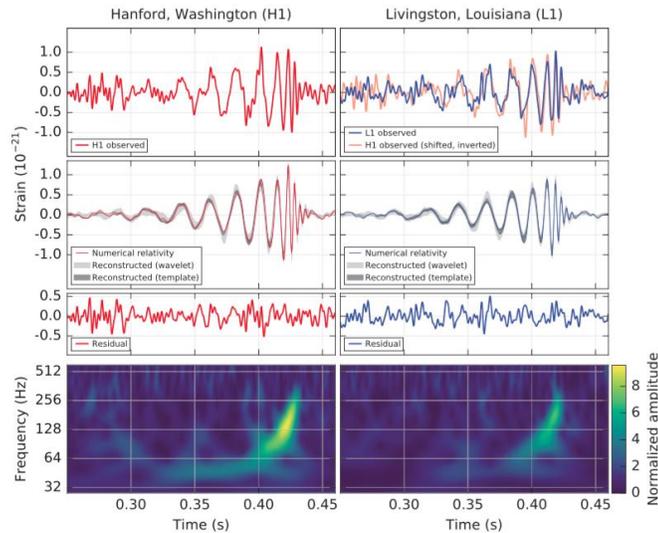


Image credit: Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), Physical Review Letters 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

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Items For Sale or Trade or Wanted:

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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Name: _____

Address: _____

Phone: _____

Email: _____