



# Smoke Signals

## Newsletter of Fullerton Radio Club

### April 2016

#### April Meeting

The April club meeting will feature William (Bill) Phenizy K6WHP, and Dick Palmer WB6JDH, who will present a topic related to QRP radios, their operation, constructions, and availability as kits. Note: the subject and material parallels the article on page 39 in the March 2016 issue of QST, co-authored by Dennis Kidder W6DQ.



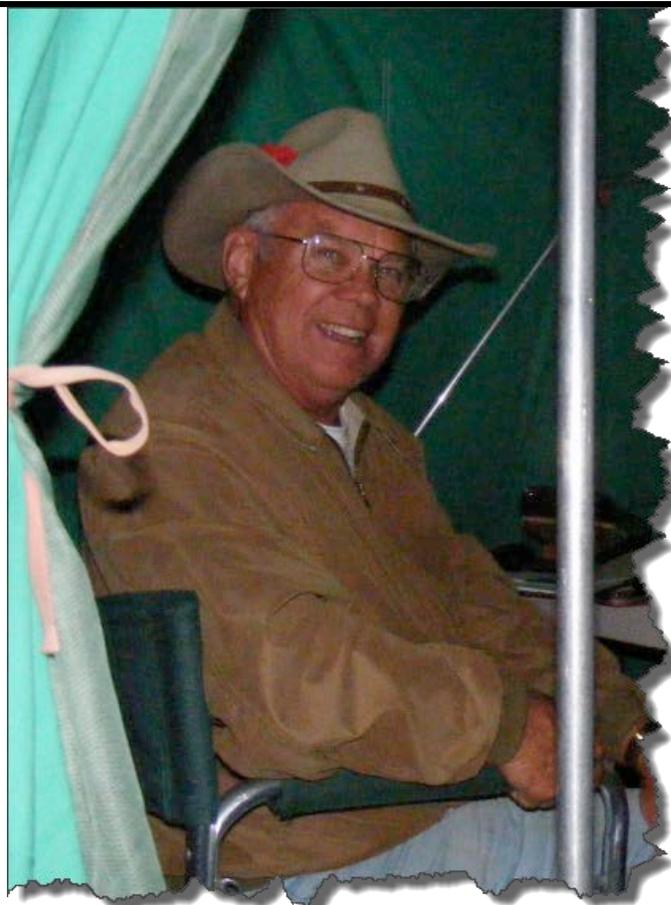
**Bill Phenizy K6WHP**

William Phenizy followed in his father's footsteps into amateur radio as a Novice in 1961 (WV6KJK) and then again as a two-year Novice in 1974 (WN6EPZ) after a hiatus for college and the USAF. In 1978, he was licensed as an Advanced as KB6HK and continued on until licensed as an Extra Class as K6WHP in 1995.

"William got into QRP when he was studying for his code test and his son kept complaining of the QRM interrupting Rug Rats. So, turning down the power to about 5 watts, he was excited to find he could work stations from all over and has been a devotee ever since.

He is an avid builder and experimenter with many kits to his credit. His chief ambition in life is to retire and 'be like WB6JDH when I grow up'. As such, he regularly visits Dick's Scope Emporium and lugs home irreplaceable remnants of Dick's collection in exchange for rectangles of green paper.

Both he and Dick are regulars at the Nationally prominent Zuni Loop Field Day effort.



**Dick Palmer WB6JDH**

In 1975 Dick got his Novice license wn6jdh, and 6 months later got the Tech. + after failing the 13 wpm code. The call went to wb6jdh. In 2001 or there about Tech. + was up graded to General still maintaining the wb6jdh call. Always being a radio builder and experimenter, a receiver was built following the National Semiconductor IC LM373, if amp and detector chip. The final product was a 40 meter superhet. receiver with agc for receiving CW and SSB signals. After a job transfer to the LA area, the bug got real bad and QRP, being very popular, building speeded to mach 2. Now the collection is over 80 transceivers mostly CW but some are both CW and SSB. As Bill has mentioned, Dick joined the Zuni Loop Mountain Expeditionary Force for Field Days.

**Fullerton Radio Club**  
**P.O. Box 545, Fullerton, CA 92836-0545**

**Web site: [www.FullertonRadioClub.org](http://www.FullertonRadioClub.org)**

## **April 2016 Board Meeting Minutes**

### **President**

Albert Solomon, AG6OF  
Phone: (714) 348-7938  
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### **Vice President**

Walter Clark  
Phone: (714)-882-9647  
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### **Secretary**

Linda Endsley, KJ6IHB  
Phone: (714) 992-4645  
E-mail: [lindiend@sbcglobal.net](mailto:lindiend@sbcglobal.net)

### **Treasurer, Public Service, Membership**

Gene Thorpe, KB6CMO  
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### **HDSCS**

April Moell, WA6OPS  
Phone: (714) 879-6895  
Emergency Coordinator, HDSCS  
E-mail: [emcom4hosp@aol.com](mailto:emcom4hosp@aol.com)  
[www.hdscs.org](http://www.hdscs.org)

### **T-Hunt**

Joe Moell, K0OV  
<http://www.homingin.com>  
E-mail: [homingin@aol.com](mailto:homingin@aol.com)

### **OCCARO Representatives**

Robert Gimbel, KG6WTQ

### **License Trustee**

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### **Directors**

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### **Director & Newsletter Editor**

Paul Broden, K6MHD  
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E-mail: [pbroden@sbcglobal.net](mailto:pbroden@sbcglobal.net)

The April 6, 2016 FRC Board meeting was called to order by President Albert Solomon AG6OF at 7:30pm. Present: Treasurer Gene Thorpe KB6CMO, Secretary: Linda Endsley KJ6IHB Directors: Larry McDavid W6FUB, Paul Broden K6MHD; Mike LeFevre WD6AQH; Robert Gimbel KG6WTQ and member Cheryl Thorpe KE6TZU.

### Treasurer's report:

Checking \$2,356.21  
Savings \$4,606.21

### Old Business:

February minutes were approved with the addition of attendance of Robert Gimbel KG6WTQ, and correct the email address of the Club President.

Should have been included in the March Board Meeting (Treasurer's report) minutes:

Checking \$ 2,424.21  
Savings \$ 4,606.14

April 30, Sat., Donate Life Run at Cal State Fullerton. Need 10 more ham radio operators.

More articles are needed for input in the newsletters.

### New Business:

Received 6 membership renewals.

Gene has all the paperwork for the taxes.

Next board meeting: 064MAY2016

Adjourned at 8:02 pm

Submitted by Linda Endsley KJ6IHB

### **Show -and-Tell**

Bring something of interest to the meeting to show and share your story. Something old, new, or just of interest to hams.

## President's Message

Hi Everyone,

It is April and so time for spring cleaning! Who doesn't love that! Well I don't, so that's all I will say on that. Well I have been watching YouTube and found a channel called bigclivedotcom that is very interesting. It shows different electronics that are taken apart and reviewed or small projects that he does that are very fun to watch. It has me thinking of having a meeting that is a hands on "how to" class on soldering or other projects. What do you think is there anything you would like to build or teach that we can do in an hour and a half? If so, let me know and we can talk with the board and set up a day. Also the club would like to put on another Antennas In The Park. If you would like to participate or are a member of another club that you think will like to join us let us know and we can start setting everything up. We would need everyone to join in by bringing a radio station or maybe a project that you would like to do or just yourself to help others and support the club. I hope to see you at the meeting this month, and please let me know your thoughts on these suggestions. I would like the input.

Thank you  
Albert Solomon AG6OF  
President

## New ARRL Podcast - The Doctor is In

If you read QST, you are likely familiar with Joel Hallas' "The Doctor is in" column. Joel, along with QST Editor in Chief Steve Ford have a new 20 minute every-other-week podcast with a similar theme. I just listened to the first "show" and enjoyed it. If you are a podcast listener, it is worth adding to your podcast feed. It is free and you do not need to be an ARRL member.

Here is a link to the ARRL page describing the podcast (and ways to get it):

<http://www.arrl.org/news/a-new-arrrl-the-doctor-is-in-audio-podcast-episode-is-now-available>  
<<http://www.arrl.org/news/a-new-arrrl-the-doctor-is-in-audio-podcast-episode-is-now-available>>

If you listen on an iOS device or mac, here is a shortcut to the iTunes page:

<https://itunes.apple.com/us/podcast/arrrl-the-doctor-is-in/id1096749595?mt=2>  
<<https://itunes.apple.com/us/podcast/arrrl-the-doctor-is-in/id1096749595?mt=2>>

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73,  
Bob - AD6QF

## Bioenno LiFePO4 Batteries for Ham Radio

Our company Bioenno Power, a leading Santa Ana, California based manufacturer, offers you a variety of advanced battery solutions including LiFePO4 (Lithium Iron Phosphate) batteries for ham radio applications. We work with different ham radio enthusiasts across the U.S. and heard about your ham radio club through our customer base. We offer a full line of LiFePO4 battery products across a wide range of voltages from 12V to 48V with capacities ranging from 3Ah to 200Ah. Our LiFePO4 batteries are manufactured to ISO9001 standards using high quality materials and stringent quality control. In addition, we also offer a variety of powerpacks (portable energy storage systems) and foldable solar panels for your field applications.

Feel free to contact us: Bioenno Power sale@bioennopower.com 888-336-7864

A bit about us, since early 2012, Bioenno Power started to provide LiFePO4 batteries, powerpacks, LiPo batteries, and various other energy products that have been well tested. Local ham radio clubs such as the Orange County Amateur Radio Club (OCARC) have positively evaluated our LiFePO4 batteries, among others. These are among best performing batteries available at a competitive price! Since then, we have sold our batteries across the country via our sales channels, and overseas as well.

## HDSCS VE License Session

**HDSCS will hold a VE examination session for all classes of Amateur Radio license on Saturday, April 23, 2016** at Care Ambulance headquarters, 1517 West Braden Court in Orange. The testing session is open to HDSCS members and non-members alike and starts at 9:30 AM. If you wish to take a test, please register in advance by contacting Ken Simpson W6KOS by phone (714-651-6535) or e-mail (w6kos-at-arrrl.net). Ken will need your phone number, e-mail address and level(s) of license that you will test for. He will reply via e-mail with testing details and what to bring. Amateur Radio talk-in will be on K6QEH/R, 146.970 MHz PL136.5. Directions and a downloadable flyer are in [www.hdscs.org](http://www.hdscs.org).

## **Donate LIFE Run Walk April 30, 2016**

### **10 Additional Amateur Radio Operators NEEDED**

**Please Save Saturday 30, April 2016 for  
the Donate LIFE Run/Walk & Family  
Festival at CSUF.**

**We need 10 more Amateur Radio  
Operators to fill in the course. Time:  
0700 - 1130 hrs. or so.**

**Contact: Gene Thorpe  
[KB6CMO@Juno.com](mailto:KB6CMO@Juno.com) with your Name,  
Callsign, E-mail Address and Phone#. I  
need the info ASAP.**

**Thanks; KB6CMO**

### **CERT Activities**

Walter Clark, Gene (KB6CMO) and Cheryl (KE6TZU) Thorpe attended a CERT hands-on training on Saturday, April 9th, 2016. The 2 topics that were covered that day were Radio Usage and Fire Patrol. The exercise involved mock situations where we worked 800 MHz handheld radios.

After the training Gene took Walter and CERT member Robert Doidge KI6KYW, to see the emergency radio gear Gene installed in the computer server room for the Fullerton Maintenance building. Gene is holding the cables going to 6m, 2m and 70cm antennas on the roof. We found the access door to the roof open and it was

sprinkling that day. Robert Doidge, left a message with the fire chief about that situation. Robert as most of you know is a past president of FRC.



**Gene Thorpe KB6CMO**

### **Classified Ads**

- MFJ VersaTuner II (MFJ-941D), 300 W maximum. With instructions manual; \$50.00
- Radio Shack HTX-404 UHF Transceiver, 440HT. With AA Battery Pack\* and Ops manual; \$50.00
- ICOM IC-3AT 220HT. With AA Battery Pack\* and Ops Manual; \$50.00

\*Rechargeable batteries are available from Batteries America

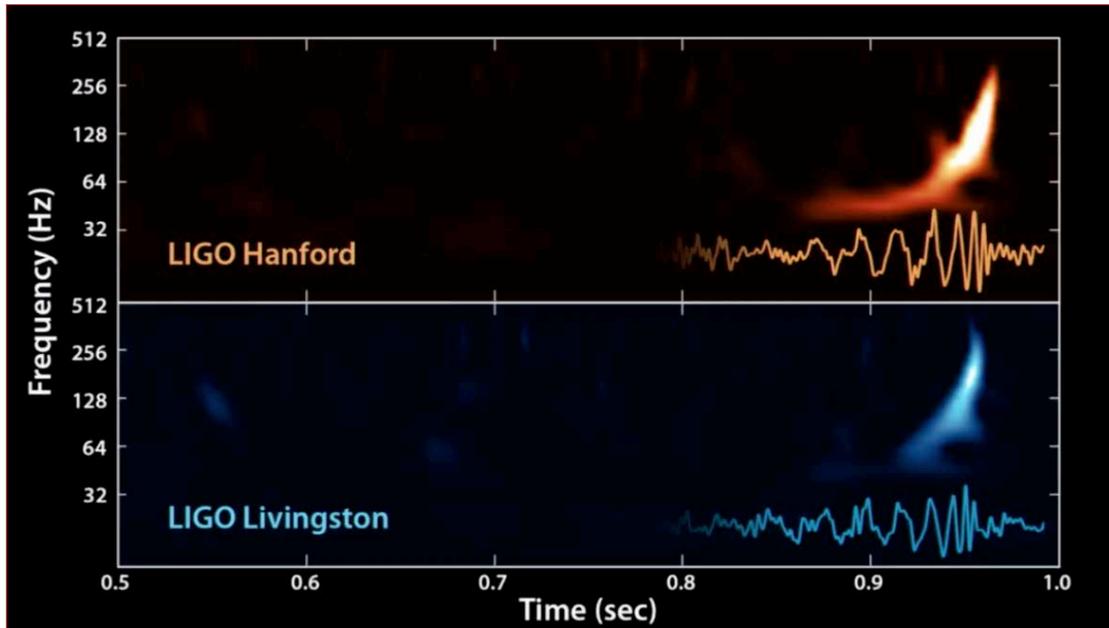
- Heathkit SB614 Station Monitor (circa 1983) With Ops Manual. Make offer

Items offered for sale by Paul Broden K6MHD.  
Contact by email ([pbroden@sbcglobal.net](mailto:pbroden@sbcglobal.net)) or phone (714-815-3185) for purchase.

[Classified ads may be placed by any FRC member. All ads should pertain to amateur radio equipment or related items]

## Gravitational Waves Detected!

The Advanced Laser Interferometer Gravitational-wave Observatory (LIGO) recently announced confirmation of the first direct observation of gravitational waves generated by two orbiting black holes spiraling into one another. The actual detection of these waves or ripples in what is known as the “fabric of space-time”, occurred on September 14, 2015 and was simultaneously observed at the Hanford, WA and Livingston, LA LIGO observatories.



**Detected Signals of the merger of Two Black Holes at Both LIGO Observatories**



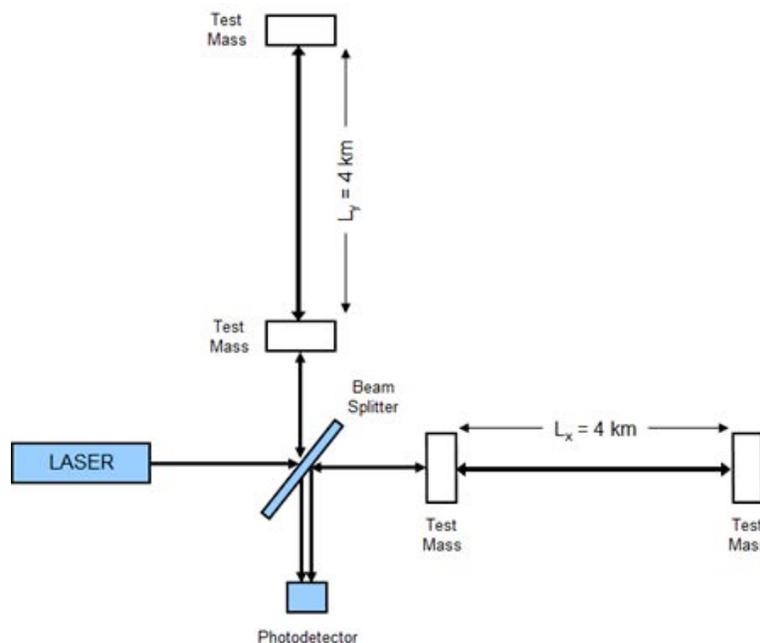
**LIGO Observatory Located in Livingston, Louisiana**

Researchers took several months verifying their results to ensure the detected signal (i.e. gravitational wave) at each observatory was not a test or a false signal (e.g. an environmental disturbance or an instrumentation artifact). The reason for two identical LIGO facilities at two different geographic locations is to provide a method to identify a “true” detection (positive correlation between the two observatories) and ignore “false” signals from vibrations (including noise) due to local effects.

In addition, the measurements from the two observatories confirmed an excellent match to the predicted gravitational “waveform” predicted by general relativity (using numerical models).

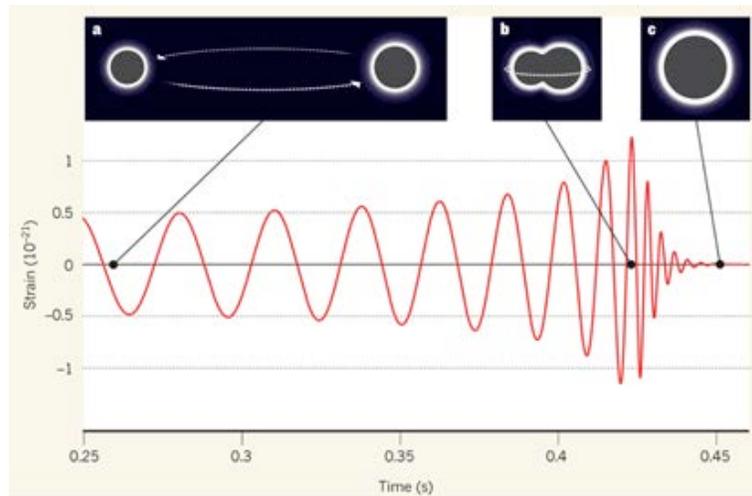
Phenomenally, actually mind-boggling, the “signal”, traveling at the speed of light, was generated by a cosmological collision with an output “50 times greater than all the power put out by all the stars in the universe put together” (as stated by Kip Thorne) and has taken close to a billion years ( $10^9$  years or 1 with nine zeros) to reach earth. Talk about propagation delay!

Technically, the “receiver” is a highly enhanced Michelson interferometer that measures gravitational-wave strain as a difference or change in length between two orthogonal (perpendicular) arms (shown in the figure below). The laser (a coherent light source operating at the near-infrared wavelength of 1064 nm) is split into two arms where the light bounces between mirrors separated by 4 kilometers (about 2.5 miles) in each arm of the interferometer. The reflected laser beams are recombined at an optical detector (photodetector) and create an intensity pattern of alternating dark and bright rings (an interference pattern is created when two waves combine in and out of phase with one another). Changes in this interference pattern (due to a change in length in the arms of the interferometer) is a measure of the detected gravitational-wave strain (a change in length compared to the original length). The level of strain sensitivity required by the LIGO interferometer is on the order of  $10^{-21}$ . For example, given the 4 km separation between two of the mirrors in one arm of the LIGO interferometer, the change in length between the two mirrors (due to the strain from an “incoming” gravitational wave) would be approximately one ten thousandths of the diameter of an atomic nucleus. An incoming gravitational wave actually changes the relative lengths in both arm of the interferometer due to gravitational waves being quadrupole radiation (electromagnetic waves that are dipole radiation). As a gravitational wave propagates through space, one transverse direction stretches while the other compresses, therefore, changing the lengths in both arms of the interferometer. Considering strain sensitivity and the types of noise contributions (e.g. thermal noise, shot noise due to photon detection and various extraneous vibration noise signals) LIGO must deal with, this puts a new meaning on definition of minimum detectable signal.



**Simplified Diagram of the LIGO**

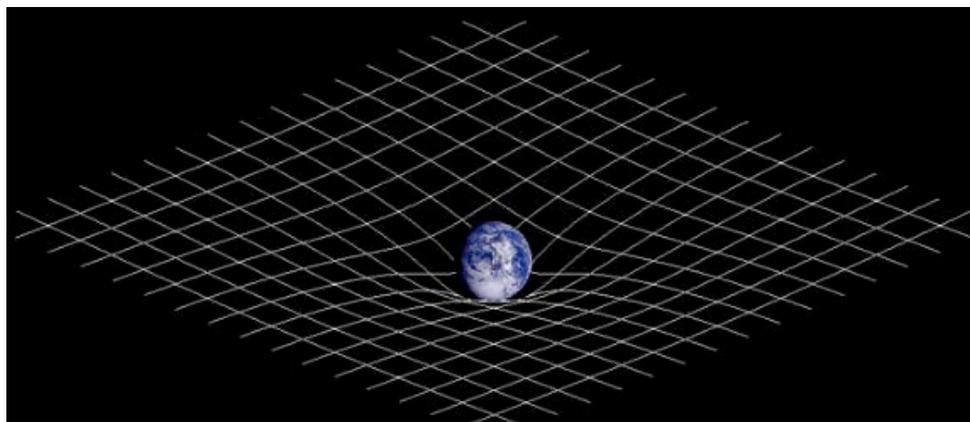
The “transmitter” is believed to have been from the merger of a pair of black holes. As the pair of black holes spiraled together (see figure below), the change in angular momentum of the coalescence pair is radiated away via a gravitational wave with the frequency of the wave increasing over time as the two black holes merge together and the decaying orbit resulting in a “chirped” waveform. The gravitational wave produces a strain in space and the observation of the wave detected by the interferometer occurred with a swept frequency from 35 Hz to 250 Hz.



M. Miller, *Nature* 531, 40-42, March 3, 2016  
(adapted from Abbott, B.P. et al., *Phys. Rev. Lett.* 116, 061102 (2016))

### **Merger of Two Massive Objects Creates a Gravitational Wave with Increasing Frequency that Reaches a Maximum then “Rings Down”**

Gravitational radiation? Ripples in space-time? First of all, just what is space-time?

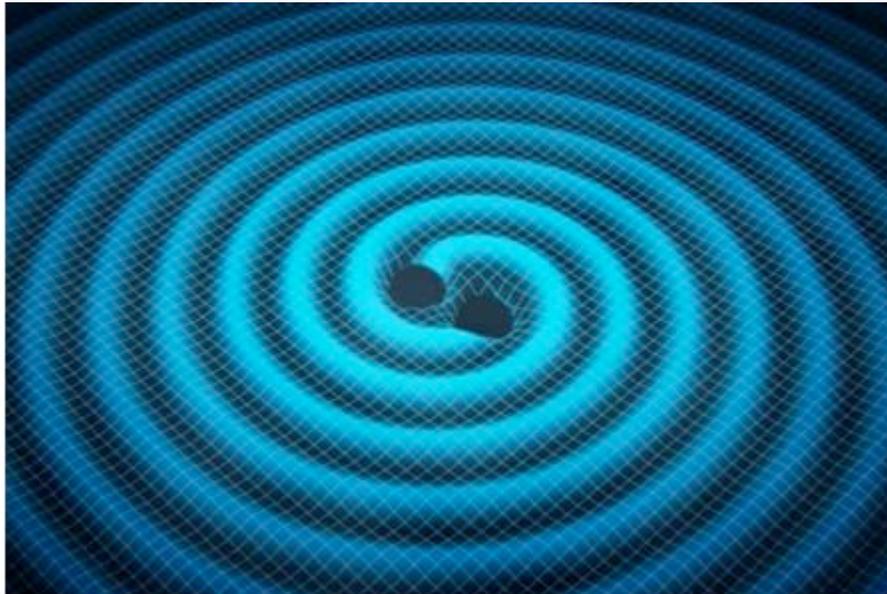


### **A Two-Dimensional Space-Time Surface Curved By Large Mass**

In everyday experience, we perceive space and time as different entities. Relativity theories combine space and time into a four dimensional space-time. After Einstein published his special theory of relativity (reference frames move with constant velocity with respect to each other; no acceleration), a mathematician named Hermann Minkowski, realized that special relativity could best be described using a four dimensional space-time. Space-time is a unification of the three dimensions of space combined with time in the “fourth dimension”. Einstein originally thought this “new” formulation of his

theory was an unnecessary mathematical complication. However, when considering relativity with the added effect of gravity, Einstein recognized that this geometric space-time concept was necessary for developing the general theory of relativity. In general relativity, space-time is curved by the presence of matter so the geometry now is expressed in terms of a curved space (also known as Riemann space). Massive objects distort space-time making space distort or “wrap”. Picture a two-dimensional “space” as a rubber sheet. Normally, this sheet is flat. However, placing an object (e.g. sphere) with a large mass (e.g. a bowling ball) will distort the surface of the rubber sheet. Another object, like a small and less massive marble, would follow a curved path of the distorted surface created by the large massive sphere (like a planet orbiting about the sun). This trajectory of the marble is a result of gravity. Gravity is a result of this curved space and this is why general relativity is a *geometrical* theory.

General relativity predicts that if this space-time “fabric” is perturbed, the ripples in space-time propagate outward at the speed of light. Similarly (loosely speaking) these gravitational waves are “like” electromagnetic waves in that accelerating charges create electromagnetic waves and accelerating massive objects give rise to gravitational waves. Accelerating objects, like the inward spiraling of two black holes, create wave-like changes in the curvature of space-time that propagate outwards at the speed of light. As this gravitational wave passes through a local region of space-time (for example, an observer here on earth), a strain can be measured from a change in distance between two objects in this region due the distortion of the local space-time.



(NASA/JPL)

### **Ripples in Space-Time from Binary Pair Merger Create Gravitational Waves**

It is interesting that Newton’s theory of gravitation does not predict or support gravitational waves since Newton’s theory assumes that physical interactions propagate at infinite speed (i.e. instantaneous, therefore, no wave propagation). In addition, with most of the popular science press always discussing quantum entanglement and quantum effects, a “classical” physics theory is catching some of the “limelight” (coincidentally the LIGO observation occurred on the one hundredth anniversary of the 1915 publication of Einstein’s theory of general relativity). Both gravitational waves and electromagnetic waves are predicted from two (albeit very different) classical field theories. Einstein’s general theory of relativity is expressed using a set of field equations that describes gravitation as a geometric curvature of space-time due to mass (actually mass-energy). Maxwell’s equations express the electromagnetic fields as a result of charge and current densities that vary with time. Both field theories predict waves that propagate away from the “source” at the speed of light.

Yes, I am overly simplifying things, however, it is interesting that Hertz (and everyday amateur radio operators) verified the prediction of Maxwell's field equations regarding electromagnetic radiation and, now, LIGO has verified the existence of gravitational waves predicted by Einstein's field equations. While radio enables us to communicate, LIGO is enabling astrophysics a "new" way of observing the universe.

[Article provided by Richard Belansky, KG6UDD]

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### DUES ARE OVERDUE!

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It's now April, and Club membership renewal is past the dues payment time. If you haven't renewed your membership there is a renewal application attached at the end of the newsletter. It's time to **SUPPORT YOUR CLUB!**

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### FRC April Club Meeting

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**Wednesday,  
April 20, 2016**

**Chapman Activity Center**  
2515 San Carlos Dr.  
Fullerton, CA

Dinner before the meeting at 5:00 PM at:  
**Coco's Restaurant, 1011 N. Harbor  
Blvd.  
Fullerton**

**Meeting time: 7:00 PM  
Visitors are welcome**

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### FRC Board Meeting

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Open to all Club members  
**Marie Callender's Restaurant**  
126 Yorba Linda Blvd., Placentia  
First Wednesday of each month.

**Next Board Meeting**  
**May 4, 2016**

QSO and dinner; 7:00 PM  
**Meeting: 7:30 PM**

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### MEMBERSHIP RENEWAL / APPLICATION

Fullerton Radio Club  
PO Box 545, Fullerton, CA 92836

(Please Print)

Name #1	_____	Call: _____	Class: _____
Name #2	_____	Call: _____	Class: _____
Address:	_____	City: _____	State/Zip: _____
Phone #1:	_____	Email #1: _____	
Phone #2:	_____	Email #2: _____	

ARRL Member     Yes     No

Special Amateur Radio Interests: \_\_\_\_\_

Dues are \$20 per member, or \$25 per family. Students (full time) \$10

**Bring your application and dues payment to the next meeting or mail to the above address.**