MOUNTAIN SPARK GAPS

NPARC—The Radio Club for the Watchung Mountain Area

Website: http://www.nparc.org
Club Calls: N2XJ, W2FMI
Facebook: New Providence Amateur Radio Club ((NPARC)

VOLUME 51 NO.2   February 2016

UPCOMING EVENTS

Regular Meetings

3/14 & 3/21
Monday 7:30
NP Community Center

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd Monday of each month at the
NP Senior & Adult Center
15 East Forth Street
New Providence

Informal Project Meeting: 7:30—9:00 PM
4th Monday of each month
Same location
Everyone is Welcome
If a normal meeting night is a holiday, we usually meet the following night. Call one of the contacts below or check the web site

Club Officers for 2015

President: KC2WUF David Bean
973-747-6116
Vice President:K2UI Jim Stekas
973-377-4180
Secretary: KD2EKN Tim Farrell
908-244-6202
Treasurer: K2YG Dave Barr
908-277-4283
Activities: W2PTP Paul Wolfmeyer
201-404-6914

On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Digital Net
First & Third Mondays 9 PM
Details as announced.

Club Internet Address

Website:http://www.nparc.org
Webmaster K2MUN David Berkley
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim

MOUNTAIN SPARK GAPS

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Contributing Editors:
WB2QOQ Rick Anderson
WB2EDO Jim Brown
K2UI Jim Stekas

Climatological Data for New Providence for December 2015

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 34 years.

TEMPERATURE -
Maximum temperature this December, 68 deg. F (December 24)
Last December(2014) maximum was 64 deg. F.
Average Maximum temperature this December, 53.5 deg. F
Minimum temperature for this December, 29 deg. F (December 5,6,19,20)
Last December(2014) minimum was 19 deg. F.
Average Minimum temperature this December, 39.2 deg. F
Minimum diurnal temperature range, 8 deg.(46-38 deg.) 12/30
Maximum diurnal temperature range, 22 deg. (52-30 deg.) 12/18

Average temperature this December, 46.4 deg. F
Average temperature last December, 37.4 deg. F

PRECIPITATION -
Total precipitation this December – 4.57″ rain/melted snow; Trace snow
Total precipitation last December - 4.97″ rain/melted snow; 0.2″ snow

Maximum one day precip. event this December; December 17 and 23; 1.2″ rain each day.
Measurable rain fell on 15 days this December, 14 days last December.
Trace of snow on Dec. 28.

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Rick Anderson
2/24/16
243 Mountain Ave.
New Providence, NJ
(908)464-8912
rick243@comcast.net

Lat = 40 degrees, 41.7 minutes North
Long = 74 degrees, 23.4 minutes West
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

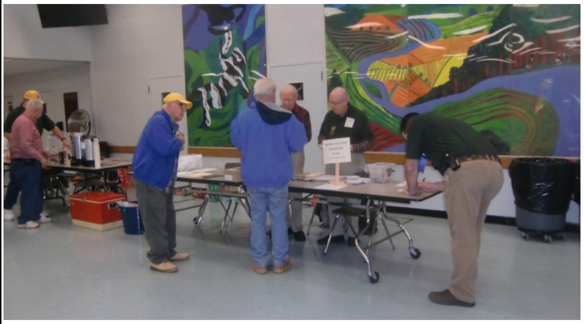
Miscellaneous

I have included a few pictures that I took at the auction. Hopefully we will have some better ones in the next issue.

Here is photo of team shirts worn by the 7th-8th grade NP Rec basketball team this past winter.

Congratulations Stu

Auction Pictures
More to Follow

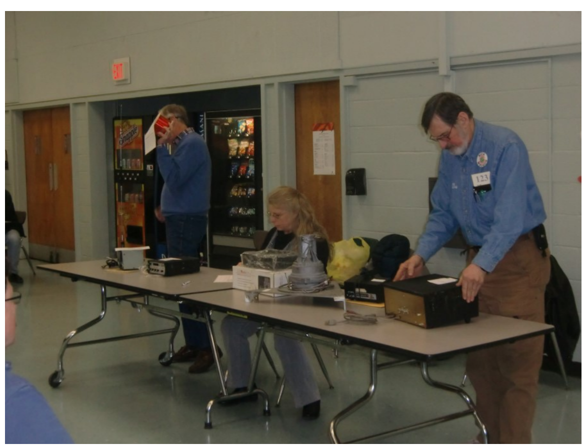


Getting Ready

Inspection

Looking the Merchandise Over

Audience Overview



Auctioneer at Work

Antenna Here is a LIGO with 4km Legs OM.

Jim Stekas - K2UI

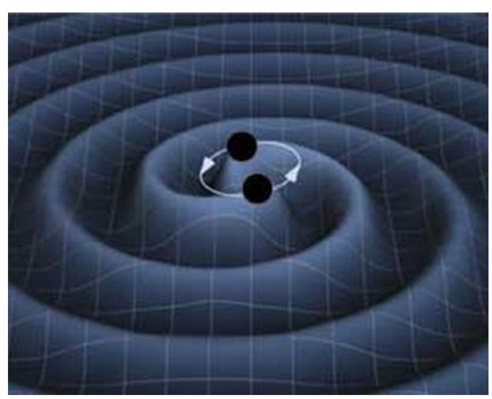
Since radio amateurs fired up the first spark transmitter designing and building antennas has been of high interest. Antenna design was largely a matter of build and test using some simple design principles until advances in computer technology allowed numerical modeling of Maxwell's equations. These days virtually every ham shack contains a computer and a great many hams use some version of NEC to model backyard antenna designs. The ARRL Antenna Book makes no mention of Maxwell or his equations, but it does include a copy of EZ-NEC on the CD-ROM included in a sleeve at the back.

Maxwell's equations describe all the electromagnetic phenomena discovered by Ampere, Coulomb, Oersted and Faraday. They define how charges and currents give rise to electric and magnetic fields, and how the fields influence the motion of charges. An unanticipated prediction of Maxwell's equations is that electromagnetic forces propagate through space as waves traveling at the speed of light, C. Einstein recognized that if Maxwell's equations were a universal law of nature then every observer would measure the speed of light as C, regardless of their motion with respect to the source. This idea was the basis of the Special Theory of Relativity, in 1905.

While the world digested Special Relativity Einstein set to work updating Newton's theory of gravity. In 1915, Einstein published his General Theory of Relativity which described gravitational fields as curvature of space and time: "Matter tells space how to curve, and space tells matter how to move." A consequence of GR is the propagation of gravitational waves as ripples in space time in analogy to the propagation of light waves. A gravitational wave striking the earth would alternately squeeze space in the N-S and E-W directions. NYC and Miami would momentarily come closer together, then NYC and LA, etc.

Now, imagine a dipole antenna in the backyard radiating 50w of power on 14MHz thanks to the currents of moving electrons in the wires. But electrons also have mass as well as charge, and therefore their motion will also generate gravitational waves. Due the small value of the gravitational constant, G, the gravitational radiation will have a power level ***360dB*** below the RF.

Clearly, if gravitational waves are going to be detected, it will require very special circumstances to dump enough energy into gravitational waves. An ideal arrangement would be two massive black holes in high speed mutual orbit. The GR solution for a single stationary BH has been known for almost 100 years, but solving the equations for orbiting black holes is only possible with numerical simulation on supercomputers. Numerical simulations now enable graduate students to solve problems in GR much the way EZ-NEC has brought antenna simulation to the average ham.



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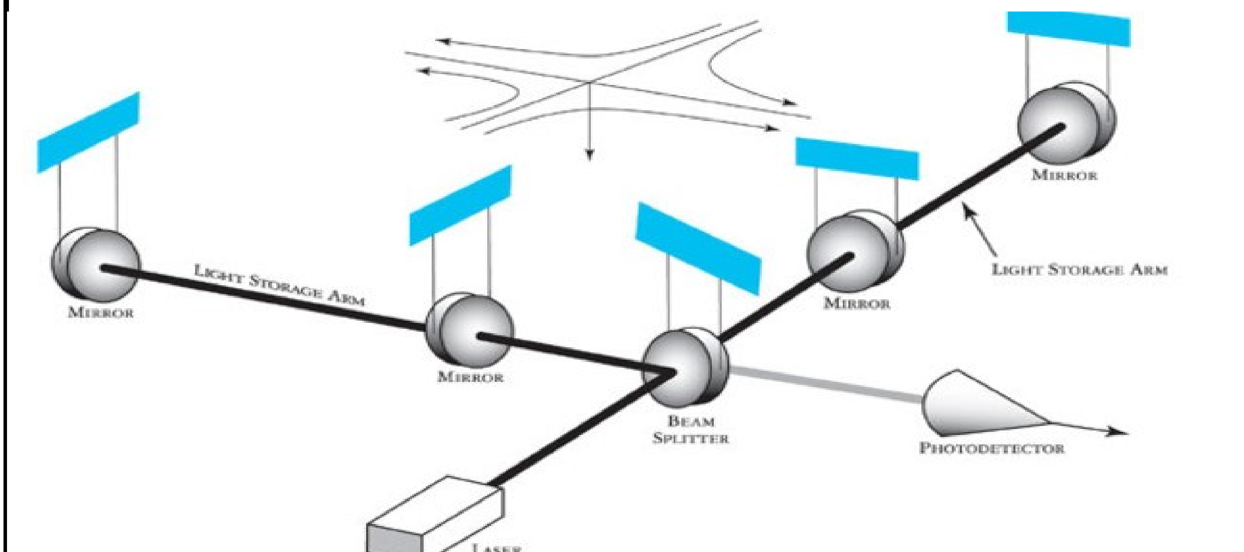
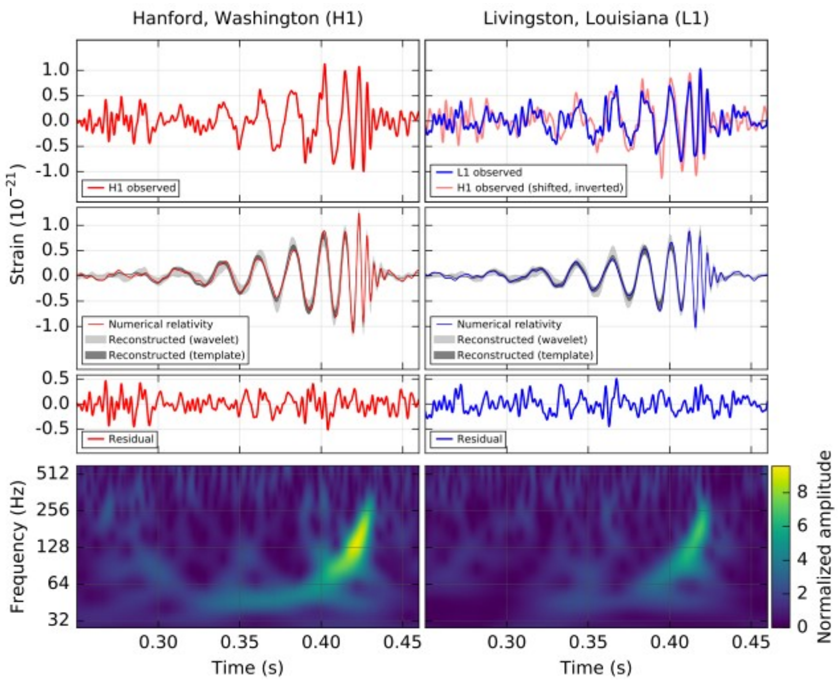
On Feb 11, LIGO (Laser Interferometer Gravitational-Wave Observatory) announced the detection of gravitational waves generated by the merging of a pair of black holes 1220 M light years away. The two BHs were each roughly 30 solar masses. As they orbited, gravitational waves carried away energy, causing the BHs orbital radius to decrease and orbital frequency to increase. In the final 0.5 seconds before the BHs merged (called "ring-down") roughly 3 solar masses were converted to gravitational wave energy. (This is about 50x the amount of energy our sun will radiate in its entire life.)

LIGO interferometers are located in Washington and Louisiana. Each splits laser light into two orthogonal 4km arms and then recombines them. Shifts in the interference pattern provide a sensitive measure of variations in the lengths of the two arms, where "sensitive" means being able to detect a change in length of 1/2000th the diameter of a proton!



You would be right to be highly skeptical of the LIGO result, except that the instruments in Washington and Louisiana observed identical signals separated by 7ms, the time it takes light to propagate between the two locations.



References:

http;//www.ligo.org/ - Official LIGO sight

https://www.youtube.cpm/watch?v=RzZgFKoIfQI—LIGO, how it works

.https://www.youtube.cpm/watch?v=aEPIwEJmZyE—LIGO press conference

Http://www.ligo/multimedia.php—LIGO official videos..

SCIENTIFIC TIDBITS
Jim WB2EDO

Planetary Magnetic Fields

Planetary magnetic fields are definitely related to rotation, but not directly. They are actually generated by the complex interaction of fluid currents (motion of material) and electrical currents (motion of electrons) in the conducting fluid of the molten metal core. This is called a "dynamo," and core convection is its primary driver, powered by cooling and crystallization growth of the solid inner core.

The importance of rotation is that it organizes the convective motion into cylindrical eddies aligned with the rotational pole. Thus, the fields generated by the rotation of these eddies throughout the core tend to line up in the same direction, adding together to form a strong dipole field. Without rotation, the convection would produce random eddies whose individual fields would be small and tend to cancel each other out.

This explains why the slow rotation of Venus would preclude a magnetic field. But what about Mars, which rotates nearly as fast as Earth and is known to have an iron core? First, the core may have cooled enough to have completely solidified; a spinning ball of solid iron doesn't produce a magnetic field.

However, there is other evidence that Mars' core is at least partly liquid. The more likely explanation is that convection in the liquid core has slowed to the point that it cannot sustain a dynamo. This might be due to the core's heat being efficiently removed through the mantle early in Mars' history, resulting in a relatively cool core that still may be hot enough to be molten.

Or, paradoxically, it may be due to inefficient heat loss from the mantle. This would cause the mantle to stay hot, which would increase the temperature at the top of the core. Since thermal convection is driven by the difference in temperature between the top and bottom of the fluid, this would be equally effective in stopping convection, and thus shutting down the magnetic field-producing dynamo.

Black Holes Inhalation

A black hole is a place in space where gravity pulls so much that even light cannot get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying or has imploded.

Because no light can get out, people can't see black holes. They are invisible. Space telescopes with special tools can help find black holes. The special tools can see how stars that are very close to black holes act differently than other stars.

How Big Are Black Holes?

Black holes can be big or small. Scientists think the smallest black holes are as small as just one atom. These black holes are very tiny but have the mass of a large mountain. Mass is the amount of matter, or "stuff," in an object.

Another kind of black hole is called "stellar." Its mass can be up to 20 times more than the mass of the sun. There may be many, many stellar mass black holes in Earth's galaxy, The Milky Way.

The largest black holes are called "supermassive." These black holes have masses that are more than 1 million suns together. Scientists have found proof that every large galaxy contains a supermassive black hole at its center. The supermassive black hole at the center of the Milky Way galaxy is called Sagittarius A. It has a mass equal to about 4 million suns and would fit inside a very large ball that could hold a few million Earths.

Black holes capture matter through their gravitational pull. Dark matter is the name astronomers use for matter that does not interact through the electromagnetic or nuclear forces in physics, but which scientists still see through its gravitational effects. Since it interacts gravitationally, dark matter behaves no differently near black holes than any other type of matter, so black holes certainly can consume it.

Although this process sounds exotic, black holes in general relativity do not care whether they feed on regular or dark matter. The only properties a black hole has are mass, angular momentum (spin) and electric charge. Any other information carried by the material that falls into a black hole, for example what type of particle it is, is lost forever. This is called the “no hair” theorem: Black holes are completely specified by three numbers and have no extra properties (“hair). For this reason, black holes are the simplest macroscopic objects in the universe.

The idea of information being lost from material falling into black holes is uncomfortable from a physics standpoint and as a result has long been a subject of intense debate (the “information paradox”). It is hoped that its resolution could be an important step toward reconciling the classical physics of general relativity with quantum mechanics.