

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 55 No.9 Aug. 2022

Regular Meetings

Second & Fourth Mondays

9/12 and 9/26

Zoom until school starts

Upcoming Events

Digital Net Mondays at 9:00 PM

PSK on 80 or 10 meters

CW training Net, Thursdays at 9:00 PM

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd & 4th Monday
of each month
Watch for Emails

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 2022

President: W2PTP Paul Wolfmeyer
201-406-6914
Vice President: W2EMC Brian DeLuca
973-543-2454
Secretary: K2AL: Al Hanzl
908-872-5021
Treasurer: K2YG Dave Barr
908-277-4283
Activities: KC2OSR: Sam Sealy
973-462-2014

—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

Mondays 9 PM
28,084 — 28,086
Will be using PSK and RTTY
Net control K2YG

Club Internet Address

Website: <http://www.nparc.org>
Webmaster KC2WUF David Bean
Reflector: nparc@mailman.qth.net
Contact K2JV, Barry

MOUNTAIN SPARK GAPS

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WB2OOO Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for July 2022

The following information is provided by Rick, WB2OOO, who has been recording daily weather events at his station for the past 40 years.

TEMPERATURE -

Maximum temperature this July, 99 deg. F
(July 24)
Last July(2021) maximum was 93 deg. F.
Average Maximum temperature this July, 90.3 deg. F
Minimum temperature this July, 61 deg. F
(July 4)
Last July(2021) minimum was 56 deg. F.
Average Minimum temperature this July, 69.9 deg. F
Minimum diurnal temperature [range, 7 deg. \(87 - 80 deg.\) 7/25](#)
Maximum diurnal temperature range, [27 deg. \(94 - 67 deg.\) 7/12](#)

Average temperature this July, 80.1 deg. F
Average temperature last July, 75.5 deg. F

Number of days of Max. temperature, 90 degs. or higher - 17
Number of days of minimum temps. of 70 deg. or higher - 16
Number of consecutive days of 90 deg. or higher temps. - 3(7/12-14); 6(7/19-24)
Number of consecutive days of 98 deg. or higher temps. - 5(7/20-24)

PRECIPITATION -

Total precipitation this July- 0.75" rain
Total precipitation last July- 7.54" rain

Maximum one day precip. event this July-

[July 8, 0.24" rain.](#)

Measurable rain fell on 7 days this July, 16 days last July.

YTD Precipitation - [25.56"](#)

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Rick Anderson
8/20/2022
243 Mountain Ave.
New Providence, NJ
(908) 464-8911

President's Column August 2022

I hope your summer has gone well. We will be back at Salt Brook School for our first September meeting on Monday, September 12th. We do plan a hybrid setup also.

It was great to see a strong NPARC representation of members and spouses at Guy Brennert K2EFB's memorial service on August 7th. Those of us in attendance heard numerous interesting stories about Guy's non-ham life. And Al K2AL summarized Guy's ham contributions nicely. Guy's remains were placed in the garden wall in the cemetery behind New Providence Presbyterian Church. Our first NPARC meeting of the month was general chit-chat.

Our second meeting featured John Kruk N9UPC, the national sales manager for Yaesu, speaking to us from Wisconsin. He gave an interesting presentation on the development of Fusion and compared it to other Digital technologies in use on the ham bands. His talk was recorded and is available at the following link:

<https://us02web.zoom.us/rec/share/qi8aXrteGU6vZEWKIdCkbdY4HSHpnfKnQYqb7aRJ7pFkVJz40E2gW8-a1xyqyd6A.JtqNx8Pgm8OU-h0q>
Passcode: ?6D\$#CbA

(Be sure to copy the link all the way through ...h0q and insert the passcode when requested. I will keep the recording posted until about September 25th.)

We will soon be electing officers for next year. I urge you to consider running or nominating someone. It takes leadership to keep the club running. I have not found it difficult as club members step up to the tasks; this is a hallmark of this club. **But leadership is required. Let Tim Farrell KD2EKN know of your willingness to be an officer.**

Keep the weekly nets in mind and join in them!!

73 for now, Wolf W2PTP, 201-404-6914, w2ptp@arrl.net

"K2AL/QRP BACKYARD PORTABLE"

Each August for the past ten years, the NJQRP Club has hosted their annual "Skeeter (QRP) Hunt", a 4 hour event that encourages hams to get outside and operate QRP. You can earn extra points for using homebrewed or kit-built rigs and for portable operation so I decided to go "backyard portable" at the last minute.

My setup:

Elecraft K1 QRP transceiver.

Bulldog mini key.

12V/20Ah solar-charged battery.

MFJ-4416C Battery Booster.

MFJ-1984LP End Fed HW Dipole (40-10M).

I made contacts with Florida, Tennessee, N. Carolina, Alabama and NJ with 5 watts on 40 and 20 meters.

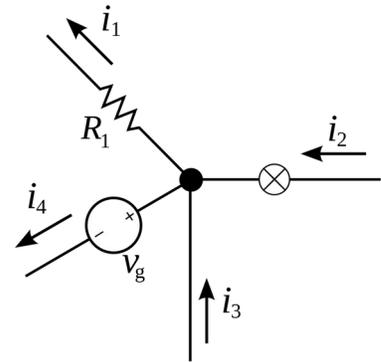
K2AL



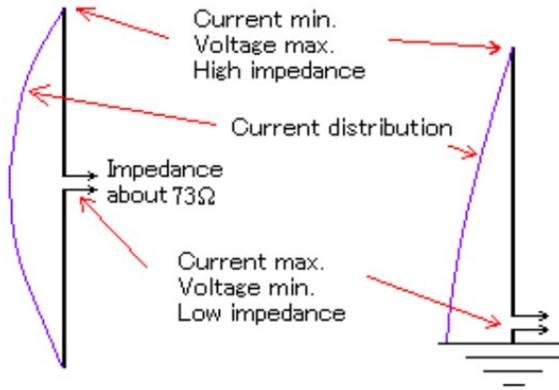
Antenna Displacement Currents

Jim Stekas - K2UI

Kirchhoff's Current Law (KCL) states that for any circuit node the total current entering the node is equal to the total current leaving the node: $i_{in} = i_{out}$. Applying KCL to the figure at right gives $i_2 + i_3 = i_1 + i_4$.



Kirchhoff formulated his circuit laws in 1845. Forty years later Maxwell would incorporate Kirchhoff's laws into his equations of electricity and magnetism.

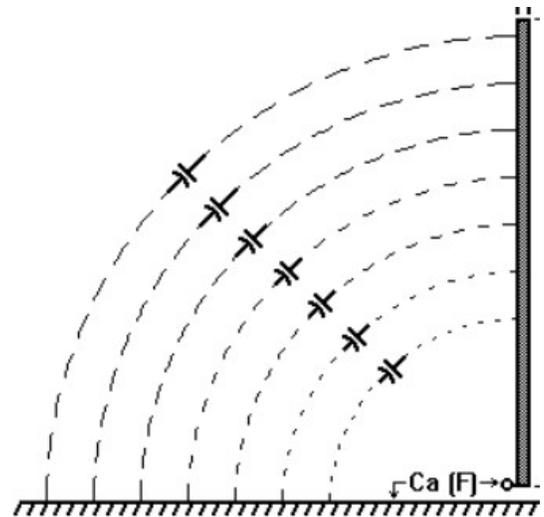


In a $\lambda/2$ dipole or $\lambda/4$ vertical the current is maximum at the feed-point and decreases until it is zero at the end(s). Taking any point, x , along the antenna as a node, the current entering the feed-point side will be slightly greater than the current exiting on the opposite side: $i_{in}(x) > i_{out}(x)$.

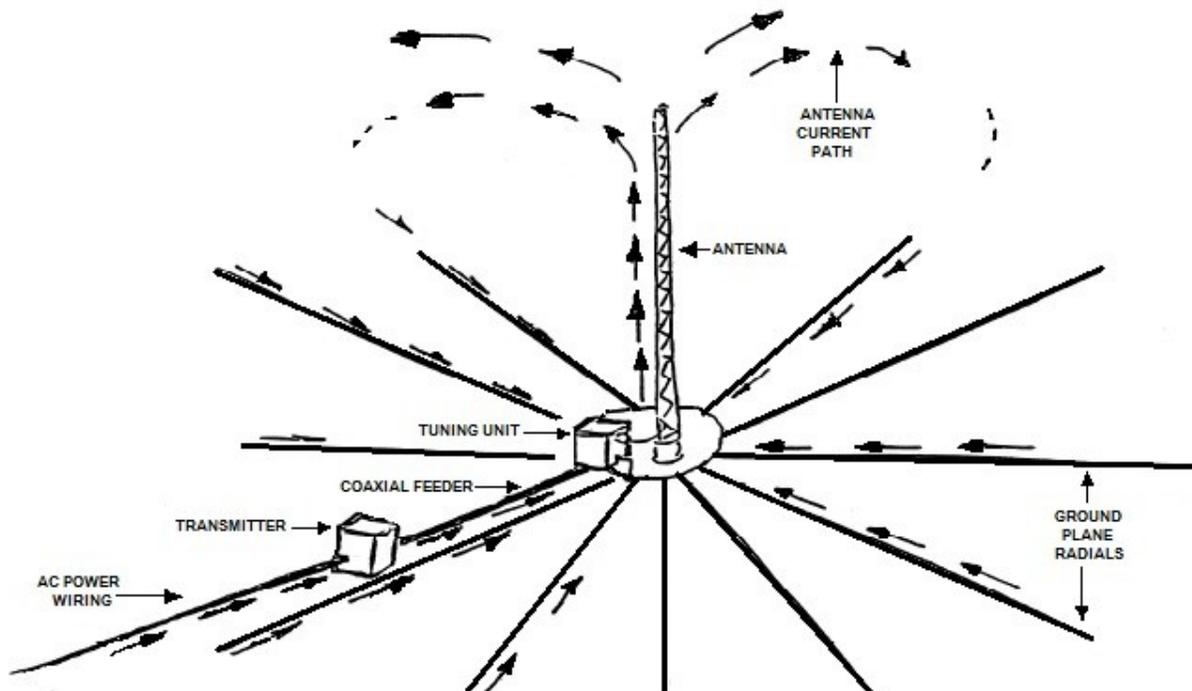
To satisfy Kirchhoff's Current Law, a "fudge factor" must be added: $i_{in}(x) = i_{out}(x) + i_{dis}(x)$.

The "fudge factor" $i_{dis}(x)$ is called the displacement current. In a vertical antenna, the displacement current is imagined to flow through distributed capacitance between the antenna and ground. (Figure at right.)

This picture of distributed capacitance is used to explain how an antenna may be shortened by adding a "capacitive hat". The "hat" some of the distributed capacitance at the end of the antenna replaces some wire by providing a more effective ground return.



Nautel is a major manufacturer of broadcast transmitter system. Below is a figure from a Nautel report on optimizing a transmitter site¹. The (displacement) current is shown proving a “ground return” for the antenna current.



This picture of antenna currents flowing in a loop that is closed by displacement currents is not only outdated, it is completely wrong! The displacement current is not a current at all.

KCL is a statement of the conservation of current at a node, which is true only for the case where a node cannot store a charge. Maxwell’s equations state that **charge is conserved**, not current. For the general case, Maxwell’s require that the rate of change of the charge on a node is given by:

$$\frac{dq}{dt} = i_{in} - i_{out} \text{ which identifies the displacement current as } i_{dis} = \frac{dq}{dt} .$$

The current in an antenna pushes charge back and forth between the two ends, and no charge or current leaves the wire to “return to ground”.

Where there is a large concentration of charge there will be an electric field. If we attach a small copper sphere with a radius of 1cm to the end of the antenna the current will pump some charge q into it. At the surface of the sphere the electric field will be $E = \frac{q}{A}$, where A is the surface area of the sphere.

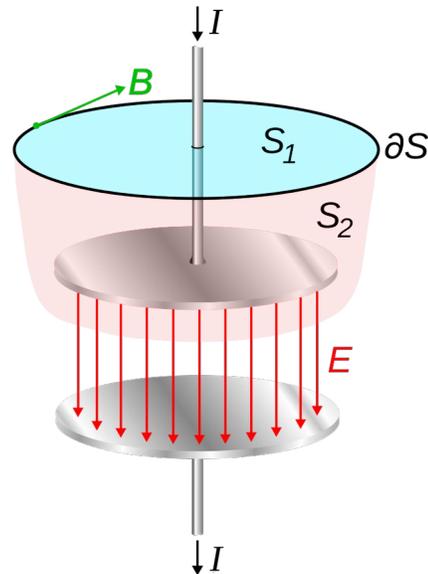
1 <https://www.nautelnav.com/wp-content/uploads/2012/08/Performance-Testing-at-Radio-Transmitter-Installations.pdf>

To make KCL work we invoke the displacement current $i_{\text{dis}} = \frac{dq}{dt} = A \frac{dE}{dt}$. This equation shows that the displacement current can be equated to a time varying electric flux ($A \cdot E$).

Maxwell's original equation describing Faraday's law broke down for a capacitor. In the figure at right the magnetic field B around the surface S_1 is determined by the total current flowing I flowing through it. But we should also be able to calculate B using surface S_2 which has no current flowing through it. So Maxwell add the displacement current

$$i_{\text{dis}} = A \frac{dE}{dt} \text{ to fix the problem.}$$

Even though the displacement current carries no charge, it **does** induce a magnetic field by Ampère's law.



The resulting Maxwell equations are symmetric in E and B , which is not only an aesthetic improvement but adds solutions for electromagnetic waves traveling through space at the speed of light. Without the displacement current there would be no radio waves, and no ham radio!

References

1. <https://commons.wikimedia.org/wiki/User:CheChe>
2. <https://commons.wikimedia.org/wiki/File:KCL.png>
3. <https://www.nautelnav.com/support/technical-resources/tips-n-tricks/optimising-site-layout/>