

<https://www.youtube.com/watch?v=IRBRv2ihAk8>

D.Smith experiment - Coil, capacitor, phase shift, part 1
by Firefly

Transcript

00:00 let's make experiment with Smith's coil

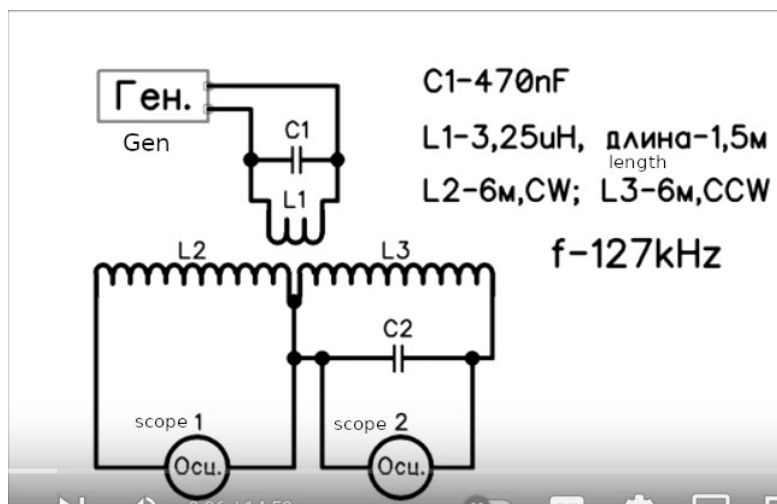
00:05 we have two coils, wound in opposite direction

00:07 diameter 3 inches

00:11 length of wire in each coil is 6 meters

00:16 here also coil L1, length 1.5 meters

00:22 so length ratio is 1 to 4



00:43 there are several documents about this device, but no one says about role of C2

00:48 what actually it does ?

01:02 in one of such document called "Smith's device without fantasy" author says that C2 needed to compensate capacitance of coil's connection wires

01:10 Smith himself says that this capacitor needed for precise tuning to match one coil with another

01:20 goal of my experiment to see how output signal change when I connect capacitor to one of the coils

01:32 frequency from generator is 127 khz

01:37 we see

01:40 signal from both coils on the scope, signals are equal

01:48 also we saw what happens when I move

01:52 inner coil

01:54 amplitude of one signal

01:58 decrease and other increase

02:01 in the center they are equal

02:08 and vise verse, signals have same amplitude and are in phase

02:18 ok, let's start experiment, take capacitor 330nF

02:22 and connect it to one of the coils

02:26 see what happen

02:33 the signals became anti-phase

02:41 here without capacitor, signals in phase

02:45 like this with capacitor, signals in anti-phase

02:50 amplitudes are different

02:55 we can adjust amplitudes by moving inner coil

03:00 amplitudes now equal
03:03 but inner coil position now
03:06 changed a little to the right
03:08 these means that capacitor is not properly selected
03:13 it is too large
03:18 let's try take smaller capacitor
03:23 let's see what happens
03:29 this was 330nF
03:32 let's take capacity 270nF
03:45 I am adjusting the amplitudes now
03:50 now inner coil is closer to the center
03:59 let's take even smaller capacitance
04:03 200nF
04:32 here it is, the coil in center position
04:37 signals from coils are in anti-phase
04:51 if I disconnect capacitor, signals are in phase
04:59 I don't know, to call this thinner
05:03 adjustment not exactly correct
05:10 it would be ok if you adjust frequency in range of few hertz
05:14 but if one of signals change it phase to 180 degrees
05:18 it's not a "fine tuning" :)
05:43 one more thing
05:48 now I have here "random" frequency
05:52 which is result of LC resonance
05:53 in coil L1 and connected to it capacitor C1
05:58 there is no resonance without capacitor
06:17 it is needed, in my case it is 470nF
06:22 Smith as I understood him says that
06:26 it doesn't matter which frequency we use to drive this system
06:33 if you have neon trafo 35 khz, then 35 khz, if neon trafo 50khz then 50khz
06:38 he says that length L1 and L2 should be 1 to 4
06:52 then everything will be ok
06:58 but how I understood Romanov's explanations, you should use very particular frequency here
07:02 the frequency needs to be such that
07:10 on the length of the coil
07:12 in my case it is 6 meters
07:17 fits only $\frac{1}{4}$ wave length
07:20 so that in one coil you get $\frac{1}{4}$ wave resonance
07:24 and in another coil you get LC resonance
07:29 with some phase offset
07:35 we have such calculation
07:38 75.29 is a quarter of speed light, divide by 6meters
07:48 it turns out that 12.54MHz
07:50 it appear that for these coils correct frequency is 12.54MHz
08:01 it could be that we can use even harmonic e.g. $\frac{1}{8}$ or $\frac{1}{16}$
08:03 and so frequency will be 6 or 3 MHz
08:20 Explanations by Romanov
08:25 ok, now see, for what LC resonance is responsible ?
08:28 it is responsible for harmonious rebuilding
08:31 structure from this (field around C) to this (L)
08:33 and for what else is responsible ?
08:39 for the quantity of energy in the system

08:41 yes, this is the most important value then
08:44 there is, see, who multiplies the voltage ?
08:47 voltage multiplies... the increase
08:50 of voltage arises from addition of
08:52 waves, you understand that this is the first
08:57 value and the second is due to the transformation
08:59 kinetic energy to potential
09:02 here on this "sits" LC resonance and its
09:06 the most important property of it
09:10 it determines the energy capacity of the
09:14 system
09:15 this is his main parameter
09:18 I can just take a quarter-wave resonance
09:20 the voltage will multiply here but
09:23 there is no energy, system energy is
09:25 nothing (very small)
09:26 do you understand that energetic capacity
09:30 or vibrational energy of such
09:32 the system you can say 0, but to it
09:37 adds an additive and this parameter
09:42 is LC
09:43 resonance
09:47 so if you want to get
09:51 a proper designed system you must combine
09:55 two things
09:55 one is responsible for multiplying voltage and second
09:59 adds after it and ensures that
10:02 there is energy storage, that is, how much
10:05 in general energy we can vibrate
10:07 to and from them something like that
10:09 if we let's just take a $\frac{1}{4}$ wave resonance
10:11 we have no energy, we have one wave for
10:18 one superimposed, but there is no energy
10:21 and now the last moment, is the most important
10:25 what you need to know, now look, now
10:28 you need, what I did experimentally under
10:33 title "blow" study the work of two
10:37 system, the first is ours
10:44 when there is a quarter here and there is
10:49 a quarter here, this half a wave together, but one system
10:56 we have a combination
10:59 that is, this part of the system, is here in
11:03 this part LC aligned
11:08 with $\frac{1}{4}$ wave resonance
11:11 and in this system in this system we have
11:16 just a $\frac{1}{4}$ wave resonance
11:20 in the general system, in the general system
11:24 we have $\frac{1}{2}$ wave
11:31 with spaced energy
11:34 parameters of the resonant system
11:36 see, you have an empty bucket and
11:42 you have exactly the same full bucket

11:45 buckets the same, all the same, yes so
11:50 here if you're making
11:53 impact on this bucket and on this bucket
11:56 at the same time, here's what you need to do
11:59 when you set up this system, you should
12:02 affect both systems
12:05 at the same time and this is the difference
12:10 phase difference between two absolutely by
12:15 parameters of the same systems in terms of
12:19 waves and frequencies, it will tell you right away,
12:24 will show the phase shift and this phase
12:27 shift
12:27 captures energy
12:31 remember, here you are just push bucket with
12:35 water and an empty bucket, a bucket with water and
12:37 what will stand still or
12:39 fly a short distance, but empty bucket
12:41 will fly far away
12:43 the conclusion is the following, if you want
12:47 get
12:48 a source for extracting energy from
12:51 ambient space
12:53 you need to make two resonances
12:59 absolutely the same, but with different
13:03 energy characteristics and influence on them
13:07 but they have to
13:09 represent one system
13:12 you influence them
13:15 respectively, one went on his own
13:18 trajectory after influence, the second
13:21 went on its trajectory after
13:23 influence, the phase difference in the trajectories
13:26 and that is the capture mechanism
13:30 energy from the surrounding space
13:33 then there is already a way to dispose of this
13:36 energy, to dispose of it precisely with this
13:40 system can be in different ways
13:43 I prefer to dispose energy
13:46 via capacitive coupling, because it is
13:49 is very convenient for anyone
13:56 that's the whole scheme of it, at least look for it, yes
14:01 you just need to explain to people what is
14:04 matrix for constructing resonant systems
14:07 there is an algorithm for switching from one of the
14:11 structure to another, that is, through
14:13 elements to scale and this is the first
14:16 what they need to learn they need for themselves
14:19 arithmetic, that is, do it on a piece of paper
14:22 should be a transition matrix of one
14:25 design to another design, later,
14:28 second to learn to get $\frac{1}{4}$ resonance
14:31 $\frac{1}{2}$ resonance, LC resonance

14:35 combine these two resonant systems and
14:38 then, already the system one and
14:43 system number two
14:45 built in one piece
14:49 to study how they are inside each other
14:52 interact