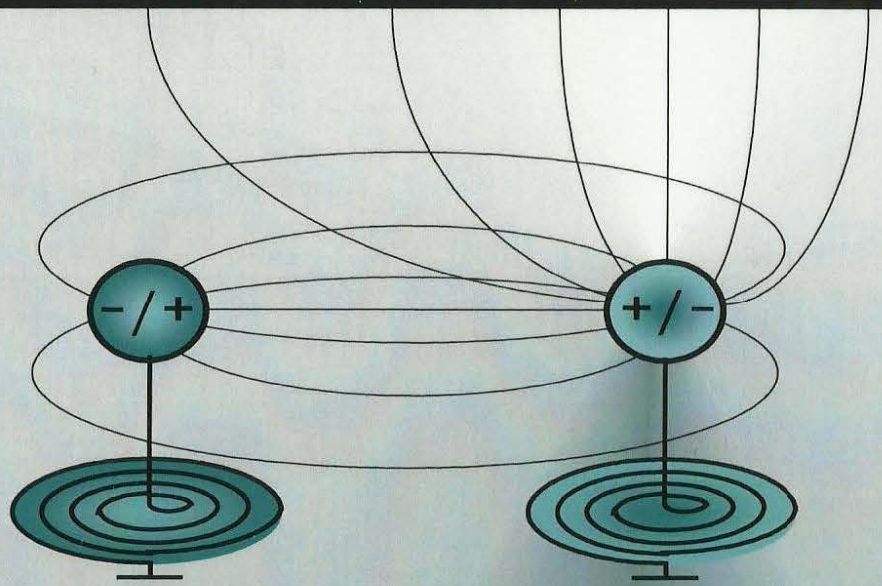
Konstantin Meyl

# Documentation ① on Scalar Wave Technology




## for the Transmission of Scalar Waves using the Experimental-Kit and Power-Kit of the 1st TZS

**Prof. Dr. Konstantin Meyl**

Documentation ① on **Scalar Wave Technology** for the Transmission of Scalar Waves using Experimental-Kit and Power-Kit of the 1st TZS

Those who seek to enter the world of Scalar Wave experimentation will find many ideas in this book. It begins with instructions for producing extraordinary experiments. These experiments provide proof of an electrical radiation which is faster than light and which cannot be shielded. With skill and the availability of external radiation sources, it is possible to get more energy at the receiver than is plugged into the transmitter. Anyone who doubts these experiments can, with this book in hand, reproduce the experiments using measuring equipment with which they are familiar.

This has prompted many others to draw up their own reports over the past 12 years. Some have written up these reports and sent them to the First Centre for Scalar Wave Technology, and some have published their findings directly. Some of these reports are, in part, quite critical and these take up most of the space in the new edition. A few contradictory results are left uncommented, although in other cases the publisher has included constructive criticism where appropriate.

Prompted by a NASA report, a solution to the puzzle of scalar waves is offered at the end of the book. The losses of a capacitor are reinterpreted on an experimental basis, and a vision into the future of scalar wave technology is described. This could be the beginning of a new technological age.

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# Documentation 1 on Scalar Wave Technology

for the Transmission of Scalar waves using the Experimental-Kit and Scalar Wave Transporter

by Professor Dr.-Ing. Konstantin Meyl

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# I.

## Preface to the Documentation 1

When there is talk of "free energy", when efficiencies of greater than one hundred per cent are promised, or even when inventors emerge with perfect blueprints for a perpetual motion machine, any doubts are justified. All too often faulty power measurements mislead, or an energy source is being drawn unnoticed. Responsible scientists therefore accept such statements only after carrying out their own tests to establish whether they can always reproduce the measurements with the instruments familiar to them. The Experimental-Kit shall take account of this fact.

All sceptics can and should reproduce my experiments. They should not learn about results in the media, but should gain their own experience of electric scalar wave transmission themselves. A hundred years ago Nikola Tesla performed the same experiments, but with very high voltages and controlled spark gaps. Because even at that time more energy arrived at the receiver than the transmitter had sent, Tesla described the transmitting station as a "magnifying transmitter" or "boosting transmitter".
Unfortunately his system in Colorado Springs was too complex and expensive for any university to be able to afford it. Consequently the results remained unconfirmed.

No scientist in the world has the right to challenge the results obtained by Tesla unless he repeats the experiments on a 1:1 basis and can provide appropriate proof of his findings. That has not been done up to now.

It will not be possible to provide this negative proof and *ignorance is not an accepted scientific methodology!*

### 1. Remarks on the Kit in general

The experiments for scalar wave transmission could be acquired from 2000 to 2014 as a demonstration kit and in an expanded version as a testing kit. As a replacement for both a version with a digital generator is available from 2014. Each of the kits allow all Tesla's statements to be verified. Thanks to modern technology, the practical effort is also reduced significantly. Nowadays the entire kit fits into a suitcase.

Many parameters determine the functionality and natural resonance of a scalar wave transmission, e.g. wire length, wire thickness, insulation, winding direction and coil diameter. Only by choosing identical parameters can perfect reproducibility of the results be guaranteed. Realising this, I have refrained from publishing a manual of instructions, since this would cause the ability to reproduce the experimental results to depend solely on the skill of the individual hobbyist. The credibility of the results would suffer. Ultimately this is about the discovery and proof of a new physical principle (and not about teaching amateurs).

All the parts that are required for operation are included inside the aluminium carry case alongside the Tesla coils. This is not only for practical purposes. If an operator wants to do without the function generator, for example, because he has already a suitable one available which operates up to 20 MHz, he should ensure that it is able to provide sufficient drive current. If all experimenters use the same function generator, all others ought to be able to reproduce the same results.

Thankfully some experimenters have sent their test reports on scalar wave transmission to the publisher. These are included from the 4th edition of the documentation onwards and so are available to other researchers. As many suggestions are included, this greatly benefits all those concerned with the transmission of electrical scalar waves.

It has been shown that the number of possible experiments is virtually unlimited. This is a new, still largely unexplored type of wave propagation, so there is still much to discover. *What would a discovery be worth if only the discoverer knew about it?*

Although originally I was the author of this book, from the 4th edition onwards I rank alongside the other authors whose names are given if they have agreed to being mentioned. As editor, I was left with the task of sorting the contributions according to the significant technical, physical and biological characteristics of scalar waves, and to comment where appropriate.



## 2. Notes on the experimental kit

A part of the inventory of the Experimental-Kit has always been a frequency counter and other flat coils (type C with twice the wire length). The function generator can also be adjusted for a wider range of different waveforms (from 2014 with a digital DDS function generator). It is assumed that mainly physicists, engineers and those experienced in metrology will be interested in the Experimental-Kit. They can of course reproduce all the experiments given for the Demo-Kit and will receive the same documentation. In addition, the kit offers all the settings they would expect from other laboratory equipment. Test sockets have been specially included for metrological procedures, for example to measure currents and voltages.

Nevertheless, the set is even suitable for those with no experience in metrology. Purchasers include doctors, lawyers, therapists, environmentalists, teachers, politicians and journalists - in short, it is intended for anyone who wants to verify or to convince themselves or others of the existence of electrical scalar waves. In the case of the digital set the optimal setting can be adjusted and stored, so that after each power-up the demonstration can be started immediately, just as we were so accustomed to the old analog sets.

It is assumed that this set is purchased primarily for personal study and demonstration purposes. Nevertheless, it is conceivable that some experiments will go further than the specified repertoire, for example in order to study biological reactions or medical influences.

The coils (of type A (7Mhz), B (14 MHz) and C (3.5 MHz)) and the ball electrodes as antennas may possibly also be ordered separately (in the shop www.etzs.de "Kit & Devices" - "Components"), e.g. for experiments with several receivers or with the coil B for higher frequencies. In this case, a suitable function generator would be necessary.

### 3. Aspects of experimental research

Anyone infected by research fever will continue to build and tinker with their own equipment and the coils they have wound themselves until they have found out everything their inquiring mind wants to know. For them, my set can only provide a first impetus. I am hoping for constructive and close cooperation from these experimenters, and from all experimenters in general. Only when all of those interested in progress pull in the same direction can ignorance of facts a century old and the arrogance of established science be overcome with the aspirational goal of entering into an environmentally friendly era based on scalar wave technology.

Physical proof is not complete until the results of a theoretical derivation are confirmed by practical measurements. Certainly some auxiliary statements of the measurements could be given in individual cases if each experiment were considered in isolation, and some people are satisfied with this.

The near-field description, for example, is one such auxiliary statement. Only if the experiment still works at ten times the near-field distance will the expert start to ponder.
The major revelation is evidently hidden when working with auxiliary statements. A theory is needed which includes all the aspects concerning scalar waves and reproduces all the properties accurately and in full.

Such a field theory had not so far existed, so I was forced to look for a suitable one. The Wave Equation to which I always refer [1, see also page 239] provides the right answer. It originally comes from D'Alembert, initially formulated one-dimensionally in terms of time and space, and moulded into its present form by his student Laplace, using the three-dimensional Laplace operator. If this is broken down according to the rules of vector analysis, a field pointer is found to diverge, which in mathematical terms represents a scalar and gives the scalar wave its name. Now the Wave Equation also requires a gradient to the scalar which, mathematically, is a vector.

The scalar wave therefore propagates directed like any wave. Everyone is familiar with this property of sound waves. Nonetheless, some confusing reports on the Internet assume that a scalar wave is undirected in order to go on to prove *that what is not there does not exist.*



Terms such as "scalar field" are misleading, since they more or less describe the opposite. That is why it is so important to apply the laws of physics, because *laws are there to be respected.*

Within the chain of evidence the experiments described here form the experimental section in proof of the existence of electrical scalar waves, because only the correspondence of theory and practice counts as real proof.

### 4. Relevant aspects of vortex physics

The most important new component of the field description is the vortex of the electric field discovered by me in 1990 which I call, in accordance with fluid mechanics, the "potential vortex" [2]. These field vortexes are capable of carrying a pulse, will spread as a longitudinal shock wave in space and possess all the properties of a scalar wave. From the perspective of my books, this documentation is an important practical addendum. Conversely, the experimenter will surely find my reference books a great help. The book entitled "Scalar Wave Transponder" is particularly recommended.

Before I published this and other books and articles, diverse aspects of my work were recorded in a collection of material in the three-part series of books on electromagnetic environmental compatibility (available under the title “Scalar Waves” from the shop at www.etzs.de). The basics of vortex physics are not available in any other textbook, but are presented in the first part of the book, with an examination of the causes, phenomena and scientific consequences of the potential vortex of the electric field.

The second book in the series includes a section on free energy and the interaction of neutrinos. It is mainly about the design details of the technical side of scalar wave energy and questions concerning its practical application. The operation of the Tesla coil previously mentioned in the first part is developed in more detail in the second part. The field theory from the first part is also developed further and considered in the context of existing constructions.

## 5. Structure of the documentation

The derivation of scalar waves from the Wave Equation which is key to understanding the experiment and a discussion of the properties and the consequences for information technology can be found in the third part of the book series that was not published until two years after the documentation. The reason for this was that until the 3rd edition the relevant chapters had been included in the documentation. This no longer matters in the case of the 4th edition onwards because the 3rd part of the collection is now available [3].

I have also held some hands-on lectures in which I have demonstrated the scalar wave transmission path. At the INET conference in Bregenz 2000, the journalist Inge Schneider took the trouble to make a typescript of my lecture. In this way, something could be captured of the live atmosphere and the crackling tension in the room, and I have decided to include this essay (in the "Review" chapter on page 250 of the German issue, not translated).

Naturally the instructions for the experiments form the core of this documentation and at the same time are intended to serve as patterns for further descriptions of experiments.

I now wish you every success in carrying out the experiments yourself and hope you achieve high efficiencies.

INDEL-Publishing Department

*Konstantin Meyl*

Villingen, June 2000 (in German) www.meyl.eu

and 2014 in English translation



## 6. Preface to the 6th edition

New discoveries usually take decades until they finally find their way into practical use. Considering that I first began in 1990 with the publication of my work to the discovery of potential vortexes and to the practical use of scalar waves, I've already come quite far; so tell me friends in their own estimation.

The world of electronics, however, is changing much faster than that of physics. Thus the Experimental-Kit is offered virtually unchanged since 2000. 14 years is an eternity for the components used, since production of the analog function generator chip was stopped by the manufacturer. We were forced to modernize the technology.

From the year 2014 a digital DDS signal generator replaces the analog technology yet originally made by hand. It is a purchased part that is rebuilt at our premises for the operation of the extremely low impedance flat coils and extended. The frequency signal is crystal stable, up to 8 MHz adjustable and storable. For the connection of the flat coils (of type A or C) is a dedicated connection available.

The coils (type B) with a resonance frequency of about 14 MHz are unfortunately not operable anymore and hence no longer included in the suitcase. But they will further on be offered in the shop (of www.meyl.eu) for those who use their own generators, which allow higher frequencies and have low enough impedance.

Besides that the experimental suitcase and particularly the coils have remained the same. This is particularly important in terms of reproducibility and comparability of results.

Almost unnoticed this documentation has become a volume 1. The planned volume 2 will be devoted to medicine and the Scalar Wave Device, as the "Documentation 2 for Scalar Wave Medicine". This is a significant aspect which is mentioned in the Documentation 1 for Scalar Wave Technology only marginally, but builds on in direct connection.

Villingen, May 2014 www.meyl.eu
(The 6th edition in German, 1st edition in English)

# II.

## Descripction of the devices for scalar wave transmission

### 1. Introduction

The wireless transfer of energy as scalar wave radiation traces back to Nikola Tesla. From him originated the patent No. 649.621 on 15.5.1900 : Apparatus for Transmission of Electrical Energy. Unfortunately his equipment was extremely large and expensive, so that no copies had been provided and the ingenious technology could extract itself from the field of vision and the consciousness of the public. Many doubters however are to be convinced only, if they have their own copy, at which they personally can make measurements and experiments. A new technology will only become public and can assert itself if it is carried beyond the scientific facilities and education centres into the public.

The lost believed technology is taken up again with the kit. By using a modern function generator in place of a spark gap generator, with an operating voltage of few volts in stead of 600 kilovolts a miniaturization of the device succeeded, at which all characteristics indicated by Tesla and still some more can be introduced and examined experimentally. Today, nearly 100 years later a scalar wave transmission device fits into a suitcase and is purchasable for everyone.

All assembly groups and component parts necessary for the experiments are included in delivery, as well as the aluminium suitcase, which is used as shielding cage. Thus a high degree of reproducibility is guaranteed.

The Experimental-Kit allows with this experiment manual both non-technicians, technicians and hobbyists a successful execution of the experiment. It is particularly important for comparison purposes that not everyone works with different coils and their own generator, because the empiric reports should encourage other experimentators to reproduce some of them.



### 2. Items delivered: Experimental-Kit

1 digital DDS function generator, freely adjustable up to 8 MHz including a frequency counter inside
1 wall power supply (primary: 100 - 240V, 50 - 60Hz AC; secondary: 5 V DC, stabilized, USB-B port)
1 connecting cable (BNC plug to banana jacks)
2 pancake coils, type A (with standard winding)
2 pancake coils, type C (with twice the wire length, half the frequency)
2 spherical electrodes with connecting lead and plastic columns
3 connecting cables with banana jacks on both sides
1 battery adapter
1 documentation (this book)

### 3. Description of the pancake coils

The pancake coil which is spiral from the inside outward wound according to Tesla, is part of an air cored transformer. The coupling coil consists of five turns and is on the lower surface of the circuit board. It can be modified, if necessary, whereby a abbreviation to 4 turns is possible, which can lead to a higher load on the generator (fig. 1). Thus the complex resistance is reducing from about 10 to 8 Ohm.

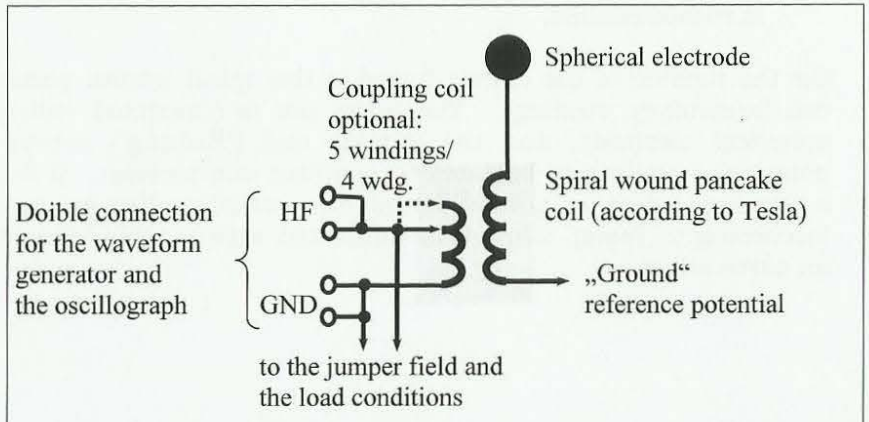



Fig.1: Air cored transformer with coupling coil and pancake coil

If a standard function generator will be used with about 50 Ohm internal resistance, problems due to overload of the power source may occur.

The two ends of the coupling coil are connected with the sockets "Generator". Here on the transmitter side the signal is coupled in, while on the receiver side an unloaded no-load operation measurement can be made if no jumper is set.

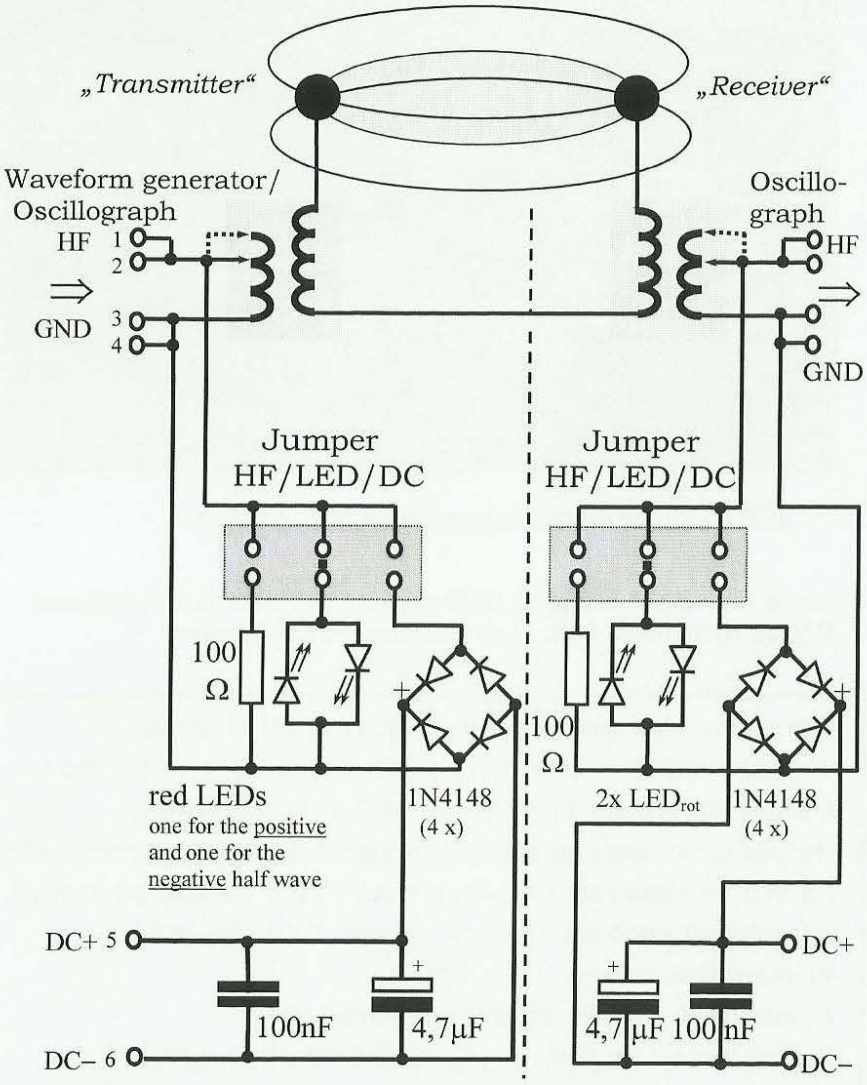
Within the jumper field three different load conditions are selectable (s. fig. 2).

1. With "LED" the two light emitting diodes are fed, which are antiparallelly switched, so that one shows the positive half wave and the other the negative half wave of the supply voltage.
2. With "HF" the coupling coil is loaded with a 100 Ohm resistance. At the sockets "HF Messung" the voltage over the resistance can be looked at with an oscillograph.
3. With "DC" the high frequency signal first becomes rectified in a bridge rectifier and smoothed in two condensers (100 nF and 4.7 µF). The voltage signal exhibits no more ripple, therefore it is possible in this jumper position to measure conventional with a usual DC voltage circuit analyzer (in position DC). As an external load a resistance of 100 Ohm is recommended.

On the topside of the circuit board is the spiral wound pancake coil (secondary winding). The inner pin is connected with the spherical electrode, and the outside end ("Erdung") serves as potential equalization between transmitter and receiver. It forms a common reference potential, which is usually called grounding (according to Tesla), when it is connected with a cable instead of an earth stake.



*Scalar wave transmission with two identical pancake coils:*




Circuit analyzer connection: Transmitter voltage and/or Receiver voltage

Fig.2: Connection diagram of the coils – air cored transformers

## 4. Description of the digital function generator

Fig. 3: *The aluminium suitcase with content*

Since May 2014 a digital DDS signal generator is used (Direct Digital Synthesis) with the following characteristics:

Waveform: **sine**, (also square, triangle or PWM signal)
Output amplitude: max. 9 Vp-p idle, about 2 Vp-p with the coil
Output impedance (at $BNC_{OUT}$): 50 Ω ± 10 % **(unused)**
Output impedance (at $BNC_{TTL}$): minimal **8 Ω (for pancake coils)**
Adjustment knob for DC offset: ± 2.5 V; **0 V (center position)**
Adjustment knob for frequency range: 0,01 Hz – 8 MHz
Frequency accuracy: ± 5 x $10^{-6}$
Attenuation -32 dB: **off** (button extended)
Saving the setup: [Sel], 4×[>], *FUNC:**SAVE**=0, [OK]
Frequency counter (at $BNC_{Ext.IN}$): **unused**, 1Hz-60MHz, 0,5-20Vpp



## 5. Setup of the digital function generator

* The highlighted setup which is listed above (in bold) is the recommended setting: **without the 32dB** attenuation and **without offset** (the knob in the middle position with an upward-pointing marker).

* By **plugging in** the switching power supply the 5 volt power supply is provided. With the red "**Power**" switched on the electronics are internally powered with 5 volts (display goes on).

* The display shows the last saved frequency, e.g.:
* F = 6780.00000 kHz. Pressing the button [OK] shows:
* F = 6.78000000 MHz.
* Pressing the button [<] shows:
* F = 6780.00000 kHz. Repeated pressing of the button [<] gives:
* F = 6.78000000 MHz.

This setting (2nd digit marked and MHz indication) simplifies the finding of the resonant frequency in most cases. The underscore on the second digit means that by turning the adjusting knob **(Adjust)** from this position the frequency can be increased or reduced.

The second line should show FUNC:WAVE=SIN, because the use of a sine as a waveform is recommended. With the button [Wave] the setting can be switched to TRI (triangle) or to SQR (square). Subsequently SIN (sine) shows up again.


Fig. 4: *DDS generator of the Experimental-Kit, the control panel*

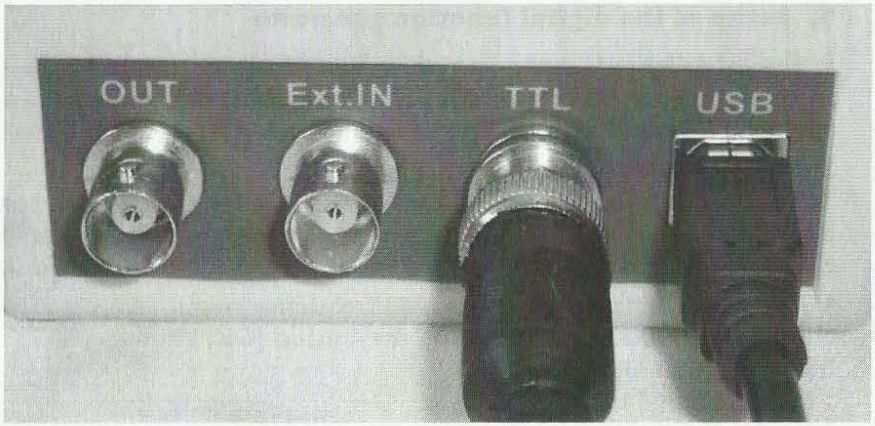



Fig. 5: *Connector block of the DDS generator (on the back)*

On the back of the DDS generator are the following connections from right to left:

**USB**: Here is the connection of the 5 V power supply.

**TTL**: Here is the connection for the pancake coil (type A or C. The connection was prepared for our application, therefore the term is no longer applicable).

EXT.IN: NC (here could be an AC voltage connected and the frequency displayed. This function is not needed, so the connection remains unused).

OUT: NC (here a 50 Ohm load can be connected, which may include a pancake coil. However there is a risk of overloading. In this case it is recommended to review the sine shape with an oscilloscope).

There may be strong repercussions on the transmitter so that the waveform is different from that of the sine wave. This can be seen when a different light illumination is observed on the light-emitting diodes. In such cases it is recommended to reduce the amplitude to the extent until the signal is again symmetrical. It is also possible that the offset controller is not centered. Otherwise for the resonance search initially turn the amplitude to the maximum.



The search for the natural resonance is relatively easy with help of the light-emitting diodes (LED). By increasing (Adjust clockwise) or decreasing (Adjust counterclockwise) the frequency the LEDs go on or off. The resonance point is found when the LEDs at the receiver glow brightly while they go out simultaneously at the transmitter. The amplitude can now be reduced and adjusted.

It is recommended to store the setting if necessary. For this the prompt is switched to the bottom row with the [Sel] button:

* FUNC: WAVE = SIN. After 4 times pressing [>] is displayed:
* FUNC: SAVE = 0. With [OK] the last setting is stored.

## 6. Safety instructions

The entire arrangement is operated by the enclosed low-voltage wall power supply with test seal (respectively batteries) and thus with a low and harmless operating voltage. A danger of an electric shock is therefore impossible with the original kit (and the provided wall power supply).

For the Experimental-Kit and also for the Scalar Wave Device SWD we have test reports of an accredited laboratory for electromagnetic compatibility. These evidences for the granting of the CE mark will be submitted upon request. Regardless of that the manufacturer for the DDS generator guarantees for his part the CE and UL testing. On the wall power supply these approvals are usually printed.

Despite of the specified stability it is to be made certain that short-circuits (e.g. by metallic objects or wires) on the circuit boards are avoided. The manufacturer assumes no liability for damages of any kind. These may, for example, be caused due to improper handling or application, or the use of other or additional, not in the set contained, components and their combination with the kit. Also closed components may only be opened by the manufacturer on the grounds of warranty.

The red POWER button switches the 5 volt supply internally off. Who wants to turn his device completely currentless should pull the plug or provide a switch at the plug (to avoid standby energy consumption).

## 7. Description of the Power-Kit

With that you can build an energy transmission according to Tesla, as has already been demonstrated by the First Transfer Center of Scalar Wave Technology at various exhibitions and congresses.

The centerpiece is the RF amplifier with push-pull output and a power of up to 20 watts in combination with the Ex-Kit. Here the amplifier is switched between the DDS generator (output OUT) and the transmitting coil. Divided into three parts, which the costumer can combine as separate components as needed, the Power-Kit is cheaper (at www.k-meyl.de). In addition to the "Experimental-Kit" is the aforementioned "RF Amplifier" and possibly even the specially assembled "Equipment for the Power-Kit" required.

Fig. 6: *Energy transmission with the Power-Kit*

To be used are the pancake coils (of type A or C) and the DDS generator of the Experimental-Kit. However the jumper must not be set at this time, since the LEDs can burn out otherwise. As shown in Figure 6 a fluorescent lamp can also be brought to light at the transmitter, or in case of additional receivers the LEDs, even without connecting the grounding wire.



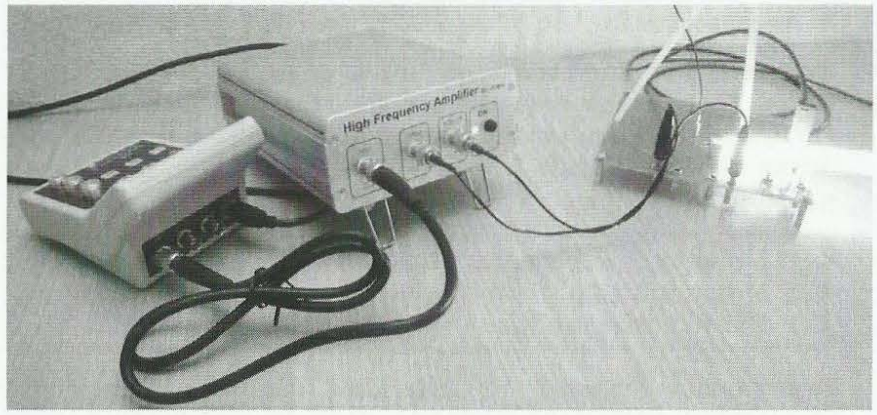



Fig. 7: *The wiring for the Power-Kit*

It is also possible with the built-in rectifier (set Jumper to DC) to connect small electric motors, as the drive for a tethered aircraft or a model ship. Suitable motors can be ordered on request as an accessory in the shop.

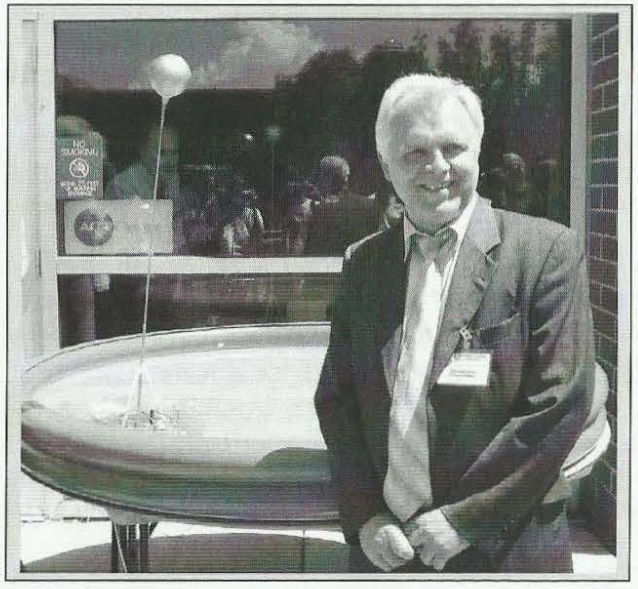


Fig. 8: *Prof. Meyl with boat at the entrance of the University of Salt Lake City, USA, Tesla Tech Conference 2007*

## 8. Accessories for the "Power-Kit" and "HF Amplifier"

Everyone has fluorescent mediums or energy-saving lamps at home. These shine even then, if the starter is already defective. For model builders on the other hand selecting the appropriate drives can be difficult. Those can be helped with the accessory kit. It includes:

1 Motor and propeller for aircraft construction
1 Motor and ship's propeller kit for model boat building
1 Construction manual

Experimental-Kit and RF amplifier complete the kit. Our recommended RF amplifier has the following specifications:

- High-frequency amplifier: bandwidth DC up to 20MHz
- 50 Ω input impedance, max. 4 $V_{pp}$ input voltage
- Any waveform, gain of about 15 dB
- Output amplitude of 24 $V_{pp}$, max. 30 $V_{pp}$
- Output current up to 1A per channel at 1 ohm
- Channel 1 and channel 2 phase-shifted by 180°
- Power output of typically 2 x 20 watts (push-pull)
- Over temperature protection, 25°C ambient temperature
- Aluminum case 180x150x65mm, fanless, weight 1.3 kg
- Power supply: 85 - 264 $V_{AC}$, 120 - 370 $V_{DC}$, 47-440 Hz
- Current consumption: 0.25 to 0.8 A; Fuse: 250V / 0,8 A

Both channels operate 180 ° out of phase. This will double the output voltage and the power of the transmitting coil when it is operated between both channel outputs (see enclosed operating instructions).

The additional equipment also contains a detailed construction manual for energy transmission attempt and design suggestions for the models with stocklists of the additionally required parts, so you can build the models as described.



# III.

## Experiments with scalar wave transmission

In this chapter you will find the instructions for 6 experiments are achievable with the kit and can not be classified into the scheme of textbooks.

Of course many explanations are possible, because the scalar wave kit works predominantly conventional, let's just say 80%. That means these 80% are resolved quickly, but what about the remaining 20%? Those and only those represent the particular challenge. Each one who gains a kit is probably interested for this 20%, for the somehow still unexplained new.

Let's try to open our eyes and to sharpen them for these issues. The dialectical structure is designed to help, so the comparison of the state of physics with the extended scalar wave model (of Meyl).

Experiments 1 to 6 belong for more than 12 years to the standard repertoire. Newly added has been the Experiment 7, which is completely unclear from classical point of view of electrical engineering. Exactly this is the special attraction of the Experimental-Kits.

At the end of the chapter there is even a by students elaborated experimental instruction for the electrical engineering practical course with the title: "Oscillating circuit test" (Experiment 10). The aim of this experiment is to learn about the components used and to study the conventional behavior. If suddenly more power is received at the end with the power measurements, as put into the transmitting coil, then each teacher has his special joy in watching the reaction of the students. The explanations usually come off very different, from wonder at the euphoria of a perpetuum mobile to denial, data corruption and doubting the own measurement.

This shows the response at small scale which is also at large scale the rule. But it is best to make your own experience ...

**1. Experiment**, subject: **Energy transfer**

**1.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**1.2 Place and Date:** D-78112 St. Georgen, 21st of June 2000

**1.3 To the status of physics of electromagnetic waves**
(according to Heinrich Hertz)

It is a physical law, after which the field strength of waves according to Hertz (radio communication and radio waves) decreases with the square of the distance. If the distance between transmitters and receivers is doubled, then thereby the power of the receiver decreases to a quarter.

**1.4 Expectation according to the scalar wave theory** (by Konstantin Meyl)

The wave equation (page 111, [1]) says that beside the wave according to Hertz still another wave, the scalar wave, must exist. In contrast to the wave according to Hertz, the scalar wave spreads not with constant speed, and also not evenly in all directions. Only a middle velocity of propagation can be indicated, which can deviate from light speed substantially. A scalar wave aligns itself with the receiver, were the field lines bundle themselves again. Without dispersion the received power in case of resonance should correspond approximately to the sent power. Therefore it should be possible to transmit both: information and energy.

**1.5 Experimental setup**

For carrying out the experiment each spherical electrode is installed over a pancake coil, as the three legs are tucked into the three holes in the plate and the wire down hanging in the centre is connected with the centre of the pancake coil.

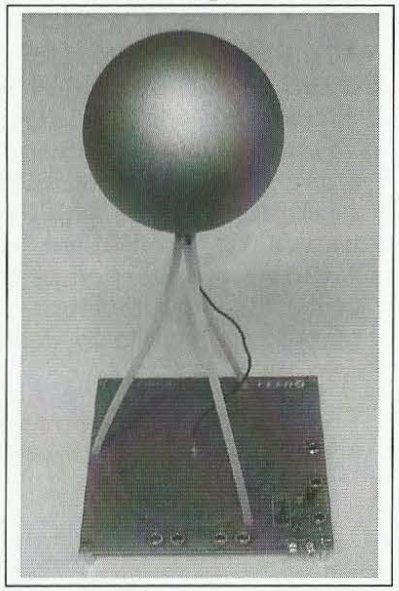


Fig. 1.1: *Installation of the spherical electrode above the pancake coil*



Now the waveform generator must be connected via the attached cable (BNC to banana jack) to the coupling coil of a Tesla coil. This coil works as a transmitter in the system. Now the function generator is being connected to the 5V wall power supply (via the USB to USB-B cable). The red button powers up the function generator.

For an optimal prompt:
Press 2x [<] and 1x [OK]. Search with "Adjust" for the resonance frequency.

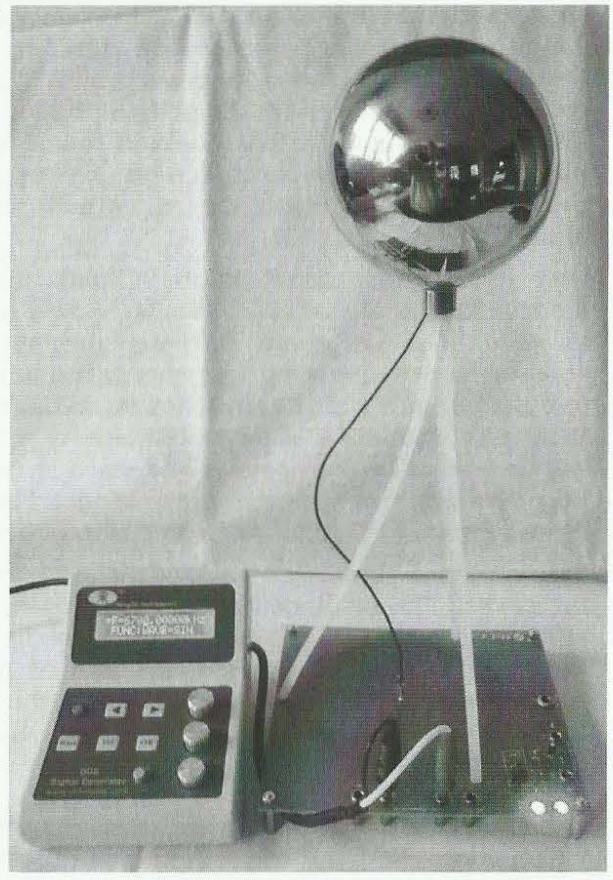


Fig. 1.2: *Wiring of the frequency generator to one of the Tesla coils*

The other pancake coil with mounted spherical electrode is used as receiver and loaded with the light emitting diodes. The jumper must be put both on the transmitter and on the receiver on position LED.

The distance between transmitter and receiver should first be selected quite small (approx. 50 cm). The points of grounding, that are the outside ends of the pancake coils, are to be connected by a laboratory cable. The attached cable (banana jack unipolar to banana jack) is designated for it.

### 1.6 Carrying out the experiment

It can be assumed, that the frequency controller is not in the right position first and no self-resonance is reached. The amplitude controller is untwisted, until the threshold voltage of the light emitting diodes is crossed by 2 V and the LEDs on the transmitting circuit board brightly shine (or fully untwisted). The (-32db) damping is switched off and the offset knob in the middle position. This can be controlled on the basis of the two LEDs on the transmitting circuit board, which should shine equally strong.

Now turn the frequency knob (Adjust) until the light emitting diodes shine at the receiver. Set the power maximum to the point at which the LEDs are extremely bright. The shining of the receiver diodes proves that an energy transmission takes place. If one LED should shine somewhat more brightly as the other one, then this signals a little unbalance of the sinusoidal supply voltage, because the positive half wave is used by one - and the negative half wave by the other diode. This can be during an asymmetrical load or an one-sided retroactivity.

The distance between transmitter and receiver can now be increased. The distance can be quadrupled for example, as the receiver is continually pulled away from the transmitter. It could be that now on the receiver side less or nothing at all can be recognized, which is a corollary of the changed resonance frequency of the system due to the larger distance. This has to be compensated by adjusting the frequency controller, until an power maximum is to be observed again. The small lamp will shine as brightly as in the experiment with the small distance, which contradicts the law of square of the distance.

### 1.7 Interpretation of the experimental results

According to guidelines of Tesla scalar wave transmitter and receiver are operated grounded. The better the grounding and the better the coupling over the grounding connection, the more simply it is to find the point of resonance. The grounding wire used within the experiment is therefore primarily an easement for the operator. This can be determined very fast, as a worse connection is tried out e.g. over the central heating, over the earthing contact of the power line or with a direct connection to



earth outside. It can come to the fact that at such a grounding in addition more "receivers" are attached inadvertently (e.g. biological systems), which go into resonance and withdraw the transmitter´s energy.
This problem can be avoided by connecting the points of grounding by a cable directly. Even if the grounding connection should be understood as a return conductor, for a closed electric circuit the other conductor is missed. That is formed in the experiment by the capacitive transmission path. The Shining of the small lamps proves that energy has been transmitted.

If it would have been waves according to Hertz, only the sixteenth part of the power might have arrived by the quadrupled distance. $(1/4)^2 = (1/16)$. Whereas it can be observed that the received power with increasing distance does not or just unessential decrease. For very large distances it might happen that the resonance couldn't be kept anymore and the oscillation breaks off. If several receivers go into resonance, it comes to an allocation of the emitted power or more distant receivers receive less power respectively.

### 1.8 Conclusion

The experiment impressively proves that it cannot concern waves according to Hertz. The power transmission shown is in principle not possible with the waves according to Hertz. Whereas scalar waves are capable of a lossless transfer of energy, wherefore the experiment is to be regarded as proof for the existence of scalar waves.

### 1.9 Consequences

If a transmitter is operated openly, without a receiver that absorbs the energy, the danger exists that the transmitter seeks for any receiver itself and that could be a biological system. Any humans, who go coincidentally into resonance, would now absorb the sent energy or a certain quantity of it. This is comparable with a positive pole, from which electrical field lines emanate and which is searching for its negative pole. Here the field lines will end, as well if the distance is very large. As well known the range is theoretically infinite. In contrast to the example, the case of resonance concerns only swinging poles, which swing with the adjusted frequency constantly between plus and minus.

As long as the power consumption is not measured, an acute danger of electromagnetic pollution exists. Apart from the employment for medical purposes, the operation of those scalar wave transmitters is to be rejected, which abuses humans as a receiver. It is to be made certain that the sent power is completely received i. e. collected and applied to a consumer load.

If we reduce the amplitude of the waveform generator so far that the light emitting diodes on the transmitter side shine not more brightly as those on the receiver side we can be sure that no biological effect will arise. If more energy is transmitted, as the receiver can absorb, further receivers should be switched in addition so that no vagabonding stray fields appear, which could be absorbed by biological systems. The optimal point is found, when during the reduction of the transmission amplitude the receiver also just begins to react with a reduction of the received energy.

**1.10 Utilities:**

Experimental-Kit and coil with middle wire length (type A), Figure 1.3

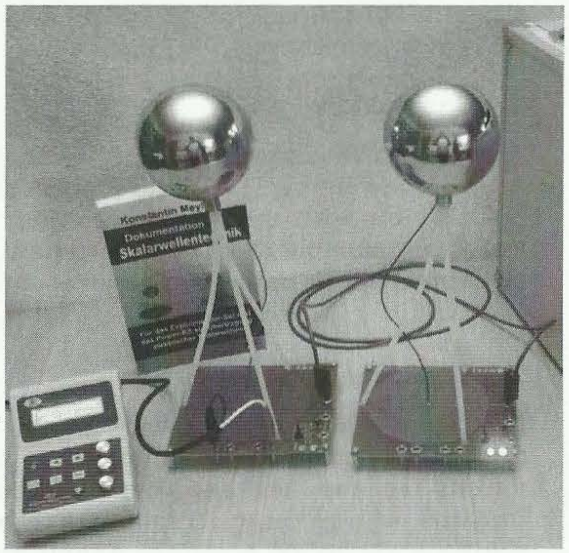


Fig 1.3: *Basic set-up of the energy transmission system (Experimental-Kit).*



**2. Experiment**, subject: **Feedback** (from receiver to transmitter)

**2.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**2.2 Place and date:** St. Georgen, 21st of June 2000

**2.3 To the status of physics of electromagnetic waves** (Hertz)

Terrestrial radio stations cannot determine on their transmitted power, how many listeners they have. There is no feedback from the receiver to the transmitter. If the effects in the experiment would be caused by radio waves (thus as the waves according to Hertz), it might not be able to determine at the transmitter whether a receiver is connected or not.

**2.4 Expectation according to the scalar wave theory** (by Konstantin Meyl)

Scalar waves spread not evenly but are the result of a resonance between transmitter and receiver. And in such a way power is only deducted, if an appropriate receiver goes into resonance with the transmitter. That means, that there should have to be a direct feedback from the receiver to the transmitter.

**2.5 Experimental setup**

To be able to observe a possible feedback the point of resonance must be found first. This is adjusted, if on the receiver the major peak can be observed and the LED´s shine most brightly. The experimental setup is in the first instance the same (like 1.5: The waveform generator is connected on one side to the coupling coil. This Tesla coil functions as transmitter. The connecting cable is plugged at the outside end of both Tesla coils and the waveform generator is connected to the wall power supply). After this is done the amplitude controller has to be fully untwisted (in the clockwise direction up to the limit stop) and the frequency is slowly adjusted with the frequency controller (Adjust) and the light emitting diodes at the receiver are thereby observed. If the major peak should not be able to be determined clearly, it is recommended to reduce the voltage with the amplitude controller. Thus the major peak appears no longer so bright, but can be distinguished clearly from the auxiliary peaks.

### 2.6 Carrying out the experiment

After finding the major peak the amplitude controller is turned back so far that the light emitting diodes on the transmitter side do not shine any longer, while the light emitting diodes on the receiver side still shine. If the connecting cable is carefully unplugged, the light emitting diodes installed on the transmitter side shine again. The LED´s, installed on the receiver side, extinguish.

### 2.7 Interpretation of experiment results

The same effect arises, if the frequency at the waveform generator is being adjusted. Also in this case the receivers LED's go out, while the LED´s at the transmitter light up, because there isn't resonance anymore and therefore no more power arrives at the receiver.

Accordingly the light emitting diodes on the transmitter side give information about the power taken off from any receivers. If the brightness changes if the grounding wire is connected from the transmitter to a radiator, it can be examined whether unwanted receivers possibly exist. For example if the brightness decreases, if the experimenter touches the grounding wire of the transmitter, he is another receiver in this case.

### 2.8 Conclusion

Therefore there is a feedback from the receiver to the transmitter, as can be observed here. With the transmission of radio waves no such feedback should be determined, in contrast to scalar waves in the case of resonance. If the transmitter is unplugged or the generator frequency changes and leaves so the conditions of resonance, no more energy is transferred.

### 2.9 Consequences

To bring his transmission path 1899 in Colorado Springs into resonance, Nikola Tesla did not has to climb the mountain, where he has built his receiver with 10 kW-power lamps. He even did not has to watch the receiver from his Transmitter tower. He only had kept his eyes on the Ampère meter at the transmitter.



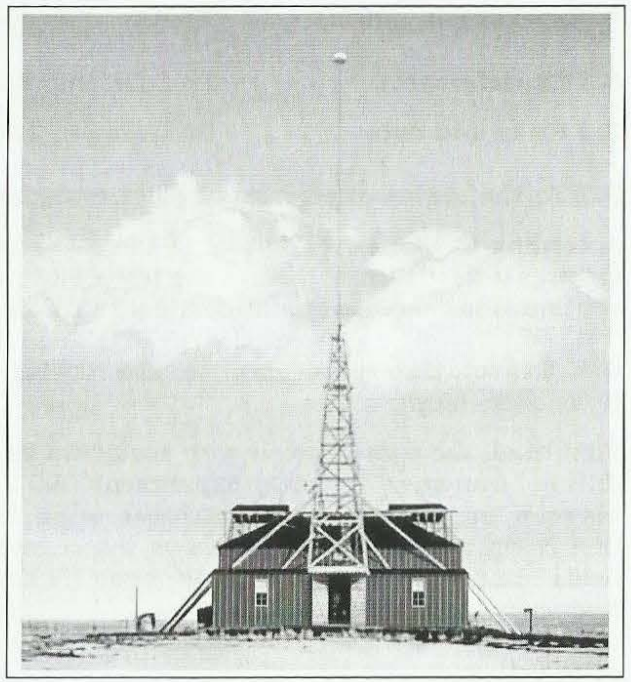


Fig. 2.1: *The experimental transmitter of Tesla at Colorado Springs 1899/1900*

His Ampère meter was telling him, when self-resonance has been reached. Then he was coming out of his barn and it was possible to see the lamps shine in a distance of 30 miles.

Numerous physiological effects are based on the principle shown in the feedback from the receiver to the transmitter. They are in this way for the first time physically modelled.

At the same time it becomes clear that the as esoteric classified coherences are nothing else than scalar wave effects. These effects are wrongfully designated as para-science, because scalar waves are still unknown to the scientific world.

The feedback shown in the experiment proves without doubt the existence of scalar waves.

### 2.10 Utilities:

Experimental-Kit, like in experiment No. 1, using the coil "A" with middle wire length

**3. Experiment**, subject: **Prove of Free Energy**

**3.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**3.2 Place and date:** St. Georgen, 21st of June 2000

**3.3 To the status of physics of electromagnetic waves** (Hertz).

According to the law of square of the distance the power at the receiver is vastly lower then at the transmitter . The field strength continues to decrease quadratically with the distance.

**3.4 Expectation according to the scalar wave theory** (by Konstantin Meyl).

First of all the transmission with scalar waves has no power loss during transmission (see experiment no. 1). The dielectric between the two spherical electrodes of an imaginary capacitor line is open and therefore able to interrelate with scalar wave fields from the environment. If such fields with appropriate frequency and phasing are present, efficiencies from over 100 % are not to be excluded, even expectable. In the end it concerns an open system.

**3.5 Experimental setup and carrying out the experiment**

The transmission path is adjusted as described in experiment no. 2. The LED´s at the transmitting coil are to be out, while at the receiving coil they have to shine. To this look first for the resonant frequency please (receiver shines) and then the amplitude has to be accordingly reduced. Subsequently, with the frequency controller, check again whether it is the correct point. There is the possibility that the receiver lamps light up at several frequency values, but only at the correct value the feedback to the transmitter is so strong that the transmitter lamps go out completely.

**3.6 Interpretation of the experimental results**

Both coils should be identical (same numbers of winding, same wire length, same coupling coil). Thus makes sure that the inductively coupled in voltage should be larger than the receivable under normal conditions.



As a matter of fact it is vice versa. On the receiver side values over the threshold voltage of the LED (2 V) are reached, which is why they shine, while on the transmitter side they go off, thus the voltage has to be under 2 Volts. The load by the LED´s is identical in both cases, so that the higher voltage gives reason to expect a higher current and a higher power. First of all it is no more than an indication, that possibly more power is received than the transmitter delivers. However, an exact measurement cannot be replaced like this.

**3.7 High frequency measurements**

Those who want to know for sure and have the appropriate metrology available, can measure directly the into the transmitting coil coupled in and received high frequency power. In addition the signal of electricity, which comes from the frequency generator, is measured with a current clamp (for high frequency measurements). The jumper is being removed. Due to the fact that between current and voltage a phase angle arises, the instantaneous values must be multiplied with one another (the scope must support this computation). This results in a likewise sinusoidal but double frequent output curve, whose average value can be consulted as a measure for the coupled in power.
The high frequency measurement on the receiving side takes place completely similarly. Here, too, the jumper is removed and the voltage is being measured directly at the coupling coil. An external resistor of 100 ohms is recommended as load. The current flowing through the load resistance is measured with the current clamp.

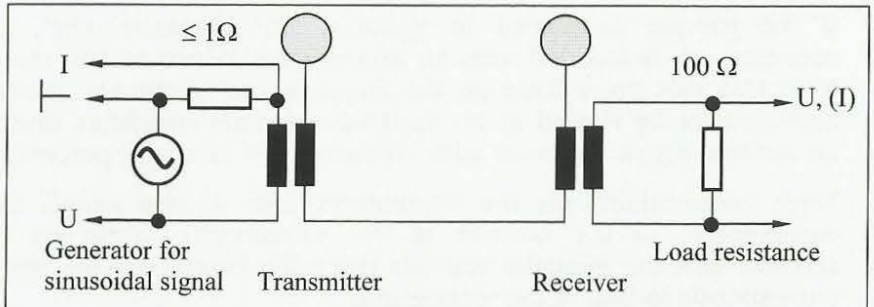



Fig. 3.1: *Wire diagram for HF measurements*

It should be in phase with the progress of the voltage. Optionally, a resistor in the form of a coaxial shunt is recommended. By optimal impedance matching of the load resistance and with appropriate adjustment of the generator the efficiency can possibly be increased more. In each case, the amplitude at the sine wave generator should be reduced as much as possible in order to minimize the power absorbed by the transmitter. As a control may be applied that the receiver follows every tiny change in the transmitting power immediately. Is this not the case, and the received power remains invariant, then the transmitter generates a lot of unnecessary stray fields and losses, therefore the power input should be reduced by the amplitude.

### 3.8 Interpretation of the high frequency measurements

Efficiencies of 100% to 500% are measured. A corresponding measurement with a 200 MHz wattmeter is printed in the book "Scalar Waves" in chapter 19.11. In addition, control measurements were performed at numerous universities worldwide.

At the same time it's easy to get unusable results if, for example, the phase correction between the current and the voltage measurement is forgotten, or the amplitude is turned up so much that far more energy is put in the transmitter as the receiver can gather. Of course, due to incorrect setting, an arbitrarily bad result is achievable. At a "control measurement" the jumper, for example, was not removed and consequently the transmitter loaded with additional 100 ohms. Such errors are preventable, too.

If the jumper is placed in position "RF measurement", the coupling coil is loaeded with an internal resistance of 100 ohms. With this can the voltage on the coupling coil of the transmitter and receiver be viewed at an oscilloscope. This simplifies finding an optimal operating point with efficiencies of over 100 percent.

Tesla recommends on the transmitter side a wire length that corresponds to the quarter of the wavelength, while on the receiver side the pancake coil has twice the length of wire, which corresponds to half of the wavelength.



To reconstruct this, corresponding coils with twice the wire length can be found in the experimental suitcase. Due to the different windings ratio a direct comparison with the LED threshold voltage is no longer possible, but the RF measurement clearly shows the value of this recommendation. In some cases efficiencies could be achieved in this way ranging up to twice the value.

### 3.9 Multimeter measurements

Not every Institute has the necessary equipment, in order to be able to make high frequency power measurements. That applies all the more to private researchers and schools. For this group the third jumper position on the coils was designed (DC load).


Fig. 3.2: *DC measurement with multimeter (jumper position: "DC")*

In this position the high frequency signal is applied to a bridge rectifier, and a condenser is loaded with the rectified voltage. On the right side of the circuit board are two sockets at which DC voltage is present. It's assumed that nearly everyone has a simple multimeter, which indicates the voltage level in DC position. If now an external load resistance of 100 ohms is connected, a simple voltage measurement can directly determine the power, which is implemented in the resistance, with $U^2/100\Omega$.

With this method the received power is relatively accurate to detect, while the transmitted power can differ considerably from the one implemented in the resistance. It is recommended to work with two multimeters at the same time. Then the calibration of the favourable amplitude and finding the correct resonant frequency is more easily. Typical voltage levels are above 400 mV on the receiver side, while the values at the same time on the transmitter side are under 100mV. (Fig.3.2)

### 3.10 Interpretation of test results of the DC measurements

Certainly a simple DC measurement cannot replace a high frequency measurement, but is always good to show the tendency. The current measurement is abandoned and it can be assumed that a higher voltage at the same resistor will entail also a higher current (Ohm's law).

If the DC voltage at the receiver is higher than the voltage at the transmitter, a so-called Over Unity effect, namely an efficiency over 100 percent, cannot be ruled out. An increase of the voltage by the factor 1.4 means already a doubling of power at the resistor, since also the ratio of the voltages come in squarely to the ratio of the powers.

Really suitable is this measurement but only for comparative purposes, since neither the phase shift at the transmitter nor the internal resistance of its power supply are taken into account.



### 3.11 Conclusion

The transmitter modulates its surrounding field. The receiver absorbs in the case of resonance, beside the sent power, scalar waves from the environment. The transmission path may prove the existence of free energy by exact power measurement.

Tesla possibly even measured that the received power continues to increase, if the distance to the transmitter is increased. Consistently and ambitiously he was, he planned a global power grid with scalar wave transmitters, which he called "Magnifying Transmitters". For a reason Nikola Tesla is considered as the father of free energy.

### 3.12 Consequences

Here is the chance of a new and environmental compatible form of energy, which is verifiably always and everywhere available, and only waiting to be used. However, the experiment is not yet a practically usable energy converter, since the signal generator with its high electricity requirement would consume all energy and some more. The experiment is only intended to serve as the first proof.

The experimenter also realizes how much the result depends on numerous boundary conditions: the time of day, the laboratory environment, the experimental arrangement, the choice and installation of the "ground connection" and even the degree of absorption of the "audience". For public demonstrations we even have had to make the amazing observation that the measurable efficiency at full audience with over 100 participants had decreased to half in comparison with the control measurements immediately before and after the event in an almost empty hall.

### 3.13 Utilities

Experimental-Kit, as in the experiment no. 1, coil A with middle wire length, purely optical control via the LEDs, or two voltmeters (DC) or even better high frequency wattmeters.

**4. Experiment**, subject: **Superluminal velocity**

**4.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**4.2 Place and date:** St. Georgen, 21st of June 2000

**4.3 To the status of physics of electromagnetic waves** (Hertz).

From the field equations, the magnetomotive force and the induction law, Maxwell calculated 150 years ago a wave, which constantly spreads with the item "c", which is the speed of light. Albert Einstein postulated, after all measurements seemed to confirm this, c as the highest possible and permissible signal transmission speed. As long as only the wave, according to Hertz, is considered, which is a transverse wave and vibrates transversal, this assumption is applicable. Since only this wave component is nowadays used, it is assumed that anywhere in the universe the light cannot be faster as 300,000 km/s. The unproven empirical proposition became an imperative, which is raised from some scientists by misjudging the connections into the rank of a law.

**4.4 Expectation according to the scalar wave theory** (by Konstantin Meyl)

The scalar wave, as a longitudinal wave, only has a middle propagation speed, for which no limit exists. It can be faster, even substantially faster than the light. An example for this experiment is again Nikola Tesla, who had measured already more than 100 years ago superluminal velocity and made fun of Einstein, who was in his eyes an unrealistic theoretician. Tesla had sent from his experimental transmitter in Colorado Springs a scalar wave signal around the earth and had determined a standing wave resonance with 12Hz. He writes that he could find the node of oscillation again on the ground plate in his laboratory in case of resonance.

For the wave, according to Hertz, the Schumann-resonance is approx. 7.8Hz. From the ratio of the resonance frequencies Tesla calculates the speed of the scalar wave emitted by him to 12/7.8 = 1.5 . His wave, Tesla concludes, must therefore have spread with the factor 1.5 of the speed of light.



**4.5 Experimental setup**

The experimental setup is the same as in the last experiment. For a quantitative evaluation the frequency display of the generator is needed (in MHz).

**4.6 Carrying out the experiment**

Possibly somebody has already noticed the fact that when tuning up at the frequency controller of the waveform generator the light emitting diodes on the receiving circuit board light up several times, albeit with different brightness. So far only the point with maximum brightness had been evaluated. The for scalar waves typical and in the first three experiments ascertained features arise here. It is particularly salient, that the transmitter's lamps go out, while those on the receiving side light up, if resonance is adjusted.

If the frequency is further decreased, another setting value can be found, at which the receiver's lamps shine. This time the transmitter is not aware of that. The transmitter lamps continue to shine completely unaffected, what from the conclusion is to be drawn that this time no power is withdrawn. It has to be the wave, according to Hertz. For checking purposes the grounding on the transmitter coil is unplugged and plugged again. Whereas the receiver's lamps go out and shine again, respectively. On the transmitter however no reaction can be recognized. The brightness of the lamps does practically not change.

**4.7 Interpretation of the experiment**

The missing feedback on the transmitter is an indication for being about radio waves, which can bring the receiver's lamps to shine only in vicinity (law of the square-distance). Further indications are that at this point the receiver's lamps do not shine more brightly than those of the transmitter, and the degree of efficiency is generally below 100 percent.

If the distance to the transmitter is increased, the received power slowly decreases, and finally the transmitter can be put into a Faraday cage. Thereby the receiver's lamps go out immediately. Mostly it is sufficient to hold the hand before the receiving electrode in order to prevent the receiving.

Such observations should be taken alternatingly at the two established points of resonance, because particularly the direct comparison of the measured wave characteristics at the two points makes it clear, that with the low frequency (4-5 MHz) the wave, according to Hertz, is used, and with the high frequency (6-7 MHz) the scalar wave, according to Tesla, is used (coil „A"). At the coil "C" the frequency values are about half as big.

### 4.8 Conclusion

The coil length was not changed, so that at a constant wavelength from a frequency change a change of the propagation speed follows directly. Both stand in direct proportionality to each other. If the frequency of the scalar wave is higher than the frequency of the radio wave, the frequency controller must be turned further toward the clockwise direction, then this wave is faster than light accordingly.

It is recommended to note the two frequencies and compute afterwards the ratio of the larger (longitudinal) to the lower (transversal) frequency. The result is undoubtful the language of Tesla: The scalar wave signal is approximately 1.4 to 1.6 times quicker at the receiver than the electromagnetic radio wave. (Typical values with the middle coil length are: Frequency of the scalar wave 6.7 MHz / radio wave 4.5 MHz = 1.5 c / c. The scalar wave has 1.5 times the speed of light).

Deeper insights are possible if the size of the spherical antenna is changed (not included). If the ball is reduced to a piece of wire without a ball at the top, then the resonance values of scalar and EM wave move toward each other and the ratio becomes smaller. One could draw the conclusion that the superluminal velocity depends on the ball size.

The range decreases simultaneously with the propagation speed. This means that the point at which the receiver falls out of resonance is reached sooner.



### 4.9 Consequences

The use of a spherical electrode as antenna accelerates the generated field vortexes and increases their stability and range. At least in this way the experiments can be lead to a physical explanation.

Some experimenters also report on their efforts to determine the wavelength with the aid of wave nodes. For this purpose they have followed the grounding cable with a field strength meter and searched the nodes of the standing wave. The distance from node to node corresponds at that to half the wavelength. The propagation velocity, which is ascertained by multiplying the adjusted resonance frequency and the measured wavelength, is above every criticism (chapter V).

It is still the correctly performed experiment, which visualizes the physical reality and not any theorems or beliefs, as they are represented by theoretical physicists. The usual argumentation, the phase velocity can be higher than the speed of light, no longer applies by the transmission of energy. It must in that case be the group velocity, because only this one allows an energy transport with c as the upper limit.

Scalar waves are modulatable and can carry information. Therefore the assumption, that the speed of light is the upper limit for signal transmission, as Einstein insisted, is to be contradicted. These facts are a tangible challenge for classical physics.

### 4.10 Utilities

Experimental-Kit, like in the experiment no. 1. First the coil A (middle wire length) is used. With the other coil C the experiments can be repeated.

**5. Experiment**, subject: **Ineffective Faraday cage**

**5.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**5.2 Place and date:** St. Georgen, 21st of June 2000

**5.3 To the status of physics of electromagnetic waves** (Hertz).

The Faraday cage is based on the principle that the inside of an electroconductive body remains field-free. It is used, in order to shield electromagnetic waves. Assuming that the electromagnetic wave only consists of waves, according to Hertz, nothing may penetrate a Faraday cage. If the transmitter is outside, the inside of the cage is allegedly field-free. Is the transmitter inside the cage, e.g. a microwave oven, no wave should be provable outside.

**5.4 Expectation according to the scalar wave theory** (by Konstantin Meyl).

The scalar wave has characteristics, which empower it to penetrate a Faraday cage. The scalar wave is able to tunnel. It must be only sufficiently fast. Furthermore a resonance between transmitter and receiver is required.

**5.5 Experimental setup**

For this experiment we need a Faraday's cage, into the transmitter is to be put. For that, the provided metal suitcase is suitable, which is opened and placed unfold on a side. The transmitting coil is put with the attached spherical electrode into the suitcase.

We connect the ground point, which is the outer end of the pancake coil, via the small laboratory cable to the connection inside the suitcase. The ground wire to the receiver is plugged from outside into the provided metal socket.

It facilitates the operation, when the generator initially remains outside. Of course, the suitcase can not be closed because of the cable. If the resonance point is found, then also the frequency generator is placed within the case (Figure 5.1).



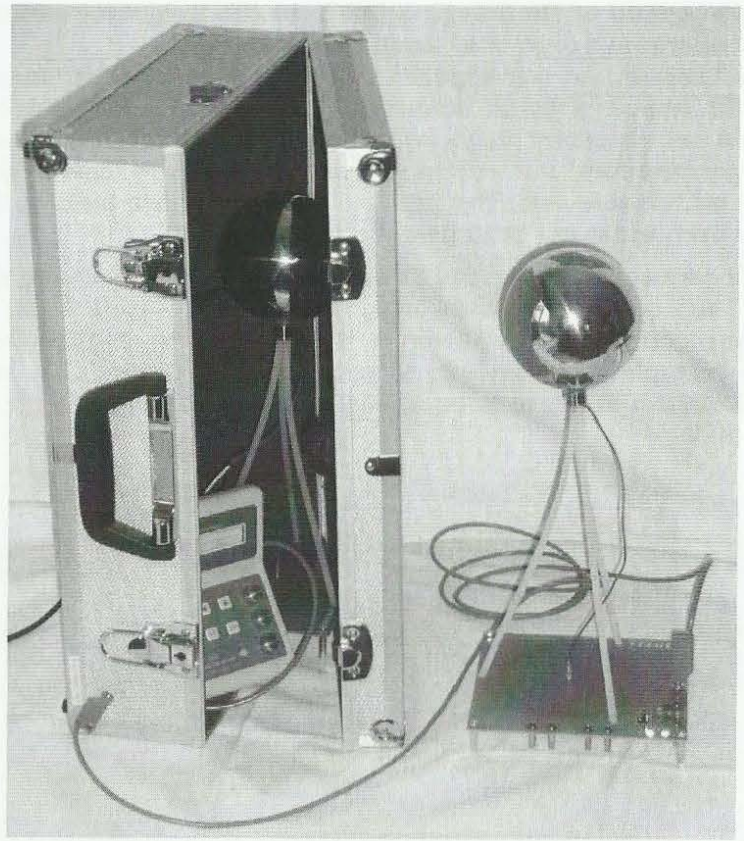


Fig. 5.1: *Transmitter and frequency generator inside of the aluminium suitcase*

Now the re-adjustment of the resonance frequency through the open gap requires some skill. However, it should be possible after closing the case that the lights on the receiver outside of the case don't go out anymore. (Figure 5.2).

But it can also be a hamster cage made of metal or a microwave oven be used. Note that mesh cages have a certain cutoff frequency. The higher the frequency, and therefore more short-wave an electromagnetic wave is, the closer the "bars" of the cage must lie together. The wavelength of microwaves is approximately 5 millimeters. This corresponds to a frequency of about 60 GHz. The frequency generator produces frequencies only up to 8 MHz.

Thus a ratio of the wavelengths from the frequency generator to the microwave oven of at least 3000:1 is given.
That means, for our experiments, a cage with 3000 times larger lattice spacings would actually be sufficient. Using the microwave oven as shielding cage, which is prooved for high frequency impermeability, our experiments with relatively low frequencies are on the safe side. The power plug should have been pulled and the oven must not be activated in any case.

The connecting cable has to be plugged into the receiver and has to be connected with the transmitter, wich has to be electroconductive connected to the cage (using a microwave oven for example, with the help of an alligator clip at metal parts). The aluminium suitcase is equipped with a socket on the inside and outside.

Fig 5.2: *The closed aluminium suitcase with external connected receiver*



### 5.6 Carrying out the experiment

The amplitude controller is fully untwisted. It does not matter whether the transmitter's LED shine. Arbitrative for the success of the experiment is the fact alone whether a chance exists to bring the receiver's LED to shine. For this purpose the frequency controller of the waveform generator is adjusted, till a maximum can be observed on the receiver side.

Who has doubts, the power supply connection cable to the waveform generator could radiate any high frequency, can use a 5-volt-battery supply instead of the wall power supply , which is also to be accommodated in the cage (provided battery adapter for 4 x 1.2 V accumulators). If the cage is closed, in this case absolutely no cable is connected to the cage. Only the cage itself is connected from outside with the receiving coil and from inside with the transmitting coil. Now the caged transmitter can vibrate as much as it wants. Outside of the cage nothing at all might arrive, according to textbooks.

### 5.7 Interpretation of the experimental results

If the lower frequency (the wave, according to Hertz) is adjusted, it is recognizable that the smallest shielding leads already to the fact that the receiver lamps go out.

The higher frequency by a scalar wave transmission behaves substantially more resistant. A gap in the almost closed suitcase or a cable, which leads out the suitcase, is entirely adequate for a perfect coupling. In the same way the small lamps on the receiving circuit board of a hamster cage or a mouse lattice proceed shining almost unimpressed. All previous experiments can be repeated and it shows that a transfer of energy, a feedback and even an increased efficiency are possible. But it is to be considered that the resonance frequency between transmitter and receiver is affected by the cage, which makes a readjustment of the frequency necessary. The cage increases the surface and thus the capacity, so that the resonance frequency decreases to substantially lower values (typical 4 to 5 MHz using the middle coil "A").

If the transmitter LEDs are to be observed for verifying, the microwave oven with its window or a cage with wire mesh are versus the aluminum suitcase at an advantage. In any case is the demonstration of an energy transfer out of a metal cage an impressive proof for the existence of scalar waves.

But even an attenuation can be observed, which is dependent on the mesh size. A Faraday cage with a large mesh size shows for scalar waves, which are 1.5 times faster than light, no perceptible impact. However, the denser the mesh of the cage, the faster the waves must be in order to tunnel through. The aluminum suitcase is proving to be extremely impenetrable regarding HF. This is not surprising, because now the molecular metal lattice is forming the cage, now the lattice spacings are only of an atomic order. As a consequence of the broad spectrum of the emitted scalar follows, that only extremely fast waves with their extremely contracted vortex particles have a chance to escape from the suitcase, and that is only a very small portion.

Is in battery mode, for example, the battery pack in addition to the pancake coil and the frequency generator also in the cage, and the lid of the suitcase is completely closed, then both the slow among the scalar waves and the electromagnetic waves have hardly the chance to leave the suitcase.
It will in this case as a general rule so little arrive at the receiver that the lights can no longer be illuminated. Only by DC measurement and multimeter or per RF measurement and oscilloscope is now a receiving detectable.

### 5.8 Conclusion

If the Faraday cage is not too close meshed, it does not represent a considerable barrier for the transfer of energy. Substantially at this result is the circumstance that a signal can generally escape from the cage, that something is measurable, which may not be. Even this experiment reveals a completely substantial characteristic of the scalar wave.

Who still has doubts and wants to hold the grounding cable accountable, should put his cell phone in a microwave oven, close the door and call the cell phone. He will in most cases be able to hear his familiar melody in the standardized microwave cage, without any grounding wire.



The field strength decreases only slightly, so anyone, who wants to realize it or not, is shown how high the used percentage of scalar waves actually is by mobile communications. This also explains why one can telephone out of a car, a train or the metal cabin of an elevator, why the cage made of sheet metal shields so little.

### 5.9 Consequences

If a Faraday cage cannot affect scalar waves, apparently no possibility is known to shield the scalar wave component of a wave. If during tunnel experiments the waves are confronted with a barrier, which should be actually insurmountable and if, albeit of this fact, signals behind the tunnel are measured, which are besides faster as expected, then a scalar wave is received without doubt. (e.g. Professor Nimtz, 2nd physical Institute of the University of Cologne).

If building biologists sell their customers shielding mats against electromagnetic pollution, these mats shield only radio waves and no scalar waves. Which of both waves is biologically active and to be held accountable for the electromagnetic pollution, is another important aspect.

If somebody seeks shelter from scalar wave radiation, a scalar wave receiver is recommended, which goes in resonance with the annoying transmitter and absorbs the sent energy. Whether such a device actually functions, can be recognized by the fact that a measurable output is perceivable: A small lamp shines or a component becomes hot. The numerous offered precautions do usually not meet this requirement against the electromagnetic pollution. Therefore, a certain amount of skepticism, when purchasing such equipment, is advised.

### 5.10 Utilities

Exp.-Kit, like in the experiment no. 1 with aluminium suitcase as Faraday cage

**6. Experiment:** **Disproof of the near field interpretation**

**6.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**6.2 Place and date:** St. Georgen, 1st of July 2000

**6.3 To the status of physics of electromagnetic waves** (Hertz).

For the disproof of the near field interpretation is to be calculated first, at which distance between transmitter and receiver the near field ends. As is well known this happens at $\lambda/2\pi$.

**6.4 Expectation according to the scalar wave theory** (by Konstantin Meyl)

At 7 MHz it might therefore not be possible any longer to bring a small lamp to shine after more than 6 meters. The near field is the scalar wave component, which is radiated by the antenna. However, the computation of the near field and especially its range always takes place on the assumption of a propagation with light speed. Scalar waves can, against the doctrine, be faster, too, so that, according to the scalar wave theory, it can be expected that the transmission of energy is still possible over a larger distance. This one increases with the speed, according to Meyl.

**6.5 Experimental setup**

The transmission path is set like in the experiments 1 to 3. The frequency is adjusted to the point of maximum luminosity of the receiver's LED. The LEDs on the transmitter side are unimportant for this experiment.

**6.6 Carrying out the experiment**

The connecting cable, which is designated by Tesla as "grounding", is lengthened to more than 6 meters by an extension cord. If necessary the frequency is to be readjusted and the setup of the maximum value has to be checked.

**6.7 Interpretation of the experimental results**

It was always possible so far and the measurements will confirm it, that with distances of more than 6 meters the light emitting diodes on the receiver can be brought to light. Thus it has been



shown that outside of the near field still a transfer of energy is possible. Certainly the finding of the maximum becomes more difficult.
The longer the ground cable or the more potential receivers are connected to the cable, for example the radiator or a water pipe, the sooner the oscillation breaks off and the resonance breaks down. Then, immediately, at one blow no receiving is possible any longer. After such a break the distance must be shortened, till the resonance is again present. After that the distance between receiver and transmitter can be extended again.
In the course of my lecture „Alternative Electrical Engineering" students increased the distance to 60 meters and took measurements as well (page 126).

**6.8 Conclusion**

If it is possible to receive the full transmitted power, even at the tenfold distance, a frequently mentioned argument of high-frequency engineering is sorted out.

The experiment can be expanded, if necessary, with the goal of showing the standing wave character as proof for the existence of longitudinal waves. As long as power is consumed, the field lines are bundled at the receiver, whereby the standing wave character is lost (radiation field). It is therefore recommended, that no jumper is set. Only a high-resistance measurement device or an oscillograph should be used to examine the voltage at the coupling coil of the receiver. If the distance between the transmitter and the receiver is varied, the chance to proof the standing wave character exists by locating the nodes of oscillation.

**6.9 Consequences**

The near field of an antenna is the scalar wave component of a wave, whereas the scalar wave, vice versa, is considerable more than just the near field. It is an electrical longitudinal wave, which propagates towards the pointer of the electrical field.

**6.10 Utilities:**

Experimental-Kit, like in the experiment no. 1, extension cord with different length, coil with middle wire length type A.

**7. Experiment**, subject: **The secret oft the pancake coil**

**7.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**7.2 Place and date:** Villingen, the 11th of January 2007

**7.3 Inductive coils in conventionel physics.**

Normally, by cylindrical coils, it does not matter whether they are energized from the beginning or the end of the winding. The connections are therefore interchangeable, without having an impact on resonant circuits e.g. a radio receiver. Also in the case of pancake coils should be no difference, because the inductance remains unchanged.

**7.4 Expectation according to the scalar wave theory** (by Konstantin Meyl)

The scalar wave transmission is often interpreted as a coupled oscillating circuit consisting of the capacitive transmission path and the via ground line interconnected coils as inductance. For someone who recalculates this R-L-C resonant circuit, only the pure inductance of the pancake coils counts and not the pin configuration. The expectation is initially not different from the textbook view. Even more surprising might be the experimental experience that this simple experiment reveals.

**7.5 Experimental set-up**

The transmission path is built as for experiment no. 1 to 3. The frequency is set to the point of maximum luminosity of the receiver LEDs, i.e. to the resonance of the scalar wave.

**7.6 Carrying out the experiment**

After the resonance has been set and verified, the frequency is to be noted. The transmission path is de-energized and (possibly with the help of adapter plugs) the ground and antenna connection at both coils interchanged. The spherical antenna is now connected to the outer connection of the pancake coil, while the ground cable runs from the center of the transmitting coil to the center of the receiving coil. Now the attempt is made to adjust the resonance of the scalar wave in the previously noted frequency window.



**7.7 Interpretation of the experimental results**

The resonance point is no longer findable. The behavior of the transmission path is completely changed. Only the EM wave with the known properties may still be set, but not the scalar wave. Why?

**7.8 Conclusion**

First the experiment shows the importance and impact deriving from the asymmetric setup. No textbook helps here. With little imagination a model concept can be developed, which can be wrong of course, but still better than no concept.

This is an air-cored transformer, which operates according to the induction principle. That is the electrons in the pancake coil are put in motion via the alternating magnetic field of the coupling coil, which is located on the underside of the circuit board at the point of maximum magnetic field strength.

But if the electrons are accelerated, it becomes tighter towards the center of the pancake coil and the mean free path decreases. However the coupled-in energy remains the same, which is why it converts less into translational and increasingly into rotational energy. Thanks to the rapid rotation of the electrons, the spherical shape is formed into a disc and then into a ring, which opens its center.

These currents, which are, regarding the wire, unbound and no longer flow through and instead around it, are often named "Tesla currents" in the literature. Only a few researchers have dealed so far with these mysterious phenomena, as they are beyond the classical theory. The Tesla currents originate no copper losses at it as a priceless advantage, because they do not move through the copper wire anymore, but oscillate around it.

It is a transfer of energy via the field with the help of field vortexes, one might say. This is the basis of the low-loss one wire technology by Tesla.

### 7.9 Consequences

According to the experiment, it is not possible to achieve a resonant link, when the center and the outer end of the flat coils are interchanged. According to the vortex model of the electron [2] that is tantamount that the transformation into a ring vortex is no longer possible this way; i.e. interchanging the coil connections prevents a wire bound current from becoming a Tesla current.

What states the vortex model of the electron? The ring vortex, which emerged from the spherical vortex, propagates in the direction of a field pointer. The propagation is therefore longitudinal. With the oscillating field pointer the propagation speed also oscillates. In the region of the speed of light the field vortex is subject to the Lorentz contraction. Once he is big and slow, and then again fast and small.

This oscillation is assisted by the ball electrode to be used as an antenna. The ring vortexes, arriving from the pancake coil, are bloated by the ball when they run around it, to contract and accelerate again when running out into the room. With this auxiliary concept the metrological verifiable influence of the ball size on the speed of scalar waves and their range would be explained.

These phenomena are still ignored, even though no cylindrical coils can be constituted on modern circuit boards. Here CAD programs often generate pancake coils when inductances are required. An unsolved EMC behavior is sometimes the result, because these pancake coils can act as a receiving antenna for vagrant Tesla currents. As a result, electronic circuits perform uncontrolled functions. However, no EMC testing is required until today, which involves the irradiation of Tesla currents.

### 7.10 Utilities

Experimental-Kit, like in the experiment no. 1.
Coil with middle wire length type A.
Two adapters of 1,3mm to 4mm and
two adapters of 4mm to 1,3mm are helpful.

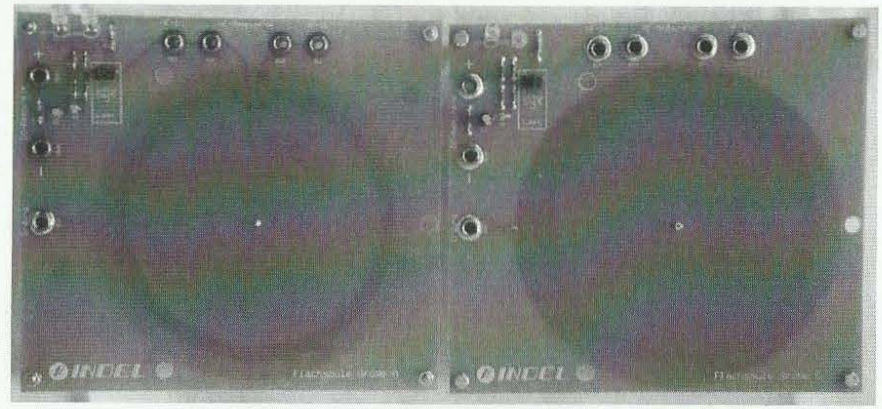


## 8. Experiments with the Experimental-Kit

First only the coil "A" with the middle wire length was used in the Experimental-Kit.

### 8.1 The „Secondary coil" (pancake coil on the top side)

But still one more coil set with the double wire length is provided, recognizable by the very fine winding with high number of windings type "C". In the shop (at www.meyl.eu) is in addition a pair of coils of the type "B" offered with half the length of wire (the double resonance frequency requires a different generator). Using these coils, the experiments 1 to 5 can be repeated. Additionally harmonic wave experiments are possible by combining different coils. In this case attention should be paid to the fact that with the number of windings also the transmission ratio of the air-cored transformer changes.



2 pancake coils each with middle (A) and double (C) wire length.

Fig. 8.1: *Two differently wound Tesla coils from the Experimental-Kit*

### 8.2 The „Primary coil" (coupling coil on the underside)

The coupling coil is identical at all variants with 5 windings. It can be modified by soldering, if necessary, on the underside, whereby an abbreviation to 4 turns is possible.

### 8.3 Function generator of the Experimental-Kit

By pressing the button [wave] the curve shape changes from "sine" to "rectangle". So a signal with high harmonic content can be generated, whose pulse-width is steplessly adjustable. That can be helpful for experiments with mixed groups of coils, e.g. with one transmitter (high number of windings: type C) and with two receivers (middle coil length, coil A).

### 8.4 Historical Experiment (according to Tesla)

Tesla had proposed to adjust his transmitter to a quarter of the wavelength, by contrast the receiver (or receivers) to the half wavelength. The function can be reproduced with the Experimental-Kit by using the coil A for the transmitter and the coil C for the receiver (or receivers). In this way all previous experiments with this mixed configuration can be repeated.
Besides, Tesla had always grounded his coils. If you detach the ground, then the receiving is interrupted. This is due to the interrupted current flow which flows through the ground wire in operation. Of course, it makes no sense to doubt the existence of this connection designated by Tesla as "grounding". It is an essential part of any Tesla transmission and thus imperatively necessary, when concerning the goal to reproduce the historical experiments.

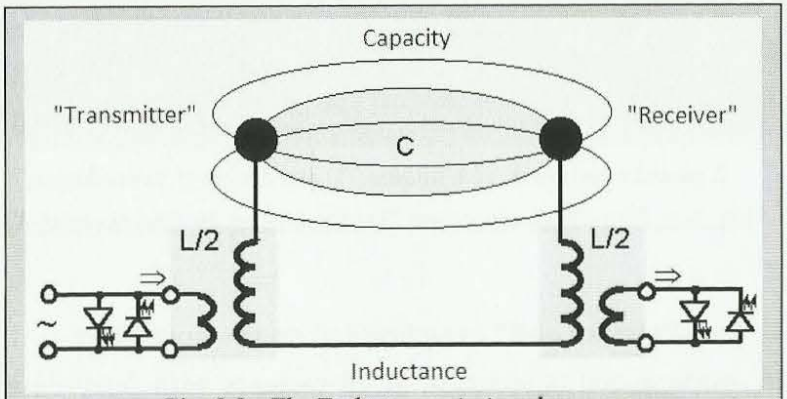



Fig. 8.2: *The Tesla transmission shown as coupled oscillating circuit*



Experiments with the Power-Kit show that it can be done without this grounding connection. But then is to question whether it is still the technology described in Tesla's patents.

### 8.5 Feedback (further experimental reports)

At this point the experimenter's imagination was needed. Some have created reports and returned them to us. Therefore these can be include in the present documentation to encourage further experimentation. I may on behalf of everyone say thanks.

When the writers' names are mentioned, they have previously given their consent to this, or have even asked me to mention them or have already published their reports by themselves. In all other cases I have presented the reports anonymously. What is important is the matter in hand, not the names of individuals. No attempt is made to hide criticism and I have included such criticism, where possible, unabridged. This provides at the end an attractive arc of suspense between the opposing arguments. Figure 8.3 shows the set as it had come in 2000 to market and how most reports are still based on it.

Wall power supply | transmitter (LED off) sine waveform generator + | receiver (2 LED shine!) frequency counter | documentation + aluminium suitcase

Fig. 8.3: *The original Experimental-Kit used from 2000 to 2014.*

**9. Experiment**, subject: **Experiments with the Power-Kit**

**9.1 Experimenter:** Prof. Dr.-Ing. Konstantin Meyl

**9.2 Place and date:** Furtwangen 1999,
TU Zagreb, Uni Split, ETH Zürich 2006, University of Utah, Salt Lake City 2007, University of Copenhagen 2008, Yonsei University of Seoul, Korea 2010, Heidelberg 2009 und 2012, Stockholm 2013, UNESCO Paris 2013, Lyon 2014, usw.

**9.3 On the state of electromagnetic wave physics** (by Hertz).

Concerning the plane electromagnetic wave arising in the far field of an antenna it is known that there is no phase shift between electrical and magnetic field pointers. This means that where the electric field strength E is zero, the magnetic field H also disappears. So in the case of zero crossing of the sinusoidal waves the energy density $\varepsilon \cdot E^2 + \mu \cdot H^2$ is found to be zero. However, if the energy falls to zero, this wave cannot be used for the transmission of energy.

**9.4 Expectations according to the scalar wave theory** (K.Meyl)

The case of the scalar wave is quite different. Here, as we know from the near field of an antenna, a phase angle of 90° occurs. This means that there is no point at which the energy density becomes zero. Quite the opposite: where E is zero, H is at the maximum, and vice versa. This wave is therefore the right wave to be considered in the case of wireless transmission of energy.

**9.5 Experimental setup**

The same coils are used as previously, but the HF amplifier is switched in between the generator and the transmitting coil. This now has 100 times the output (at approx. 10 times the voltage and 10 times the current). To make use of the full output of the push-pull output stage, the coupling coil of the transmitter is connected between the two outlets 'Out1' and the inverted 'Out2'. If you cautiously turn up the amplitude regulator until the LEDs are illuminated but do not burn out because of overloading, you can also perform all the previous experiments with the RF amplifier of the Power-Kit. However, this is not recommended.



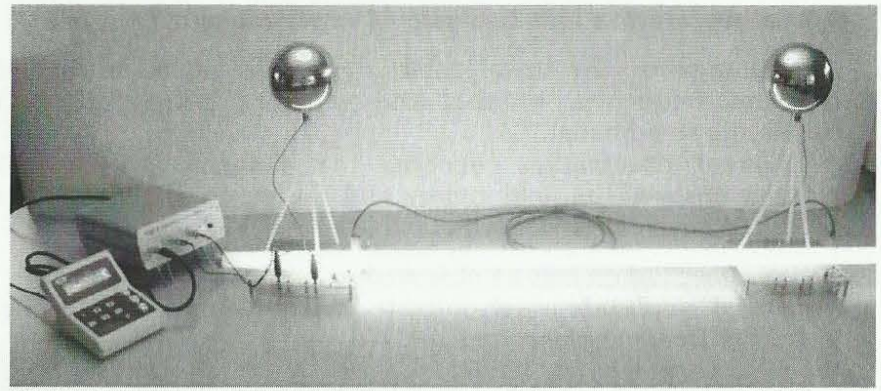


Figure 9.1: *The setup of the Power-Kit consisting of the digital sine wave generator, the HF amplifier and the coils from the Exp.-Kit.*

The recommendation is to remove the jumpers from the circuit boards and search or adjust the natural resonance with a fluorescent lamp. It is also possible to use an old lamp which no longer starts. Either the lamp is placed transversely across the pancake coil at the transmitter (as in figure 9.1), or is held in the hand with the other end held against the ball or the antenna wire.

The "Amplitude" controller is turned up to full power. Then pressing the "Mode" button displays the frequency setting and the left-hand arrow button is used to move the decimal point to the left as far as the MHz range. Now the controller "Adjust" is rotated and thus the frequency adjusted, until the fluorescent tube is illuminated.

**9.6 Performing the experiment**

It is also possible to find the natural resonance without a fluorescent lamp. To do this, the ground cable is disconnected. This severs the link between transmitter and receiver. Only the jumper at the receiver is now placed in the "LED" position. The transmitter's amplitude is to be fully untwisted. The resonant frequency is found when the LEDs at the receiver light up, whereby it should be initially placed near to the transmitter.
This corresponds to an entirely wireless transmission of energy. So experiments can be performed on the scalar wave properties and experiences accumulated.

### 9.7 Interpretation and Analysis of experiment

Any change in the arrangement, gaps or cables affects the resonant frequency, so that the resonant point has to be constantly re-adjusted.
A different observation concerns the distance at which the receiver absorbs the field energy and the much greater distance when resonance breaks down.

Nodes of oscillation can be observed on some fluorescent tubes at a reduced amplitude which migrate through the tube. This might be a high-frequency harmonic or the fundamental wave.

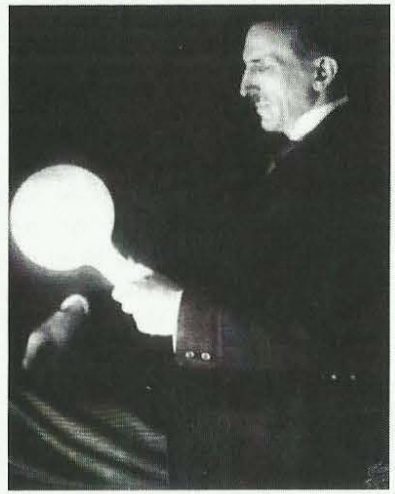


Figure 9.2: *Nikola Tesla with a lamp illuminated from the field.*

### 9.8 Conclusion

There are many pictures showing Nikola Tesla holding a lamp which is illuminated from the field. This effect can be reproduced using the Power-Kit. Through the higher output some stray fields occur which makes it easier to study scalar waves, for example: when are we observing stray field effects, and when is it pure radiation, and when are resonance or wave properties shown by nodes? These are always open electrical field lines: only their paths and distribution in space are altered.

A fluorescent lamp has no pronounced resonance in the frequency range used. It has to be forced into resonance.

The LED test is a different matter: both transmitter and receiver have an identical layout and values for capacitance and inductance. The problem is the non-connected ground cable, which has an adverse effect on the range. To improve this, Tesla uses earth rods or water in the case of an energy source for ships.



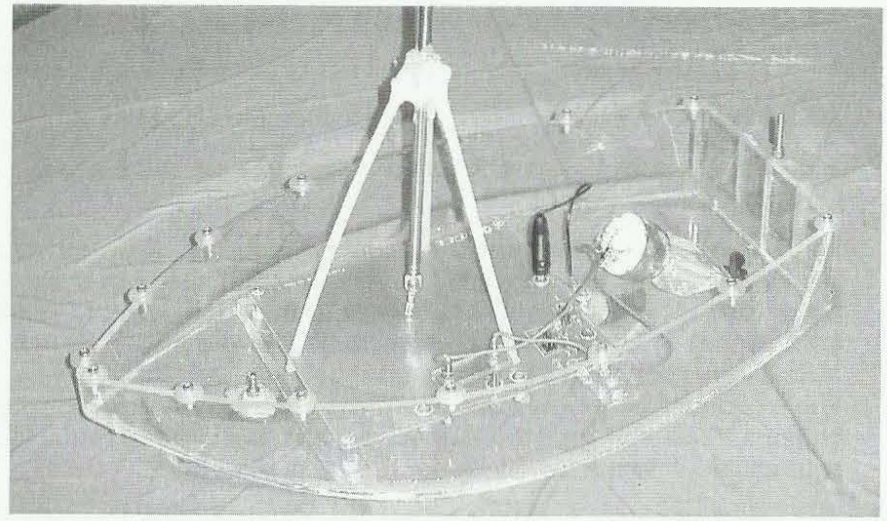


Figure 9.3: *The model boat of the 1st TCS driven with approx. 5 watts (transparent making it obvious that there is no battery)*

### 9.9 Consequences

Those who have the Power-Kit as well as the Experimental-Kit are able to implement a technically neat construction. For this four coils of type A or C and four ball antennas are needed. A transmitter-receiver pair (with a ground cable and no jumpers) is driven by the Power-Generator at natural resonance and an additional pair (with a ground cable, jumpers and no generator) is set up in parallel. Although there is no conductive connection between these pairs, the LEDs are illuminated. The field oscillation from the Power-Kit will excite the passive unit from the Experimental-Kit, causing synchronous resonant vibrations.

### 9.10 Utilities:

Power-Kit, consisting of the Experimental-Kit, the RF-Amplifier and the accessories for the Power-Kit. Additionally the kit includes all the necessary parts such as an electric motor and accessories for building a model boat and a model airplane for the practical demonstration of this technology.

**10. Experiment**, subject: **Tesla oscillating circuit**

**10.1 Experimenters:** Students of electrical engineering

**10.2 Place and date:** Electrical engineering laboratory

### 10.3 Experimental setup for measurements on the closed oscillating circuit

To carry out the experiment the frequency counter of the (original) Experimental-Kit is connected to the function generator via the three provided sockets ("Sync" synchronisation signal, "GND" ground and a 5V power supply socket). The prompt is shown in MHz (is dropped from 2014).
The frequency generator now has to be connected to the coupling coil of a Tesla coil with the help of two short-circuiting links. This coil now acts as the transmitter.

The other pancake coil is used as the receiver. The jumpers on the transmitter and receiver circuit boards are removed and the two coils are connected at the ground sockets using a cable (1m).
The two coil centres are connected with a capacitor (10 pF) (instead of the ball antennas).
The frequency generator is now connected to a 230V socket using the provided power supply.

### 10.4 Implementation of the closed oscillating circuit

To measure the voltage an oscillograph is connected to the receiving circuit board. Now increase the frequency controller (wide, fine tuner in middle position, sinusoidal waveform, amplitude at maximum, frequency range: HI) until a maximum voltage is displayed in a suitable measuring range on the oscillograph. For this the frequency range is run through several times to detect possible further maxima.
The frequency and voltage at the extrema are documented.

It may be that a harmonic wave is found at a voltage maximum instead of a resonance frequency.
This can easily be detected by the typical double frequency of the 1st harmonic wave or the whole-number multiple of half the wave length $n * \lambda/2$ (n=1,2,3, ...).
Now the inductance L of the coil can be determined with the help of the recorded values.



### 10.5 Determination of the inductance of the pancake coil

1. Determine the inductance L existing from both air-cored coils for the two most prominent resonant frequencies from the resonant condition of the LC oscillating circuit:

$$f_0 = \frac{1}{2\pi * \sqrt{LC}} \qquad (1)$$

2. Now the ground cable and capacitor are interchanged. For this the capacitor is connected between the two ground sockets and the two coil centres are connected with a cable and the measurements and determination of the inductance L repeated.

*Please explain any difference which arises.*

### 10.6 Setup for measurements on the open oscillating circuit

The experimental setup is the one from the experiment in section 10.3. Instead of the capacitor, the ball electrodes are now used. The ball electrodes are mounted above the pancake coils by inserting the three legs into the three holes in the circuit board and connecting the hanging wire in the middle to the middle of the Tesla coils.

### 10.7 Performance of experiment on open oscillating circuit

The experiment is carried out similarly to section 10.4. The transmitter and receiver are first positioned at a distance of approx. 1m to each other and connected by the corresponding long "earthing cable".

By reference to the recorded values and the inductance calculated in section 10.5, the capacitance of the transmission path can now be determined with the formula (1).

### 10.8 Determination of capacitance of ball antennas

Please determine the capacitance C between the two ball electrodes by analysing the dominating resonant frequencies at different distances.

Determine the value at 1m and repeat the measurement at a distance of 2m and finally at 3m. At the same time the ground cable is lengthened and the capacitance of the transmission path determined again.

### 10.9 Determination of capacitance of rod antennas

Replace the ball electrodes with "rod antennas" whose rod length roughly equals the antenna connection cable for the ball antennas, and then determine the capacitance C at 1m distance.

*Please, compare and discuss the results.*

### 10.10 Output measurement on open oscillating circuit

Now it is about measurement of the transmitted power and calculation of the efficiency at 1m and 3m distance.

For this the effective power, applied to the transmitter coil and consumed at the receiver's load resistance:

$$P = U * I * \cos\varphi \qquad (2)$$

shall be determined. The required equipment comprises:

1 x two-channel oscilloscope (for at least 40 MHz),
1 x current clamp for high frequency measurements,
1 x 100 Ohm resistor suitable for high frequencies.

### 10.11 Experimental setup and calibration of the amperemeter

The system is set up as described in section 10.3. To allow a possible phase shift caused by the measuring system it is necessary to determine this by the ohmic resistance.

For this the 100Ω resistor is connected at the output of the frequency generator.

A channel of the oscilloscope is now connected to the resistor to measure the voltage and the other channel is connected to the current clamp in order to detect the amplitude of the current.

The current clamp is applied to the cable of the resistor. In doing so, the direction of the arrow has to be noted and must remain the same during further measurements.



A suitable measuring range for the voltage is chosen at a latched vernier adjustment of the oscilloscope. At the channel, showing the current, the measuring range required by the amperemeter has to be set (e.g. 50mV/div).

The phase angle $\varphi_e$, occuring during the calibration measurement, must be subtracted from the further measurements.

### 10.12 Experimental set-up for measuring output

To measure the output the normal plug-in jumpers between the frequency generator and transmitter must be replaced by short cables to which the clip-on ammeter can be clamped. At the receiver the jumper of the LED is removed and the 100Ω resistor is connected to the "Generator" socket. Current and voltage can now be read off at the resistor as during calibration.

The resonant frequencies are sought at which the amplitudes show a maximum at the oscilloscope. Voltage and current are read off and the phase angle must be corrected to the phase angle obtained during calibration.
The output is then found by: $P = U \cdot I \cdot \cos\varphi$ (3)

For U and I the effective values are used which can be calculated from the measured peak values:

$$U_{Eff} = \frac{\hat{U}}{\sqrt{2}} \qquad I_{Eff} = \frac{\hat{I}}{\sqrt{2}} \qquad (4)$$

The oscilloscope is now unclamped from the receiver and connected to the transmitter with the same settings. The change can now be directly read off (voltage and current are taken from the cables between the generator and transmitter).

### 10.13 Terms of reference for measuring output

*Please determine the effective power at the transmitter and receiver sides and state the efficiency*

$$\eta = \frac{P_{Empfänger}}{P_{Sender}} \qquad (4)$$

*at 1m* distance and at 3m distance.

*Discuss the results and compare them where appropriate with measurements of output on the closed oscillating circuit with C = 10 pF.*

## 10.14 Comments concerning measurement of an OUE

In the experiment to measure output on the open oscillating circuit the lecturer must be prepared for much discussion with the students because they want exact information.

The scalar wave transmission line is an open system. It is not possible to eliminate energy from the environment and in principle an over-unity effect (OUE) is possible. Therefore if an efficiency of over 100% is measured, the transmission line is still not a perpetual motion machine. The radiation collected from the environment is not measured and so cannot be shown in the energy audit. In fact, if all the energy sources involved were to be taken into account, the energy conservation law still remains valid.

Major errors also migrate through the Internet on the subject of ostensibly "free" energy. If it is considered that nowadays so many sources of radiation are in operation on Earth, which all more or less emit scalar value portions in addition to the normally used electromagnetic wave, this energy is anything but free. Anyone who feels "free" enough to collect this energy, will make the operator of the transmission equipment angry by the time this person discovers who has been taking his energy without permission.

In fact, the technicians at Rias Berlin were able to observe on an ammeter when the allotment holders below their transmission equipment shone a fluorescent tube on their radishes by connecting one end to a wire antenna and earthing the other end.

In doing so, the emitted scalar wave portion was used. Although this actually should not exist and it is also not intended to be used for receiving radio transmissions, the experiments indicated the collection of the expensive high-frequency energy by the hobby gardeners. The Berlin Senate had to issue a prohibition, successfully demanded by the Rias lobbyists and contrary to the teaching doctrines of the time. What had rather accidentally come into use in this instance can be systematically studied using the kit (see 2nd experiment: "Feedback"). Each increase in the receiver load raises the transmission current correspondingly.



If the source of "free" energy is being discussed, neither the postulated zero point energy nor the vacuum helps further. Energy is always tied to particles. However, by definition, a vacuum is free of particles. Therefore, if energy is collected, field eddies of a particle character must be involved, for a vacuum is never field-free. The annular eddies of the mysterious Tesla currents, for instance, possess these properties.

Where it is mentioned in the 3rd experiment that Tesla collected free energy, although at the time no technical sources yet existed, it is due to the frequencies chosen by Tesla. In the range between 20 kHz and 100 kHz, where nowadays submarine communications take place using scalar waves, collection is in fact possible. Nonetheless, the transmitters are fairly large and the coil wire is kilometres long.

All kits from the First Centre for Scalar Wave Technology function in the lower MHz range and the coils are also much smaller. However, the ionosphere is impermeable to short waves. This means that signals from transmitters on Earth are reflected back to Earth, whilst the corresponding ones from the sun go back into space.

Within this range the collection of solar radiation is thus impossible. If the reception of energy is measured, the experimenter can be fairly sure of having collected man-made sources of energy. Particularly in the region of the released ISM frequency of 6.78 MHz there is an abundant supply of radiation sources.

Finally to close this, I wish that all those who are experimenting may find good efficiencies!

And so that success is certain I am providing an additional tip:
When you have found the point of maximum output, optimize the efficiency subsequently through fine tuning until the power supplied to the transmitter is minimal. Here too, practice makes perfect.

# IV.

## Measuring reports for the Over Unity Effect

The last experiment promises an efficiency of more than 100% but in no way guarantees it. Only long faces are guaranteed if success does not occur. There are various explanations for this: on the one hand, the optimal setting of the resonant point demands plenty of skill, and on the other hand the efficiency breaks down immediately if the supplier of energy shuts down its transmitter without warning. Those carrying out experiments have in the past rung me to complain: "Yesterday it was functioning and today nothing is working". Of course, this does not mean that the equipment has failed. It is just that the right source is missing. This can happen. However, if efficiencies of between 300% and 500% are found, the responses then fluctuate between euphoria and self-doubt.

### 1. Further experiments on the OUE

The employee of a global company writes me in 2003: "I had the opportunity to test one of your demo kits recently. It also does not take long until I was able to confirm your measurements, which have puzzled me (up to 300% efficiency). Only after I read your book completely and found some very interesting things".

From a university in the USA in 2007 a professor was asking: „can you please tell me, what is the most over unity, that you have seen using only one receiver?"
My answer was that I do not speak about my demonstrations, but about the results other universities have reached. "The Technical University of Berlin did measure 200 %, the University of the Bundeswehr in Munich did measure about 300 % and the maximum had been measured at another Technical University in Germany. The professional stuff from the measurement department of the university did reach 1000 %, which is an over-unity-effect of 10. There were many observers present, but I have doubts whether anyone will have the courage to speak about the truth. Please be aware that you will measure only 100 % or even a bit less so as long as there is no additional energy source available in your environment".



The Colleague from America responded as follows: "The reason I asked is because of my attempt to replicate your work. I was only able to achieve over-unity by using multiple receivers. When I used just one, my received energy was approximately 74 % of the transmitted energy. However when I used 3 receivers and one transmitter, my total received energy was approximately 168 % of the transmitted energy".
Sounds interesting – but any evaluation or remote diagnostics is hardly possible for me without being able to take a look at the experimental setup of the Professor.

### 2. Power measured at the Nottingham University

In 2009 a master's student sent me the following mail:

"Dear Prof. Meyl, I have submitted my application to the University of Nottingham for a Masters Research Program and with you as my second supervisor. I have run your experiment again today and am being questioned about the truth about the over unity effect. My result seems to send a shiver down my body because I started to doubt that there is free energy.

I choose to consider the kit as a black box and measure the input power and output power. The rectifier "DC voltage" as well as "LED" at input is misleading because it is in parallel to the input coil.

The best way to test over unity is to remove the jumper entirely in the transmitter and measure the voltage and current going into the input coil only. Then, at the output side, measure only the voltage and current going into the 100 ohm resistor (AC). I am using pancake coil C.

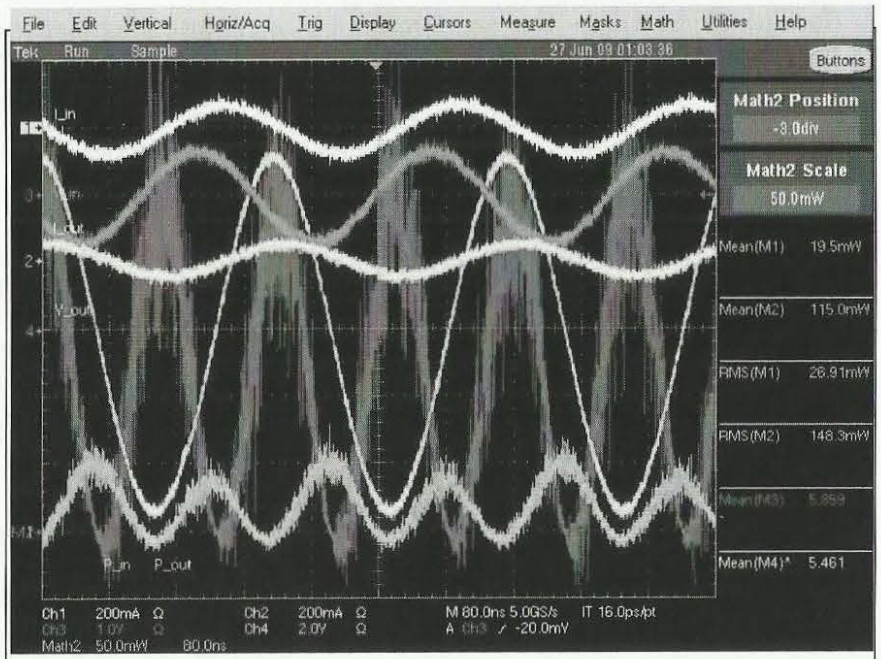
At about 3.56Mhz, where the output voltage is about 270 degrees angle delayed from the input voltage, the output voltage is very much higher than input, but the current at input is very much higher than output. Measuring the Voltage and the currents and then multiplying both Vin_rms with Iin_rms and Vout_rms with Iout_rms, the output power is much less than the input.

I have also removed the spherical ball and was able to turn on the receiver LED while turning off the transmitter LED, only at a different frequency compared to the one with spherical ball. The spherical ball doesn't seem to be a 'must have' to do the energy transfer. But, of course, it may make an improvement.

I kind of think the Tesla wireless system is more like single wire system: actually the air is one path and the earth line is the other path. I hope by writing here, you can convince me that free energy can be derived from this system, and that making a self-sustaining power supply is possible. Thanks!"

In his next mail the student presented these results:

"Hi Prof Meyl, I pumped in 27mW and am now getting 148mW out, > 5x over unity! Using Coil C at 3.6MHz.




M1 is mean of V_in x I_in, M2 is mean of V_out x I_out,

M3 is rms of V_in x I_in, M4 is rms of V-out x I_out,

Orange curve is V_in x I_in (50mW/div),

Purple curve is V_out x I_out (50mW/div) Fig.: 2.1 *Plot of the Scope*

Regards, D. L".

So far the report from Nottingham University, that has reached me 2009.



The client and purchaser of the experimental set used here was a major chip manufacturer, who at first supported the WiTricity system until he was forced to recognise how unsuitable the MIT system was for his requirements [4]. Solijacic and the sponsors from the NSF (National Science Foundation) had to admit that, with four years of delays and the lead of Meyl to overturn, the American experiment failed.

Only show and marketing provides no technology to compete with its superior. Actually the use of bundled electrical radiation guarantees a much better efficiency and larger ranges than that of the magnetic stray field used in existing RFID technology.

The student was so excited at the 500 % efficiency measured, but his professor at Nottingham University was unimpressed, and he was made to abort the experiment. Why? Why are cleanly taken measurements denied?

This can perhaps be explained by the fact that such a measurement constitutes a threat to theoretical physics, with the consequence that the fundamentals have to be reinterpreted, and that represents an enormous effort which people are afraid of. People look away and continue to do as they did before.

This also happened to me at the Bundeswehr University. A colleague insisted on carrying out conventional measurements on the experimental set. An automated power calculation was not reliable enough for him. He also used the BNC connector he was familiar with, even though it has a strong dampening effect, as it would help to suppress the disturbing noise which is at issue here.

As a result we could "only" measure 300 % efficiency, much to the astonishment of all the students and assistants present. However this result was not documented.

Instead a report was hidden on the internet (named "Speedy") and only made known to insiders, which was not false, but describes only the conventional performance. The key "new" results were not even mentioned. *People look away and then cannot see anything that they do not want to see.* But read for yourself this otherwise informative report.

## 3. Interpretation of the Scalar Wave Experiment,

given by Prof. Konstantin Meyl at his lecture at the Bundeswehr University (of the German army) on 16.Jan. 2001 (anonymous).

### 3.1 Experiment Set up

"Illustrated simply the experiment has the following set up:

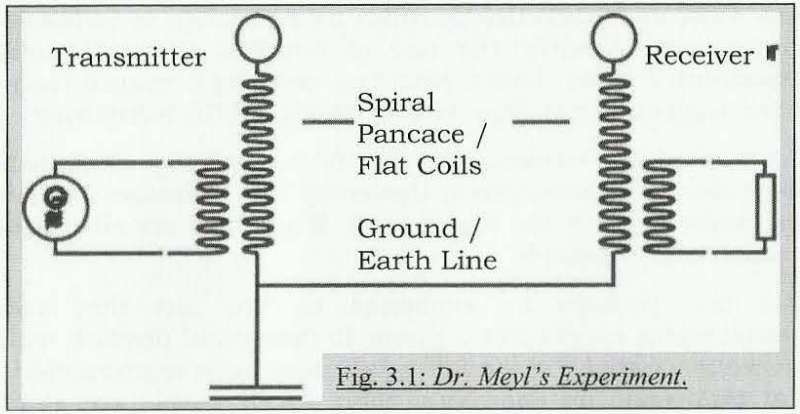



Fig. 3.1: *Dr. Meyl's Experiment.*

If one conducts Prof. Meyl's experiments in the manner stated, then one will see the stated effects. It will be particularly evident that around the middle frequencies $f_s$ there will be a good power transfer, which has a high level of efficiency. Prof. Meyl interprets this as scalar waves.

### 3.2 Interpretation

In order to understand the experiment one must consider the various parasitic capacitances and inductances that occur in this arrangement and depend on its surroundings.

A rough equivalent circuit diagram for a circuit with a frequency range $f_P$ of about 4 MHz is provided overleaf.

At this frequency the equivalent capacity $C_s$ and the equivalent inductance $L_s$ are in resonance, so a large current flows through the series resonant circuit and through the earth inductance $L_E$. Because of the high voltage drop or the equivalent inductance of the earth cable, the virtual earthing point V gets a high potential, which is transmitted through the earth line to the receiver.



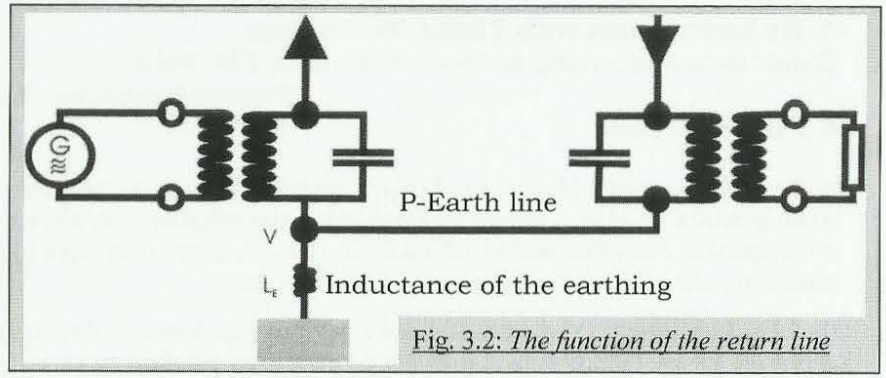



Fig. 3.2: *The function of the return line*

The high power which is measured there is, therefore, a consequence of the power transmission through the P- earth line, which in this set up is a pseudo-earth line. The return line is the real earth. So the transfer takes place through a line.

If you also earth the receiver side of the series resonant circuit then we expect the effect to be slightly weaker, but the principle still remains the same. However if you were to remove the pseudo earth line (P-earth line) and correctly earth the receiver (which requires care), then the effect would disappear and the received power would be reduced by several orders of magnitude.

A repeat of the experiment using circular coils gives essentially the same results. It is clear to see that the high level of power transmission is due to the flat coils, but is related to the circuit arrangement. If you were to remove the real earth on the transmission side then the P-earth line would function like an antenna, and external signals would be received.

All effects observed can be explained by existing theories. A scalar wave in free space could not be detected.

---

How is one to contradict the statements of the chair holder and his laboratory engineer? "All observed effects are explained" it says. Right, because the others are not even observed. Could one say, is not desirable to examine them carefully? Why were the coil ends of the flat coils not swapped for control purposes?

Here is another report from the HF technology department:

## 4. My Experiences with TESLA Technology

*Scalar waves according to Meyl, or Standing EM-Waves.*

(From the Internet, translated)

### 4.1 Introduction:

"I met Prof. Konstantin Meyl at a symposium on free energy in Berlin in August 2000, at which he gave a lecture on scalar wave transmission with a practical demonstration. I was fascinated by the subject, and on the way back from Berlin made it my aim to verify the experiments I had been shown.

Prof. Dr. Meyl offers a demonstration and experiment kit, however this was too expensive for me (although the prices are entirely justified). So I acquired a 20 MHz signal generator as well as various components, so I could also continue to carry out experiments in other fields for which the demo-set is not suitable. (To all savers: currently I have about 5000 DM invested in the relevant equipment and materials. If you only want to experiment with scalar wave transmission then the kit Prof. Meyl offers is considerably cheaper.).

The biggest obstacle I faced was making the flat coils, as these need to be as identical as possible. After successfully constructing a complex winding machine, I carried out a test phase of around 3 months, in which all possible parameters were altered and documented.

### 4.2 Current Status:

I am now in a position to be able to perform the experiments demonstrated by Prof. Meyl with my reconstruction.

In one experiment Prof. Meyl shows that at the receiver two LEDs light up while at the transmitter the LEDs go out. This is only a first indication of overunity. As the LEDs essentially only show the supplied and decoupled voltage, nothing can be said about the coupled and decoupled power. In my experiments I have found the exact same result when the amplitude of the supply voltage is reduced to a certain point. Accurate measurements showed an input voltage of approx. 1.7 volts (zero-peak) and an output voltage of about 2.1 volts (zero-peak). The threshold voltage of my LEDs is about 1.9 - 2.0 volts. However a measurement of the currents taken with a high-precision measuring resistor showed that the supplied current was about twice as high as that of the output. A power measurement, taking into account the phase conditions (minimal phase shift), showed the output line to be lower than the input line.



Further experiments under slightly adjusted conditions proved to be very successful. By altering the geometry of the experimental set up I am able to achieve a higher output power than input power. The output power is now around 350 mW, from an input power of 210 mW. These values were taken reliably and were verified by measurements taken by two separate independent engineers. Temperature measurements showed a similar result, and were similar to the latter test set-up.

In another arrangement an input power of around 70 mW achieved an output power of almost 600 mW, although this still has to be accurately verified as a significant phase shift occurred on the input side. (When measuring high frequency AC voltage measurement errors can easily occur.) However first temperature measurements suggest a confirmation of the results.

### 4.3 Further Comments:

Whether the captured power is to do with scalar waves, at the moment I cannot judge and I do not want to establish this. Detailed measurements of my experimental setup show clearly the characteristics of a standing wave, which is also known in acoustics. Without wanting to advertise, I whole heartedly recommend all books by Prof. K. Meyl where this topic is discussed in detail. I also agree with his statement where he condemns the "handiwork" of others who are inexperienced in making power measurements, which are generally unsuccessful. I also wish to make clear that to carry out experiments "just quickly" makes no sense. I have needed four months and have carried out around 300 different, often unsuccessful, measurements to reach where I am today.

O.B. in March 2001".

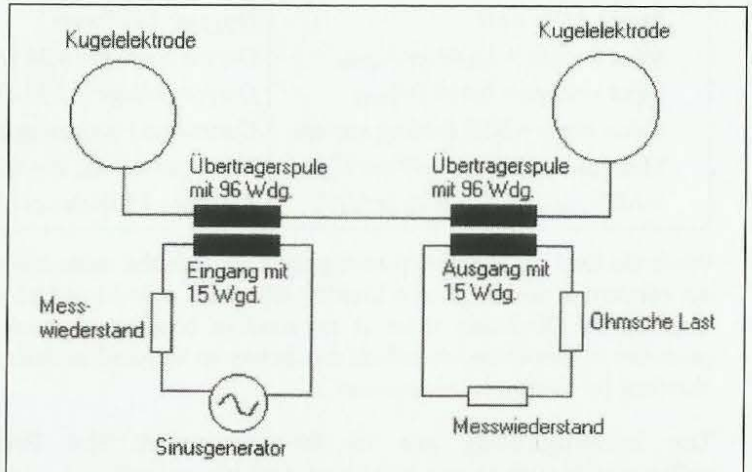



Fig. 4.1: *Experimental set up in principle (German original)*

The report of this committed experimenter makes one thing clear; had he aborted his experiments too early then his results would have been negative and there would have been no detectable gains in energy. It was only because he improved his setup and usage that he could suddenly show an efficiency of 170 % and eventually even see it increase to 860 %.

We learn from this: *No-one should throw in the towel too soon.* Unfortunately many do not have the time or patience. This leads to the so-called "critical reports," which in reality should be regarded as "shoddy reports."

In 2001 a professor from New Zealand also sent me a measurement report:

**5. Tests on Tesla coil device** (from New Zealand)

"Dear Prof. Meyl, we have carried out preliminary tests on your experimental coil kit. We can confirm that we have measured input and load powers with accurate digital Tektronix TDS 3012 scope and current probe with a predicted accuracy plus or minus 5% based on our own calibration tests.

Our signal source is a Thurlby Thandar 10 MHz direct digital Synthesizing function generator. A summary of results as per your suggested experimental procedure are as follows (all values of power are from scope maths function):

| At 7,4 MHz resonance frequency: | |
|---|---|
| **Input**: LED's off | **Output**: LED's on |
| Input current = 13,42 $[mA]_{RMS}$ | Output current = 4,24 $[mA]_{RMS}$ |
| Input voltage = 0,452 $[V]_{RMS}$ | Output voltage = 1,53 $[V]_{RMS}$ |
| Phase angle = 85,3 leading current | Current and voltage same phase |
| Mean power in: P = 0,49 [mW] | Mean power out: P = 6,32 [mW] |
| VAR's input S = 6,06 [mVA] | **Measured Efficiency: 1290 %** |

While the load mean output power greatly exceeds the mean input power (12:1) our concern at this stage ist o identify where the 6.04 [mvar] of reactive power is going to. Obviously there is no reactive component inside the function generator to absorb and re-reflect this power so we need to define whether it is absorbed by electronic components..."

The investigations are to be continued, the Professor and colleague writes to me at the end of his report.



In any case the open Tesla resonant circuit evidently constitutes a mainly capacitive load, according to the measurements reported. Other users of the kit have also come to this conclusion.

Unfortunately, as already explained, not everyone reaches the distinct operating point where energy is gained from the ambient field. People give up at this point and other experiments with characteristic evidence are not even completed, and so in their eyes the whole scalar wave model is in question.
People look past scalar waves because such a thing was not in their education, so people do that which they understand and can explain without any gaps. In a good example a Swiss HF engineer gave the in-house contract to his boss, who was the CEO of a medium sized company.
His report however does not help much more with matters of scalar waves, but it does give a good insight into how a professional thinks and works thoroughly, which also earned him his degree from the prestigious ETH Zürich.

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**6. Investigation Report from Switzerland**: September 2008

Topic: Scalar wave transmission with Tesla coils

Test Subject: Demonstration kit for the transmission of electrical scalar waves from K. Meyl.

**6.1 Synopsis**

This report summarises the results of the investigation which has a transmission path built with Tesla coils, according to K. Meyl's experimental set-up for the detection of scalar waves. The experiment was focussed on Meyl's detailed discussion of the experiments with the transmitter and receiver included in the kit. However this experiment only investigates the antenna part of the set up with a vector network analyser.

This means the transmission involves complex, interacting electromagnetic resonance phenomena in the range of short waves, between 1 and 10 MHz. In this test set up both Tesla coils act as coupled resonance circuits.

It was found that between the two Tesla coils there was a transmission in the frequency range between 4 and 7 MHz, with an attenuation of a few dBs. This transfer is practically unaffected by the distance of the antennas from each other (aside from when they are in the extremely near field). It is defined almost exclusively by the properties of the "earth connection." All tests carried out are consistent with the view that no signal transmission takes place through the air, but through the conductive connection ("earth wire") of the two antennas' basepoints. Here the resonantly driven Tesla coil acts with this "antenna base point" as a HF current source, which pumps charge in the connection cable, earthing system or in the ground. If the antenna basepoints of both Tesla coils are in an area of influence on each other, then the observed coupling of the resonant circuits takes place.

The characteristics previously observed can be explained with conventional HF technology. Electrical scalar waves could not be detected (at least not in the air). "Over unity" was not observed.

The Tesla coil experiment set up allows signal/energy transfer through only one connection (wire or earth). For a data transmission a modulation of a carrier signal would have to take place. Due to resonant bandwidth this only allows for a lesser rate of data transfer when compared with existing baseband technologies. Potential applications for such a data transmission system should satisfy the following two basic requirements:

- Existing conductive connection
- Relatively low bandwidth requirements

For power transmission applications, requirements would include a dedicated, unearthed connection cable.

## 6.2 Test Instruments and Programme.

**Test Sample:** Demonstration kit for the transmission of electrical scalar waves circuit boards with coil size A tested.

**Test Instruments:** Vector network analyser Agilent HP8753D



**Test program / contents:**

- Examination of the measuring setup acc. to the documentation of K. Meyl
- Properties of the coils and antennas
- Transmission properties of the connection
- Dependence on the distance of the antennas
- Dependence on the base point connecting lead
- Influence of the transmission power
- Interpretation of the transmission path
- Application possibilities / potential improvements

## 6.3 Results: Examination of the measurement setup, according to the documentation of K. Meyl

The experiments, which in his documentation K. Meyl describes as proof of scalar wave transmission, have been amply discussed on the internet. This does not need to be repeated here. However, it is important to note that the proposed measurements are not suitable for comparing transmitted and received power.

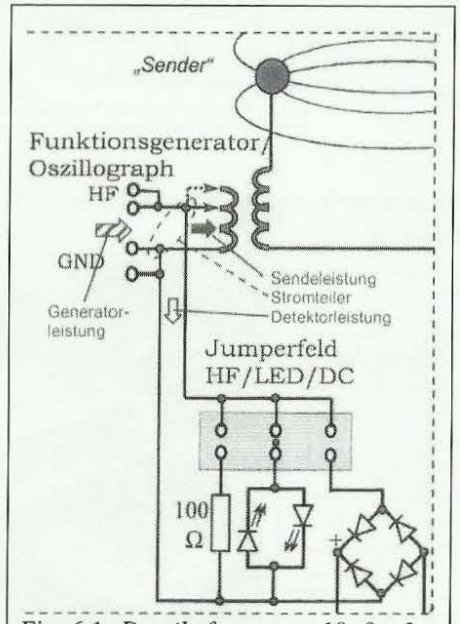



Fig. 6.1: *Details from page 18, fig. 2 (circuit diagram)*

While the detectors at the receiver (LED, resistor, rectifier) actually reflect the received power, this is not the case with the transmitter. Here the detector array is switched on parallel to the transmitter coil, and so functions as a current divider. The power shown at the detector corresponds to the proportion of power (from the generator) which has not flowed into the coil. Comparison of the two detectors (e.g. brightness of the LED's) says nothing about the coupled and decoupled power in the transmission system.

The coupled power is not measured. For that the detectors would have to be connected in series instead of parallel. For this reason the experiments which can be carried out with the demonstration kit are not suitable to provide evidence of scalar waves.

(Meyl's comment: So the array is to be turned off when the power is measured and the jumper is to be removed. The specification was clearly not followed, which had an effect).

### 6.4 Properties of the Coil and Antennas

In order to understand the transmission properties better the properties of individual components have been examined:

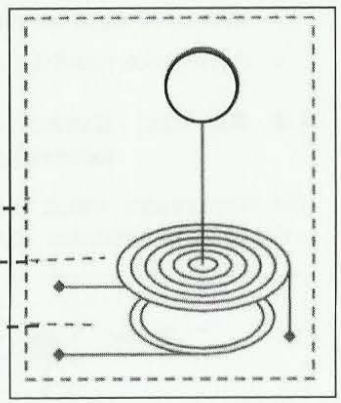
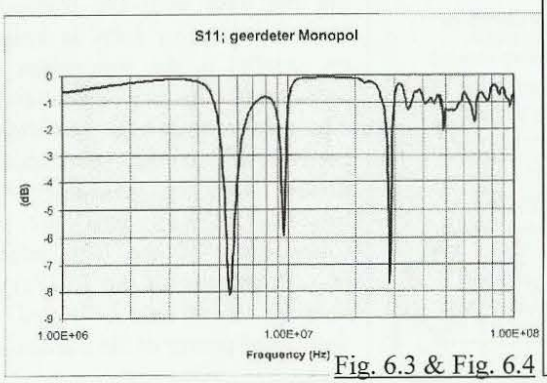


Fig 6.2: *The Air Transformer*

- Antenna Monopole
- Monopole Coil (on the upper side of the PCB)
- Coupling Coil (on the under side of the PCB)

The resonance characteristics of the monopole antenna was measured as S11 at the coupling coil with an earthed monopole coil.



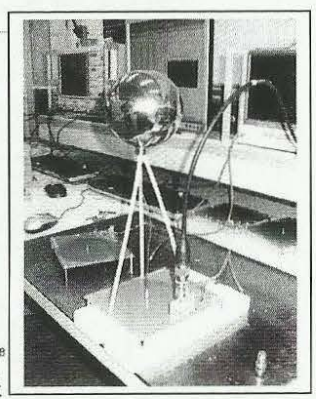



Fig. 6.3 & Fig. 6.4

The first resonance at about 5.5 MHz corresponds to λ/4 of the unwound length of the monopole coil with the ball as a top capacitor.



So at this frequency the coil and ball act as a shortened monopole antenna or a resonance circuit with the environment. The measured length of the conductors of the coil monopoly is about 9.5m. At a propagation velocity of about 0.7*c on the circuit board, this gives the exact resonance at 5.5MHz.

If the coils are connected in series to a 50 ohm resistor and S11 is then measured, then the series resonance for the monopole coil would be around 9.5MHz, and the series resonance for the coupling coil around 6.5 MHz, i.e. above these frequencies the coils would no longer function as inductors but as capacitors.

However in the case of the coupling coil that also means that as a result of this natural resonance, energy flows best through the coil, and is best transmitted at 6.5 MHz.

It will be shown later that 6.5 MHz is the frequency which allows the lowest transmission loss. Since the series resonance of a coil is often influenced by its surrounding, the optimum transmission frequency is also dependent on environmental conditions. By using an additional capacitor in parallel to the coil the resonance can be deliberately shifted to another frequency (closer to 5.5MHz), stabilising and improving the transmission system.

In our experiments, a capacitance of 100 pF has led to an improvement of up to 4 dB.

### 6.5 Transmission Properties of the Connection

The transfer properties were measured as S21, as shown in fig. 6.5. In each case the generator power was 0 dBm.

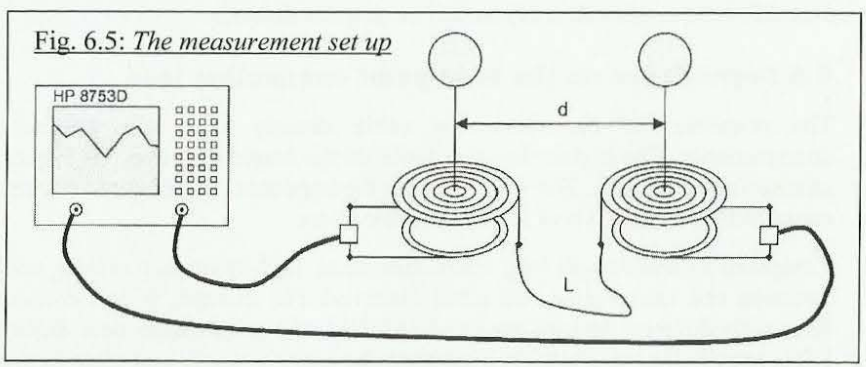



Fig. 6.5: *The measurement set up*

The parameters which were changed were the distance between the antennas d, and the length and properties of the earth connection L.

A typical transmission curve is shown in the following Figure 6.6:

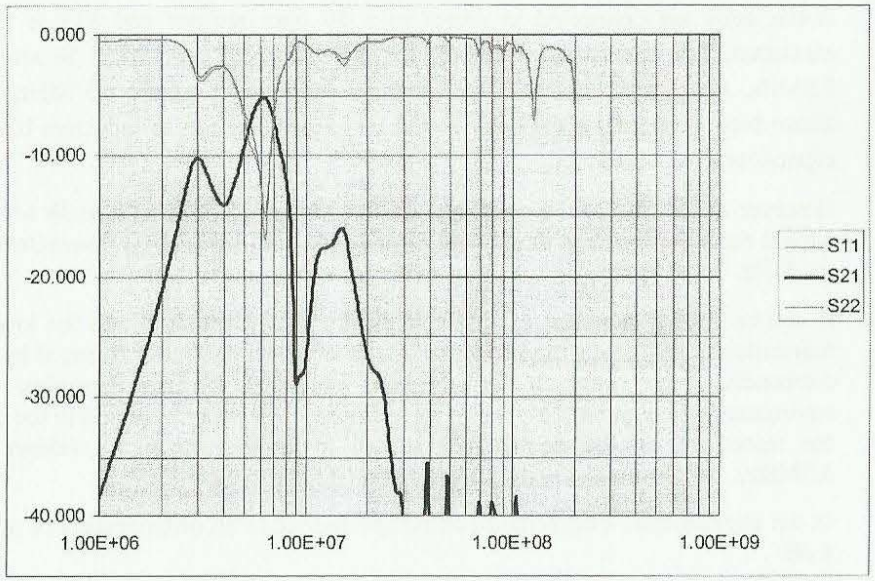



Fig. 6.6: *Measured results for d = 10 m, L = 10 m, no earth.*

The antenna distance d has practically no influence on the transmission characteristics, unless it is extremely close i.e. under around 0.5m. It was not found that the amplitude is dependent on antenna distance.

## 6.6 Dependence on the base point connecting lead

The properties of the connecting cable directly affect the transmission characteristics. The higher the impedance of the connecting line, the higher the attenuation of the path. The way in which the impedance is generated (inductive, capacitive or resistive) is of little importance here.

Compared to wavelength long connection lines, high frequency effects, such as rejection and cancellation, are often observed. For example if two connection lines with different lengths are used, in which the propagation time difference $\lambda/2$ is exactly the transmission frequency, the entire transmission stops (a mutual cancellation of the two partial currents).



If an earth connection is inserted parallel to the connection line, or if the connection is realised through the earth itself then this results in an increased attenuation of the transmission line of around 15 dB.

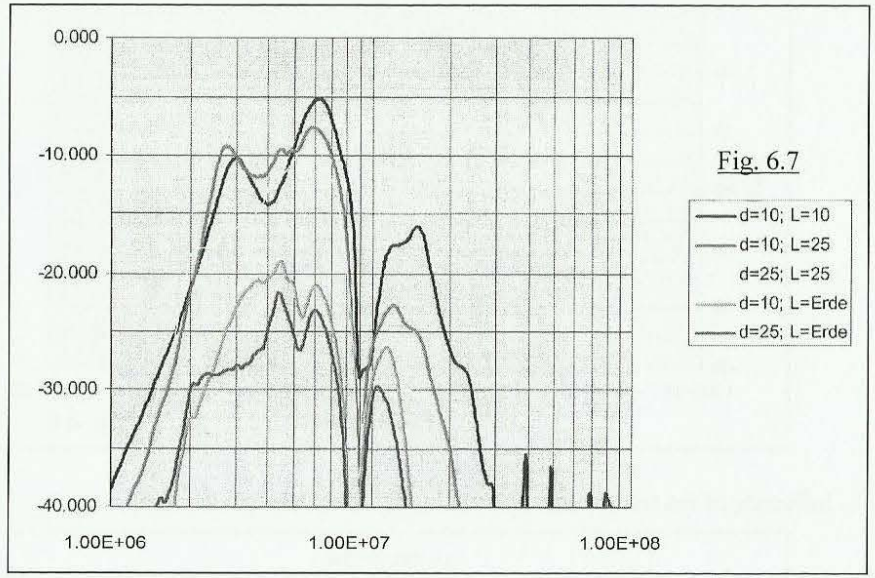



Fig. 6.7

The connecting line between the antenna base points should not be understood as a component of the resonant circuits involved in the transfer (no frequency shifts). But it forms the coupling medium between the resonant circuits. The shorter and more direct the coupling, the lower the losses.

On the one hand the earth can provide a medium for a transmission, however on the other hand its considerable capacitance represents an additional sink for its current coupling.

## 6.7 Influence of the Power Transmitted

To test the influence of the transmission power, a transmission path with different powers between 0.001 W and 10 W was measured.

This transmission path has antenna spacing of 10 m and an earth connection cable of 10 m. The coupling resonant circuit has been optimized here using external parallel capacitance.

Transmission Performance:

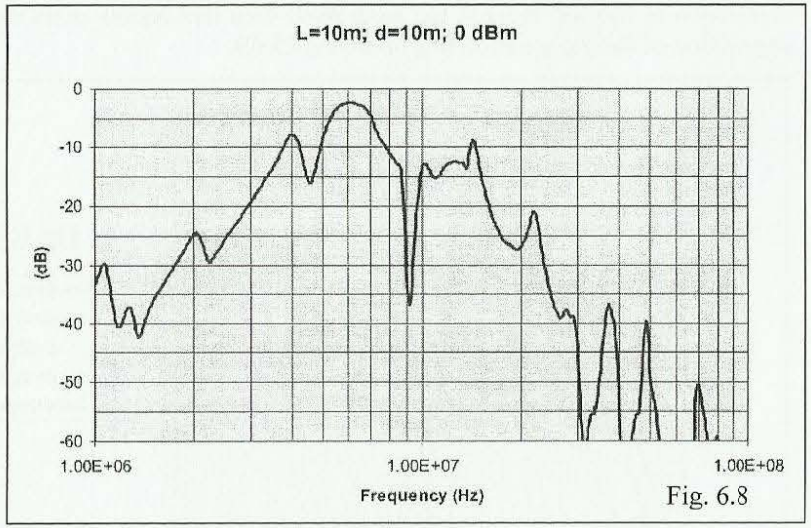



Fig. 6.8

Influence of the transmission power on the minimum attenuation:

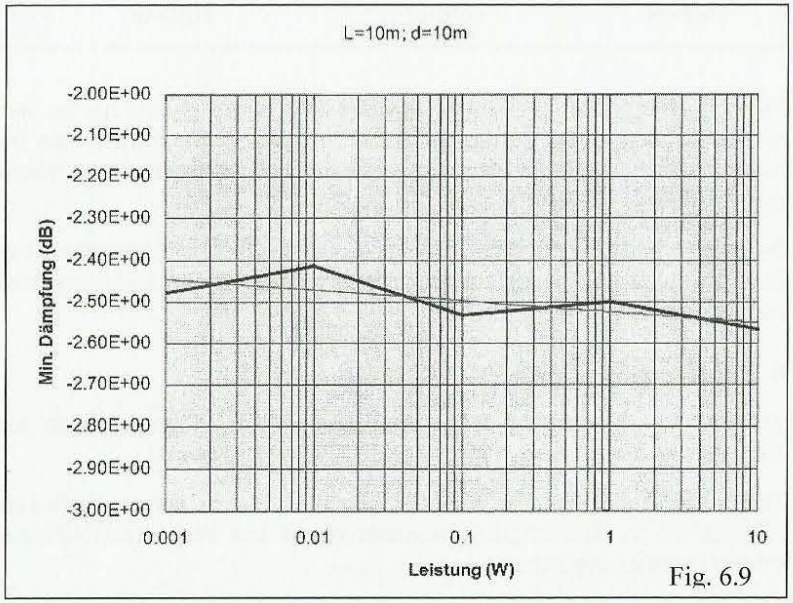



Fig. 6.9

The minimum attenuation tends to decrease with increasing transmission power. This can be explained by heating in the connecting line and a corresponding increase in the resistance.



## 6.8 Interpretation of the Transmission Path

All observations and results made are consistent with the explanation that the Tesla coil is operated as a Lambda/4 Monopole, which is excited to resonance by the feed in coil.
According to classical antenna theory, a standing wave is excited onto a monopole at resonance. At the top of the antennas (here at the ball) the E field is at a maximum and the H field is at a minimum. At the base point of the antennas this is reversed, i.e. the E field is at a minimum and the H field is at a maximum.

If now such a monopole is excited by a separate coupled coil, this antenna at its base point will behave like a charge pump i.e. pumping current onto a connection line.

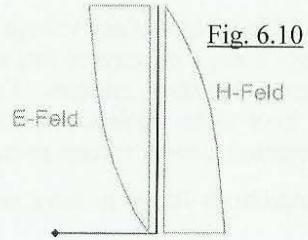



Fig. 6.10

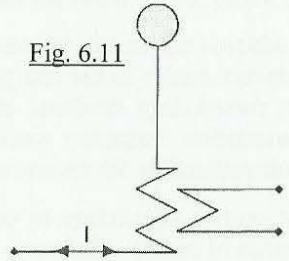


Fig. 6.11

If at the other end of the line there is the same kind of antenna, then it will in turn be excited to resonance, and a signal can be decoupled from the coupling coil.

This process can be compared with two water vessels connected with a line [pipe]. If there is a change in the level of water in one of the vessels, then this also affects the water level in the connected vessel.

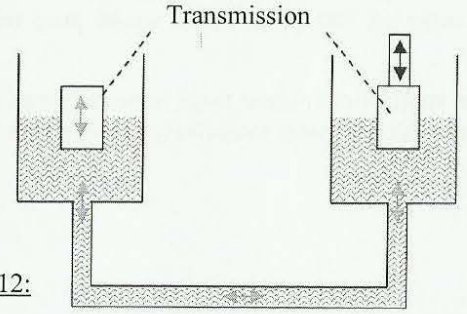



Fig. 6.12:

If such a system is connected to an even bigger compensating vessel (earth), then the transmitted power will of course decrease accordingly.

## 6.9 Application Possibilities / Potential Improvements

According to the above interpretation the transmission of electrical power takes place through the connection path between the base points of the antennas. No power is transmitted through the air. Yes, all power emitted by the antenna system is lost in the actual transmission. Therefore an ideal resonance system for this application would radiate as little power as possible. Most improvements to this would be possible. An adjustment to the resonance characteristics of the coupling coil would lead to an improvement in efficiency, as mentioned previously.

Since, in this system, only one connection lead is needed, instead of two as in a normal circuit, theoretically the loss of energy transferred should actually be less (no losses in the rest of the circuit is required).

In addition the energy transfer should take place without any voltage, as there is a current source in the charge pump. Only it must be ensured that no losses in the surrounding medium can be induced by eddy currents. For this the transmission frequency would probably have to be made too small that to be made realised by the resonators. (space required, power, voltage strength etc.)

But such a connection to the energy transfer is likely to have no earth, for reasons of energy efficiency

When data is transmitted, under this principle, a modulation of a carrier wave must always be used. When compared to existing base band data transmission technology the achievable data rate is low.

Accordingly, this technology is mainly suited for use in applications with small bandwidth requirements (language, control, etc.). In this short wave system data rates of more than 10 kBit/s are barely conceivable. For use in multimedia applications (20-100 Mbit/s) the size of mechanical structures would have to be reduced by an order of 100-1000. This would pose technical problems for production.

It is suitable for applications where there is already earth connection, with no external antennas, which requires a relatively low data rate.



Examples of this could be :

- Train radio or train protection (on the rail)
- Cable car communication (via the supporting cable)
- Submarine radio as a replacement of the ELF system (salt water as medium)
- Building automation (via PE conductor) as a replacement power line communications
- Emergency radio systems for government / military / mines (no external antennas)

## 6.10 Interpretation:

The transmission system examined is an interesting phenomenon of electrical engineering (single wire data and energy transmission). There is potential for improvement of the current test set up, so that it has less transmission loss. Depending on the application further steps need to be taken to explore different aspects and limitations of the setup.

Existing HF and electrical technologies are sufficient to explain the results and observations. An energy transfer via scalar waves through the air could not be detected in these experiments. Whether the transmission through the conductive pathway could be considered as a scalar wave could be discussed."

---

This was the detailed report of a Swiss HF engineer. The report offers a high level of quality and expertise.

Given this I regret all the more that no additional energy could be harvested. Maybe a personal visit should have taken place at the right time, as with the University of Bundeswehr. Then perhaps now I could be reporting a proof, even if, as is so often is the case, that the OUE was not added at the end.

For a single correctly performed OUE measurement can decompose the whole elegant report to ashes if the statements of the textbooks are no longer effective.

# V.

## Experiments concerning the „earthing connection“

The Swiss report is not the only one which picks up the transmission characteristics of the connecting line between the transmitter and receiver as a main point. To my astonishment it is often perceived as a disadvantage that the return current flows here. Perhaps only false expectations lead to a feeling of deception or disappointment. Here people only need to pull out the plug of the earth connection to see the receiver swich off.

It is true that the "earthing" is an essential part of every Tesla transmission, something which Tesla himself always emphasised. Therefore it is worthwhile devoting a separate chapter to this important theme.

In 2003 a teacher reported his experiences.

### 1. From the High School Class
of the Indipendent Waldorf School.

„ Dear Dr. Meyl! After obtaining your experiment kit for scalar waves, an advanced group of students took made several measurements, following instructions from your book "Skalarwellentechnik". We were able to confirm your statements from this book.

The group also took the equipment set to the Institute of HF-physics at the Technical University. However there there was crticism that what you called an earth line was actually a galvanic-inductive coupling. Measurements taken with a probe and oscilloscope demonstrated this.

Diagram A also shows my opinion that when the receiver is in resonance, in the neutral line maximum AC voltage builds up, and minimum current flows.

Diagram B shows distance measurements (10-40cm) without this neutral line. Surprisingly at the receiver opposite the transmitter a 7 fold increase in voltage appears. Initially this ratio even increases with distance.

I have some experience with HF experiments, Decimeter wave transmitters (self-built), and know how many "unthinkables" may occur during the tests.



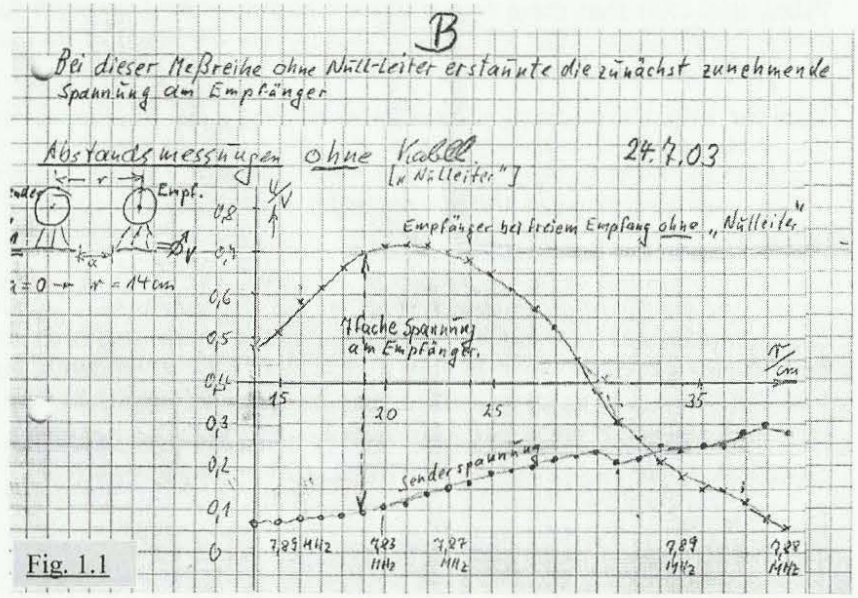


Fig. 1.1

My question is: How do you assess the claim that the neutral line is a galvanic-inductive coupling and is thus able to bridge larger distances? On 30th August I will demonstrate the equipment at a conference. There the neutral line may be a bone of contention for my colleagues. Please support me with an arguement for your interpretation."

I answered the physics teacher saying:

*Thank you for your letter from 25.07.03, and especially your interest in our work. If the earth wire is criticised by the HF institute then this only shows that the set up has not been properly understood there. Presumably there people only know the Hertzian wave, and everything else is considered incorrect from the outset...*
*The earth conductor is not a defect but an integral part of the system. Tesla demonstrated the significance of the earth conductor and you can also see this for yourself: pull the earth wire out then nothing arrives at the receiver.*
*I explain the transmission system with an LC resonant circuit, which means that the full current, which oscillates back and forth between the two capacitor electrodes, must flow through the return cable. The reason I call this cable the earth wire is because Tesla introduced this term, and had evidently worked with ground spikes.*

*However I only work with 2 volts generator voltage (instead of 60,000 Volts), and with that there is usually not sufficient field strength for a usable transmission. But it is best if you try the influence of the earth wire for yourself.*

*Even the longitudinal field propagation is nothing new. In any capacitor the fields run from one electrode to the other, i.e. in the direction of propagation. What is new and largely unknown is the wave character, which only appears when the two capacitor electrodes are separated by half a wavelength or more.*

*So far that has not been the subject of research. The distance between capacitors is usually so small that it can be calculated with an approximation of scalar waves. So the aim of the experiment is to make the scalar waves present in every capacitor into a research topic, because the scalar wave is interesting and has enormous potential for use, which could go unnoticed by people.*

*I wish you much success at the conference with the equipment!*

*Kind Regards*
*Konstantin Meyl,*
*Villingen, August 11, 2003*

Alas, whether my response provided the support hoped for I do not know.

On curve A a measurement at the DC connectors in the frequency range 4-8 MHz can be omitted in favour of the measurment curves shown in the last report. Here the results repeat themselves.

Regarding the curve B shown, more detailed diagrams exist for distances 0 - 80m, carried out by a professor, a laboratory director and a group of students in Upper Austria.

This engaged group of Tesla researchers formed after they had come by bus to Furtwangen in the Black Forest to attend my lectures. After this they were all "electrified."

The final papers they produced were, for a time, available on the internet. Here is the report from the investivation on the earth line from 15.05.2004.

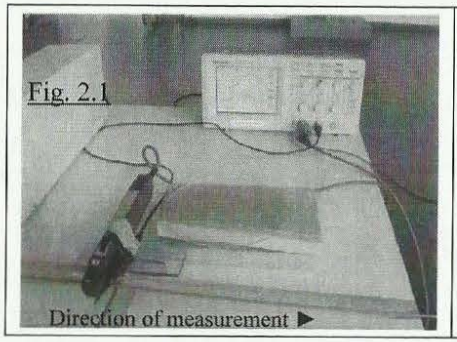


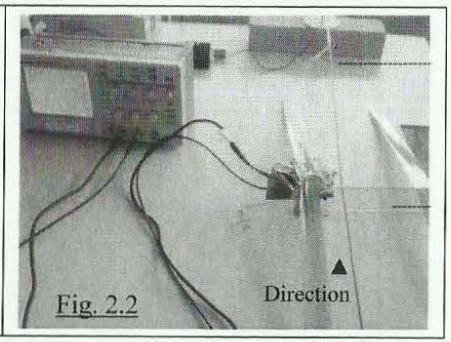
## 2. From the Report of the Laboratory test "Earthing-Line"

The report consists mainly of tables and diagrams, which I would like to summarise and comment on.

### 2.1 Current and field measurement along the earth line: L = 80 m

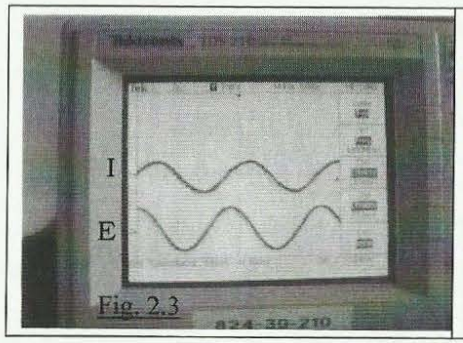
A look at the laboratory shows the set up of the experiment, with the taut "earth line."

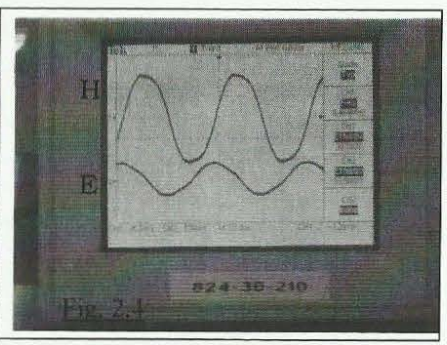



The left figure shows the current measurement along the 80 m long line. The right figure shows the field measurement
(a1 = 32 mm, a2 = 60 mm, a3 = 250 mm)

Measurements are taken with the Tektonix TDS 210 oscilloscope.




In the left figure the upper curve represents the current strength I, the lower curve represents the electric field strength E. In the right figure the upper curve represents the magnetic field H, and the lower curve again represents the electrical field strength E.

**2.2 Measurement Diagrams** at distance x [m] from transmitter

I would like to pass over the numerical tables and go straight to the graphic representation of these values.

Represented:
Current strength I (x), electrical field strength E (x) and phase angle, each as a function of distance x [m].

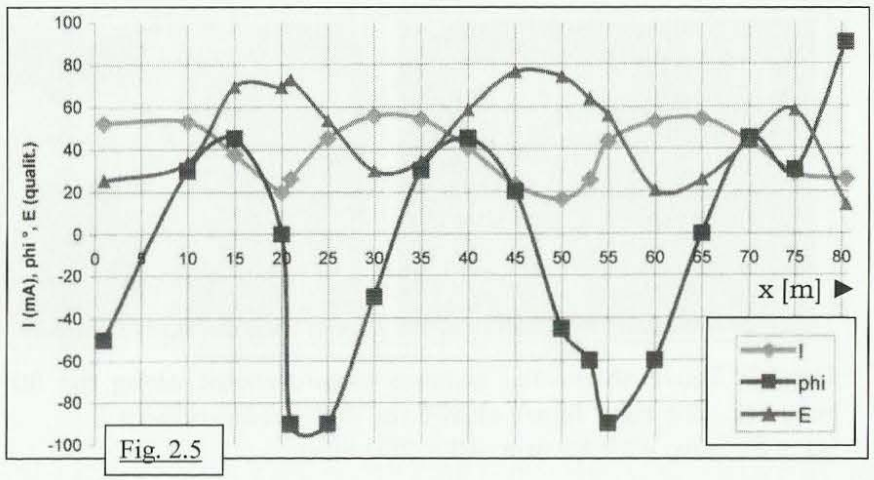



Fig. 2.5

The next graph shows the magnetic field strength H, measured at different distances [a] from the earth wire.

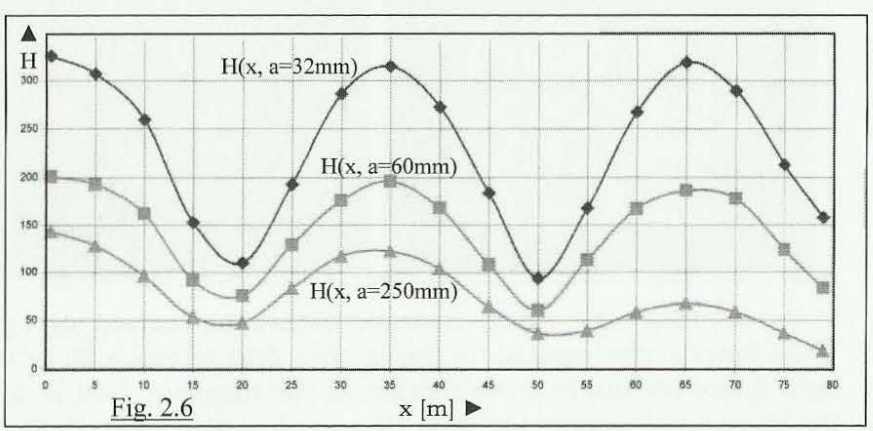



Fig. 2.6



This time the electrical field strength E is measured over the earth line length x, and perpendicular to the earth line.

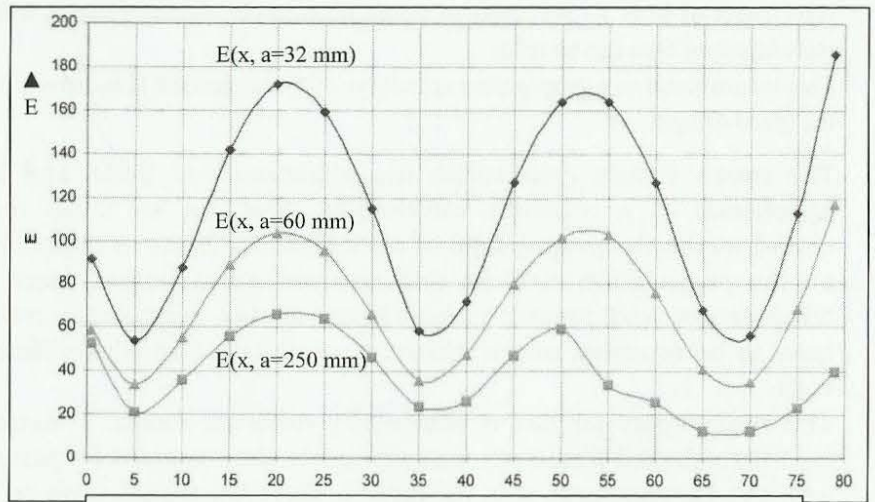



Fig. 2.7: *The Electrical Field Strength Depending on Distance*

The phase angle between the H and E fields is nuch less dependent on the distance [a]. Again here the measurement took place at a frequency of f = 4.4MHz as φ(x):

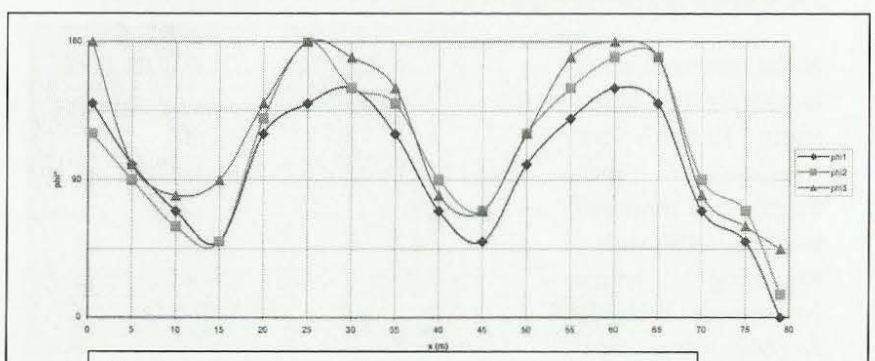


Fig. 2.8: *The phase angle between the H and E field.*

It raises the question of what the coil length would include "*The flat coil has an outer diameter of 105mm and an inner diameter of 4mm. For the spiral coil this means a total length of 12 m.*" (Note these are not coils from the kit).

### 2.3 Findings on the propagation speed

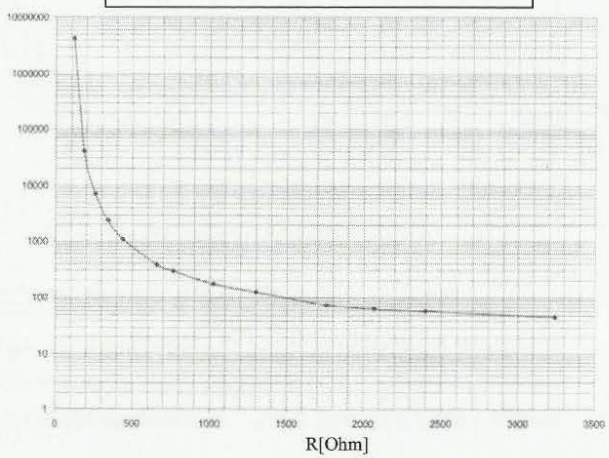
A frequency of 4.4MHz and propagation at the speed of light results in a wavelength of 68m. At the nodes of E and H, however, standing waves with a wavelength of 60m can be read.
This would result in a propagation speed ($v = f \cdot \lambda$) around 10% slower than the speed of light.

The result clearly contradicts the statements of Tesla and his hypothesis of a constant wavelength. Now, as we know from sound waves the propagation of a longitudinal wave is dependent on the propagation medium and environmental factors, such as temperature and pressure etc. Therefore this experiment would have to be repeated under different conditions and with different coils.
The next report (3) has a completely different result. I suspect that the selected frequency was alongside the resonant frequency, and the Herzian part was measured. But this would have to be checked.
This report concludes with a power measurement of a load resistance of the receiver coil. It appears here in the original.

### 2.4 Power Measurements at the homemade Receiver

At the receiver 2 small incandescent lamps (each 500mW) are connected, at which the power is measured using an LDR with a measuring bridge [wheatstone bridge?]. A 600 Ohm lamp resistance gives a total power of 1W.

Fig. 2.9: *Power P = f(R) for LDR*






## 3. Experiment, Subject: Wavelength measurement and propagation speed.

**3.1 People involved:** Dr. Michael K. (PhD in el. engineering)

**3.2 Date and Location:** Munich, Aug.23 - Sept.3, 2001

### 3.3 Expectation according to the Scalar Wave Theory
(of Prof. Dr.-Ing. Konstantin Meyl)

In the experiment kit the fourth experiment describes the wave propagation with speed faster than the speed of light. In this experiment the propagation speed of scalar waves is determined mathmatically, based on the hertzian wave (with the speed of light). The higher frequency of scalar waves, in comparison to hertzian waves, results in a propagation speed of faster than the speed of light. However this only works under the assumption that hertzian waves and scalar waves have the same wavelength. In this experiment an attempt is made to find the length of the scalar wave by determining the maximum and minimum values of a longitudinal standing wave. This will enable conclusions to be drawn about propagation speed.

### 3.4 Experimental Set-up

The experiment kit was used with each of the same coils (type A, B and C) on the transmitter and receiver side. The DC voltage at the receiver coil was measured with a commercially available voltage meter.

- Jumper on the receiver side: DC
- Jumper on the transmitter side: LED
- Number of windings of the primary coil: 5
- Waveform: sinusoidal

50 m and 100 m cables were used as earth wires. Two 12V batteries were used to power the generator.

For a comparison measurement, to minimise the burden on the receiver, the receiver coil (type A) was modified. The capacitors provided for measuring DC voltage and the 100 ohm resistor (R) were removed. In this experiment primary coils with 4 and 5 windings were also measured, but this provided no significant differences.

### 3.5 Experimental Procedure

The experiments were carried out at two different open air locations. After adjusting the respective resonance frequency, then, with the receiver and with connected measuring device in the hand, distances of 50 and 100m from the transmitter, and the respective minimums and maximums of the voltage curve were marked on the floor. To check the influence of the spherical capacitor measurements were taken both with and without the ball on the transmitter and receiver side.

### 3.6 Evaluation

The voltage curves measured show clear minimums and maximums, although the voltage readings were sometimes very low. The values of successive maximums appear to decrease slightly, but the effect could not be determined exactly. (v shows the propagation speed calculated from the wavelength and frequency.)

| *Earth Line 50m* | | | | |
|---|---|---|---|---|
| **Coil** | **f [MHz]** | **λ [m]** | **v [m/s]** | **Voltage** |
| **Type B** | | | | |
| with Ball | 11,5 | 30 | $345 \cdot 10^6$ | 0 - 5mV |
| without Ball | - | - | - | |
| **Type A** | | | | |
| with Ball | 7,8 | 46 | $359 \cdot 10^6$ | 0 - 10mV |
| without Ball | 7,4 | 46 | $340 \cdot 10^6$ | 0 - 10mV |
| with Ball (without R) | 6,7 | 48 | $322 \cdot 10^6$ | 0,2 - 1V |
| without Ball (without R) | 10,5 | 32 | $336 \cdot 10^6$ | 0.03 - 0,3V |
| **Type C** | | | | |
| with Ball | 4 | 76 | $304 \cdot 10^6$ | 1 - 12mV |
| without Ball | 4,3 | 64 | $275 \cdot 10^6$ | 5 - 60mV |
| | 8,9 | 40 | $356 \cdot 10^6$ | 0 - 10mV |
| ***Earth Line 100m*** | | | | |
| | **f [MHz]** | **λ [m]** | **v [m/s]** | **Voltage** |
| **Type A** | | | | |
| with Ball | 5,9 | 58 | $342 \cdot 10^6$ | 0 - 12mV |
| without Ball | 7,5 | 46 | $345 \cdot 10^6$ | 0 - 20mV |



The Hertzian wave could not be identified in all cases (possibly due to the long length of the earth wire). After a loss at the transmitter, the voltage curve remained almost constant from 2 to 50m."

At the type A coil with the middle wire length with a 50m [earth] line, and with a ball antenna a resonant frequency of 4.6MHz (instead of 7.8) could be detected.

According to Tesla, who calculated the superluminal speed of the scalar wave from the frequency ratio, there would be a result of 1.7 times c. However the measured wavelength multiplied by by the frequency gives a speed of only 1.2 times the speed of light, which is in itself already spectacular enough.
It is probably reasonable to conclude that the wavelength changes in the transition from transversal to longitudinal, and it is less accurate to assume it is constant.
If values, with the same set up, only minus the load resistor, were compared, then the frequency ratio would be lower (at (6,7 MHz/5,2 MHz) = 1,3). However the measured values give a lower factor (3.22/3). This moves between 1.1 and 1.3 [times the speed of light], with one one exception always has a speed faster than light. The former Siemens employee carefully came to the following conclusion.

### 3.7 Conclusions

"The measurements taken only represent an indication of the aim, which is to understand the standing wave characteristics of the scalar waves. This is reproducable and feasible without any major difficulties. From the wavelength and frequency it is clear to see a speed faster than light, even if not to the extent calculated with reference to the Hertzian wave. Astonishingly the transfer also works without balls. This does not appear to have an effect on the transfer speed. The HF influences, especially the earth connection, make all the measurements very difficult to take. The first set of measurments were attempted with a 200m [earth] wire, but even the most effective inductance did not yield any useable results. There is still a question over the behaviour of the herzian wave. As expected no distinct standng waves could be detected, but the voltage did drop significantly at greater distances. Here it seems that a part of the scalar wave (only radiation) participates as a underlying effect".

**3.8 Apparatus:** The experiment kit from the shop of the First Transfer Center of Scalar Wave Technology (www.etzs.de).

## 4. Report from Austria on Energy Transfer

Again we come to the tesla researchers from Austria, who unfortunately, with their home made coil, could not attain speeds faster than light and apparently could not reproduce any scalar wave effects. In their set up type C coils were used. They were some of the first to take up my research and thus have more experience than most.

Because of our good cooperation I had invited them for a lecture at my stand at the *Mannheimer Maimarkt* in 2009, where the energy transfer path for 300 watts was demonstrated in action. The result was a TV recording and the following summary report:

### 4.1 Report on wireless transmission of Energy (Mannheim 2009)

"In our previous experiments we started from a Tesla experiment at Colorado Springs, in which an energy transfer was carried out with 10kW over a distance of 42km. The frequency is supposed to vary between 100 and 400 kHz (Fig. 4.1).

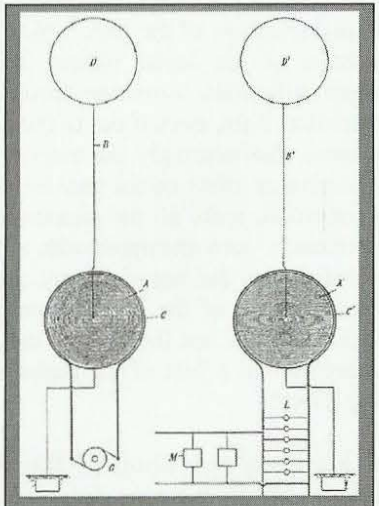


Fig. 4.2 *Tesla's-Patent 1900*

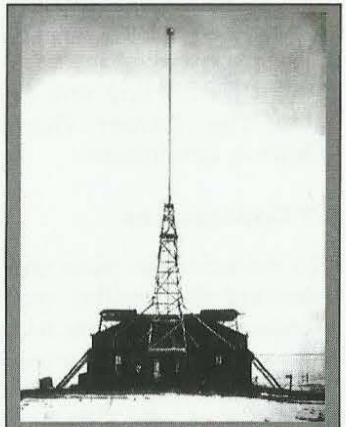


Fig. 4.1: *Magnifying Transmitter in Colorado Springs*

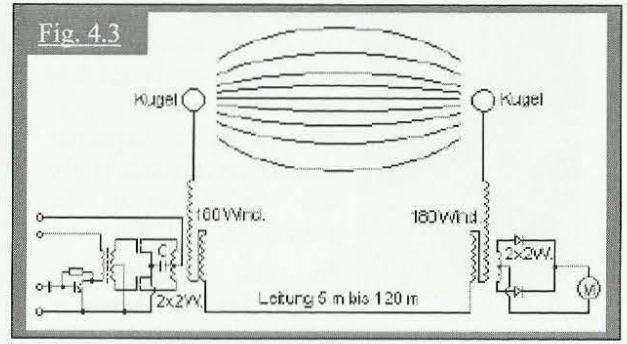
The transmitter and receiver were earthed on one side, so that an energy transfer had to take place between the balls. Prof. Konstantin Meyl, in his experiments, books and lectures on this supposed principle [3], also points out and explains the energy transfer by means of scalar waves or neutrino power.



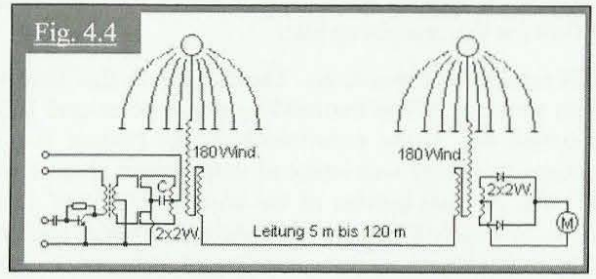
### 4.2 Experiment set up for wireless energy transfer.

In all of our experiments, and those of Dr. Meyl, the ends of the spiral coils had to be connected with a wire, and could not be earthed, as in Tesla's experiments.

In 2007 at a conference at the Vienna Natural History Museum power of up to 100 watts was transmitted with the adjacent circuit [fig 4.3].




A participant in the conference pointed out an interesting varient function. In his opinion the energy transfer does not take place between the balls, but from the transmitter and receiver balls to the ground.




The physical principle would be that the transmission coil and ball, and the receiver coil and ball form a series resonant circuit. The two resonant circuits are connected on one side with a wire connection, and on the other side they are connected to the earth via the ball capicitance.

The adjacent circuit [fig4.5] is flipped vertically as it is common in electrical engineering to show the earth potential underneath the circuit. The capacitors below correspond to the ball capacitance to the earth.


Our transmitter and receiver elements were constructed the same, as can be seen in the figure below. Underneath the spiral coil with 100 winds, or a double coil with 180 winds, a rod (telescopic antenna) was attached to the the ball. Under the spiral coil there are the coupling and decoupling coils on an acrylic ring.

4.6

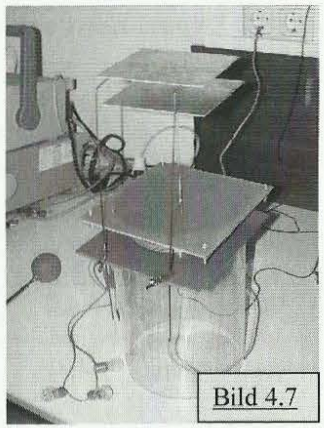


Bild 4.7

In the figure to the right [4.7] it can be seen that the ball from fig. 4.6 has been replaced by a printed circuit board, and above this circuit board another earthed circuit board has been attached. The capicitance of this air capacitor roughly corresponds to the ball capicitance to the ground (some 10pF).

So the circuit was constructed as shown in the last circuit diagram. The same good transfer values were achieved as in the setup with balls (80% efficiency). Therefore the assumption has been confirmed and the energy transfer takes place over two seriers resonant circuits in resonance, which are connected with a wire. With a series resonant circuit usually a higher current flows in the connecting line.

This connection line still raised some questions. The current in this line was measured with a clamp on ammeter. When transmitting power of around 100W there were currents of almost 4A. In the experiments in the Natural History Museum a part of this connecting wire was replaced with copper enamel wire with a diameter of 0.063mm. A cross section of the wire of 0.003mm$^2$ had a current of 2A, which results in a current density of 666A/mm$^2$. Copper windings are expected to experience maximum current densities of between 2 and 3 A/mm$^2$, and in electircal installations a maximum current density of 9 A/mm$^2$. The values measured were 100 times this and so the thin copper enamel wire melted".

(Note: Tesla had already demonstrated to his lab visitors why in the single wire transfer there was much less to no loss.)

### 4.3 Checking the current measurement

"We suspect that the "actual" current (by electrons) is much lower, and that the current clamp, which measures using the magnetic effect of the current, is influenced by a magnetic effect unknown to us. For accurate determination of the current the current comparison method was used. A resistor (R2) with 38.2 Ohm resistance was swiched on in the connecting line, and a second resistor (R1) was driven with variable DC voltage (U=).



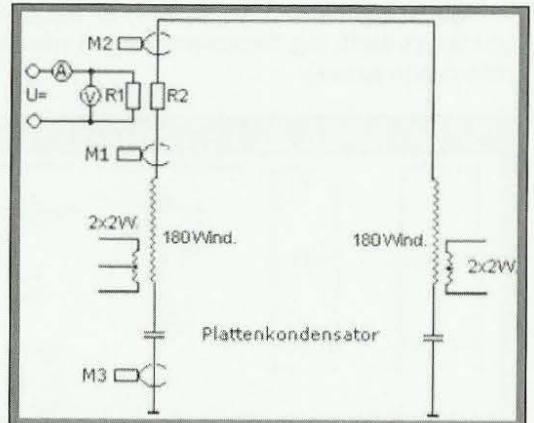



Fig. 4.8: *Equivalent Replacement Model*

The temperatures of the resistors (equivalent to power lost) were measured with a thermal imaging camera.
According to $P = I^2 \times R$, when R and P are the same, then the current I must also be the same.

The DC voltage source (U=) was controlled so that the temperature of the resistor R1 was the same as the temperature of R2.
Therefore the direct current set must be the same as the HF current in the connecting line. The HF current was also measured at other points (M1, M2, M3), and at all points it was the same.

The current measurement in which the copper enamel wire with 0.063mm diameter actually melted shows that this wire starts to glow at around 3.8A, and when the current is raised slightly it melts. This value was considered unexpectedly high by many of our technicians.

Finding 1: The HF current is high and there are no unknown magnetic effects.

Finding 2: The connecting line cannot be earthed or replaced by two earth connections, as this would mean a short circuit of the series resonant circuit, and then no transfers would be possible. The voltage on the connection line is small, since the voltages at the coil and the capacitor are very high, however they are directed opposite to each other and nearly cancel each other out.

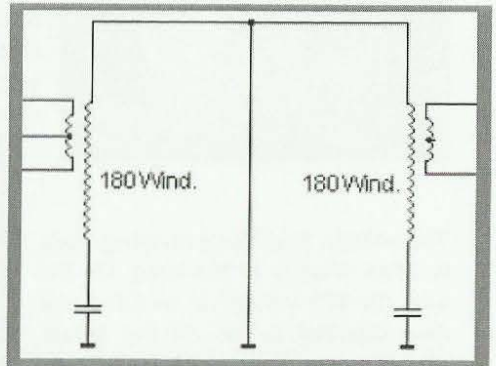



Fig. 4.9: *Simulated image of the flat coils used in Austria*

Finding 3: There is only a HF high voltage field from the balls to the ground. The high field strength will light things itself, (eg. flourescent lamps) when they are kept in the field (impact ionization in gasses).

In resonant circuits the AC resistance $X_C$ :

$X_C = 1/\omega C$

and the inductance $X_L$

$X_L = \omega L$

are the same. The voltages are also the same, but are opposed.

In series circuits elements of the same type can be grouped together.

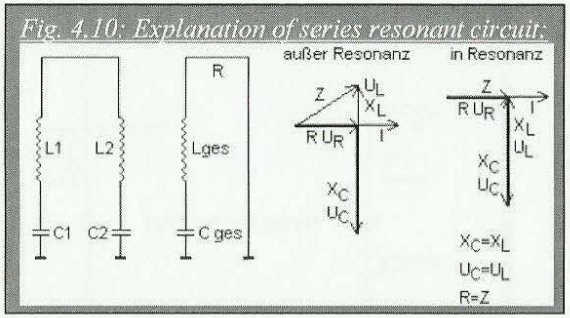


*Fig. 4.10: Explanation of series resonant circuit:*

Therefore $L_{ges}$ is the sum of $L_1$ and $L_2$, and $C_{ges}$ is the sum of $C_1$ und $C_2$. Since the current is only limited by the resistance of the wires, and this is very small in comparison to the AC resistance, a larger current flows. In the experiments the voltage at the AC resistor was some 10,000 volts.

## 4.4 Energy Transfer on a Boat and a float in a water tank.


Fig. 4.11

Since 2003 we have had a model in operation in the HTL, in which there is a boat and a float with a lamp attached to it in a water tank with a diameter of 1.6m. The lamp is supplied with energy. On the boat and the float are the same resonant elements, consisting of a spiral coil and ball. On the bottom of the spiral coil are 2 windings as a decoupling coil.

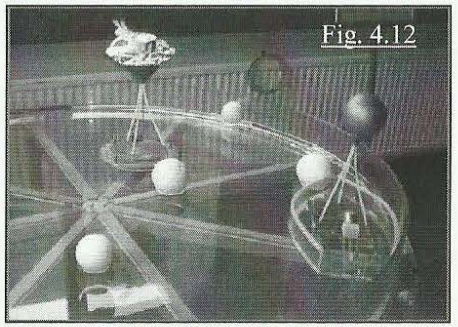


Fig. 4.12

The voltage from these coupling coils is taken directly to the lamp. On the boat the HF voltage is rectified and then supplied to the driving motor. The Styropor balls in the pool only serve to deflect the path of the boat.



## 4.5 Evaluation

A resonant element, the same as those in the boat and the float, is used as a transmitter, and is placed 25m away in another room. There is then a connecting line, which runs from the tranmitting element to the eight-legged tube frame under the water tank.

Here a wireless energy transfer really takes place, as there is no galvanic connection between the transmitting element and the receivers. The energy transfer takes place capacitively from the tube frame, through the 2cm thick bottom plate of the basin, and from the foam under the bottom plate through the coloured water. From the water there is a connection to the coil through a sheet of stainless steel under the boat and the float.

The transmitting element was located in an adjoining room.
The technical data for the transmission is: Frequency: 3,3 MHz
Spiral Coil: 100 windings, 12 cm diameter, (Power-Kit, Typ C)
Spherical antenna: plastic ball coated with conductive paint
Distance transmitter pool: 25 m
Transmitter power: 5 W
Power of the boat: 2-3 W
Power of the lamp: 1-2 W

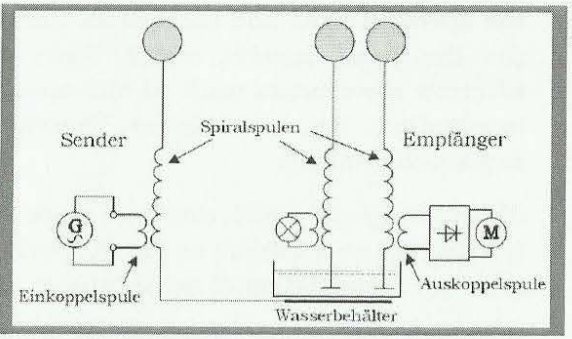


*Fig. 4.13: This water basin with boat and float was in continous operation in HTL Wels from 2003 until 2008.*

The capacitive coupling in the water basin is shown in the circuit diagram. There is no galvanic connection from the transmitter to the receivers.

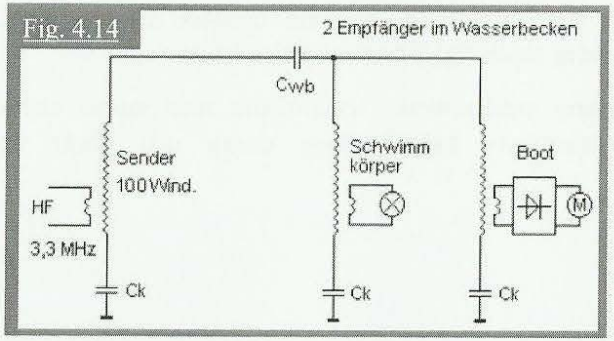


Fig. 4.14

The circuit diagram to the left shows the same working as our present knowledge shows" (fig. 4.14).

$C_{wb}$ is the capacitive coupling from the tube frame to the water.

$C_k$ is the capacity of the balls to the ground.

### 4.6 Comments (Meyl)

The concept of a single wire transmission through the earth line is at first plausible. Eventually this technology will also be counted as an invention of Nikola Tesla. Low conduction losses are seen in both systems

It is certain that we have here a resonant circuit, which requires two different connections, which broadly speaking run over two different media: on the way out it runs through the air, possibly as a scalar wave, which can barely be detected using measuring techniques, the return is connected with a cable, or alternatively a pool of water. Here current and field strength measurements can be made, which show the return line to be an air route.

The measured wavelength of the returning current and field can catch up with the propagation speed, which in all cases is around the speed of light and sometimes faster, so in no case can it be the the head current which flows through the earth cable. Electron movements such as the ones which took place are also longitudinal, but much slower. Therefore they are ruled out as an explanatory model.

Alternatively we could continue work with the model of stripline technology, as students at the TU Berlin had already suggested at the final presentation of my lecture in 2001.

Stripline technology however is only described as having a maximum of c. If the field of the return line is faster than the speed of light then do we have to expand the model? Is the return line impressed by the mirror image field created by the scalar waves travelling faster than light between the balls.

There are still many unanswered questions and none should make hasty assessments before they carry out their own experiments.



The earth has a large and sometimes also disturbing influence. For example when the measuring devices are connected to the earth. However such problems can easily be avoided by switching to a battery operated setup (as described in section 3).

Questions remain about the field distribution of the ball antenna. Do the field lines now run from ball to ball, or do they each run to the earth? Presumably the seek out the shortest path. In the gymnasium of the Austrian HTL the transmission unit was raised, for inspection purposes, until the distance to the floor was larger than half the distance between the balls. The behaviour of the transmission line was measured and compared again, but it had not changed in any way.

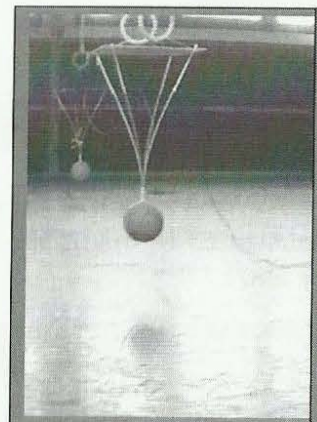


Fig. 4.15 *Gymnasium*

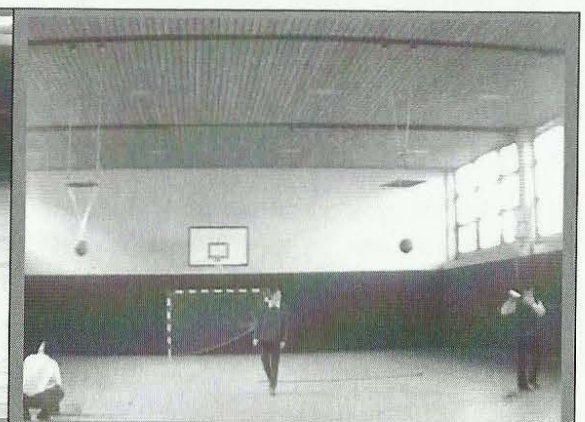


Fig 4.16 *With a Large Distance to the Ground*

This result surprised me a little as I saw that it makes little difference whether the electric field lines run directly from one ball to the other, or first make a detour to the earth and then run to the other ball. Finally in both cases propagation occurs longitudinally as a scalar wave. And to demonstrate this is the goal we arrive at.

### 4.7 Circuitry Used

Below is the circuit diagram, which was used in the experiment into energy transfer.

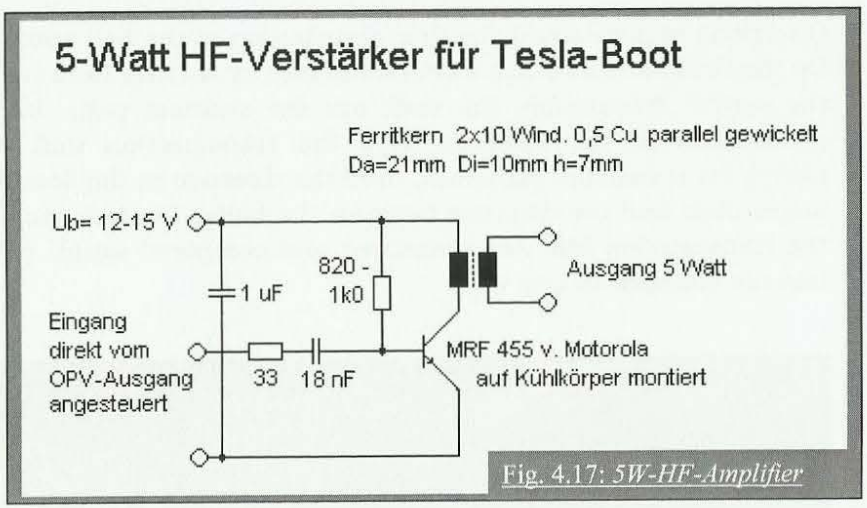



Fig. 4.17: *5W-HF-Amplifier*

For higher powers of up to 400 watts a push-pull circuit is used, which was shown as a poster and demonstrated in operation at my stand at the first TZS in Mannheim in 2009.

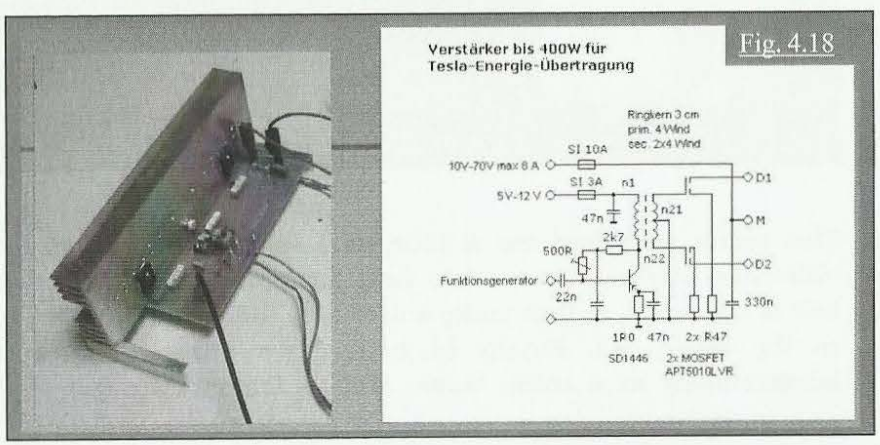



Fig. 4.18



Here the complete circuit is shown.

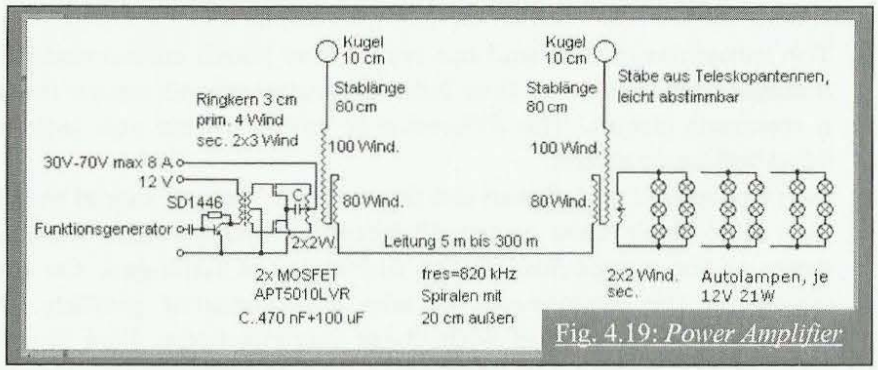



Fig. 4.19: *Power Amplifier*

In the meantime the circuit has found its way onto the internet and a detailed construction manual can be found at
de.scribd.com/doc/87451338/Bauanleitung-Willmann-02-08

Measured values are also provided, which you can use for comparison with your own projects (Fig. 4.20 underneath).

| | | Sender | | Synchronleitung | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Verstärker | | | Gen | nach Sender | | | vor Empfänger | | | | | | DC-HF | | Ab |
| U= | I= | P= | f | Phi | Uosz | I~ | Phi | Uosz | I~ | U~ | I~ | P~ | | Ku | st |
| V | A | W | kHz | ° | Uss | A~ | ° | Uss | A~ | V | A | W | % | cm | cm |
| 29,5 | 2,6 | 76,7 | 748 | | | 0 | | | 0 | 35,09 | 1,754 | 61,55 | **80,24** | 10 | 94 |
| 29,5 | 2,7 | 79,65 | 776 | | | 0 | | | 0 | 35,09 | 1,754 | 61,55 | **77,27** | 10 | 75 |
| 29,5 | 2,5 | 73,75 | 810 | | | 0 | | | 0 | 33,33 | 1,754 | 58,46 | **79,27** | 10 | 55 |
| 29,5 | 1,8 | 53,1 | 895 | | | 0 | | | 0 | 17,54 | 1,316 | 23,08 | **43,47** | 10 | 33 |
| 29,5 | 3,8 | 112,1 | 880 | | | 0 | | | 0 | 26,32 | 1,579 | 41,56 | **37,07** | 15 | 55 |
| 29,5 | 2,6 | 76,7 | 846 | | | 0 | | | 0 | 29,39 | 1,579 | 46,41 | **60,5** | 6 | 55 |
| 29,5 | 2,7 | 79,65 | 780 | | | 0 | | | 0 | 35,09 | 1,754 | 61,55 | **77,27** | 6 | 94 |
| 29,5 | 2,5 | 73,75 | 815 | | | 0 | | | 0 | 30,7 | 1,754 | 53,85 | **73,01** | keine | 94 |
| 29,5 | 1 | 29,5 | 1079 | | | 0 | | | 0 | 8,772 | 0,877 | 7,693 | **26,08** | keine | 20 |
| 29,5 | 2,7 | 79,65 | 780 | 0 | 0,8 | 3,509 | 45 | 0,6 | 2,632 | 35,09 | 1,754 | 61,55 | **77,27** | 6 | 94 |

As already mentioned, here different spiral coils were used. However their exact dimensions are described, which makes construction easier, if necessary.

# VI.

## Experiments concerning the Transmission Path

The transmission line and the return line (earth connection) form a single unit insofar as they form the outward and return lines of a resonant circuit. The difference is rather where you look and what will be analysed.
I first proposed and discussed the resonant circuit model in 2000 at a SSE conference at the University of Amsterdam (NL), and again at the symposium at the university of Tübingen. On these occasions the experiment kit was demonstrated publicly. You could say it all started with these contributions. Now that we have considerably more experience, looking back is of special concern to me.

1. **Scalar waves, Theory & Experiment** (by Prof.Dr.K. Meyl)
   (Presentation, University of Amsterdam 2000, Printed: JSE [5])

*It will be shown that scalar waves, normally remaining unnoticed, are very interesting in practical use for information and energy technology for reason of their special attributes. The mathematical and physical derivations are supported by practical experiments. The demonstration will show:*

1. *the wireless transmission of electrical energy,*
2. *the reaction of the receiver to the transmitter,*
3. *free energy with an over-unity-effect,*
4. *transmission of scalar waves with 1.5 times the speed of light,*
5. *the inefficiency of a Faraday cage to shield scalar waves.*

### 1.1 Tesla radiation

Here is shown extraordinary science, five experiments, which are incompatible with textbook physics. Following my short lecture I will present you the transmission of longitudinal electric waves.

It is a historical experiment, because already 100 years ago the famous experimental physicist Nikola Tesla has measured the same wave properties, as me. From him stems a patent concerning the wireless transmission of energy (1900)[1]. Since he also had to find out that at the receiver arrives very much more energy, than the transmitter takes up, he spoke of a „Magnifying Transmitter".



By the effect back on the transmitter Tesla sees, if he has found the resonance of the earth and that lies according to his measurement at 12 Hz. Since the Schumann resonance of a wave, which goes with the speed of light, however lies at 7.8 Hz, Tesla comes to the conclusion, that his wave has 1.5 times the speed of light[2].

As founder of the diathermy Tesla already has pointed to the biological effectiveness and to the possible use in medicine. The diathermy of today has nothing to do with the Tesla radiation; it uses the wrong wave and as a consequence hardly has a medical importance.

The discovery of the Tesla radiation is denied and isn't mentioned in the textbooks anymore. For that there are two reasons:

1. No highschool ever has rebuilt a „Magnifying Transmitter". The technology simply was too costly and too expensive. In that way the results have not been reproduced, as it is imperative for an acknowledgement. I have solved this problem by the use of modern electronics, by replacing the spark gap generator with a function generator and the operation with high-tension with 2-4 Volts low-tension. I sell the experiment as a demonstration-set so that it is reproduced as often as possible. It fits in a case and has been sold more than 100 times. Some universities already could confirm the effects. The measured degrees of effectiveness lie between 140 and 1000 percent.

2. The other reason, why this important discovery could fall into oblivion, is to be seen in the missing of a suitable field description. The Maxwell equations in any case only describe transverse waves, for which the field pointers oscillate perpendicular to the direction of propagation.

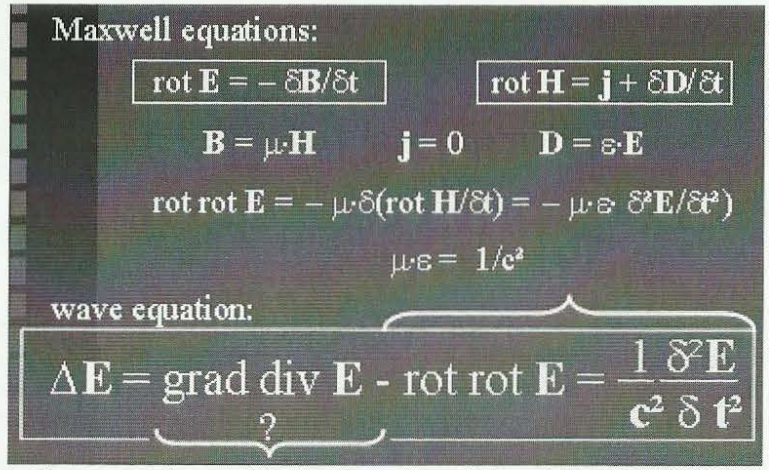



Fig. 1: *The vectorial part of the wave equation (derived from the Maxwell eq.)*

## 1.2 Wave equation

By using the Laplace operator the well-known wave equation, according to the rules of vector analysis, can be taken apart in two parts: in the vectorial part (rot rot **E**), which results from the Maxwell equations and in a scalar part (grad div **E**), according to which the divergence of a field pointer is a scalar. We have to ask ourselves, which properties has this wave part, which founds a scalar wave?

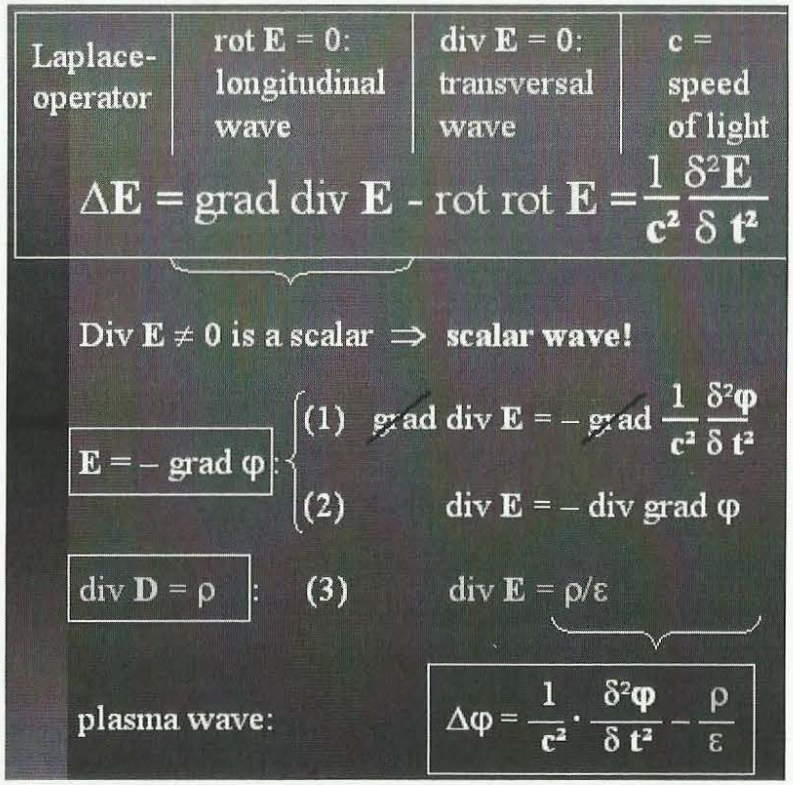



Fig. 2: *The scalar part of the wave equation describes longitudinal electric waves (derivation of plasma waves).*

If we derive the field vector from a scalar potential φ, then this approach immediately leads to an inhomogeneous wave equation, which is called plasma wave. Solutions are known, like the electron plasma waves, which are longitudinal oscillations of the electron density (Langmuir waves, Nobelprize 1932).



## 1.3 Vortex Model

The Tesla experiment and my historical rebuild however show more. Such longitudinal waves obviously exist even without plasma in the air and even in vacuum. The question thus is asked, what the divergence **E** describes in this case? How is the impulse passed on, so that a longitudinal standing wave can form? How should a shock wave come about, if there are no particles which can push each other?

I have solved this question, by extending Maxwell's field theory for vortices of the electric field. These so-called potential vortices are able to form structure and they propagate in space for reason of their particle nature as a longitudinal shock wave. The model concept bases on the ring vortex model of Hermann von Helmholtz, which Lord Kelvin did make popular. In my books[3] the mathematical and physical derivation is described.

In spite of the field theoretical set of difficulties every physicist at first will seek for a conventional explanation. He will try two approaches:

## 1.4 Resonant circuit interpretation

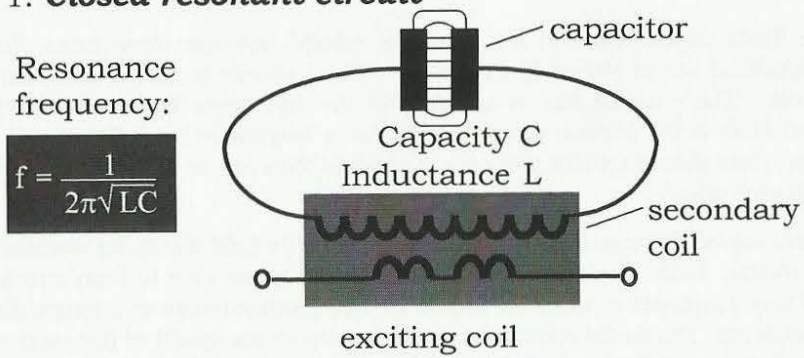
Tesla had presented his experiment among others to Lord Kelvin and he already 100 years ago has spoken of a vortex transmission. In the opinion of Kelvin it however by no means concerns a wave but radiation. He had recognized clearly, that every radio technical interpretation had to fail, because alone the course of the field lines is a completely different one.

It presents itself to assume a resonant circuit, consisting of a capacitor and an inductance.

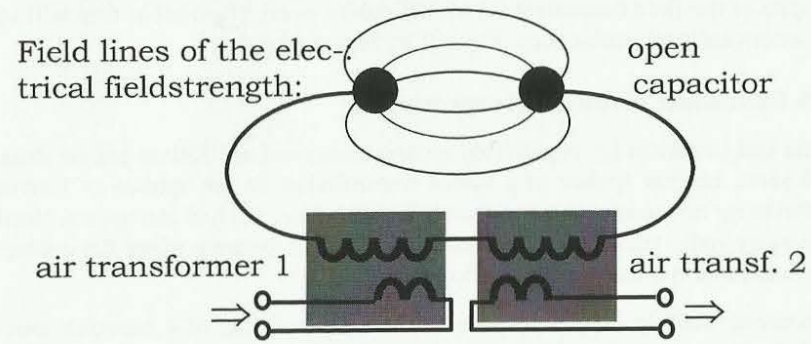
If both electrodes of the capacitor are pulled apart, then between both is stretching an electric field. The field lines start at one sphere, the transmitter, and they bundle up again at the receiver. In that way a higher degree of effectiveness and a very tight coupling can be expected. In this manner without doubt some of the effects can be explained, but not all.

The inductance is split up in two air transformers, which are wound completely identical. If a fed in sinusoidal tension voltage is transformed up in the transmitter, then it is again transformed down at the receiver. The output voltage should be smaller or at maximum equal the input voltage– but it is substantially bigger.

1. ***Closed resonant circuit***




2. ***Separating the resonant circuit***




3. ***resonant circuit with open capacitor***

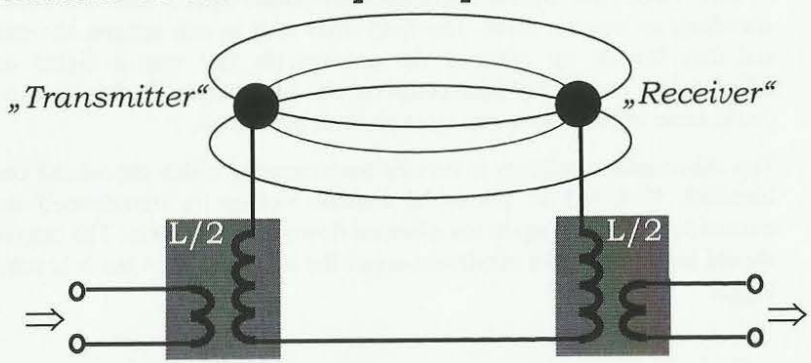



Fig. 3: *Interpretation as an open resonant circuit*



There can be drawn and calculated an alternative wiring diagram, but in no case the measurable result comes out, that light-emitting diodes at the receiver glow brightly (U>2Volt), whereas at the same time the corresponding light-emitting diodes at the transmitter go out (U<2Volt)! To check this both coils are exchanged.

The measured degree of effectiveness lies despite the exchange at more than 100 percent. If the law of conservation of energy should not be violated, then only one interpretation is left: The open capacitor withdraws field energy from its environment. Without consideration of this circumstance does the error deviation of every conventional model calculation lie at more than 90 percent. There one rather should do without the calculation.

It will concern oscillating fields, because the spherical electrodes are changing in polarity with a frequency of approx. 7 MHz. They are operated in resonance. The condition for resonance reads: identical frequency and opposite phase. The transmitter obviously modulates the field in its environment, while the receiver collects everything what fulfils the condition for resonance.

Also in the open question for the transmission velocity of the signal the resonant circuit interpretation fails. But the HF-technician still has another explanation at the tip of his tongue:

### 1.5 Near field interpretation

In the near field of an antenna effects are measured, which on the one hand go as inexplicable, because they evade the normally used field theory, which on the other hand come the by me shown scalar wave effects very close. Everyone knows a practical application: e.g. at the entrance of department stores, where the customer has to go through in between of scalar wave detectors.

In my experiment the transmitter is situated in the mysterious near zone. Also Tesla always worked in the near zone. But who asks for the reasons, will discover that the near field effect is nothing else but the scalar wave part of the wave equation. My explanation goes as follows:

The charge carriers which oscillate with high-frequency in an antenna rod form longitudinal standing waves. As a result also the fields in the near zone of a Hertzian dipole are longitudinal scalar wave fields. The picture 4 shows clearly how vortices are forming and how they come off the dipole.

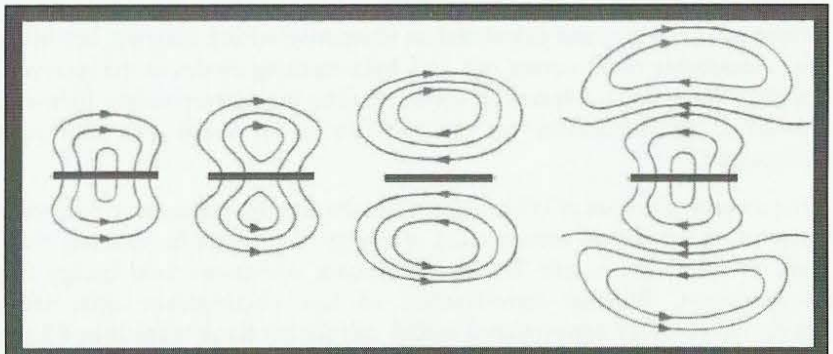


Fig. 4: *The coming off of the electric field lines of the dipole.*

Like for the charge carriers in the antenna rod the phase angle between current and tension voltage amounts to 90 degrees, occur in the near field also the electric and the magnetic field phase shifted for 90 degrees. In the far field however the phase angle is zero. In my interpretation the vortices are breaking up, they decay, and transverse radio waves are formed.

### 1.6 vortex interpretation

The vortex decay however depends on the velocity of propagation. Calculated at the speed of light the vortices already have decayed within half the wavelength. The faster the velocity, the more stable they get, to remain stable above 1.6 times the velocity. These very fast vortices contract in the dimensions. They now can tunnel. Therefore speed faster than light occurs at the tunnel effect. Therefore no Faraday cage is able to shield fast vortices.

Since these field vortices with particle nature following the high-frequency oscillation permanently change their polarity from positive to negative and back, they do not have a charge on the average over time. As a result they almost unhindered penetrate solids. Particles with this property are called neutrinos in physics. The field energy which is collected in my experiment, according to that stems from the neutrino radiation which surrounds us. Because the source of this radiation, all the same if the origin is artificial or natural, is far away of my receiver, every attempt of a near field interpretation goes wrong. After all does the transmitter installed in the near field zone supply less than 10% of the received power. The 90% however, which it concerns here, cannot stem from the near field zone.



### 1.7 Experiment

At the function generator I adjust frequency and amplitude of the sinusoidal signal, with which the transmitter is operated. At the frequency regulator I turn so long, till the light-emitting diodes at the receiver glow brightly, whereas those at the transmitter go out. Now an energy transmission takes place.

If the amplitude is reduced so far, till it is guaranteed that no surplus energy is radiated, then in addition a gain of energy takes place by energy amplification.

If I take down the receiver by pulling out the earthing, then the lighting up of the LED´s signals the mentioned effect back on the transmitter. The transmitter thus feels, if its signal is received.

The self-resonance of the Tesla coils, according to the frequency counter, lies at 7 MHz. Now the frequency is ran down and see there, at approx. 4.7 MHz the receiver again glows, but less bright, easily shieldable and without discernible effect back on the transmitter. Now we unambiguously are dealing with the transmission of the Hertzian part and that goes with the speed of light. Since the wavelength was not changed, does the proportion of the frequencies determine the proportion of the velocities of propagation. The scalar wave according to that goes with (7/4.7=) 1.5 times the speed of light.

If I put the transmitter into the aluminium case and close the door, then nothing should arrive at the receiver. Expert laboratories for electromagnetic compatibility in this case indeed cannot detect anything and that, although in spite of that the receiver lamps glow. By turning of the receiver coil it can be verified that an electric and not a magnetic coupling is present although the Faraday cage should shield electric fields. The scalar wave obviously overcomes the cage with a speed faster than light, by tunnelling.

### 1.8 Literature

1 Nikola Tesla: Apparatus for transmission of electrical energy. US-Patent No. 645,576 vom 20.3.1900.

2 Nikola Tesla: Art of transmitting electrical energy through the natural mediums, US-Patent No. 787,412 vom 18.4.1905.

3 Konstantin Meyl: Scalar Waves, INDEL Publishing dep. [3], Konstantin Meyl: Scalar Wave Transponder, INDEL Publishing

- More information in Internet: http://www.meyl.eu

**2. Comments** (Meyl)

This much published essay and the corresponding lectures and numerous universities from 2000 split colleagues into enthusiastic supporters and doubting sceptics. At first this was to be expected. However astonishing was the unscientific behaviour of the German para scientific society with its disinformational internet posts.

The claim was that I had violated Maxwell's theory and therefore my scalar wave concept is wrong. That is of course not true, because I do go further than the unquestioned validity of Maxwell's equations. The measures suggested by me are an extention of the theory around the potential vortex first postulated by me [3].

Meanwhile we can dispense with this postulate, since on the one hand I have published a derivation of the potential vortex from recognised laws of 'textbook physics'[1], and on the other hand since the Helmholtz Society's discovery of magnetic monopoles in 2009 [6] further experimental evidence is available [7].

### 2.1 A One-sided Declaration of War

I had to accept that this cult like group had declared war, for whatever reason. They placed a tendentious article in the well-known magazine "Der Spiegel," which raised my international notoriety [8]. My Wikipedia was blocked, abused, finally the page on "scalar waves" and my own access was removed after the people in charge of wikipedia thought the issue had become too contentious.

The arguements of the supposed sceptics had nothing to do with any scientific debate.

Because of the name "Scalar Wave" it was approached as a non-directional wave and it was mathmatically deduced that everything was zero.



In fact the gradient of a scalar wave leads to a vector as described by the wave equation, as a non-directional wave cannot exist. But we knew this already, even without the help of the para scientists from Darmstadt.

In the publicly fought battle they eventually found followers, which led to the spread of predjudice among people who did not want to use the experiment kit and probably did not have sufficient time to get to grips with the issue of scalar waves. I can understand these problems from colleagues. In a case like this it is only preferable to talk rather than prejudging a technology when it is not fully understood.

### 2.2 On the incorrect report of so called "gravity researchers"

At some point the issue was so confused that it was barely recognisable, regardless of whether it was seen by a cult member or a just a sympathiser. One could only identify the opposition by the polemic formulations and the unscientific approach.

A good example is the report by a privately funded "institute" for gravitational research, which has been spread on the internet. The presentation leads one to believe that this is a serious experiment which has gone to a lot of trouble. However at the end everything is dismissed as harmonic effects, which represents the wishful thinking of this unknown group, and is their only criticism of the kit.

Everyone is familiar with the characteristics of harmonic waves, which are also generated by the kit.

However the characteristic integer ratio to the fundamental wave is not even given as between the scalar wave resonance and the radio wave. If you change the length of cable to the ball electrode or the ball diameter then the frequencies will change against each other in proportion. Then these can never be harmonic waves.

The manager of the institute, a merchant and coin dealer, received a letter from me requesting that he remove the polemics from the report and correct several technical errors that I had found. It is telling that no corrections were made. This makes it clear that the issue was with the parties and not the matter at hand. For this reason the report has no place in this document. Moreover the gravitational researchers have until now made no significant findings in their own field, which is what they should actually concern themselves with.

The scientific interest following should seek the opposite, and should objectively examine new technology presented.

### 2.3 On Teaching at the Technical University of Berlin

We must first look at the roots of this in the year 2000. At that time time I was demonstrating the kit to the dean of the faculty of Electrical Engineering at the Technical University of Berlin (TU Berlin). Outside it was very loud: the Love Parade was raging through the streets.

However the fresh wind of scalar waves was blowing through his institute. He gave me a position as a lecturer for the winter semester. As part of the multidisciplinary curriculum reform project, some laboratory experiments into "alternative energy technology" were performed with the experiment kit.

This was very exciting because everything was so new. At the end of the semester (1st February 2001) the work was presented to the public by the student groups. This I would like to report now.

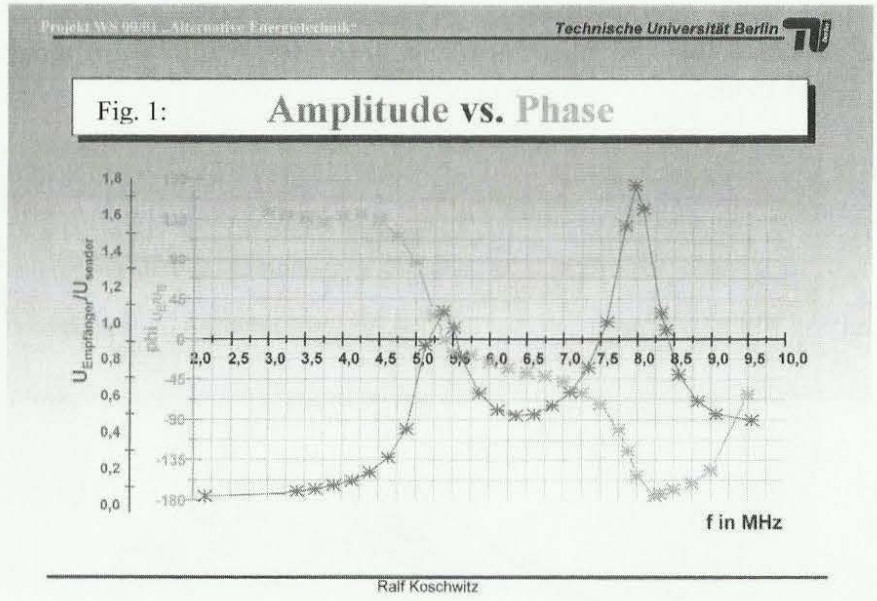


### 3. A student group from the TU Berlin reported

At the beginning of the lecture the students were provided with around a dozen experimental kits.

### 3.1 The amplitude and phase response

First the amplitude and the phase response were recorded. The voltages taken at the the coupling coils, showed a first maximum of around 5 MHz. At the same time the phase response is exactly the zero line.



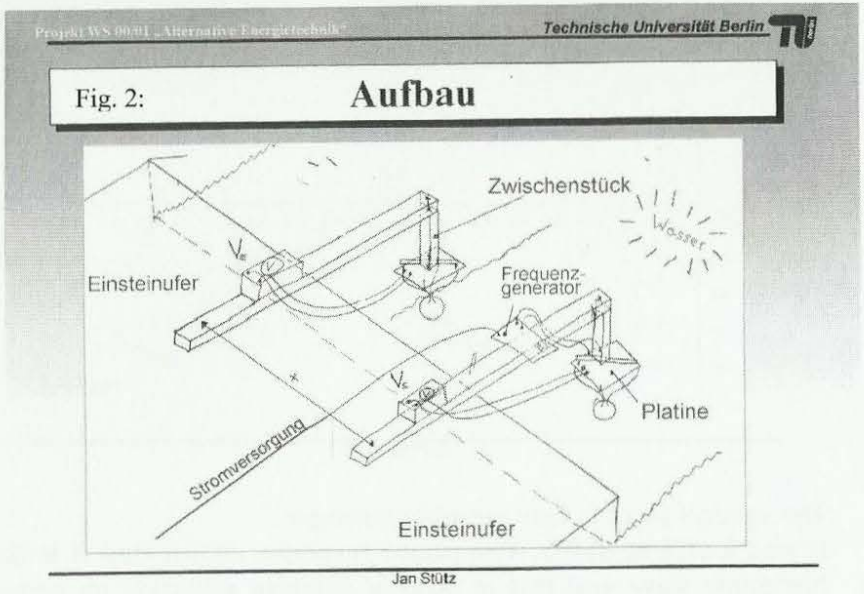

The second peak is considerably stronger.
It was found at 8MHz. The phase response shows that it is not a harmonic wave and this is quite a different situation as here the phase tends to be -180°.
Since at the receiver no phase shift takes place, afterwards a pure resistor is used as a load resistor, the phase rotation happens solely at the transmitter.

The difference is made clear by the students' table.

| | Resonance1 | Resonance2 |
|---|---|---|
| Frequency | 5 MHz | 8MHz |
| Amplitude Ratio | 1 | 1,8 |
| Phase Shift | 0 | 180° |

### 3.2 Berlin air or Spree water?

The next experiment relates to the transmission path. It should compare the propagation in water with the usual propagation in air. Since the river Spree flows past the TU building it made sense to place the ball electrodes into the water 'headfirst.' A diagram was made.




First a shift of the resonance frequence was noticed. In coil A this was typically 6.3 MHz, when immersed in water this rose to 10.3 MHz.



Distance x between the transmitter and receiver was varied from 0 – 2 m. Distances of smaller than 20 cm are of little significance.

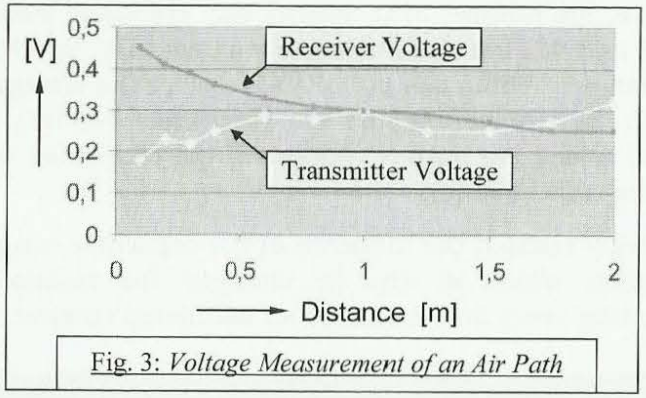



Fig. 3: *Voltage Measurement of an Air Path*

The results of the air measurement show that with increasing distance there is a fluctuating, but largely constant transmitter voltage. Also the receiver voltage, which begins with something like a decrease according to the distance square law, afterwards remains fairly constant.

In water, however, the attenuation effect is evident.

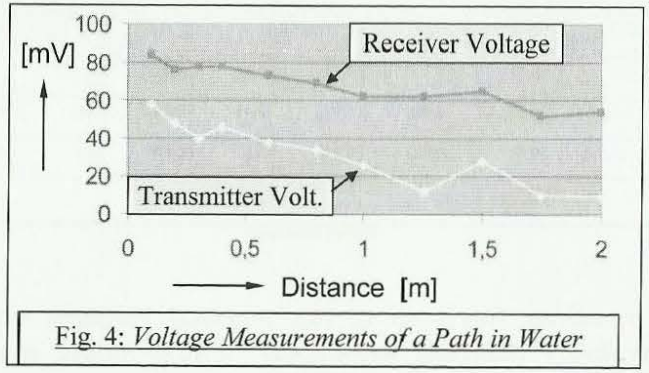


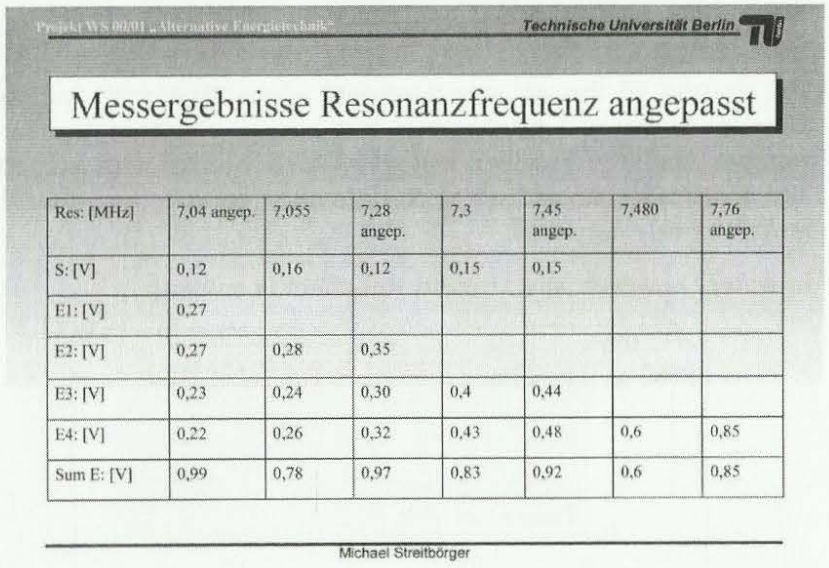

Fig. 4: *Voltage Measurements of a Path in Water*

Both voltages decrease with distance, with the transmitter voltage falling quicker. Overall the amplitude reduced by a factor of 5.

### 3.3 Experiment on the set with multiple receivers

Starting from the default configuration with one receiver at 1 m distance, the number of recipients was gradually increased to 2, then 3 and 4. First the frequency was set to 7.74 MHz and then not changed. With each additional receiver the voltage decreased at both the transmitter and the receivers. For this reason the student added the output voltages of the connected receivers, or coupling coils in series.

He quickly realised the influence of the capacitive coupling on the resonance, which is why he changed the resonance at the transmitter every time he added an additional receiver.




If you consider the sum of the received voltages now then it remains fairly constant regardless of how many receivers are connected. Also the transmitter shows it is impressed very little. This suggests what some people had already suspected: The field lines radiated by the transmitter divide amongst the connected receivers.

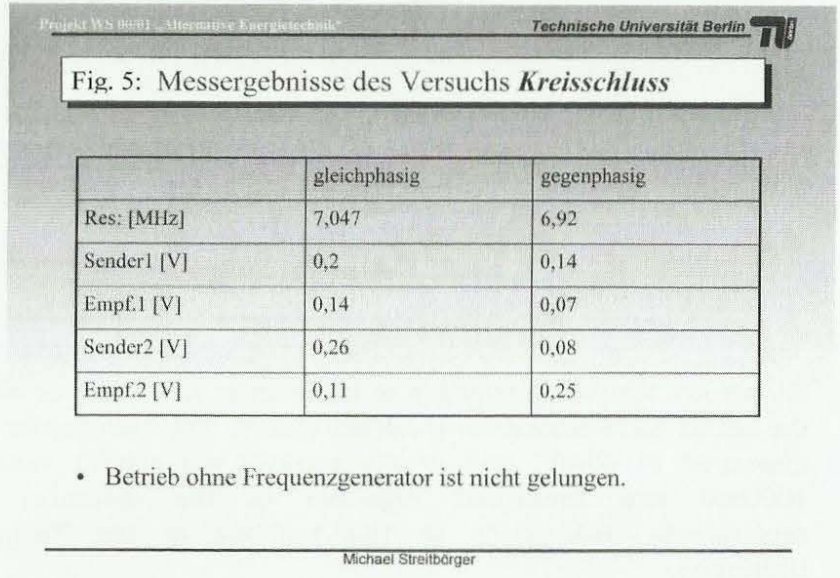


### 3.4 Experiment with 2 kits as a "self runner"

To put it bluntly: this ambitious experiments failed. Somewhere the student had doubts about the performance measurements. He demanded the hard evidence: if a closed a closed loop circuit were possible, then it would show in the open system energy flows.

He then built two transmission lines. He connected the coupling coil of a transmitter with that of the second receiver and vice versa. His idea should provide the first path with the energy gain of the second, and of course vice versa.

So long as the function generator was connected the setup also worked, but without the generator everything stopped. So where is the problem?




In this case you should record an image of the field lines. In fact when both kits operate in phase then no more current flows. When they operate in anti phase then the field lines no longer run to their recipients, but along the shortest route to a ball from the partner set.

### 3.5 Determination of the dependence on distance.

A final group of students were interested in the question of at which distance the resonance breaks down. They used 65m long copper wire (1mm diameter) as a ground connection.
The measurements were taken in the corridors and repeated outside (in front of Café Campus). They presented the results in a graph.

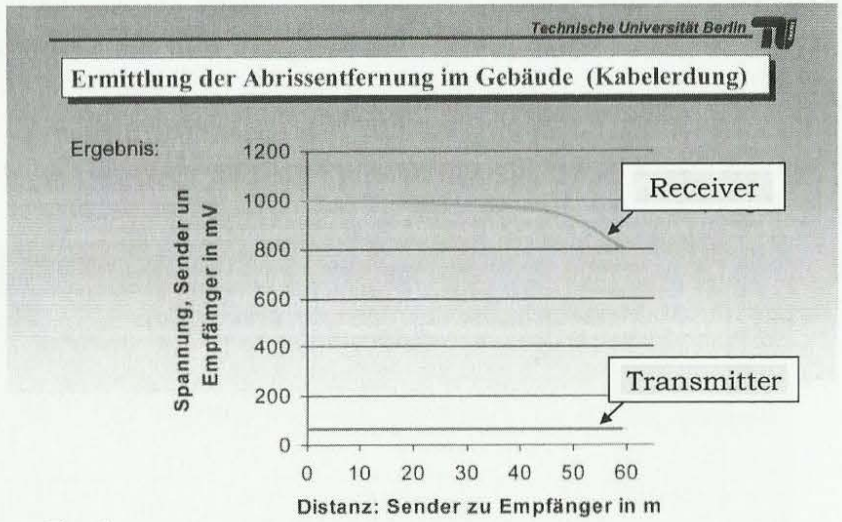



Fig. 6:

Shown are measured voltages of transmitter and receiver coil at the scalar wave resonance (7.3MHz, coil A). The transmitter was measured at 60mV, and at the receiver a constant value of 1000mV was measured regarless of the distance. The experiments took place in the building of the Technical University.

For control purposes, but not shown, the Herzian wave was also set. The voltage, which was 450mV at a distance of 35cm, reduced with the square of the distance, as stated in textbooks. After 2.5m nothing was received.



The results were repeated in the open air outside of the TU Berlin building. The Herzian wave showed practically the same behaviour. However the ground cable had a strange and inexplicable effect on the scalar wave. The cable was laid on the asphalt or on a hedge, and this had a strong influence of the more or less chaotic measurements. Here a particularly strange curve is shown.

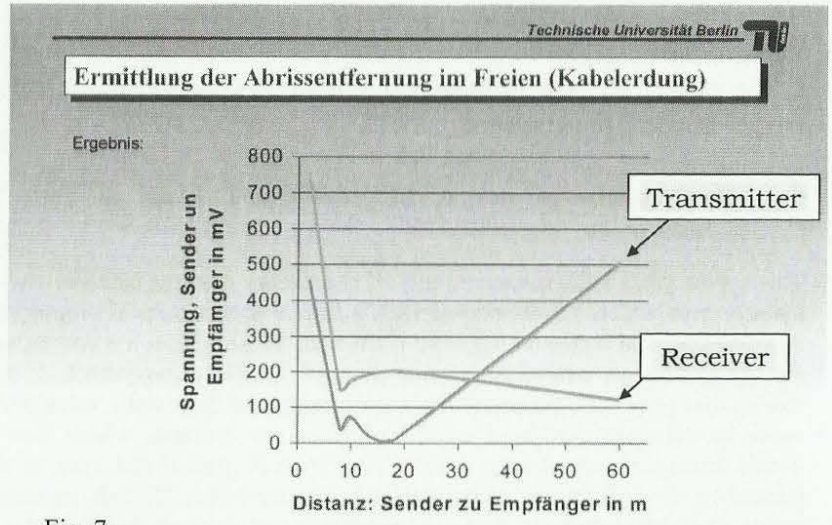



Fig. 7:

Unfortunately I could not be there in person for these measurments, and I am, by nature, a sceptic and only accept what I measure myself. The students wanted to know from me what they had measured here, I could only answer with a question: Are there any unquestioned and unnoticed receivers in resonance? (Students in the cafe, or the hedge) The capacitor path is open to all sorts of surprises and everyone agreed:

*Errors are everywhere*

## 4. The criticism of a TU student

Whilst most students took part in the scalar wave experiments openly without reservation, there was one who made it his ambition to find proof to the contrary. He also quickly found support amongst the institute's leadership, because criticism is fundamental and important in science. I am also of this opinion and will make changes if the criticism is constructive and solid. Unfortunately this condition is not always met.

The student wanted to prove to me that no efficiency of over 100% takes place, as can be read in his report from 01.08.2001. He writes in the introduction:

### 4.1 **Measurements on a Transmission Line** of two Tesla transformers.

This report deals with measurements of the energy transfer between two Tesla transformers which are connected with a line. For this purpose, input voltage, input current and output voltage are measured. These results are compared with the simulation an equivalent circuit diagram of the arrangement. It will be shown that only with potential free measurement of the output voltage can it's value be determined without error. Only then can currents, which flow backwards through the measuring devices and towards ground and back to the HF generator, thus distorting measurements, be ruled out. If such measurement errors cannot be ruled out, then the impression can be given that the ratio of the electrical output power to input power is greater than one.

So I accompanied the students in the Electrical laboratory and he did his best to avoid the aforementioned problems. All instruments were battery operated and no mass connected etc. How then could efficiencies clearly greater than 100% occur? He thought that it could not be, and that there must be a measurement error. He offered the explanation that stray fields at the bypass the measuring equipment at the transmitter, but do not do the same at the receiver. What a wonder, with a measured efficiency of approximately 200%.



### 4.2 **Response** (Meyl)

Yes I can understand that on the way to the receiver something is collected from the environment. But from the transmitter it is housed in HF proof casing and connected with a coaxial cable to the sensor, so the collected stray field is certainly not here.
At the final meeting he put a simulation on the table which he had created with a Maxwell field calculation programme. And what came out of it? Maxwell, of course without OUE [over unity effect], because an energy gain is not permitted by a such Maxwell programme.

I could not accept the criticism and on 08.02.2001 wrote him a friendly letter:

„I very much appreciate your efforts to verify the Tesla transmission of scalar waves. Unfortunately for finding the maximum working efficiencies the measuring teachniques I recommend for in the lab are not available. Afterwards the powers should be measured oscillographically at the same time, as has been done in my lab and in Technical University of Clausthal.

Our measurements on Friday noon, for which we unfortunately did not have much time, have at least confirmed that the floor of the laboratory shows an unusually large influence on the behavior of the experiment. The capacitive coupling between the transmitter and buildings can in fact lead to the fact that here a current flows to the building earthing, which as a result leads to a differential current on the leads, from the function generator to the coupling winding on the plate. Our measurements can be interpreted in this way.

With connected receivers this coupling and the differential current should continue to grow - but we measured a decrease!

Scalar wave theory interprets this as a clear consequence of resonance. Conventionally I have no explanation for this behaviour, which goes in the wrong direction, as you have argued previously in our discussions.

From your appearance I get the impression that you have the ambition to prove that there are no scalar waves. From a scientific point of view this is an acceptable aim, as long as counter evidence can be found. However strict rules must be observed, to which I would like to draw your attention:

1. No mistakes can be made. Whoever works out a capacity incorrectly in the simulation will not be believed for the rest of the calculation.
2. If you magic some characteristics out of thin air and do not openly reveal how you got to your results, then you make yourself implausible.
3. Simulations are not and end in themselves. A simulation only makes sense if for each calculated result a measured result is available and comparison is possible.
4. If, as in this case, irreconcilable differences between the measurement and the calculations occur, then the simulation model must be improved.
5. It is a model to find that all measured properties are approximately correct and can be described. Its is not permissible that a different model is used for each phenomenon.
6. In the event that the experiment to find proof of scalar waves proves to be unsuitable, this would in no way prove that scalar waves do not exist.
7. However a single measurable phenomenon, which cannot be explained conventionally, is enough to justify my scalar wave approach.

For example, the transmission line at 4.5 MHz has a completely different behavior than at 7 MHz. I make one reference to Hertz and even Tesla and to show that the measured properties justify this interpretation. If you want to describe both conventionally then it is required that the simulation reproduces this correctly, and up until now this has not been the case..."

When I left Berlin I had won many friends amongst the students of TU, but also an enemy, who then without my intervention could seek and find points which corresponded perfectly with his simulation, which had no over unity effect. Some colleagues from TU Berlin filled 45 pages with welcome results. Unfortunately this document is not very helpful in the seach for scalar waves, which were neither sought nor simulated.

In the closing meeting the Dean of the electrical engineering department let a careless remark slip, which [I suspect] was to do with an underhand contract. He stated the source as the University of Stuttgart and said to me "you know the score." Further questions went unanswered.



### 4.3 Simulation of the Ground Based Model

Of course the transmission path behaves predominently conventionally, which is why the underlying perameters conventionally determined in the lab in TU berlin are correct. Those who are interested should take a look at the revealing diagrams in the report, which I happily include in this document.

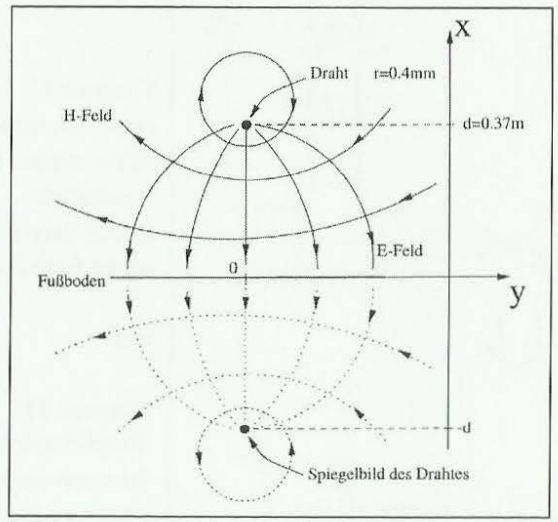



Diagram 16 (left):
The connecting line between the two antennas as a waveguide with its mirror image in the half-space (mirrored charge).

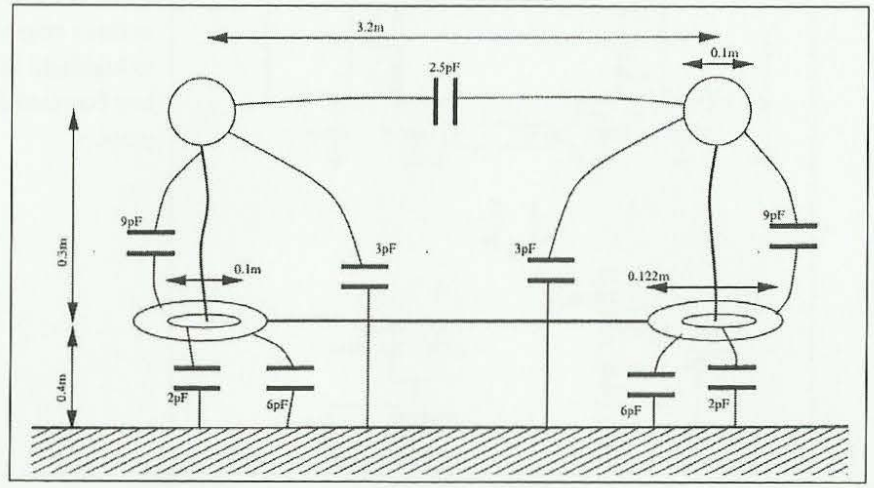



Diagram 15 (from the report of the TU student):
Capacities between the individual elements of the overall set up.

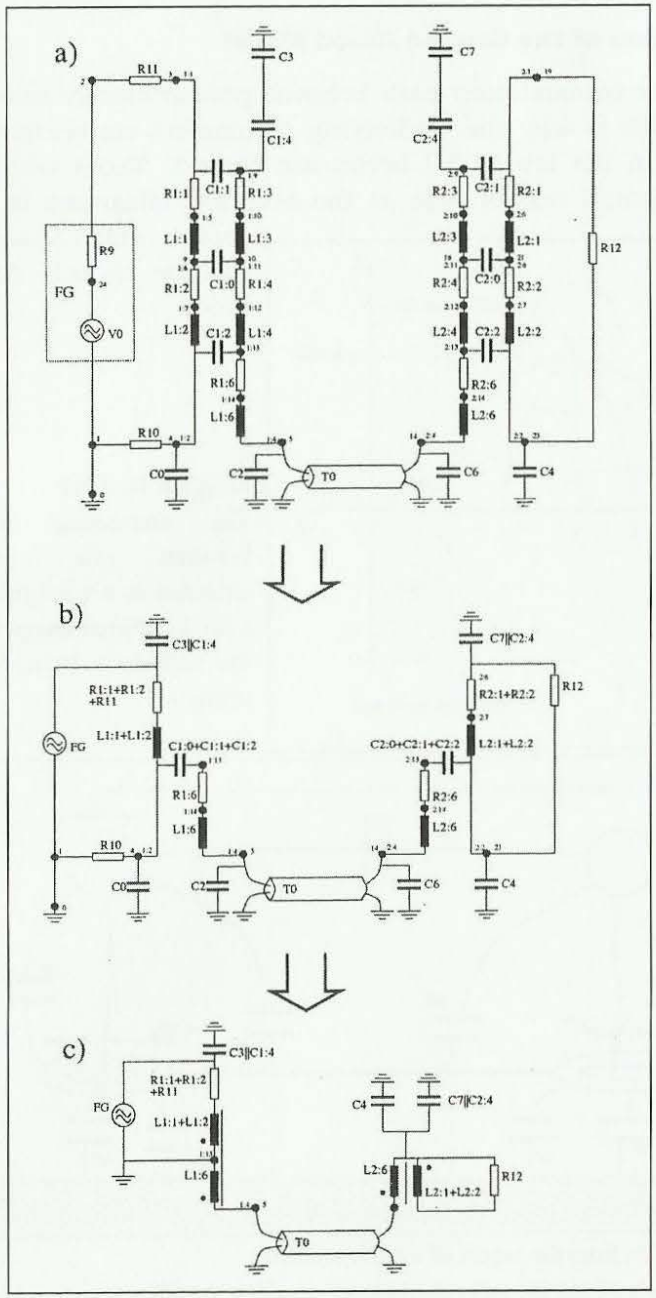



Diagram 17 (from the report of the student): Equivalent circuit diagram of the full set up.

and

Diagram 35: Simplification of the equivalent circuit diagram in three stages, to highlight the key functional parts.



My criticism of this criticism is that the simulation model is improved until the measured and calculated curves of the conventional operating behaviour are consistent with each other. What remains is my criticism that the significant and new effects have not been noticed, or worse; a blind eye was turned to them.

## 5. Four critical HF technicians report

Next I come to a group of critical researchers who made a good attempt and looked closer than others. An endearing old gentleman whose curiosity remained in his retirement wrote me a long letter.

### 5.1 Ehningen, April 23rd 2001

Dear Colleague Meyl,

I belong to a small workgroup whose task is to investigate much-discussed problems and, where possible, to make measurements and find our own point of view.

There are four of us;

- A communications engineer, who was previously employed in a measuring technology company.
- A former developer for the Department of special and plant equipment at an institute in Reutlingen.
- A healing practitioner with experience in the field of Radiesthesia, who also has a good knowledge of the field of high-frequency technology
- And me - a communications engineer, formerly director of development at a measuring technology company, with over 50 years of experience in the field of wireless technologym high frequency and communications technology. From the 1960s until the 1990s I was also a lecturer in these fields at Stuttgart University.

In our small laboratory we have the instruments necessary to carry out such experiments, including oscilloscopes, level oscillators, highly sensitive spectrum analyzers, field meters, etc.

We believe that we are a team whose practical experience, theoretical knowledge and resources make us suitable for many tasks.

For around a year we have turned our attention to your experiments and the relevant publications. Over the course of this project considerable doubts have formed over the validity of the experiements.

Although we are inclined to form a critical standpoint on account of our origins and previous professions, we are very open to new ideas, assumptions and concerns.

We have repeated your experiments impartially and have purchased your experiment kits and documentation in order to get the closest match to your results. We also have most of most of your supplementary books.

Now we are of the opinion that the experimental results can be interpreted without any new theories. Of course we do not wish to discourage or upset you with this. We know very well that great progress can only be achieved with imagination and vision.

The fact that the expected results are only found when the earth connection takes place through a wire struck us as suspicious. With a "real" ground connection (large ground plug, capacitive metal plates, etc.) between two stations in the open air, it did not yield any results.

### **5.2 Set up** (see attach 5.5 of this letter)

In our first investigations we used a replica of your arrangement ie. with a "plate coil" and one or two coupling coils. The results did not differ significantly from those we reached later with the coils from your experiment kit.

The transmitting and receiving parts were connected by a cable on the ground, which is the same as the one in the kit. The length varied from a few meters to around 20 meters, and the distance to the ground was taken up with a metal plate embedded in the floor.

The generator was a Wandel & Goltermann level transmitter, with a frequency range up to 14 MHz and adjustable internal resistors or grid-independent generator. We always worked with R = 75 ohms, and thus had no difficulty with the leads, which also had an impedance of 75 ohms.

On the receiver side both the LED of the experiment kit and a separate rectifier could be connected with the instruments, which offered a opportunity to measure based on a calibration curve.

Furthermore, we had a spectrum analyzer available, with which frequency responses can easily be measured, shown and recorded.



After the first probing experiments we determined the equivalent circuit diagram of the individual components and the whole set up. Soon we assumed that the wire connection between the two terminals should not represent a "good" earth, but would take over the actual energy transfer. In our view this [energy transfer] takes place over the earth wire system. This (in communication engineering terminology) is an "outside line" with wave impedance Z=250 to 350 Ohms, dependent on the wire thickness and height above the ground. The connection from the transmitter or receiver to the earth takes place with the capacity of the balls.

Each terminal is composed primarily of a transformer with coil capacity in parallel with both coils and a third capacitance between these two coils. The spread of the transformer is not negligible, it plays an important role along with the aforementioned capacitancies. In contrast the coil resistances are of lesser importance, even if they are not small when at frequencies of a few MHz.

Since the "earth" line is connected to the "high impedance" side of the transformer, it is practically operated "idly." In fact the characteristics of a standing wave are noticable. The whole set up could be regarded as a (loaded) dipole with a power supply at one end.

We measured the electrical parameters of the equivalent circuit with the equipment available to us, which was not to the highest accuracy. However with these values we could easily calculate the measured frequency response etc.

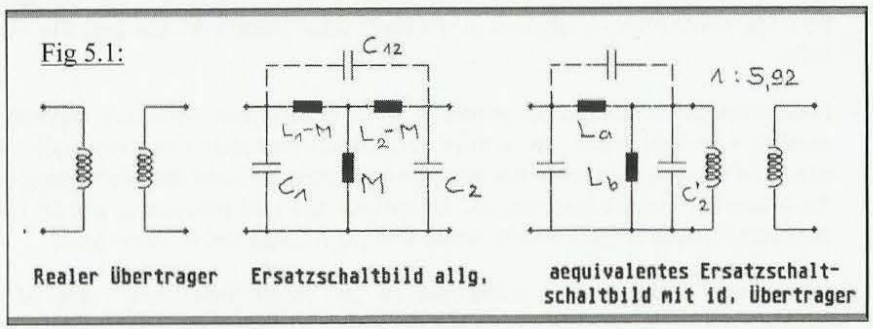
After we found good correspondence between the calculations and measurements it seemed logical to realise the elements of the equivalent circuit diagram with equivalent components, ie. we replaced the balls with a small capacitor to ground: The measured results only changed marginally.

Next we replaced the plate coil, which you regard as an important component of the terminals in your setup, with a small coil with a ferrite core. A second coil on the core took the role of the coupling coil. Again the fundamental frequency response was unchanged.

## 5.3 The Equivalent Circuit of the Transformer

The plate coils are seen as transformers and initially are used in a T-circuit form. The two wound capacitors are at the input and output. A coupling capacitance C12 between the coils is shown in dashed lines, and produces a barrier effect above the frequency range of interest.

Fig 5.1:




This circuit can be converted into a circuit consisting of only two inductors with an ideal transformer at the output (see eg. Feldtkeller, R.: *Spulen und Übertrager [Coils and Transformers]*, S. Hirzel, Stuttgart).

This is the complete circuit arrangement given. It is interesting that in reality the capacitance leads from the transformer to the earth (as shown), but - electrically equivalent - the "hot" end also may be used: Their effect as "coupling capacitances" is better expressed there.

## 5.4 The Electrical Behaviour of the Assembly

As shown, the loss free transformer can be replaced by a a series inductance and a parallel resonance circuit; the ideal transformer is connected after. The primary wound capacitor can be be disregarded, at least, on the transmission side opposite the source impedance of the generator.

This arrangement shows the known and typical behaviour of the so-called "resonance transformer": initially, and so at a lower frequency $f_1$, it affects the resonance of the parallel circuit ($L_b$ and $C_2'$). Since it represents a large resistance, it results in a high voltage at the transmitting transformers and thus a good transfer to the receiver.

At an overlying higher frequency $f_2$, this parallel circuit behaves capacitively and compensates the series inductance $L_a$.



In the behaviour of a series circuit there are known to be high voltages at its elements as well as at the capacitively functioning parallel circuit. Over the entire circuit the voltage is practically zero. Under these conditions a large current flows in the transmitting transformer and the effect is again a good power transmission.

Thus we have two excellent frequencies for transmission $f_1$ and $f_2$, at which it is to be noted that good transmissions are achieved at one frequency with high voltage and low current (parallel behaviour), and at the other at a higher frequency with low voltage and high current (series behaviour). It is now clear to see that the LED on the transmitter side only responds at high voltage ($f_1$) and at the second resonance $f_2$ dims or goes out completely. By contrast the LED on the receiver side is almost constantly lit, no matter how the power is supplied from the transmission side.

The shielding you are using with an aluminium case is visually impressive, however anyone who has any experience with shields worked with casings knows that the smallist gap, a bad connection in the doors or a piece of wire inside can render the entire casing ineffective. Also a wire feed (eg. for power supply) without high attenuation choking is unusable (mine is 120dB/50Hz). Therefore it is questionable to attach a generator outside and use it to supply the actual transmitter in the casing.

The cage built for our experiments consists of a hood (aprox. 30 x 30 x 60cm) made of fine wire mesh on all sides except on the ground of the narrow side which is soldered. The ground contact is made of the wide, angled mesh edges, which are pressed against the ground plate with wooden beams. With this casing neither an escaping nor a penetrating signal could be measured.

## 5.5 System (from the letter dated April 23th 2001)

We have found the following values which are well suited for a simulation:

R = 75 Ohm / lead with around 2 m length and Z = 75 Ohm

$C_1$ = 22 pF / $L_1$ = 6,1 µH / $L_2$ = 90 µH / M = 15,3 µH

$C_2$ = 3,6 pF / $C_{12}$ = 12 pF / $C_{ball}$ = 5 pF

From these inductance values you get the coupling factor k = 0,65.

In the modified transformer equivalent circuit diagram $L_a$ = 3,53 µH and $L_b$ = 2,58 µH and $C_2$ = 126 pF. The transformation ratio is 1:5,92.

The "earth connection" is sumulated by a chain circuit of L and C, at which the resultant frequency limit of L and C must be sufficiently high (30 – 50 Mhz). The number of sub-elements is determined by the actual length of the line.

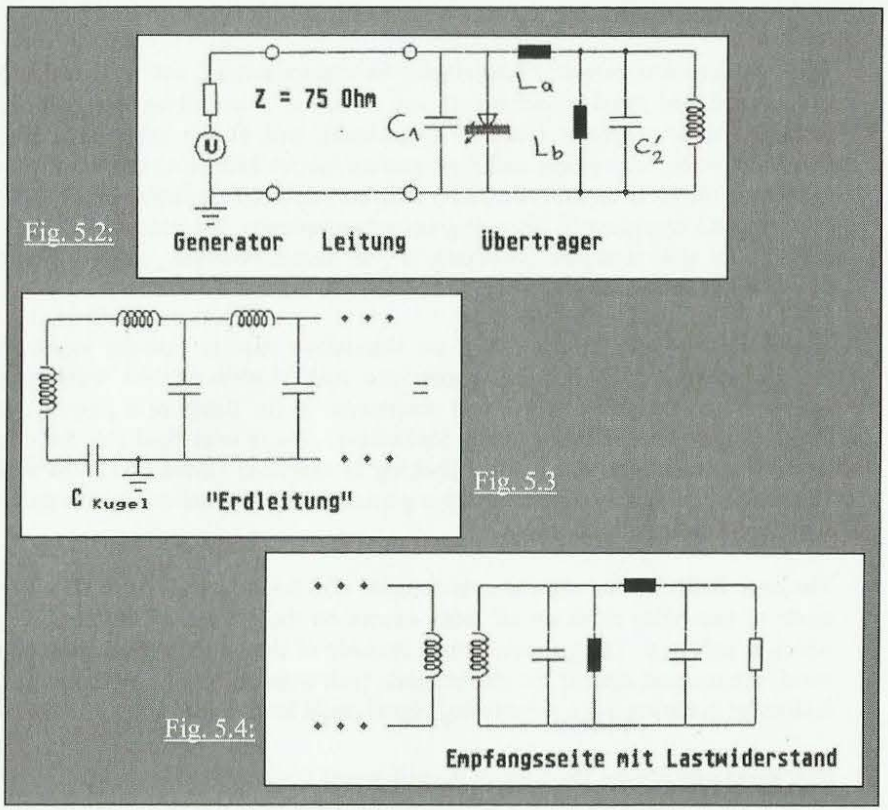



Fig. 5.2:




Fig. 5.3




Fig. 5.4:

## 5.6 Short Comment (Meyl)

After talks and a visit to my transfer centre, it was possible to steer their classical view towards the new and unfamiliar aspects which we want the kit to produce. These questions still occupy the colleague. In October 2001 he sent to me an interim report on his deliberations.



## 5.7 Ehningen, October 23rd, 2001

"In the meantime I have been looking for a plausible answer to the problem of whether it is possible to convert the reactive power, which is delivered to the field when the electromagnetic wave is detached from the radiating part, into real power.

Actually it is evident that reactive power can only remain reactive power - otherwise the energy balance would not work out - this is said clearly in the formulas. I have shown this in the attached summary. If you free [remove] the operation of the power density vector from the distance dependence generally applicable (ie. 1/r2), then a residue remains which can be represented by a locus curve:

While the locus curve for $E_r$ x H has no real part, the other component $E_\vartheta$ x H has a constant real part, and its reactive part reduces with increasing distance.

At the moment we are trying to find the "suction effect" of a second receiver near to the transmission line measurement devices. There the "parasite" should be free standing and will get a syncronised connection. We will report on this.

Thank you once more and best regards on behalf of my friends and myself."

At another point he asks me: "After your presentation did the vortex stay concentrated and together and not diverge? Hertzian waves usually run apart (as a spherical wave) unless they are guided. This can be a single wire (as in Sommerfeld or the Goubeau line), a non conductive "wire" such as plastic with $\varepsilon_r > 1$, a two wire for communications or even a tube (hollow line). A wave which does not diverge without need for a guide, ie. your vortex, would be something superb!"

I agree with this as it is exactly that which explains the potential vortices I discovered in 1990 [2]. To prove this I have experimented mainly with scalar waves.

A member of his research team was particularly active. He sent me detailed investigation reports, which are, of course, included in this document.

## 6. Lab Report: Arrangements of flat coils with ball electrodes

### 6.1 Aims

- Investigation of the basic behaviour
- Determine the influence factors, primarily for the connection cables.

Investigation team Reutlingen, November / December 2000

### 6.2 Equipment

| | |
|---|---|
| Transmitter, Receiver: | Flat coil Type A, from INDEL GmbH, Villingen-Schwenningen<br>Main coil with 47 windings and 5 coupling windings.<br>Ball electrode 10 cm diameter, 25 cm antenna wire. |
| FG 7000 | Generator 0,01 Hz - 10 MHz, ELV, $R_i$ = 50/600 Ω, $U_{max}$ = 10 Vss |
| FC 7008 | Frequency counter, ELV, 1 Hz -1,3 GHz |
| R-Instr. | Moving coil measuring instrument with one-way measuring rectifier,<br>Frequency range 0,1 - 20 MHz, Measuring range 2 / 5 / 10 V=<br>Internal resistance 680 / 1,5 k / > 3 k Ω,<br>Characteristic: $U_{eff}$ = (U= + 0,55)/1,35 resp. $U_{ss}$ = (U= + 0,55) * 2,074 |
| MA2 | Measuring adapter for plugging into INDEL board (receiver)<br>Terminating resistor 47 / 100 / 200 / 680 / ∞ |
| MA4 | Measuring adapter for measuring voltage and current, which are fed to the transmitter coil. Input from the generator output to the transmitter with current measuring resistor and voltage dividers and connectors for 2-channel oscillograph |
| Oszillograph | Philips 2 channel Oszillograph PM 3211, 0 -15 MHz |

### 6.3 Investigations

Measurement of the amplitude response over frequency of:

- voltage and current flowing into coupling winding of the transmitter coil
- Output voltage on the coupling coil of the receiver.

Varied:

- The cable length of the connection line ("earthing wire")
- LED's switched on or off
- Only transmitter without connecting line to the receiver
- Type of connection cable and different load resistors at the receiver

The circuit sheet shows the set up examined and a range of data from the components.



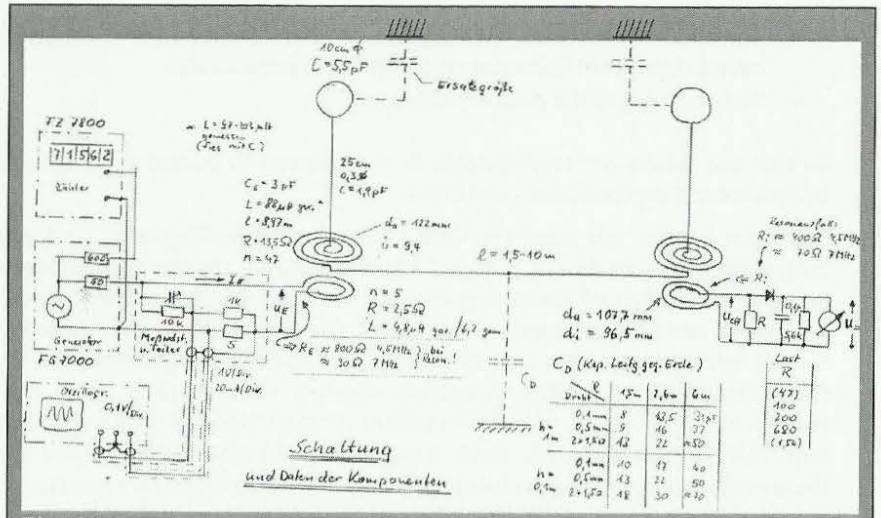



Fig. 6.1

At the beginning we got to know the arrangement and its behaviour as well as possible. The biggest problem at the beginning was a lack of reproducibility. Almost every connection of a measuring device at any point of the coil arrangements, due to the earth capacitance or earth connection, results in an immediate change in the characteristics of the assembly, such as shifts in the resonance points, amplitude variation of the input values and output voltage. Since [this was noticed] measures mave been taken to ensure that the measurement conditions are always defined, to give comparable results.

### 6.4 Influencing factors

It is known that the earthing of the connection line between the main coils of the transmission collapses to almost zero. The following factors also change the behaviour of the circuit and strongly influence the results of the experiments:

- The earthing of the coupling coil (5 winds) at both transmitter and receiver: The earth is provided by the saftey [earth] connection of the measuring equipment. With safety isolated equipment the large capacitance of the measuring mass towards the earth has an effect.
- The choice of earth points on the coupling coils: the transmitter power was greater when the internal connection of the transmitter-side coupling coil was connected to the earth of measuring mass.

- The connection cable: The length, size [diameter] and how it is layed all have a significant influence on the measurement results.
- Size and type of the receiver-side load

So that the results are reproducable it is important to ensure clear measuring equipment and reproducable conditions.

The input voltage was measured with a two channel oscillograph. At the same time current was measured with a 5 Ohm measuring resistor. Much care was taken in the design of measuring adaptor. In particular the connection of the measuring line for measurement of current must be soldered very close to the resistor body, because every small piece of line and every slight bend can distort the measurment result. The measuring adaptors were checked with an Ohm resistor of 100 Ohms as a load. Deviations of amplitude and phase shift of less than 10MHz are sufficiently small. Compared to the other factors, listed above, these simple measuring instruments and adaptors are sufficiently accurate.

With this arrangement of devices the input and output values can be measured similtaneously. This is useful because the characteristics of the set up could be changed significantly by reconnecting eqipment and taking separate measurments, if charges, potential differences or other factors are changed.

### 6.5 Results

The voltage and current measurments, which are fed from the generator, show pronounced frequency dependent maximums and minimums. In each there is a current minimum in the region of 4.5 MHz, which is behaviour similar to a parallel resonant circuit. Around 7 MHz the set up behaves like a series resonant circuit, this results in a maximum current, at which point the generator voltage collapses (minimum voltage).

The respective frequencies are dependent on the slightly differing cabel lengths used. Examination of the phase relationship shows that little or no phase shift occurs between the voltage and current at the minium. Therefore it is possible with these points to calculate the absorbed power without any significant error. The frequencies at these minimum/maxium points correspond closely to the relatively flat voltage maximum at the output.



If the transmitter and receiver side LEDs are turned on, the amplitude curve of the voltage is limited by the internal voltages of the LEDs. A current minimum of around 4.5MHz cannot form as the transmitter side LEDs will still be lit. That these originate at about 7 MHz, is related to the collapse of the generator voltage together due to the high current consumption.

When the plug of the connection line is pulled to the sender (no backwards effect of the receiver exists) then this completely changes the electrical characteristics of the transmission assembly. In the resonance frequencies previously observed current and voltage now have completely different values. The new extreme values occur only at much higher frequencies.

One of the main causes for a lack of reproducibility if found in the connection line (usually referred to as the earthing wire in the records of Prof. Meyl). Whether it lies on the ground and how it lies almost always change results. Therefore the length and position of the wire, as well as the influence of the wire type was examined.

The highest voltage at the output was measured using the thin enamelled copper wire, when the line lay 1 m off the ground. The lowest was the aluminum foil connecting line, where the voltage was sometimes only half as much. When the line lies on the floor, in all cases the voltage is significantly reduced (30-50%). It was shown in previous experiments that inserting a resistor of 10 ohms or more into the line gives no significant change in results.

The results described lead us to the conclusion that it probably could be the capacitance of this line to the earth which influences the results. The larger the capacitance, ie. the smaller the capacitive resistance to the earth, the lower voltage transmitted (with direct earthing of the connection line there is almost nothing transmitted).

### 6.6 Power transmission

The transmitted power at the receiver with Ohmic termination is calculated with

$N = U^2/R.$ The absorbed power of the transmitter can be calculated as

$N = U * I * \cos \varphi,$ where, as previously stated, for the points in question

$\cos \varphi = 1$ can be set, without causing significant errors.

In this study these calculations resulted at best in $N_{out}$= 10,3 mW bei $N_{in}$ = 16,6 mW, which corresponds to $N_{out}/N_{in}$ = 0,62. This is quite a high value, but there is no discernible overunity.

In the case of the LEDs, the LEDs on the receiver side lit up at around 7 MHz, at which time the transmitter LEDs went out. It is clear, from what has already been said, that this is because the voltage of the generator breaks down. At the same time the current flowing in the set up increases significantly. The absorbed power is high, and there is also no overunity present here.

### 6.7 Final Remarks

The behaviour of the set up as evidence for scalar waves, which was defined clearly in the documentation, was much less clear in practice and was influenced by many factors. In all previous experiments surprisingly it was found that the connection line is an element which determines transmission properties, and its strange behaviour requires further investigation.



## 7. Lab Report: Replacement of the flat coils with capacitors

### 7.1 Aims

- Review a setup with replacement components
- Replacement of the ball with a fixed capacitor

Investigation team in Reutlingen, February 2001

### 7.2 Equipment

| | |
|---|---|
| Transmitter, | Flat coil Type A, made by INDEL GmbH, Villingen-Schwenningen |
| Receiver | 47 windings main coil und 5 windings coupling coil<br>Ball with 10 cm diameter mit 25 cm cable |
| FGmod | Generator 0,01 Hz - 10 MHz, ELV, $R_i$ = 50/600 Ω, $U_{max}$ = 5 Vss<br>ELV board, modified for battery operation, with sweep input |
| RGDE<br>with FGmod: | Single chip processor board made by Conrad Co., here programmed for ramp generation and data collection, battery operated |
| R-Instr. | Moving coil measuring instrument with one-way measuring rectifier, frequency range 0,1 - 20 MHz, measuring range 2 / 5 / 10 V=<br>Internal resistance 680 / 1,5 k / > 3 k Ω,<br>Characteristic: $U_{eff}$ = (U= + 0,55)/1,35 resp. $U_{ss}$ = (U= + 0,55)*2,074 |
| MG1 | Measuring rectifier, one-way rectifier arrangement<br>Frequency range 0,1 - 20 MHz, with connection to multimeter<br>Internal resistance 680 /1,5 k / > 3 k Ω,<br>Characteristic: $U_{eff}$ = (U= + 0,55)/1,35 bzw. $U_{ss}$ = (U= + 0,55)*2,074 |
| MA2 | Measuring adapter for plugging into INDEL board (receiver)<br>Terminating resistance 47 / 100 / 200 / 680 / ∞ ,<br>connectable with one-way measuring rectifier for multimeter,<br>Frequency range 0,1 - 20 MHz, Re = >3 kΩ. |

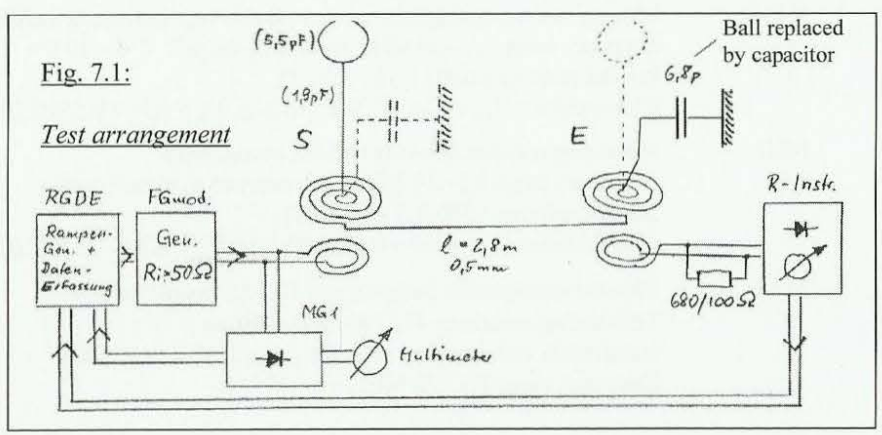
### 7.3 Investigations

Measurement of the amplitude response over frequency of:

- voltage present at the coupling windings of the transmitting coil,
- the output voltage at the coupling coil of the receiver,

the balls were alternately or both replaced by fixed capacitors to ground.

If you look at the components of the circuit according to their function, then the ball and its connecting wire represent a capacitor to ground. Therefore what is examined here is whether the capacitance from the ball and connection cable to ground can be replicated with a capacitor to ground. The connection line between the base points of the main windings of both coils is initially maintained as before.
Presumably fixed capacitors the same size as the ball and line capacitance together should give the same results. In the experiments the ball of the transmitter and the receiver were alternately replaced with a small ceramic capacitor connected to ground. Finally both balls were replaced by this small ceramic capacacitor. Schuko sockets lack a suitable earth. The test arrangement corresponds to the sketch on the circuit sheet. The positions of the arrangement and the connection line were kept constant during the test period.




### 7.4 Result

When a capacitance value of 6.8 pF is selected the results are practically the same. (Results see attach). This value agrees with the sum of the capacitance values of ball (5.5 pF) plus connector line (1.9 pF), which together are 7.4 pF. This is sufficiently consistent.



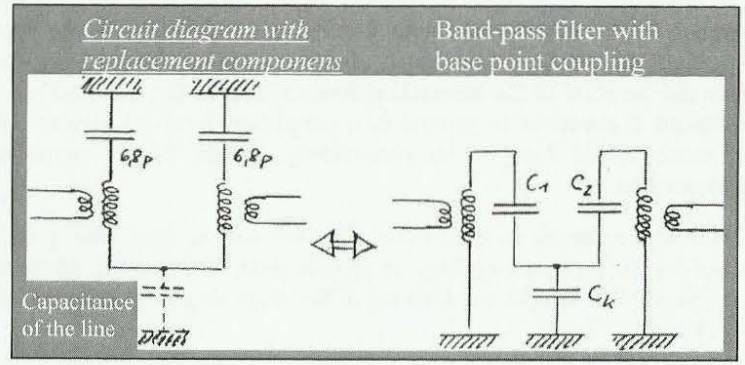



Fig. 7.2:

### 7.5 Conclusion

The suspicions were confirmed by the invertigation. The use of a ball plays no role in the transmission at the receiver, at least not in the area examined.

In a similar vein it could be investigated whether the flat coil can be replaced by a similar different type.

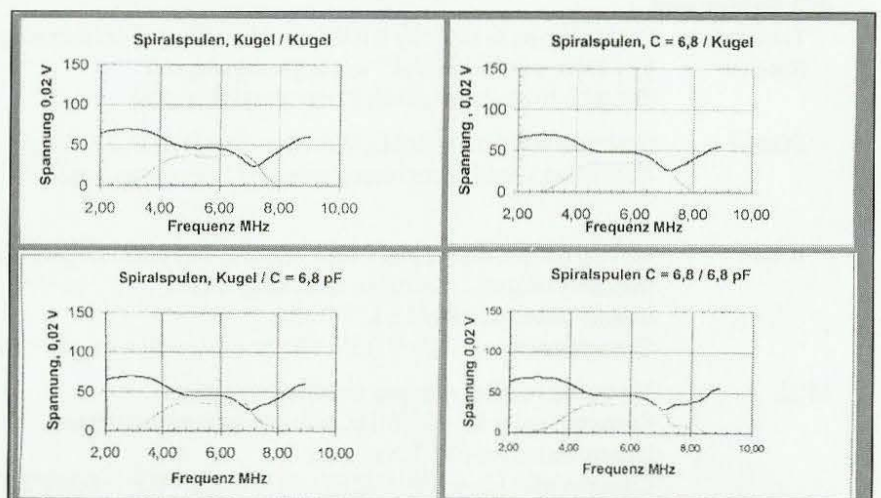



Fig. 7.3: *voltage applied at the coupling coil of the transmitter (dark line), the output voltage at the coupling coil of the receiver (light line) plotted versus the frequency at a load resistance of 680 Ohm.*

It is interesting to put this in relation to the results from experiment report 1 (chapter 6). In this it was found that the output voltage at the receiver was dependent on the type and length of the connecting line. If one looks at the electrical function of the connecting line, as long as the cable length is short, it represents a capacitor to ground in a simplified form (at greater length wave resistance would have to be considered), except that it connects the two arrangements.

This is the same as in the circuit diagram with a dual band pass filter and capacitive foot point coupling, as replacement components, as used in radio equipment. The height and distance of the cusps depends on the coupling factor which is given by $C_k$.

## 8. Lab Report: Flat coils with ball electrodes in shielding case

### 8.1 Aims

- Examination of an arrangement with flat coils and ball electrodes, one of which is in a shielding cage.

Investigation team in Reutlingen, March 2001

### 8.2 Equipment

| | |
|---|---|
| Transmitter, Receiver | Flat Coil Type A, made by INDEL GmbH, Villingen-Schwenningen<br>47 windings main coil und 5 windings coupling coil<br>Ball with 10 cm diameter mit 25 cm connection cable |
| FGmod | Generator 0,01 Hz - 10 MHz, ELV, $R_i$ = 50/600 Ω, $U_{max}$ = 5 Vss<br>ELV board, modified for battery operation, with sweep input |
| R-Instr. | Moving coil measuring instrument with one-way measuring rectifier,<br>frequency range 0,1 - 20 MHz, measuring range 2 / 5 / 10 V=<br>Internal resistance 680 / 1,5 k / > 3 k Ω,<br>Characteristic: $U_{eff}$ = (U= + 0,55)/1,35 bzw. $U_{ss}$ = (U= + 0,55) *2,074 |
| MG1 | Measuring rectifier, one-way rectifier arrangement<br>Frequency range 0,1 - 20 MHz, with connection to multimeter<br>Internal resistance 680 /1,5 k / > 3 k Ω,<br>Characteristic: $U_{eff}$ = (U= + 0,55)/1,35 bzw. $U_{ss}$ = (U= + 0,55)*2,074 |
| MA2 | Measuring adapter for plugging into INDEL board (receiver)<br>Terminating resistance 47 / 100 / 200 / 680 / ∞ ,<br>connectable with one-way measuring rectifier for multimeter,<br>Frequency range 0,1 - 20 MHz, Re = >3 kΩ. |



| | |
|---|---|
| SNA 62 | Generator with coupled selective measuring receiver, made by WaGo<br>0,1 MHz - 3,2 GHz, $R_i$ = 50 / 75 Ω, $R_e$ = 50 / 75 Ω,<br>connected to printer, used here as a scanner. |
| Antenna | 8 cm rod antenna coaxial cable, to measure the radiation in conjunction with SNA 62 |
| Shielding Case | Base plate and hood made from fine bronze gauze, soldered edges, joint of the hood pressed with 4 wooden planks, Dimensions: Width - 40 cm, Depth = 30 cm, Height = 65 cm,<br>Holes of 4 & 6mm for plastic axles for generator. |

### 8.3 Investigations

Measurment of the amplitude curve over the frequency of

- Output voltage at the coupling coil of the receiver
- The radiation

In which the receiver or the transmitter are alternately placed in the shielding cage. The circuit diagram shows the set up.

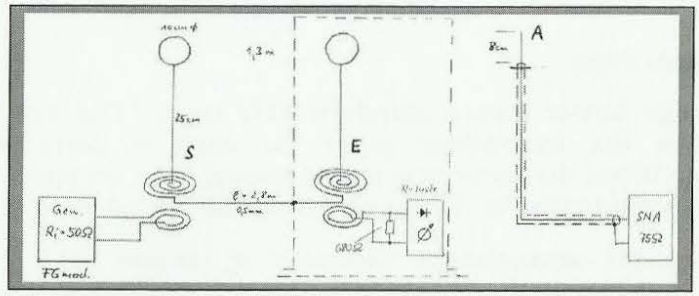



Fig. 8.1: Experimental set up

With shielding cage 30 x 40 x 65 cm

The receiver arrangement along with the passive display device can be placed in the cage. The instrument could still be read through the translucent bronze mesh. Likewise in the second run, the battery powered generator with the transmitter arrangement can be placed in the shielding cage. The generator could be operated by plastic axles which enter through the smallest possible holes. The outer connection of the primary coil ("earthing") was placed inside the shielding cage. The connection line to the second coil was connected externally.

The radiation was measured with a rod antenna and a selective measuring receiver as a scanner. In terms of the Scanner amplitude the envelope curve is to be evaluated.

There was always a control measurement made first, in which the shielding cover was not present. This was followed by the second measurement with the cover.

### 8.4 Results

When the receiver was in the shielding cage, output voltage could no longer be found there. With the antenna and the selective measuring receiver, as expected, radiation was found.

When the transmitter was in the shielding cage no output voltage could be detected at the receiver coil. Likewise there was no radiation present, even though the sensitivity of the scanner was increased as much as possible by narrowing the bandwidth.

### 8.5 Conclusion

The postulated transmission of electromagnetic longitudinal waves from both inside and outside of a shielded cage could not be confirmed by either the measurement of the output voltage at the receiver coil or by detection of radiation by a rod antenna, in the case of the transmitter being housed in the closed case.

### 8.6 Comments (Meyl)

Was the cage denser than a standard EMV cage? The negative result when the transmitter is in the cage is particularly surprising. When the receiver is in the casing, then normally the transmitter cannot find it. This we have already found out.

The experiment arrangement indicates a serious error: the generator operates with an internal resistance of 50 ohms to the coupling coil, which has a highest of 10 ohms. Perhaps the mismatch is the only shortcoming, but unfortunately I was not there to check everything. It makes sense that the theme of the "shielding case" is examined in the next chapter.



## VII.

## Experiments on the shielding cage and mobile phoning

A "technology scout" from Holland recently granted me another publication. It concerns a report, which the company KEMA made on his behalf in 2005.

### 1. KEMA Nederland B.V. Report

Under the Titel *"**Scalar waves for wireless or single wire energy transmission**"* the published Report contents 16 pages about an *"initial test to demonstrate the possibility of wireless or single wire energy transmission"*.

### 1.1 Summary

Prof. Meyl has developed a wireless energy transmission method with so called scalar waves. If this type of energy transmission succeeds, it is possible to develop a wireless energy distribution system. Tetradon, as technology scouting company, has discovered this technique and estimated the high value as a potential method for energy transmission. To get an objective opinion about the actual potential of this system, Tetradon has asked KEMA to perform some independent initial tests using the demo-kit, supplied by Prof. Meyl, for evaluating this wireless energy transmission method.

The purpose of these initial tests was to demonstrate (with the use of the demo-kit). The results of the initial tests are::

- energy transmission with the method of Prof. Meyl is possible.
- for small distances no energy losses are observed. However the system is very sensitive for environment and stray capacities.
- it is possible to transmit energy with a single wire configuration (from the inside of a Faraday cage to a receiver outside this cage, when a direct earth connection is used). This type of energy transport was also shown by Strebkov et al. [c].
- wireless energy transmission is not demonstrated (Faraday cage as earth connection).

This system is extremely sensitive for external influences. Therefore claims of wireless energy transmission could not be proven or disproved.

Another system with earthing of both transmitter and receiver employing energy radiation by radio transmission must also be feasible. Whether this would lead to significant energy transmission without hazardous effects to the environment is still to be seen.

The idea of energy transfer with a single wire or by earthing and radio-transmission as such seems feasible. For the moment power supply at low levels would be possible, particularly if the energy transfer can be stretched over a longer period than the energy consumption. An example could be radiation of energy to charge a battery that feeds LED's periodically as in a traffic control system.

For large-scale energy transmission further research should be conducted. When this system is applicable, it is for example possible to build off-shore wind parks further away from the coast.

## 1.2 Introduction

Prof. Meyl has developed a demo-kit to demonstrate wireless energy transmission with so called scalar waves. If this type of energy transmission succeeds, it is possible to develop a wireless energy distribution system. Tetradon, as technology scout, was exposed to this technique and marked it as a potential method for energy transmission. To get an objective opinion about the actual potential of this system, Tetradon has asked KEMA to perform some independent initial tests using the demo-kit, supplied by Prof. Meyl.

Therefore the demonstration kit of Prof. Meyl was investigated and some initial tests were done.

- The demonstration kit exists of:
- 2 electrode spheres
- 2 Tesla coils
- 1 frequency generator
- different accessories (i.e. cables, manual)
- 1 aluminium suitcase (functioning as Faraday cage).

The purpose of these initial tests was to demonstrate that:

- energy transmission with this method is possible,
- signal intensity is independent of distance between the energy transmitter and receiver,



- energy transmission is possible when the energy transmitter is placed inside a Faraday cage (single wire or wireless).

The theory behind scalar waves is described in the literature [a, b] supplied with the demonstration kit. It has not yet been studied in depth and this report will not draw conclusions on the precise theory or description as such.

## 1.3 Relation Energy Transmission and Distance

According to literature [a] the signal, and therefore the amount of transmitted energy, is independent of the distance between the energy transmitter and receiver. Therefore the distance between the transmitter and receiver is varied and the transmitted voltage is measured.

### 1.3.1 Set-up and measurements

In figure 1 the set-up of the demonstration kit is given.

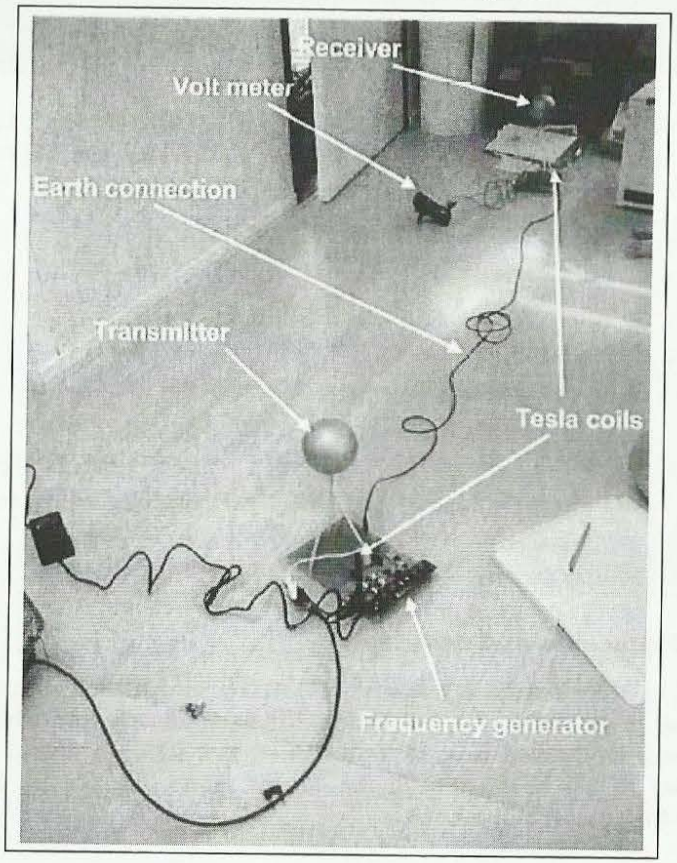



Figure 1: *Set-up Demo kit*

The distance between the centres of the transmitter and receiver are taken as:
• 20 cm, • 40 cm, • 80 cm, • 210 cm.

The voltages measured are strongly influenced by the presence and place of the cables used to determine the voltage. Also the shape of the function deviated strongly from a sine wave when observed with an oscilloscope. Therefore it was not possible to exactly measure the voltage. In Table 1 the measured voltages are given in relation to the distance. Also the frequency of the transmitted energy was determined. LED's on the receiving sphere indicate if energy transmission is present (see figure 2).

Table 1 Measured voltages at different distances

| Distance centre to centre | Voltage |
|---|---|
| 20 cm | 38-44 mV |
| 40 cm | 24-45 mV |
| 80 cm | 52 mV |
| 210 cm | 33,7-50 mV |

The frequency of the energy transmitted is 2.5 MHz which denotes a signal at the border of medium and high frequency with a wavelength in the order of 100 m.

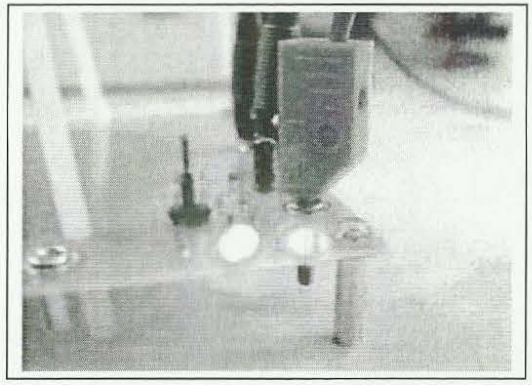


Figure 2: *LED indicating successful energy transfer*

### 1.3.2. Discussion and conclusion

The signal intensity is quite independent of distance between the transmitter and receiver, up to distances of a few meters. To be absolutely sure whether no energy losses are present over larger distances, this situation should also be tested. Care should be taken with the current set-up, because of the high sensitivity for external influences.



## 1.4 Influence Faraday Cage

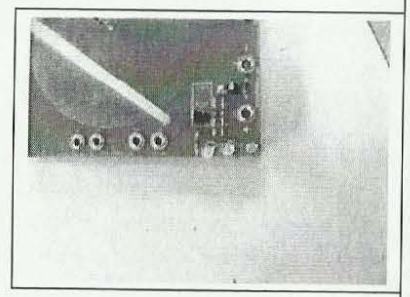
Different tests were done regarding the behaviour of the wireless energy transmission when a Faraday cage is present.

### 1.4.1 Aluminium suitcase

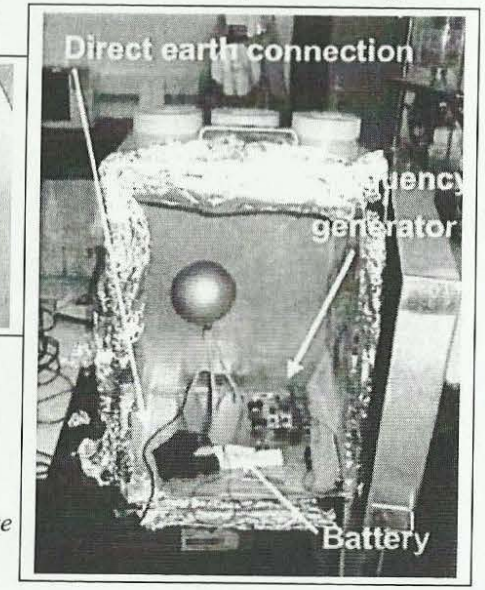
First the Aluminium suitcase was investigated on its Faradaic behaviour. A mobile phone was placed inside the suitcase and then the case was closed. With a phone outside the suitcase the mobile phone was contacted successfully. When contact is possible, the suitcase is not a perfect Faraday cage, at least not for the transmission frequencies for mobile phones. Although the present experiments were performed at lower frequencies and the cage may have a better Faradaic behaviour, still from certain frequencies the cage does not suffice. Therefore this suitcase is not used during testing of the influence of a Faraday cage on energy transmission.

### 1.4.2 Single wire energy transmission (direct earth connection)

A Faraday cage was designed using a metal box and additional aluminium foil, to completely close the gaps. The energy transmitter and the frequency generator were placed inside the cage. A battery was used to provide energy to the frequency generator (see figure 3).



*3a) LED indicating successful energy transfer with closed Faraday cage*




*3b) set-up inside Faraday cage*

Figure 3:
*Signal when one sphere is placed inside Faraday cage with direct earth connection*

A conducting wire was placed between the transmitter and receiver earths, creating a direct earth connection between the earth sides of the coils under the transmitter and receiver. The earth connection was insulated from the Faraday cage. A mobile phone was also placed inside the Faraday cage, so a guarantee of functioning of the Faraday cage can be given.

The frequency was adjusted until transmitted energy was received at the receiver (indicated by LED's). Then the cage was slowly closed, with only the earth connection going from the inside to the outside. The mobile phone was not reachable with the door closed. The energy (LED's kept burning) was still received at the sphere outside the cage.

### 1.4.3 Wireless energy transmission (Faraday cage included in earth connection)

According to the theory of Meyl wireless energy transmission from inside the Faraday cage to the outside is possible. This is tested by using the Faraday cage as earth connection. The earth connection of the coil under the transmitter inside the cage was connected to the aluminium foil and the same was done for the coil-receiver system outside the cage (see figure 4 and 5).

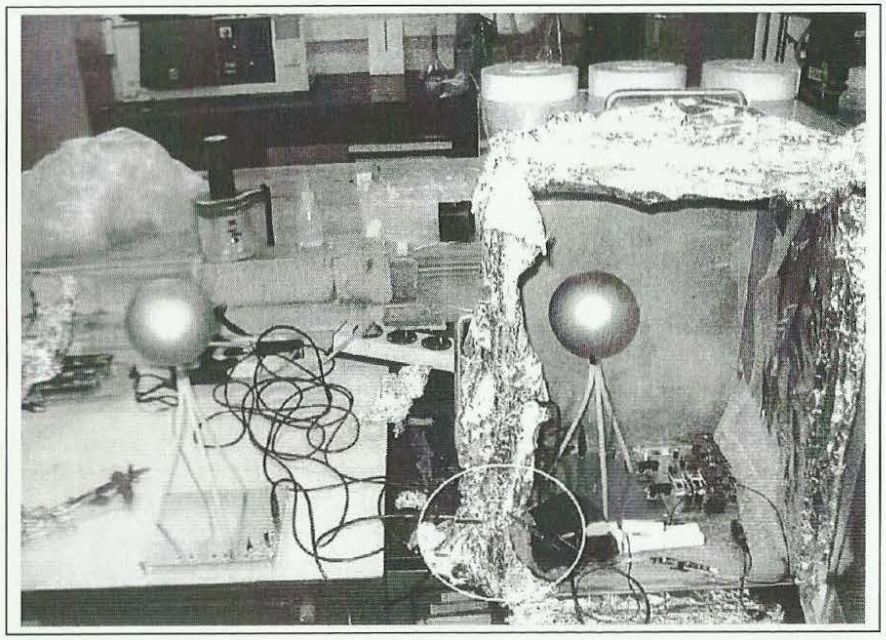


Figure 4: *Set-up with Faraday cage used as earth connection: overview.*



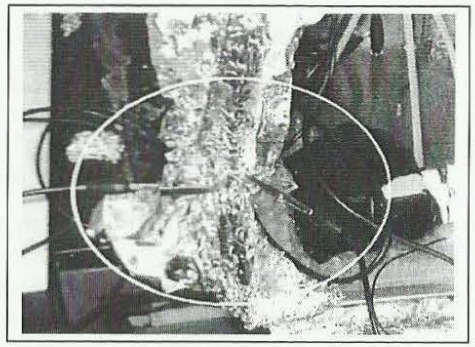


Figure 5: *Set-up with Faraday cage used as earth connection: detailed view of earth connection.*

When an earth connection through the Faraday cage was made it appeared impossible to adjust, the set-up such that burning of the LED's outside the Faraday cage was present. Opening the cage and tuning the generator was carried out repeatedly. Every time energy was received, and the hand necessary to adjust the transmitted energy was taken out of the cage, the received energy faded away. This indicates that the system is very sensitive to environment and stray capacities. Therefore it is not possible to determine whether complete wireless energy transfer from inside a faraday cage to the outside is possible. A human sized Faraday cage would be helpful to investigate wireless energy transmission (such that communication between outside and inside is possible for coordination of the experiment) or another type of sophisticated measurement set-up (e.g. tuning of the receiver on the outside could also be done instead of tuning the generator).

### 1.4.4 Discussion and conclusion

The aluminium suitcase supplied by Prof. Meyl appeared not be a tight Faraday cage. Therefore a more robust Faraday cage was developed.

From these initial tests it becomes clear that energy transfer with the use of a single wire is possible, even when an energy transmitter is placed in a Faraday cage. Probably the wire will function as energy transfer medium. Strebkov, Avramenko, Nekrasov and Roschin also show such .a type of energy transfer [c]. They developed a single-wire electric power system capable of transferring 4 MW/mm$^2$ with a current density of 600 A/mm$^2$ , but it looks like they used a superconductive system.

The system appeared very sensitivity to the environment and stray capacities. Not all experiments could be done and measured as precise as we would have liked to. Assuming Prof. Meyl also did tests in more robust Faraday cages it is interesting to know whether he always uses a direct earth connection or whether he also used the Faraday cage as earth connection. If the last was not done, no real evidence of wireless energy transfer is present.

### 1.5 Conclusion

Energy transmission with the system scalar waves is possible. For small distances no energy losses are observed. However the system is very sensitive for environment and stray capacities. Therefore it is expected that it will be very difficult to test this relation for larger distances with the present test set.

Energy transmission with a single wire system is possible, like also shown in literature. Because during the tests it appeared that it is possible to transmit energy from the inside of a Faraday cage to a receiver outside this cage, when a direct earth connection is used. A direct earth connection means that earth of transmitter and receiver are connected, but they are insulated from the Faraday cage.

For the particular case of wireless energy transmission it was not possible to measure this phenomenon. The system, with the Faraday cage included as earth connection, is extremely sensitive for external influences. Therefore, the claims of wireless energy transmission could not be proven or disproved for all cases.

If Prof. Meyl always uses a direct earth connection between the energy transmitter inside the cage and the receiver outside the cage, it is correct that energy transmission takes place. However this does not mean that it is wireless, because the earth connection can function as an energy transfer medium. This is the same system as used for single-wire electric power systems.

Another system with earthing of both transmitter and receiver employing energy radiation by radio transmission must also be feasible. Whether this would lead to significant energy transmission without hazardous effects to the environment is still to be seen.

Wireless energy transfer from within a Faraday cage as part of the earth system would be very interesting. For that last statement however more measurements have to be done in a more sophisticated measurement set-up.

The idea of energy transfer with a single wire or by earthing and radio-transmission as such seems feasible. For the moment power supply at low levels would be possible, particularly if the energy transfer can be stretched over a longer period than the energy consumption. An example could be radiation of energy to charge a battery that feeds LED's periodically as in a traffic control system.

For large-scale energy transmission further research should be conducted. When this system is applicable, it is for example possible to build off-shore wind parks further away from the coast.



### 1.6 Recommendations

Before starting the development of a wireless or single wire energy systems it is important to do some additional research. Aspects to be taken into account during this phase are described in the following paragraph in chronological order.

#### 1.6.1 Near future

For small distances it is clear that energy transmission ***without intensity losses*** is possible. However this relation is not demonstrated for larger distances. Therefore

- Relation between energy intensity and larger distances have to be determined. This should be tested in an area where little environment and stray capacities are present.

***Single wire energy transmission*** is possible. In literature systems using single wire energy transmission systems are present. Before developing a single wire energy distribution system, more information about the single wire system is necessary. Therefore:

- Literature research to single wire energy transmission systems, including aspects as superconductivity, should be done.

However the statement of Prof. Meyl regarding ***wireless energy transmission*** including a Faraday cage is not demonstrated. Therefore two additional aspects are necessary:

- gain information from the measurement set-up used by Prof. Meyl. Was there always a direct earth connection present or did he also use the Faraday cage as earth connection.
- develop a sophisticated measurement set-up, in which environmental influences are excluded.

#### 1.6.2 Future

Energy radiation by ***radio transmission*** is also a kind of single wire energy transmission, whereby the earth is used as direct earth connection. Therefore an investigation should be done to determine:

- the amount of energy transported with radio transmission,
- hazardous effects of radio energy transmission,
- existence of radio energy transmission systems.

Parallel starting the development of a single wire or wireless energy transmission it is necessary to know:

- possible markets (e.g. low power supply applications, or high voltage energy transmission)
- market sizes
- environmental aspects for different markets (e.g. a lot of environment and stray capacities or none).

### 1.6.3 Long-term vision

When technical performance and market potential are satisfying, the development of energy transmission systems can be developed. Dependent on the outcome of the research, low level power supply or large-scale energy transmission systems can be developed.

For example low level power supplies can be used for feeding of LED's in a traffic control system.

Large-scale energy systems can, for example, be used to build off-shore wind parks further away from the coast.

Arnhem, 7.Juli 2005

KEMA Power Generation & Sustainability

By order of Tetradon

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## 1.7 References

[a]: K.Meyl: Dokumentation zur Skalarwellentechnik, INDEL 2000

[b]: K.Meyl: Elektromagnetische Umweltverträglichkeit, Teil 3, INDEL Verlag 2002, engl. edition: Scalar waves, part 3, 2003

[c]: Strebkov, Avramenko, Nekrasov and Roschin: Single-Wire Electric Power System; New energy Technologies; Issue 1; 2003

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**1.8 Utilities:** the Experimental kit of the 1st Transfer Center of Scalar wave Technology.



## 2. Comment

This KEMA report focusses on an economic application of scalar wave technology, in which the single wire solution is of particular interest. Namely the grounding line is not connected to the faraday cage, so the entire high frequency output power is taken out of the cage via this line. This is actually more like a single wire technology.

### 2.1 Single wire or wireless?

If the above manual is followed then the faraday cage should be completely closed, ie. there may not be any cables running from inside to outside. The transmitter inside should be conductively connected with the cage from the inside, and the receiver from outside.

Whoever thinks that commercial aluminum are cases are not resistant enough to HF can build their own suitable case. At several companies in Munich and Erlangen, amongst others, the experiment was successfully demonstrated in a standard EMV shielding case.

The only time where function could not be displayed that I have experienced, was in Erlangen. The frustrated engineers dragged me and my kit, which still worked in an EMV case, into the shielding case of a magnetic resonance tomograph. That time the others won and I, frustratedly, had to admit that the strong magnetic fields of the superconducting magnetic coils had overridden the weak field of my demo kit, and in addition overloaded the receiver outside the casing so much, that the receiver could no longer find its transmitter. In this case the LED remained dark.

## 2.2 The mobile phone in the microwave

In the KEMA report the aluminum case was checked for HF impermeability by placing a mobile phone inside and calling it. In an incorrect assumption a phone of this type would only emit electromagnetic waves, which would require antenna efficiency of 100%. This team came to the conclusion that the case was not a usable cage, which is why they made their own cage.

However the experiment can be repeated at any time with a microwave oven. Put the mobile phone inside, shut the door, and ring the number. If it rings then is the cage unusable? Yes, because such a cage would not be TÜV [Eng. Technical Inspection Association] certified, and would never reach the required CE standard.

Inside a microwave oven a magnetron generates at least 750 watts of HF power. If the oven space were not impervious to the 2.45GHz then it would be dangerous to anyone who cooks with it. The cooking space must work as a standard Faraday cage. And if no microwaves can escape, then likewise no radio signal can penetrate inside it. But in reality the phone inside the cage does ring. Why is this?

The transmission power of a mobile phone is less than 0.5% of the power of the magnetron in a microwave oven. The incoming field strength, which indicates the call, is lower again, as this reduces with distance from the nearest transmitter mast, according to the inverse square law. And this comes through when nothing else does?

In the early days of "mobile mania," when transmitters still had a good efficiency of 80% and an antenna was pulled out of the phone, this experiment would have seldom succeeded, because only 20% of antenna noise, which allows scalar waves to be able to "tunnel," had a chance of penetrating the cage.



But then opponents of mobile communications began to call for the limits for electromagnetic waves to be made more stringent. At first the were not listened to, but eventually they appeared on TV and were heard by more people. They form a respectable cross section of society. Only qualified high frequency engineers, who are familiar with wave equations, did not take part. The mobile communications industry eventually acted.

Extendable antennas disappeared from the market. Antenna efficiency was halved from around 80% to 40%. This means that only half as many electromagnetic waves are emitted, which is touted as beneficial for public health.

However, with this the scalar wave proportion has been tripled, from around 20% to 60%, and this alone is responsible for people's biological exposure [3, Part 3].

## 2.3 The scalar wave portion of a mobile phone

The wave equation has only two components, the transverse and the longitudinal component. But it does not describe thermal losses. Those looking for answers should know the major wave equations and take the laws of physics seriously. This example makes it clear how important a good educational in the basics is, so that mistakes are not made.

In fact, all the mobile phone masts were reequipped because their transmitters are supposed to communicate with mobile phones. Today if all the world makes a call from a car, tube train, or even from inside an elevator then it will only work if the radio signals can come in and out of the faraday cage.

HF engineers will benefit from the fact that the scalar wave part, unknown to them, can be modulated in the same way, as they have learned from the Herzian part. So they are not forced to distinguish between the two parts of the wave.

In addition the distance to the nearest mobile phone mast is short enough that no fading due to different propagation speeds can take place. However this means that a modern mobile phone barely uses the electromagnetic waves measured in the EMV lab, and these are largely replaced by the biologically relevant scalar waves. Can this be proved by measurments?

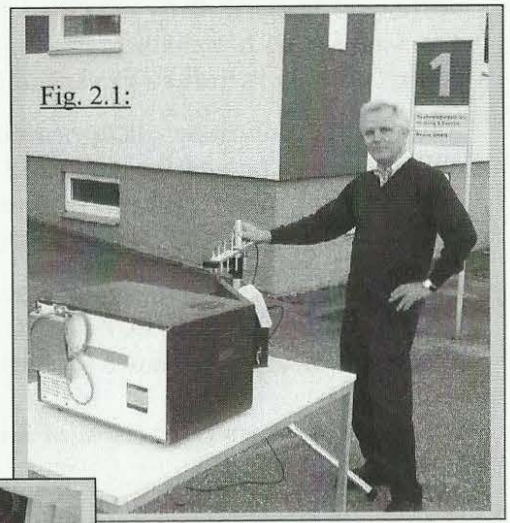


Fig. 2.1:

September 2005 in the car park in front of the Technology Park of Villingen-Schwenningen a free field measurement was made (see figure 2.1). First the environmental noise was measured: 80 dB µV/m.

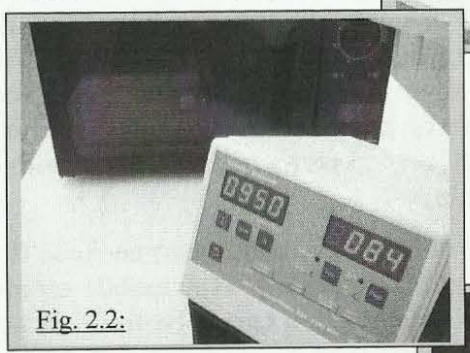


Fig. 2.2:

Then a mobile phone was placed in the microwave oven, turned on, and called. Here the field was raised to 84 dB µV/m.
(see figure 2.2 left).

When the cage door was opened, the level rose to 89 and 105 dB µV/m, depending on the requirements of the mobile phone (fig. 2.3 right).
Although when no standardized measurement environment was present here, it tended to indicate:

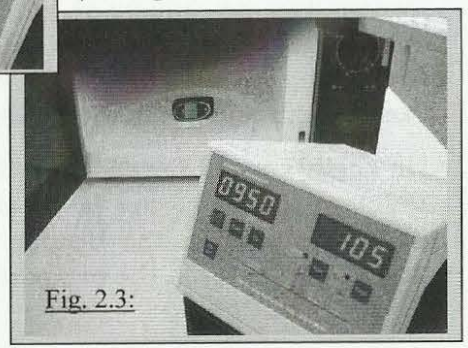


Fig. 2.3:



The field of the mobile phone inside the Faraday cage is detectable outside the cage and it can be correlated with its respective activity (on/off, ringing, receiving speech etc.). In this example, the level was at least 4 dB µV/m above the general ambient noise of the environment. With the door open, this increased by at least another 5 dB µV/m. This means that in this older phone model, the efficiency was still about 50%.
This trend continues and today's devices are much poorer. Eventually only scalar waves will remain.

Whoever does not have the measuring apparatus used here can instead look at the bars that indicate the field strength of their phone.

If a mobile phone from today were placed in a cage outdoors, then, in my experience, the number of bars would halve, because all electromagnetic parts would be retained by the cage. If the same experiment where carried out in a reinforced concrete building or a basement, where attenuation is already provided by the steel mesh in the walls, then the decline will be less.

A complete decline barely takes place at the present density of the transmission masts. Only if the next mast is very far away and the reception ouside would be very weak.

### 2.4 Biological Compatibility

In the KEMA report the issue of biological compatibility using a wireless energy transfer is also mentioned and research requirements are identified. This concern is entirely justified. It is also shared by those opposed to mobile communications.

My comment is: *you should just not make mistakes.*

Biology does it correctly. The scalar wave radiation generated by cells is received and collected by other cells. Therefore it is important to collect [the scalar waves] [9].

However the cells produce more radiation than is necessary. The radiation which does not find a receiver, radiates out from the body as an aura. Measuring instruments see this as a noise signal. Since no specific measuring instruments for scalar waves, with which the aura could be detected, are available, here only the sum signal (as noise) was measured.
Conversely technically generated scalar waves can radiate into the body and be collected there. In this case, when a person becomes a receiver, there may be a biological effect [10]. The stray fields of a scalar wave source are always to blame.

It is problematic that body cells use scalar waves as an energy carrier as well as for information, and they show a tendency to become in resonance with all available signals in the surroundings. On the other hand, cells favor certain frequency windows and always use magnetic scalar waves and not electric. [11].
The frequencies used for mobile communications (UMTS, W-LAN, Bluetooth, ...) are now largely in the middle of the biological window at about 2.45 GHz. The microwave oven also operates at these frequencies, so the absorption by cells technically warms.
Systems for wireless energy transmission, such as RFID are the WiTricity [4] propagated by MIT, work with the stray magnetic field. That which could lead one to despair: *everything which can go wrong, will go wrong."*
How might a better technology for wireless energy transmission look?

- Directional instead of scattered fields (completely collected by the receiver)
- Electric fields instead of magnetic fields
- Scalar waves instead of electromagnetic waves (which carry no energy)
- Only operates outside of biological frequencies (eg. VLF, LW and KW frequencies)
- Perfect resonance between transmitter and receiver (same frequency, opposite phase, identical waveforms)



### 2.5 A 400 watt transmission without stray field

In an accredited laboratory for electromagnetic compatibility in Austria we clearly got it right. There, only 150 watt and then 400 watt transmissions were tested.

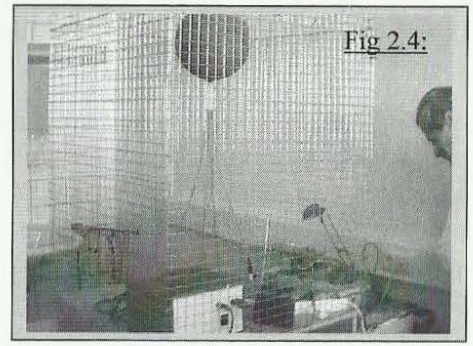


Fig 2.4:

The scalarwave transmitter was placed in a Faraday cage, whilst outside the cage a washing machine motor (as an example) is supplied with power wirelessly over greater distances. To the astonishment of the EMV technicians, the field of the transmitter was not measurable.


Fig. 2.5:

After finding the resonance point, the transmission power was set to exactly the power collected at the receiver, so that no stray field would occur. From that moment on no field was detected, as all the field lines from the transmitter ran exclusively to the receiver.

Without a stray field no losses occur, the range goes to infinity and there is also no biological influence any more. This would be ideal and to seek this should be our aim. The EMV experiment makes clear that the goal of an E-smog-free wireless transfer of energy is actually attainable.
Or put another way: whoever doesn't attain a CE mark for their scalar wave equipment, has it set wrongly or has not found the resonance point. But who practices with the set will quickly realise: "practice makes perfect."

## 2.6 Mesuring equipment for scalar waves

It should be made clear to whoever still has doubts about the existence of scalar waves that the wave equation requires the existence of a recognized law, and this is not up for discussion or debate. What's more we have an obligation to apply laws, including those of physics.

We should take this restriction as an opportunity and draw positive conclusions. The part, which is measured at lower than the theoretical maximum of 100%, we should no longer leave unnoticed or dismiss as garbage or disturbing antenna noise. On the contrary this is the biologically relevant part, which delivers energy and information to cells.

This wave part could be used to great benefit and even measured. The experiment with the Faraday cage shows us this. There the scalar wave part is decoupled from the electromagnetic part. So we could construct orifice plates or scalar wave filters.

This has to do with the tunnel effect, because, as we know, a Faraday cage retains electromagnetic waves when the wire mesh is tight enough. Whatever still wants to come through must tunnel. (see [3], Part 1 comments on tunnel effect, chapter 6.14).

It was proven at the University of Cologne that a tunneled signal is faster than light [12]. This is completely in accordance with the wave equation, and the scalar wave portion contained therein.
On the other hand, the quantum physics misinterpretation of an instantaneous tunneling, in which no time should pass, appears to be a violation of the law. Perhaps it is caused by ignorance as a result of poor education and a neglect of the old field physics.

At present there are still no scalar wave measuring devices. However this could change.



One idea, for example, would be to subtract the radio signals received simultaneously from wide-band noise receiver, in order to display the scalar wave portion.
From military research it has long been known that it is possible to hide secret information in a noise signal, and then make it audible again through cross-correlation or auto-correlation analysis. This is scalar wave technology at its finest. On this subject another group of students from TU Berlin have carried out research. *Knowledge is helpful it is learned from.*

## 2.7 Radiation-free mobile communications with scalar waves

Much attention was aroused by the public demonstration of a phone call from Bad Tölz in Bavaria to St Petersburg. The show was repeated shortly afterwards with a call to Australia. What was special was that these telephones did not require batteries. To my knowledge they were filled with wires and quartz sand and use scalar waves as an energy supply, as well as a carrier for the modulated spoken information.

A German-born, Russian-educated scientist demonstrated the futuristic technology. Gravitational waves provided the energy used, or so he told astonished reporters. Of course these may also be considered as scalar waves. Since the natural waves do not carry enough energy, it was sent out by a technical source, which his colleagues on the other end temporarily "scaled globally" onto the wavelength of his phone line. This was a one time show, which was not repeated by the people involved.

My institute, the 1st Transfer Center for Scalar wave Technology (1.TZS), at the same time, demonstrated a similar experiment in the technology park of Villingen-Schwenningen as part of a series of public lectures. However in this experiment the transmitter was not hidden. On the contrary, everyone was supposed to see where the receiver got its energy from. The demonstration took place on 14th of March 2003 and was repeated again a year later. The secretary of a 4-member research group presented this report to his colleagues and friends:

### 2.7.1 Scalar wave LAN, a visitor's report (14.3.2003)

"The known components of the demo kit are used: flat coils, ball electrodes and HF generator. The "transmitter" and "receiver" arrangement was connected with a "ground line" as before.

Firstly the transfer of data between two laptops was shown. They were connected to the transmitter and receiver of the demo set with special interface boards. The transfer too place in both directions. Modulators on the interface boards altered the load, so that the generator voltage on the transmitter side was changed (modulated) directly or through the reaction of the receiver. On the respective other sides the signal is indicated. "

### 2.7.2 Scalar wave mobile phones, the visitor reports again

"In the second experiment a "transmitter" with a generator was connected with two "receivers" through a "ground connection cable." A cassette recorder was connected to one of the "receivers." An active loudspeaker was connected to the second "receiver."
Any properties in the final stage at the low impedance loudspeaker output of the tape recorder seem to be sufficient to change the HF load. These changes in load causes voltage changes (modulation) at the generator of the "transmitter," which [makes the signal] effective and detachable. The coupling coil of the "receiver" contained a diode bridge for demodulation. "

I will reveal the circuit I developed and used in the demonstration in the next chapter. In the lecture scalar waves, shown as a model, are compared with modern mobile communications and the advantages [of scalar wave communication] explained:

- ***No stray field*** (as waves are bundled at the antenna)
- ***No biological influence*** (without stray field)
- ***Global range*** (when ideally bundled)
- ***No battery in mobile phone*** (supplied by wireless transmitter)
- ***Un-tappable*** (exclusive resonance with the other partner in the call)
- ***Decentralized organized network*** (no network provider required)



The disadvantage is the stray field which occurs when the phone establishes resonance with the other partner in the call. Another difficulty would be the billing system and energy from the central transmitter could be collected by "black listeners" and diverted. There is a lot of work to be done by engineers, but technical solutions are possible.

It is up to us whether we prefer low-radiation mobile communications or whether we want to continue to be exposed to radio waves day and night without interruption.
But first let's read on with the insightful, slightly abridged report from the scalar wave demonstration at the Villingen-Schwenningen Technology Park in the Black Forest.

### 2.7.3 Scalar wave boat model, the visitor reports further

The coils-ball arrangement was connected to a 3 watt power amplifier. The connection line led from the outside coil end, under the bottom of an inflatable paddling pool, to a 20*30cm electrode. The water in the pool was made more conductive with two cans of salt (the salt improves the transmission but, in our experience, is not absolutely necessary). The boats each had a spiral coil and a ball (with a cap made out of aluminum foil to increase the capacitance). The bulb of a boat lit up because of transmitted energy, when at the other boat a motor with a propeller was driven. The efficiency of the transmission after subtraction of the losses in the coils was around 70% - 80%.

In the second part of the experiment the "transmitter" arrangement was inserted into an aluminum container with a lid (around 60cm diameter, 70cm height). The container was grounded. The supply line was connected with a coaxial plug, and the connection line was led out isolated. Even under this conditions the lamp lit up and the boat was moving.

### 2.8 Scalar wave transmission of biological signals, report

Some people have used the components of the demo kit for medically therapeutic experiments. Therefore a special design is now offered for these applications. In it the coils, balls and other components are housed in two tall, narrow casings. The flat coil is located at the upper surface so that substances and preparations can be placed on it.

One of these casings contains the generator with adjustment controls, such as a timer with which timings for procedures can be set (SWG-A, see www.etzs.de, in the shop: "devices").

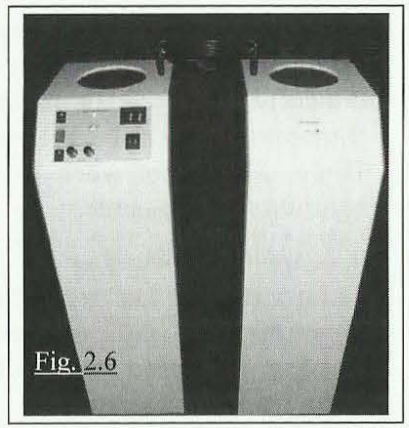


Fig. 2.6

The other casing contains only the receiver coil and ball. Both casings have LEDs to show resonance.

A drug is placed in glass bottles on the coils, and the experimentee sits in the field between the antenna balls. In some cases the effect will be immediately verifiable. Doctors in Saarbrücken and an Austrian rehabilitation center were identified as users. With well over a thousand patients with broken bones, the rehab center has found this treatment to be statistically significant. The average length of stay was reduced from 3 weeks to 2 weeks with 4 minutes of application per day. This results in a cost reduction of about 30%, so it should also be of interest for health insurance companies.

After the break an interesting video of Dr. Rothdach, MD from Munich was shown. He has documented experiments, in which he has transmitter information to biological systems or copied information from substances on water: He used the demo kit in its normal form (coil type A). In one of his measured diagrams a weak resonance of the voltage at the receiver coil at about 5MHz, and a strong pronounced resonance at 6.85MHz was recognizable. (According to Prof Meyl the higher resonant frequency is where scalar waves occur.)

In the first experiment the oscilation for a substance is transferred to a person seated next to it. To check the effect the BIO-ohmmeter from the Aschoff's testing set up was used. Because of expenses the measuring range is limited to the 4 measuring points of a hand.

The transmitter coil was fed with 6.85 MHz. The receiver coil was placed further away. When chemical or biological toxins were placed on the transmitter coil then the BIO ohmmeter readings of the test subject were outside of the norm. If they were removed or if nosodes with counter agents (dilutions of the poison) were applied to the body then the values returned again to the norm. With the Herzian resonance at 5MHz no such information could be transmitted.



At the transmitter coil and the connected receiver coil: a substance was placed at one coil, and at the other a glass with distilled water was placed at the other coil. After a few minutes of exposure at 6.85MHz the information was copied. This water was used for the test described above. The effects were the same as with the original substance. The copying works in both directions: from transmitter to the receiver and vice versa. At 5MHz (electromagnetic wave part) no information could be copied.

Dr. Rothdach explains it by saying that the transmission of information only takes place with the scalar wave at 6.85MHz, and not with the Herzian wave at 5MHz. If the receiver coil was connected to the 100ohm resistor (selected by a jumper) instead of the LEDs, then no influence could be achieved, "because all energy is absorbed", the medical doctor said. "

## 2.9 **Use of scalar waves in ancient times,** end of the report

"Obviously such transfers of information are possible. The mechanism which makes it work is to be regarded as open. Probably much investigation work is still necessary in order to understand what happens in this experiment.

In the last contribution Prof. Meyl told us about his new book: "Transmission Technology of the Gods" [*Sendetechnik der Götter*], a very interesting matter which will surely occupy me for a while. At the end of the event each participant received a copy."

That was the report on the events in March, written by the secretary of the quartet of HF researchers, which was addressed to "those interested in scalar waves."
Before the experiment-loving doctor from Munich has a chance to comment himself, I would like to report more on the circuit technology of the scalar wave phone. A group of students have kindly written three laboratory reports, which may be replicated.

This technology can also be combined with the paddling pool. For this purpose we built an amplifier and speakers on the raft. The energy is, of course, transmitted wirelessly through scalar waves, together with the music, which is modulated on [to the wave]. The LF source at the transmitter was turned on, and then the music played at the floating raft.

## 3. Experiment: LF transmission from transmitter to receiver

**3.1 Location:** Performed in Laboratory for electrical engineering, 2002

**3.2 People carrying out experiment:** Two university students

**3.3 To state the physics of electromagnetic waves (Heinrich Herz):**

The electromagnetic wave transmits, by modulation of its carrier frequency, the LF signal without exception from transmitter to receiver (as usual in radio technology)

**3.4 Expectations according to scalar wave theory** (by Konstantin Meyl)

The scalar wave functions exactly the same as the electromagnetic wave. It is expected that in both set ups an information transfer is possible. A simultaneous energy transfer should only be possible with the scalar wave at the higher frequency.

**3.5 Experiment set up**

Required: 2 identical flat coils (type A or C) and 2 ball electrodes, a grounding cable, a frequency generator (up to 12MHz), a source for NF signal and an active loudspeaker or an oscilloscope (fig, 3.1)

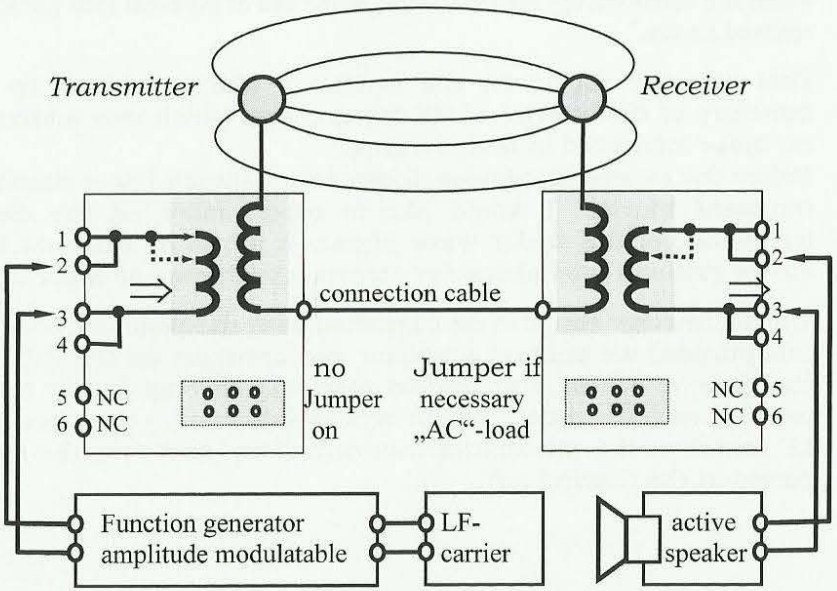



Fig. 3.1: *Set up of a music transmission by scalar wave*



The balls are placed above the plates and their cables contact with the center of the coil. With the connection cable you connect the two plates at the sockets marked "grounding" (standard set up).

As HF generator we used the digital and amplitude modulatable generator (SWG-M). It is connected to terminals 2 and 3 on the transmitter plate.

On the second plate (receiver) you connect the active speaker or the oscilloscope to outputs 2 and 3 of the plate, if the active speaker filters out HF itself. In this case it could be advantageous to load the receiver with 100 ohms, this was the jumper will be in the "AC" position.

Otherwise you use the HF rectifier on the plate, then set the jumper to "DC" and connect the active speaker to terminals 5 and 6.

**3.6 Experimental Procedure**

Firstly set the frequency generator to the aproximate resonant frequency (Herzian wave aprox. 3.5-5MHz, scalar wave aprox. 6.5-8.5MHz). Then start the audio source and adjust the HF frequency until you can hear the LF audio signal well (or you can see on the oscilloscope).

**3.7 Evaluation**

The transmission works for both types of wave in the same way: ie, the LF signal arrives at the receiver, even if it is not high quality, which can be explained by the simplified design of the demodulator.

**3.8 alternative audio frequency modulator** (development by 1.TZS)

Not every function generator has an inbuilt LF modulator. For such cases we have developed a simple circuit with only a few components. This is installed between the sound carrier and sockets 5 and 6 of the transmitter plate. The jumper activates the sockets by being switched to the "DC" position.

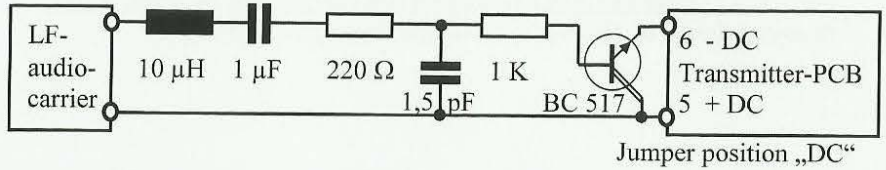



Fig. 3.2: *LF-Modulator for the scalar wave transmitter*
*(the circuit is a first draft by Steffen Finger, an employee at 1.TZS)*

### 3.9 The whistling buoy (development by 1.TZS)

On the receiver side there are other demonstrations possible which can only be achieved with scalar waves. The receiver floating on an island with its optical signal reminds us of a light buoy.
A particularly attractive advance is the music transmission, in which the LF amplifier draws energy itself from the carrier wave. A battery is not necessary with this, and it still makes the buoy in the water make noise.

The receiver plate (without jumper) is connected to the HF coil through terminals 2 and 3 with the circuit shown below. The operating voltage of the amplifier is stretched over a cascade. The rest is largely standard LF circuit technology.

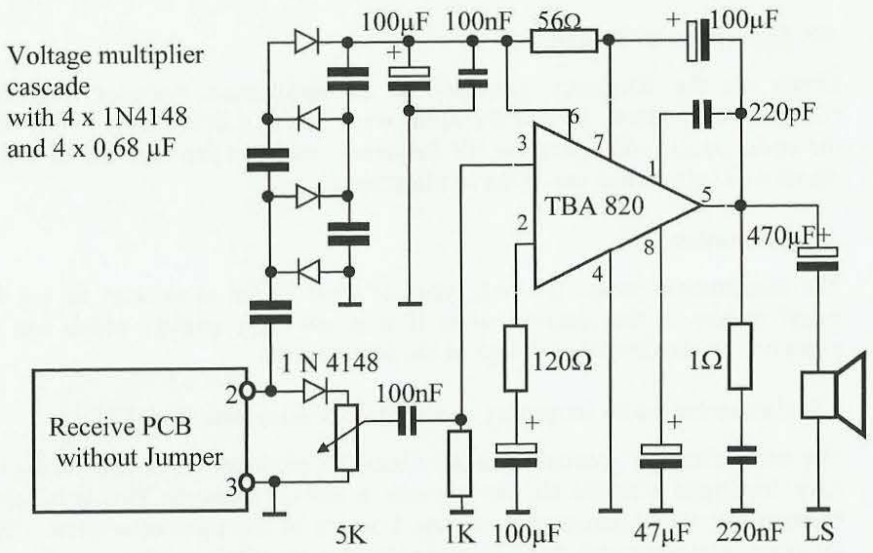



Fig 3.3: *LF-Amplifier with information and energy from the scalar wave. (a circuit design by the employee Steffen finger 1.TZS, 2008).*



## 4. Experiment: LF-transfer from receiver to transmitter

**4.1 Location:** Performed in electrical engineering placement in 2002

**4.2 People carrying out experiment:** Two university students

**4.3 To state the physics of electromagnetic waves (Heinrich Herz):**

The electromagnetic wave does not interact and therefore is not capable of sending the LF signal from the receiver backwards from the receiver to the transmitter (otherwise every broadcaster would hear many listeners who are switched on).

**4.4 Expectations according to scalar wave theory** (by Konstantin Meyl)

In the case of scalar waves the transmitter and and receiver are in an exclusive resonance, so that from the point of view of the signal curve they are indistinguishable. This also means that signal fluctuations occur in exactly the same way on one side as the other. For this reason it is expected that the backwards transfer can also be achieved.

### 4.5 Experiment Set up

Required are 2 identical flat coils (type A or C) and two ball electrodes, a ground wire, a frequency generator (up to 12 MHz), an audio source for the LF signal and an active loudspeaker or an oscilloscope (similar to the set up in 3.5). The audio source is connected with the low impedance loudspeaker output directly to the DC terminals 5 and 6 of the receiver coil (the jumper is in the "DC" position).

With the connection cable you connect the two plates at the sockets labeled "grounding" (standard setup).

On the transmitter you connect the active speaker or the oscilloscope to the outputs 2 and 3 of the plate with a parallel RC circuit (without jumper).

### 4.6 Experimental Procedure

First, set the frequency generator to the approximate resonance frequency (Herzian wave aprox. 2.5-5 MHz, scalar wave aprox. 6.5-8.5 MHz). Then start the audio source and adjust the frequency of the HF until you can head the NF audio signal (or see it on the oscilloscope).

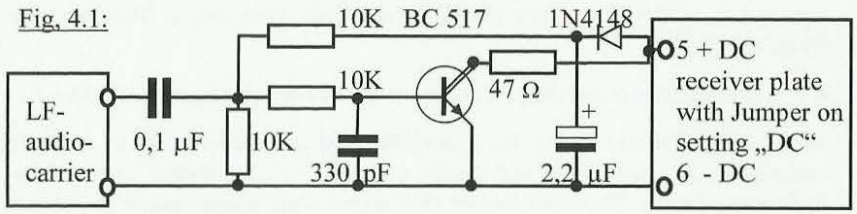
### 4.7 Evaluation

With the Herzian wave the NF signal cannot be heard or seen. With the scalar wave it can.

### 4.8 Improved audio frequency modulator (development by 1.TZS)

As a result the students were able to reach the goal, but critically it is too early to judge the techniques used. Firstly not every MP3 player or sound carrier is suitable for direct connection. Also the coupling at the transmitter proved to be rather a fluke. We were invited to 1.TZS to make improvements. In the new design the base bias is obtained from the HF signal, and, in comparison to the original design, it is also significantly enhanced and improved.

Fig. 4.1:




Note: The load resistance (R2 = 100 Ω between 5 and 6) is rather disturbing in this operation and should be unsoldered from the board.

This time the HF receiver plate is supplied with the audio signal and it is decoupled at the transmitter. It is important to refine and improve the circuitry for decoupling.

### 4.9 Improved audio frequency decoupling (development by 1.TZS)

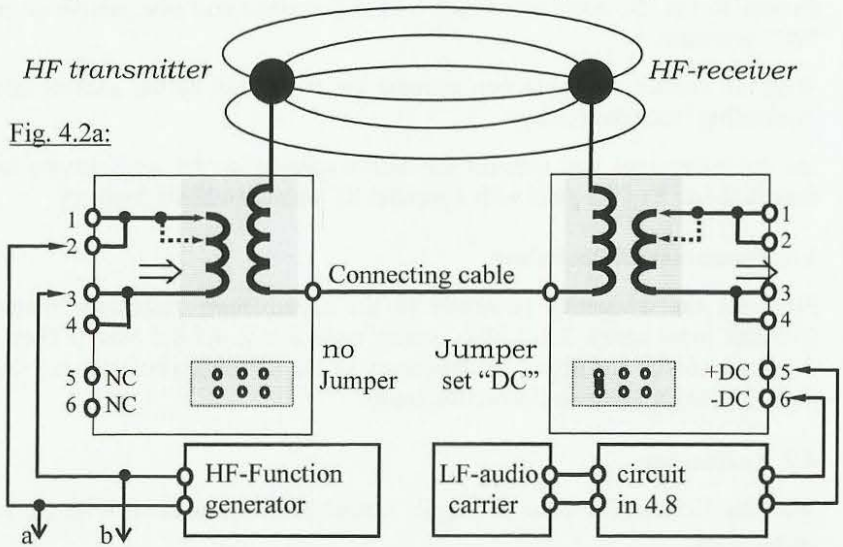



Fig. 4.2a:



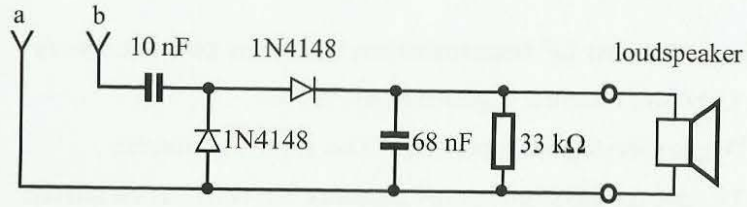



Fig. 4.2b:

*Continuation of plan 4.2a for uncoupling of LF signal in parallel to HF transmitter (a circuit design of the employee Steffen finger 1.TZS, 2008).*

### 4.10 Discussion and evaluation (of the improved circuit of 1.TZS)

With a little effort the weaknesses of the circuit, tested by the students in the electro technical laboratory, can be avoided. The Tesla transmission once again proves itself to be a perfectly coupled resonant circuit. The importance of this in industry is enormous. Take, for example, the tire pressure controls in a heavy goods vehicle. This is a clear contribution to road safety, but a technical challenge.

The distance between dual tires is too big for RFID technology, and "energy harvesting" or battery operations are not reliable enough. Here scalar wave technology opens a few field of activity. Just to name one example if an electronic sensor is inaccessible or is rotating, it can be supplied with energy and then the information obtained can be sent back to the energy transmitter.

At the South-West exhibition in 2008 and the Mannheim Maimarkt in 2009, such a system was publicly demonstrated. As an example the signal from an optical sensor was captured at the HF receiver and modulated onto the scalar wave as a carrier signal, and then sent backwards to the HF transmitter. This technique works regardless of whether one supports the existence of scalar waves or is a sceptic.

In this application the connecting line is not detrimental, but rather the opposite. In a vehicle the chassis serves as a return line. The ball bearings barely impede the HF. In lifts the suspension cable can be used etc.

The advantage is that the number of potential recipients, which the transmitter power is divided amongst, can be limited, and that increases the reliability of the transmission line. In order to go into resonance there must be galvanic connection to this so called "earthing." This will also apply to people, who, if they are not conductively connected, who do not need fear biological disturbance.

## 5. Experiment: LF-transmission between two receivers

**5.1 Location:** Electrical engineering lab. in 2002

**5.2 People carrying out experiment:** Two university students

**5.3 To state the physics of electromagnetic waves (Heinrich Hertz):**

The electromagnetic wave transmits by a modulation of its carrier frequency, always from transmitter to receiver (radio technology).

**5.4 Expectations according to scalar wave theory** (by Konstantin Meyl)

Now the two versions (experiments 3 and 4) come to fruition. Since both individual tests work when tested individually, it is assumed that this attempt to send and receive an audio signal from HF receiver to HF receiver should work. The main difference is in the in-phase operation of the two receivers. When the transmitter and receiver oscillate in opposite phase to each other, then this also applies for every further receiver which receives its energy from the transmitter. So the receivers are in phase with each other. So they cannot establish a resonance with regard to the scalar wave. This leads to a decoupling of the carrier wave, because this inphase LF signal arrives at all further receivers rotated 180°. At this point it is just important that something arrives, assuming the experiment succeeds.

**5.5 Test set up**

Required are 3 identical flat coils and 3 ball electrodes, 2 grounding cables, a frequency generator (up to 12MHz), an audio source for the LF signal and an active loudspeaker or an oscilloscope. Whoever works with the experiment kit can substitute the transmitter with coil A, and the receivers with the two type C coils and the ball atnennas. This is similar to Tesla's original report, in which his transmitter also operated his transmitter with $\lambda/4$ and his receivers with $\lambda/2$ .

With the respective connection cables connect the receiver plates to the sockets labeled "ground" at the transmitter coil.

Connect the LF source with outputs 5 & 6 to the HF receiver PCB (jumper on "DC"). The frequency generator supplies the central transmitter using the HF inputs 2 and 3 of the transmitter plate (without jumper). At the second HF receiver plate connect the active speaker or the oscilloscope to outputs 2 and 3 of the plate (jumper on "DC").



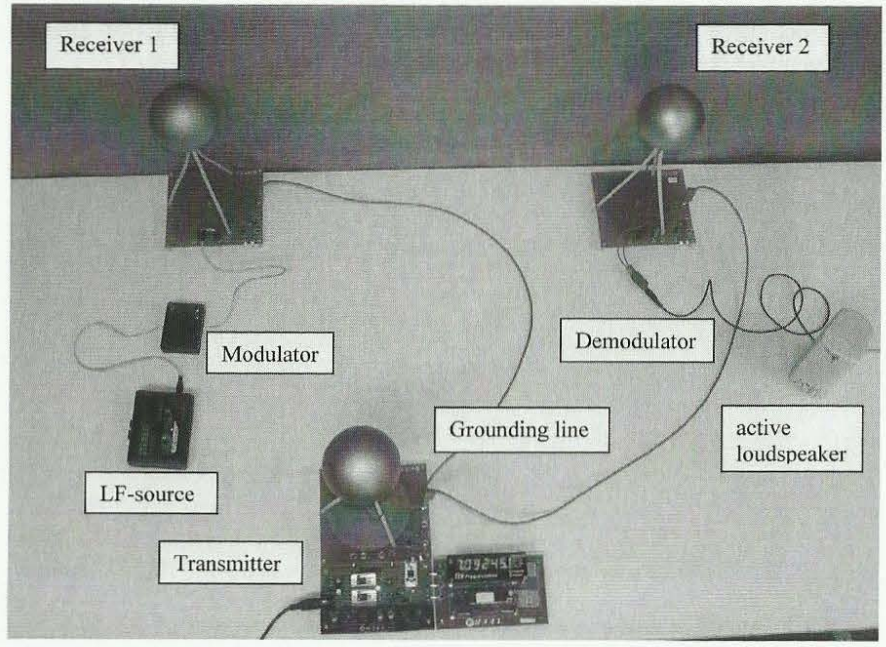



Fig 5.1: *This shows the arrangement, as it was tested in 1.TZS.*

**5.6 Experimental Procedure**

Adjust the frequency generator to the previously measured resonant frequency of the scalar wave (Hertzian wave approx 3.5 - 5 MHz; scalar wave approximately 6.5 - 8.5 MHz). Switch on the audio source. Now the HF frequency must be finely adjusted until you can hear (or see) the audio data well.

**5.7 Evaluation**

With the Herzian wave the LF signal cannot be heard or seen. With the scalar wave it can.

**5.8 Improved electronics** (development by 1.TZS)

The students describe again here how they could be successful with economical measures. However the criticism expressed in section 4.8 is still valid in this experiment. Therefore it is still worth the expenditure to use the electronic circuits described here.

On the modulator side the circuit in section 4.8 is recommended. As a demodulator the circuit from section 3.5, or the improved 3.9 circuit are recommended.

Fig. 5.2:

**5.9 Discussion and evaluation** (of the improved electronics by 1.TZS)

Providing it is technically well executed, this experiment is promising. It represents something like the prototype for a future mobile communication based on scalar waves. A central and well grounded scalar wave transmitter provides the mobile phones in its area with energy. They use this to go into resonance (antiphase). The individual telephone number is modulated on as a modulation pattern. If this pattern is selected then my phone rings. The mobile phones of the two people in conversation do not exchange any energy, only pure information.

So long as it can be ensured that the transmitter only emits as many scalar waves as necessary for the number of phones supplied by it, then there will be no stray field. As long as there are no transmission losses then no biological damage will occur. Unfortunately the central transmitter cannot do completely without a stray field, which is required by a phone so that it can enter the network. However compared with today's antennas that produce almost 100% stray fields, it would be a tremendous step forward.

The other side of the biological effect of scalar waves is that they do not only cause damage, but they can also be used therapeutically for the benefit of mankind. This was also presented at the memorable meeting in the technology park of Villingen-Schwenningen.



# VIII.

## Research on biological and medical effects

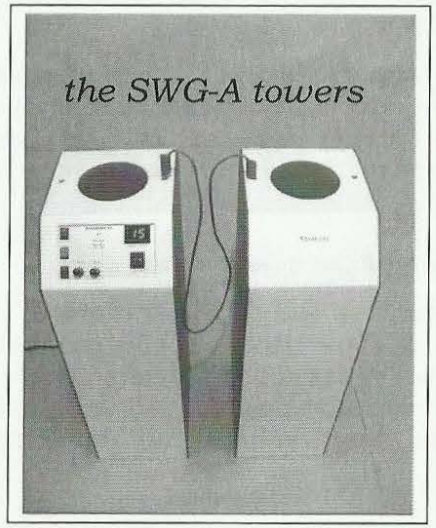
Next, we turn to the experiments on the transfer of biological information via scalar waves as a carrier. For this purpose, appropriate Scalar wave devices are developed by the 1.TZS and distributed by the INDEL GmbH. The devices are presented first.

### 1. Presentation of the scalar wave devices

It is a further development of the experimental kit in housing with an open working space on the Tesla coil (type A) which is specifically developed for bio-engineering experiments and the ability for low-frequency modulation of the carrier wave.

### 1.1 The former Scalar wave device in analog technology

The demand of the scientific world for reproducibility of the experiments has been satisfied with the construction which is based on the electronic schematics of Tesla and the disposal of the experimental kit. Inspired by six at any time repeatable basic experiments on the special properties of a scalar wave, several researchers have conducted further investigations, preferably on issues of biological activity of longitudinal waves. Especially these researchers demanded a specifically for their research projects improved type of construction because they experienced some difficulties in the handling with the more open test arrangement.



This was the reason for deve-loping our scalar wave device SWG-A in 2004 (Fig. 1. "A" was telling, that analog technology was used).

The successor is the Scalar Wave Device SWD which uses the discussed DDS-generator today. In the revision of the device the same antennas and coils of type A are used again and nothing is changed in a technically point of view to remain the repeatable experiences and results with the previous device also for the future.

The exact description of the SWD along with practical reports and specific case descriptions can be found in the second documentation for scalar wave medicine.

A feature of this scalar wave device is the accessible top with the exposed Tesla coil (diameter 11 cm). "Here you can put substances with biological information directly into the field of the pancake coil". At least that was the functional specification from the researchers to study the biological and technical characteristics and their desire to modulate "biological information" of the carrier wave.

Researchers with the experimental kit had space problems with the wire of the spherical antenna. This requirement is considered for all other scalar wave devices. Especially clinics and medical practices decide to use the SWD.

With the increasing interest from biomedical laboratories and university institutes, the wishes and the functional specifications changed again. For their very specific needs an SWT has been developed. This scalar wave transporter is lying in between the experimental kit and the SWD.

### 1.2 The transport phenomenon of the scalar wave

A starting point were the experiments and demonstrations in the technology park of Villingen in 2004 about mobile communications with scalar waves. A transmitter supplies energy to all cell phones there. In terms of the resonance condition, all cell phones have the same frequency first while antiphase to the central transmitter.



All cell phones have the identical phasing among another. So, they repel each other. This has consequences. If the transmitter turned off, all calls would stop immediately.

The transport of information does not necessarily suffer from the opposite phase. If a receiver modulates the carrier wave with language (e.g. AM), all the other recipients with the same resonance can detect it. This is similar to dialing phone numbers in mobile communication today. It was first shown how music and language can be transported from one receiver to another in the TP-VS in 2004.

Professional labs are particularly interested in the transport effect. They transfer drugs and other biological information with it today. For instance, in the laboratory of Professor Luc Montagnier (Nobel laureate in 2008) about 100 base pairs of borrelia-RNA were transferred with scalar waves through water in 2013.

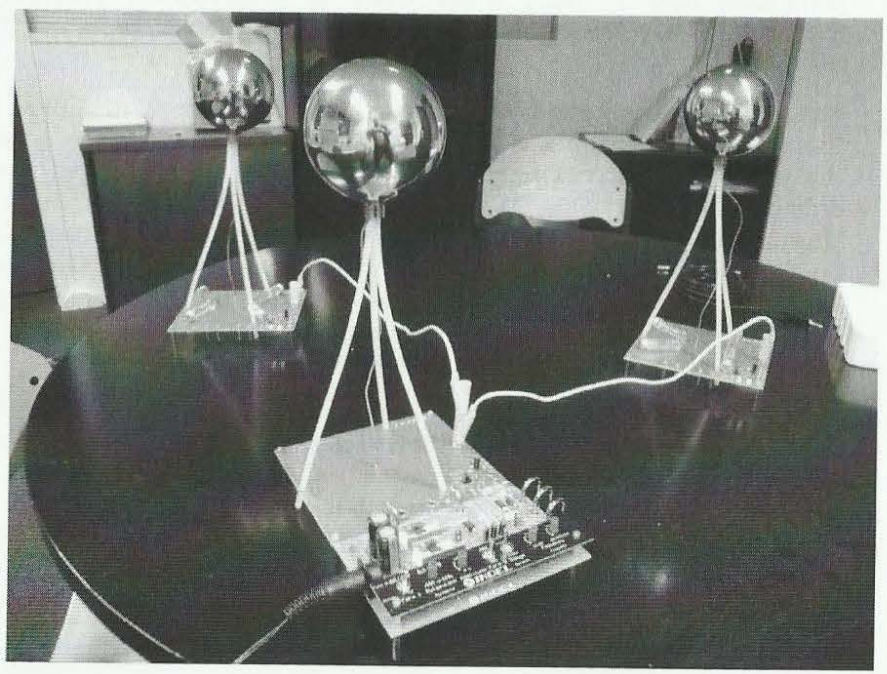


Fig. 2: *The experimental setup in the office of professor Luc Montagnier, near Paris, (2013); using DNA-information on the left coil and 4 water bottles on the right coil.*

In his laboratory is an idiosyncratic method of measurement used which provides an accordance up to 98% over minimum distances away (0 - 1 cm) in his own experiments.
The transmission path was over 1 meter with the kit (3 x coil A). With its measurement technique, more than 30% identical information in the water was detectable instantly. The result is extremely significant (Figure 2).

The results at the University of Brescia were not quite as compelling (Figure 5). Here had been worked with leukemia cells, but the variance was too large for a distinct significance. We will deal with the results later. In this regard, especially the second volume is recommended.

In one point the experiments agree in both cases. It works with a central power station (center) and more than one receiver (right and left). This experimental setup had proven itself in Heidelberg previously and in many other research laboratories. Therefore, the scalar wave transporter SWT comes with 2 receivers on the market.

The 10 years of experience had taught us that at spas or therapeutic use in rehabilitation clinics the patient always forms the second receiver which is why the scalar wave devices need only one receiver.
Unanimously, users have recommended to place the information on the receiver tower because the effect is about twice as strong in comparison to the location of the vial on the transmitter coil. The transmitter coil of the SWD is now hidden inside the tower to exclude any incorrect operation from the outset.

The technical background can be measured. Keep the measuring head of your oscilloscope in the direction of the two balls, then you will measure an almost twice as strong field around the receiver ball. Among other things, this is due the idle receiver in comparision to the low internal resistance of the function generator.

Therefore, optimal conditions for working without patients is a kit of two idle receivers.



### 1.3 Features of the scalar wave transporter SWT

On May the 2nd in Lyon, at the 8th Meeting of expert researchers in the field of scalar waves, the SWT was introduced and is intended for biochemical and biomedical professional labs. For good reason, the test tube is used before the experiments are extended for animals and humans. Therefore, a means of transport is needed to transfer the biological information of a test tube to another over some distance. This requires two receiver coils in our case.

To ensure that the pancake coil remains free, the antenna wire is led downwards as in the SWD. In a specialized laboratory you see the effect of the detuned resonance. When you come too close to the antenna, you get capacitively coupled. Therefore, the antenna must not be hidden in a tower. Normally you love the more open design.

The antenna of the SWT is extendable. This has technical reasons also. Minimal differences between the two receivers cause to different voltages and the LEDs illuminate different. You could swap the three identical coils cyclically and choose the version with the highest accordance.

A fine tuning should follow. This can be done with a slightly longer or shorter antenna to adapt the wavelength.
Overall, the range increases while the antenna length is increased.

The LEDs can be switched off as well. If the resonance is found and the experimental setup is not changed, this setting could be saved in the digital generator (as described on Page 21). The LEDs are no longer needed.

The adjustment of the resonance is very convenient with the help of the LEDs but unfortunately the LEDs cut down the peak in the sine curve when the diode current increases. This can lead to disruptive contortions in transition, which can be avoided by switching off.

## 1.4 Delivery contents of the SWT

1 DDS function generator, freely adjustable up to 8 MHz including a frequency counter inside
1 wall power supply (primary: 100 - 240V, 50 - 60Hz AC; secondary: 5 V DC, stabilized, USB-B port)
1 connecting cable (BNC plug to banana jacks)
3 pancake coils, type A, incorporated in a plastic box
3 spherical electrodes with telescopic rod
2 connecting cables with banana jacks on both sides
1 documentation (this book)

Figure 3: *Delivery contents of the scalar wave transporter SWT*



For special needs more coils and antennas are available as well as a battery adapter (the 4 Mignon batteries, each 1.2 V, are not included). Professional labs that do not require medical training and also send their final research report to the 1.TZS, can purchase the SWT at special rates.

## 1.5 The boxes of the SWT

The 3 boxes are identical and can be used (1) to transmit energy, (2) to receive energy and transmit information at the same time or (3) to receive energy and receive information at the same time.

As already said, in the case of resonance you can no longer distinguish who is transmitter or receiver. At the end is always a state of equilibrium

Figure 4 shows one of the three boxes.

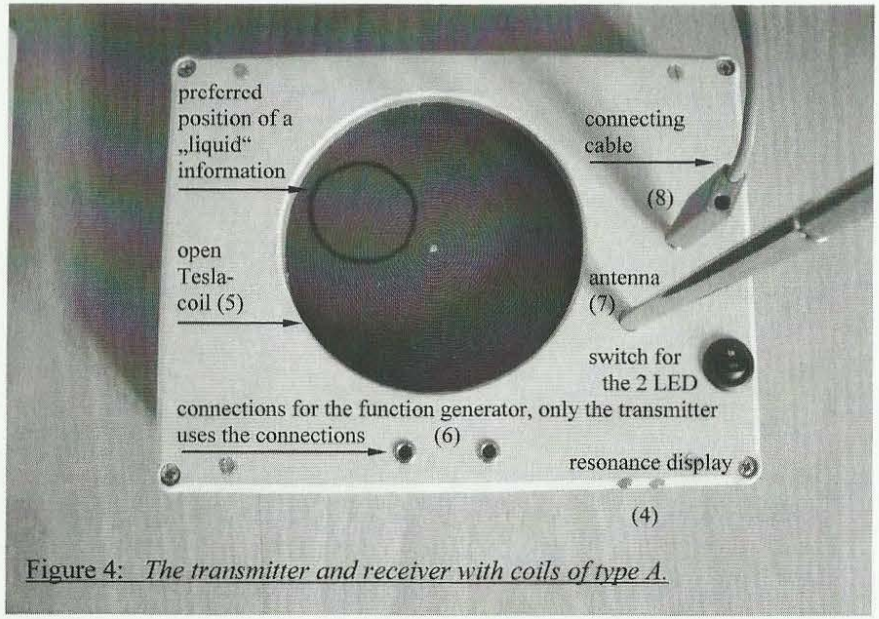



Figure 4: *The transmitter and receiver with coils of type A.*

Each box (1-3) is equipped with two antiparallel connected LEDs (4) to show the resonance. The open window of the Tesla coil (5) has a usable diameter of 90 mm.

### 1.6 Placement of the SWT

It is important to ensure that the devices (transmitter and both receivers) are not too close to metal objects which could shift the resonance frequency. A minimum distance of 50 cm to the heater must be maintained. A table with a metal plate should be avoided.

It is also important to ensure that no metal or sharp objects are placed on the pancake coil. This can damage the coil. If you use glass on the flat coil (e.g. ampoules of sample liquid), you should avoid leaded glass which could shift the coil resonance.

The popular misconception that light, so-called biophotons, could transfer scalar waves can be disproved with an optically opaque screen in front of the receiver (Figure 5).

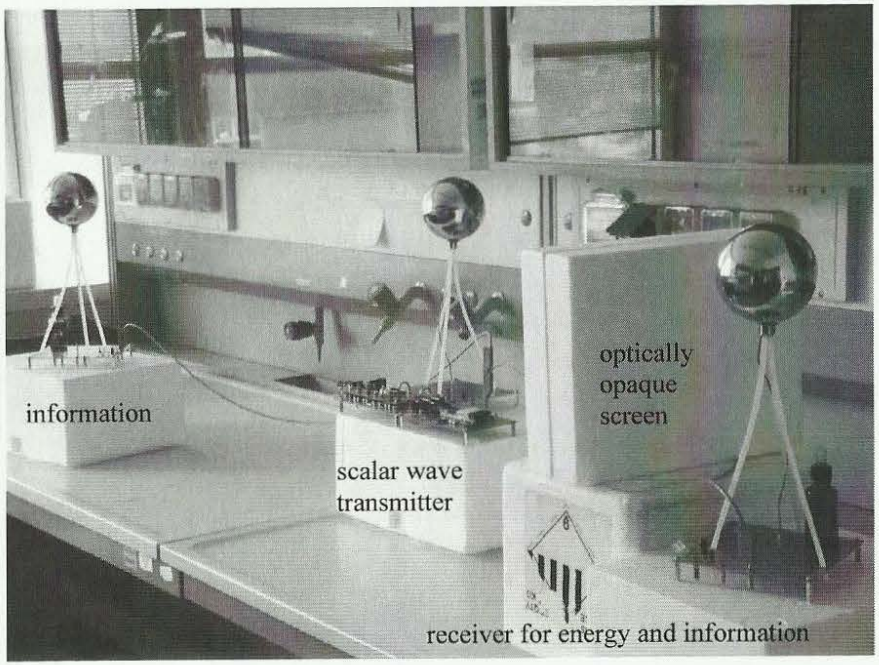



Figure 5: *The experimental setup in the DNA laboratory of the University of Brescia, Italy, 2013*
*(Facolta die Medicina e Chirurgia, Universita degli studi di Brescia)*



Skeptics like to use the unexamined prejudice that a detectable effect would only work if a certain person was in the room. In such cases, I recommend to try the experiment again by different people. During the transmission, all individuals should also leave the room.

### 1.7 The startup of the SWT

The external switching power supply is connected to the grid and via the USB cable to the generator.
The generator output "TTL" is connected to a box (connections 6). The two receivers are connected from the "ground connection" (8) with the two cables (8).

The antennas are inserted through the hole (7) and slightly screwed by turning clockwise. The telescopic rods are extended to approximately half the length. Otherwise, the boxes fall over.

The 3 boxes should be placed visibly on the table so that the user sees all the LEDs (4). With the red button, the generator is switched on and with the frequency controller (adjust) the resonance frequency of the scalar wave is searched (advice: press [<], [<], [OK]).

With the diodes of the transmitter can be controlled if the offset is actually regulated to zero. By turning this knob to the right and to the left, the one or the other LED on the transmitter goes out. However, both LEDs should be equally strong. Please adjust the determined center position.

The amplitude at the used generator frequency slightly decreased while the frequency increased. At 8 Mhz, the stop is reached already. The finding is very easy when you start with full amplitude of 8 MHz and regulate backwards until the LEDs of the receiver are on the maximum and the LEDs of the transmitter remain barely dark. The resonance point is found.

Now, the two paired diodes of the receiver gain the attention. The LEDs should respond equally. If a correction is necessary, you can attempt to change the length of the antenna in order to achieve the desired balancing.

For the search of the resonance with e.g. glass bottles with liquids, the same bottles with water should be placed on the coils. Preferably the bottle is placed on the marked spot of the coil.

This setting should be saved now (as described on page 21) and if necessary readjusted before each new attempt. The quartz crystal is a great help to stabilized the frequency, especially for comparative experiments with the same setup as condition.

Figure 6: *Experimental setup of the scalar wave transporter SWT*



### 1.8 Work surface on the Tesla coil

The boxes have a freely accessible pancake coil (also called a Tesla coil) on the top as part of an air transformer. On the coil, preferably on a receiver, the samples can be placed in the high frequency field of the coil. For this purpose, the housing was left open to create a work surface there.

Please never give fluids or substances directly on the work surface. Always use a bowl of glass or something similar and never place metallic or sharp objects on the pancake coil. This could damage the coil.

The sample affects the generated field. The generated scalar wave from the SWT operates as a kind of "transport medium", similar to the role of water in homeopathy. A threat from the field of the SWT is almost impossible, as well as the water used in homeopathy considered as comparatively harmless.

## 2. The Beginning of experiments with the SWT

The technical experiments for the transmission of electrical scalar waves are described in this book (chapter III). The experiments can also be accomplished with the scalar wave transporter SWT. In this way, everyone can be convinced individually of the existence of scalar waves and their special features.

For biological experiments with the SWT, the default setting must be choosen. Unfortunately, as electronics producer, we are not able to write a comprehensive instruction manual for MDs. We also point out that the technical product becomes only a spa device or a medical therapy unit through the placing of a nosode or a vial with biological or chemical substances.

For medical indications for the practical use of the scalar wave devices, I refer to the medical-technical distribution of the manufacturing company and recommend the collected reports in the second documentation about scalar wave medicine.

It all started with an experimental kit which also was the blueprint for the scalar wave transporter SWT.

At a conference at the University of Kaiserslautern in 2002, I had the opportunity to address a physician from Erfurt: "Did you bought two of my experimental kits?"

Dr. K. answered, "Yes, it works very well. One kit is for my wife and one is for me."

"Why don't you borrow the kit to each other?" I asked.

Dr. K. replied, "We treat with it. I will not tell you how because that is our formula for success. We are the only ones in the country and this knowledge is spreading rapidly. Our Patients arrive from far away now."

Eventually, he has told me what he does with it. He places a drug on the pancake coil and transmits the information to the patient just like homeopathy.

He told about a young couple with a wish for child who tried it for a long time in vain. The young woman had to bring semen from her husband. The gynecologist placed the semen on the Tesla coil (type A) and informed the woman with it. That alone was not enough, but the woman could be imprinted on her husband and it actually worked in the following week. She got pregnant.

This sounds incredible but it is a true story. Our system stands in hundreds of medical offices today and the physicians do not want to be without the opportunities that it provides.

From a scientific point of view, such examples are without significance because nobody can prove that the woman without the treatment could get pregnant too. However, the idea was in the world and has been discussed.

Let me report about another experiment, that was held in the premises of the 1.TZS in Villingen in the Black Forest on May the 27th, 2011.



## 3. Report about an experiment with Paramecium

We first met in China on April the 28th, 2011 at the second World Congress of the DNA in Dalian. As invited Chair the topic of my presentation was, "DNA Reading and Writing by Scalar waves". Among the audience was a colleague, who had a relevant research paper with the heading, "Cellular Communication through Light", which was developed at the University of Basel in Switzerland [19].

He also used the model with biophotons of Prof. Popp because the scalar wave was still unknown for him. On the return flight, we designed on a sick bag the concept to replicate his successfully experiments with my scalar wave device. This would confirm the communication between the paramecium and the accordance with the model of scalar waves.

Let us first read the publication of the colleague about his chosen experimental concept according to [19].

### 3.1 Abstract

*„Information transfer is a fundamental of life. A few studies have reported that cells use photons (from an endogenous source) as information carriers. This study finds that cells can have an influence on other cells even when separated with a glass barrier, thereby disabling molecule diffusion through the cell-containing medium. As there is still very little known about the potential of photons for intercellular communication this study is designed to test for non-molecule-based triggering of two fundamental properties of life: cell division and energy uptake.*

*The study was performed with a cellular organism, the ciliate* Paramecium caudatum. *Mutual exposure of cell populations occurred under conditions of darkness and separation with cuvettes (vials) allowing photon but not molecule transfer. The cell populations were separated either with glass allowing photon transmission from 340 nm to longer waves, or quartz being transmittable from 150 nm, i.e. from UV-light to longer waves.*

*Even through glass, the cells affected cell division and energy uptake in neighboring cell populations. Depending on the cuvette material and the number of cells involved, these effects were positive or negative. Also, while paired populations with lower growth rates grew uncorrelated, growth of the better growing populations was correlated. As there were significant differences when separating the populations with glass or quartz, it is suggested that the cell populations use two (or more) frequencies for cellular information transfer, which influences at least energy uptake, cell division rate and growth correlation.*

*Altogether the study strongly supports a cellular communication system, which is different from a molecule-receptor-based system and hints that photon-triggering is a fine tuning principle in cell chemistry." [18].*

### 3.2 Comment

In fact, as I have determined and published [10], the wavelength of the radiation cell is in the UV range. The findings of the cell researchers are increasingly congruent and this is encouraging. The concept of scalar waves is the most advanced and most precise of all known and published concepts.

This is why we arranged a meeting a month later to reproduce the successfully experiments with the scalar wave device SWG-A.

**3.3 Experimenters:** Prof. Dr. Meyl und Dr. Fels*
*(Swiss Tropical Institute, Basel & UPMC Université, Paris)

**3.4 Place and date:** Villingen-Schwenningen, May 27th 2011

### 3.5 Experimental Setup

In the center in between two receiver towers the transmitter tower of the SWG-A has been placed. The distance is 2m in both directions, in total the distance is 4 m.



### 3.6 Experimental instruction

The cuvettes, which should influence each other, are placed on the receiving towers. The described quantity of paramecium are injected in the cuvettes with liquids together and the scalar wave device is turned on in self-resonant. The identical solution of nutrients and the same population of animals are used just as in the earlier experiments with glass or quartz jars.

### 3.7 Result

After just a day, we were able to state that the results of the counting of the animals under the microscope were tendentially similar to the previously achieved counting without the artificial scalar wave and beyond the distance of the glass thickness.

### 3.8 Interpretation

Unfortunately, we had limited the experiments to one day. Therefore, we could not carry out measurement series, statistical analysis and quantitative significance with the necessary certainty. Only the qualitative statement remains that the trend is right. We agreed that further research is needed.

However, no final research results will be presented in this book. Without exceptions, this only happens in selected and peer-reviewed science journals. The mainly expectations are to spread the experimental instructions and to give suggestions for further experiments. The reader should also be encouraged to participate.

The objectives may be quite different. An example would be to prove that the communication of the paramecium take place with scalar waves and without light.

The field of cancer research is a sensitive issue. Numerous objectives can be defined there. Approaches are noticeable in this domain but still no results are presentable, accepted as scientifically based.

## 4. **An exciting experiment** on October 18th 2012

At a medical research center in Germany

Fig. 4.1: *A transmitter and two receiver coils in the laboratory.*

### 4.1 Experimental setup and test execution

An identical setup using two receivers with a central transmitter was chosen. This "equiphase working concept" has proven to be the more efficient one once again.

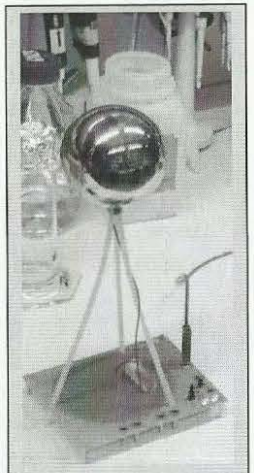


Fig. 4.2: *Cuvette on the flat coil.*

Both receiver coils had cuvettes with identical cancer cells in a nutrient solution placed on them. The sample on the right was poisoned with one per cent sodium azide. The scalar wave transmission had been turned on for 9 minutes. After an application time of 12 hours all cancer cells on the left side were dead, while a control sample was still alive.

I'll skip commentating on this since the tests are still running and won't be finished for a long time. When it comes to cancer, diligent work is vital and rash conclusions could have dire consequences.



### 4.2 Killing of cancer cells with the power kit

In another experiment with the power kit the death rate was at about 95% after a short application time, even without the poison. The cancer cells pretty much bursted thanks to the high power. The cuvettes in picture 7.3 are beneath the fluorescent lamp in the testing area.

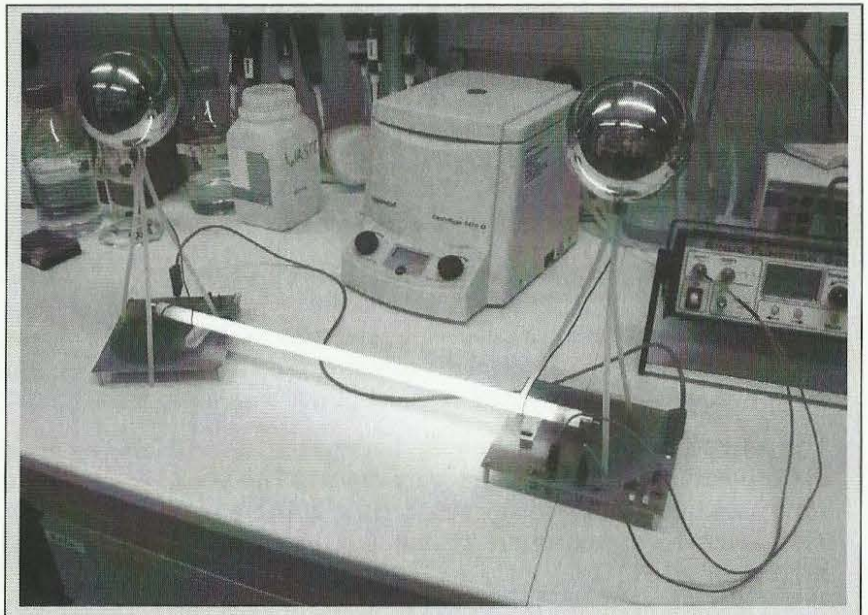


Fig. 4.3: *A fluorescent lamp, wirelessly fed through the power kit.*

The ambition of both tested methods reminds of *hyperthermia*, where cancerous tissue is exposed to overheating in radiotherapy to promote the death rate of cancer cells. Now, death is to be brought about by scalar waves. Of course the healthy tissue must not be damaged and that's what further tests are about.

The idea that it is possible to take a sample of the cancerous tissue, kill it outside of the person and then to only transmit the information using scalar waves almost sounds too nice to be real. But what if it does indeed work? Would that be *hyperscalar*?

## 5. Transmission of antifungal medicaments via scalar waves

During the carnival weekend, on the 9th February 2013, we (an epigeneticist and I) started an exciting experiment.
We decided to find out whether the growth of yeast you can buy at a supermarket could be slowed down with the well known medicament "Canesten", which is used to fight fungal infections. The medicament was to be transmitted via a modulation of scalar waves.

**5.1 Performed by:** Dr.med. Johannes Ebbers
Dr.-Ing. Konstantin Meyl

**5.2 Location and date:** Radolfzell, February 8th till 11th 2013

### 5.3 About the effect of the medicament Clotrimazol

On the market under the trading name "Canesten", a medicine against fungal infections is available, which damages the cell membrane of fungi (through delaying the synthesis of ergosterol). Thanks to this trait the growth of yeast culture on a hotbed can be slowed down. Here the medicament is used as a tincture.

The samples are top-fermented beer yeast, found on the market as dry yeast (saecharomyces cerevisiae). The yeast is dissolved in water and then put on a hotbed in a culture dish, drop by drop. The aerobic reproduction of the samples happens inside of an incubator at 32°C.

### 5.4 Expectations according to scalar wave theory (by K. Meyl)

Scalar wave transmission only works with information, never with chemical substances. Should the effect of Canesten operate on a chemical basis, then the experiment will fail.

If however, the effect mechanism, or at least one of them, is controlled solely by information, then there is a chance of transmission. The at first chemically bound, but biologically effective information is modulated onto a carrier wave, similar to how radio and TV signals are transported from the transmitter to the receiver. Instead of electromagnetic waves the biologically effective scalar wave is used.



### 5.5 Experimental setup

The incubator is rebuilt into a scalar wave receiver. Since there is no space for a ball antenna, a patch aerial made of aluminum foil is glued onto the upper side of the plastic casing and connected to the flat coil (type A). The Petri dish with the samples is put under the circuit board with the coil. The junction line is led out through the see-through front door and connected to the transmitter. In a second test another receiver (also type A in the background) is connected to the transmitter.

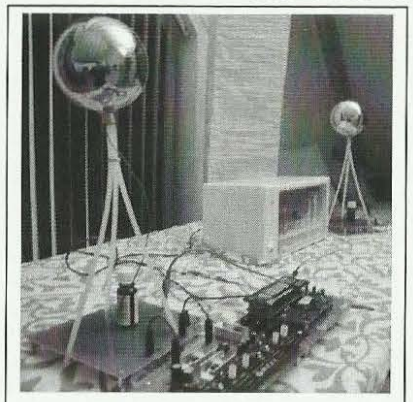
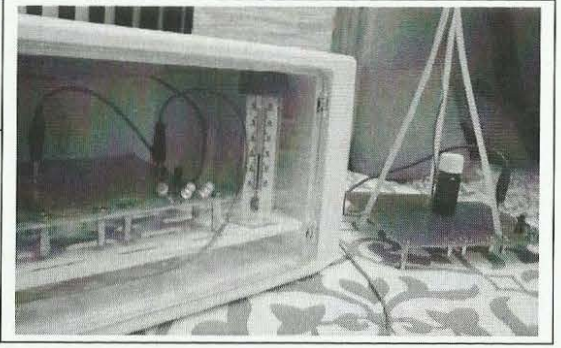


Fig. 5.1: *The setup*

Fig. 5.2 (right): *The incubator with the second receiver*



### 5.6 Test execution

Once the resonant frequency is found and the amplitude is reduced enough to the point at which the LEDs on both receivers barely light up, leave the setup as it is. Even the cables should now remain as they are. The only change is that for the first test there is no medicament during the 24 hours of incubation, while for the second test it's placed onto the transmitter coil and for the third test onto the second receiver. The flat coils are part of an air transformator and the medicament is bringing its oscillatory information into its stray field area, modulating the information onto the carrier wave - at least this is the assumption.

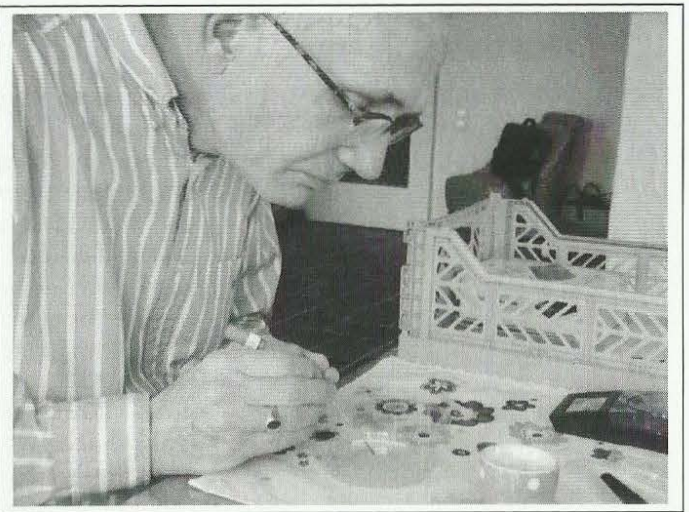


Fig. 5.3: *Dr. Johannes Ebbers as he handles the samples in the Petri dish.*

During every test, up to 8 samples of the yeast solution are put onto a hotbed next to each other in a culture dish, then covered with a glass lid and put under the flat coil in the incubator. For the preliminary test the number of probes and the test period could be limited to 24 hours. During the incubation time no persons should be present in the room.

### 5.7 Test evaluation

Under the microscope the median diameter of the yeast samples was measured, before and after the incubation. First we did the control measurement without application of the medicament. We calculated a growth of 2.2 to 3.4 mm (diameter), equaling a growth of 54.4%.

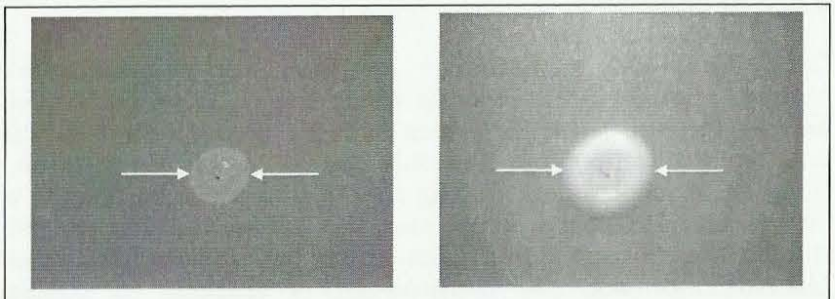


Fig. 5.4: *Yeast sample before and after the 24 hour incubation time.*



During the following 24 hours a new Petri dish was prepared. This time, the growth-halting medicament was put into a glass jar on the transmitter coil. The diameter of the samples grew from 2.7 mm to 3.9 mm, which equals a growth of 44.6% or a reduction of 18% in comparison.

The third test was even more exceptional. The medicament was put onto the second receiver next to the incubator. The median growth of all samples was a mere 38.6% this time, from 3.1 mm to 4.3 mm in diameter. This experimental setup let us measure the growth two-dimensionally under the microscope and the growth was slowed down by 29%.

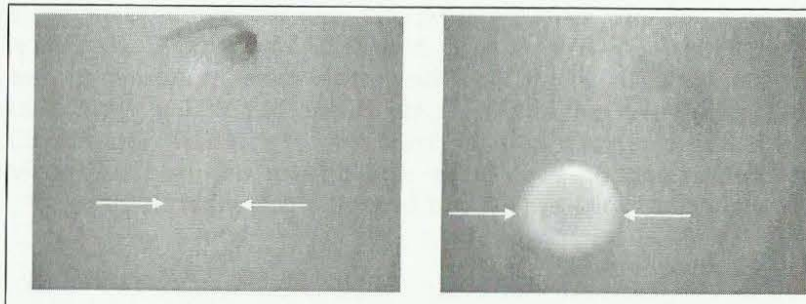


Fig 5.5: Yeast sample before and after 24 hours – using the Canesten Drug

### 5.8 Conclusion

Considering the spread of the individual samples the second test should only be viewed as a tendency in the right direction. The third test however, with a reduction of 29%, is pretty clear. It should not be forgotten that Canesten can not completely halt the growth of the yeast even if it comes in direct contact with it. This time, the cable is 2 meters away from the transmitter and another 2 meters away from the second receiver. The distance between the antennas of the receivers however had been reduced. Once all control measures as well as tests using more samples have been completed we will publish the experiment.

The preliminary test should serve as a stimulus for further experiments regarding the transmission of biological and medical information with the help of scalar waves. It would be desirable if such tests could be replicated as often as possible and if people could talk about it and publish more information.

The receiver with the informator substance vibrates in an equiphase manner when a patient sits between the towers of a SWG or touches the isolated "ground connection" and as such functions as a second receiver even without him holding a coil of any kind. To have a successful transmission to cell cultures though, another receiver coil is required as shown.

Owners of an experimental kit are recommended to use a transmitter coil of the type A and to use type C receivers. New orders of such a kit can have the case customized, meaning instead of two coils of the type B another coil of type A and an extra ball electrode can be delivered. Just enter "Bio-experiment-set" when placing your order and all the required equipment will be packed up so that you can replicate the experiments.

### 5.9 Consequences

This experiment tells us a couple of things: A medicament, also known as the "informator", should always be placed on the receiver coil and not on the transmitter coil. This is due to the low terminating resistance of the receiver coils, which end up reaching a higher field strength. There is more to it though. Assuming resonance, transmitter and receiver vibrate in antiphase, which means that the two receivers that are connected to the same transmitter vibrate in an equiphase manner. Concerning the carrier wave, they repel each other. This does not apply to the modulated information. It detaches itself from the carrier wave and moves from receiver to receiver on a direct path. This idea would explain the high performance of the last setup.

Furthermore the scalar wave has proven to be a useful carrier for biological information once again.



## 6. Transmission of specific biological information over a distance of 4 meters

The aim of the experiment is to transmit the information of the growth hormone gibberellic acid onto a pea culture over a larger distance. On the technical side we use a carrier wave at about 6.78 MHz that runs along a copper cable in some kind of strip line, all the way from the information source to the peas, meaning from the gibberellic acid to the Petri dish. Examined is the length growth of the root buds or to be more exact the median value measured using multiple germinating peas. Those that received information are compared to those that did not. The most distinct result is gotten by comparing these to peas which had only formed half as long roots after 46 hours without a carrier wave.

**6.1 Performed by:** Prof. Dr. Heide Schnabl
Prof. Dr. Konstantin Meyl

**6.2 Location and date:** Villingen, February 24th to 26th 2013

### 6.3 Effect of gibberellic acid

Gibberellic acid with the chemical formula $C_{19}H_{22}O_6$ is a botanical growth hormone that speeds up the germination and in this case especially the length growth of the root buds of peas. This trait can be observed when you add it to watering water. How should this effect be interpreted though, considering the peas never come in contact with the substance yet some kind of information transmission over a longer distance seems to have the same end result?

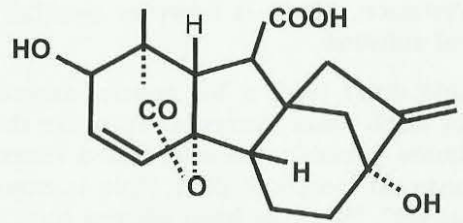


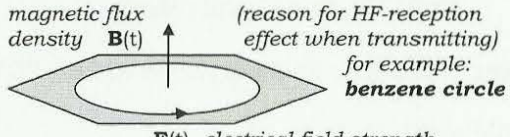

Fig. 6.1: *Chemical structure of gibberellic acid.*

### 6.4 New approach to the communication of cells (by K. Meyl)

The spatially arranged structural formula of gibberellic acid consists of multiple pentagonal and hexagonal ring systems (figure 6.1). From the benzene circle or the pyrymidine ring, as they occur in the base pairs of DNA, we know the delocalized electrons that freely move about inside the ring.

When you bring these rings (they are pretty common in organical chemistry) into a magnetic field, then electrons start to move due to induction. What we deal with is a frame antenna for the reception of high-frequency signals.

The induced loop current is capable of saving the magnetic field and then release this stored energy as information, much like a source or transmission antenna (figure 6.2).




Picture 6.2: *Ring systems using the benzene circle as an example, acting for Propulsion and as antennas of organical chemistry.*

This is the basis used by the author to explain cell communication, as well as the reading and writing of DNA-bound genetic information [10, 11]. Should the substance-bound effect of the growth hormone upon excitation in a magnetic field be transferred to the motion of the ring electrons, then the result is the modulation of the created magnetic field.

The model concept assumes that the information can be transported after the electrons in the ring have received it from the chemical substance. There is however another problem that asks for a technical solution.

Magnetic fields don't have a big reach, especially not when they are caused by such weak currents. To make the transmission over a larger distance possible the modulated magnetic field has to be modulated onto an electrical field. This is done with the so called "experimental set", that has been offered for 12 years (in the shop on www.etzs.de).



### 6.5 Experimental setup with the experimental kit

By default, inductivity and capacity are in use of the oscillating circuit for the shown setup. A peculiarity however is that the capacitor plates are pulled far away from each other, here the distance is 4 meters. It is assumed that this would still work even if the distance was 40 meters by the way, although this wasn't tested.
Between both electrodes of the capacitor, that are balls instead of the more common plate variant, the electrical field spans from one ball electrode to the other in a longitudinal way. This further improves the emission.
The induction consists out of 2 flat coils that are connected via a long cable with each other (figure 6.3).

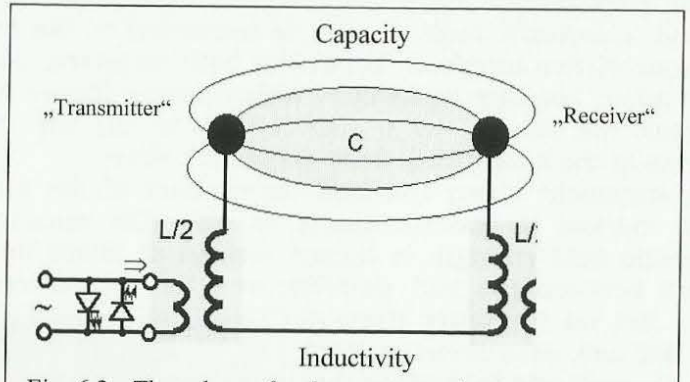



Fig. 6.3: *The scheme for the resonant circuit transmission*

The flat coil on the upper side of the circuit board makes for an ironless transformator in combination with the coupling coil at the bottom. Both coils are identically built and equipped with LEDs to display any eventual current. A sinus function generator induces a coil that is to be called "transmitter" while the other one will be the "receiver".

If we think of the flat coil with a connected ball electrode as a lambda/4-antenna, then a standing wave will form in self-resonance according to classic antenna theory. The tip of the antenna is the ball electrode, where a maximum of the electrical and a minimum of the magnetic field strength occurs. At the bottom of the antenna the opposite happens with Minimum of the E-field and Maximum of the H-field.

High-frequency stimulation through the coupling coil makes the antenna act like a charge pump at its bottom, where the magnetic field is at its strongest. This "charge pump" puts an electrical current on the connection line, which oscillates back and forth between transmitter and receiver. The characteristic frequency of the oscillatory circuit comes to about 6.78 MHz for the coils used here. It's a special case of resonance in which transmitter and receiver are in antiphase, yet oscillate with the same frequency.

### 6.6 Pointers on how to optimize the experimental setup

The antiphase behaviour seen in the present test should be avoided. Experiences with similar transmissions, for example the Canesten and yeast culture test [chapter 5] have shown a doubling of the performance when two receivers were used. To do this a second, identically built receiver is connected to the transmitter. Because of the antiphase behaviour both receivers, compared to each other, oscillate equiphase, which means there's a repulsion towards the carrier wave. This seems to aid the detachment process of the information from the carrier wave.

The statement about the field distribution of the antenna has been checked by measurements as well. The maximum of the magnetic field strength is indeed located at about half the wire length between the ball electrode and the connection line. The point lies on the outer third of the flat coil as a measurement using a magnetic field probe that has told us.

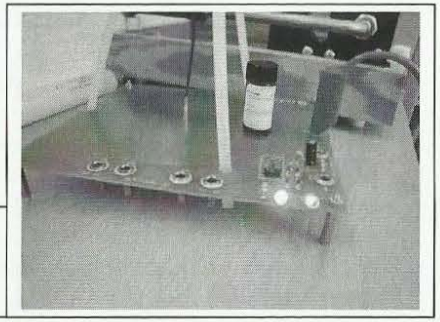


Fig. 6.4: *Optimal placement of the medicament or the test substance on an open flat coil.*

Right here is where the coupling coil is placed on the bottom of the circuit board to optimize the induction process and this is also where, on the upper side, the biological substance should be brought into the magnetic stray field. In practice the culture dish has a spatial extent of course, but this proves to not be a big issue as the maximum is not especially distinctive and the full coil surface may be used.



To maximize the overlay of the magnetic fields of the substance and of the high-frequency carrier, which is interpreted as modulation, a watery solution inside of a glass container is preferred. Experiments have proven that the permittivity of glass and water is about the same. Plastic bottles however may dampen the weak magnetic signals of the samples to the point where transmission is no longer possible.

### 6.7 Test execution

Once room temperature, lighting conditions and other environmental factors are under control, testing may start. The preliminary test, that already had a positive result, has multiple constructions running simultaneously. Due to production tolerance of the coils however any differences must be compensated for by placing the samples after half the time into another setup. If you only use one setting, then these problems can't occur given the technical adjustment remains the same. It just takes longer if you perform the experiments one after the other.

Fig. 6.5: *The source material: Dried peas as seeds.*

The present simultaneously running setup had all peas in a watery solution for 36 hours, where they pre-sprouted. Afterwards they are in a bulging state, where otherwise no root buds have formed.

W: Now we place them in Petri dishes and then on one of both receiver coils (W). Onto the other receiver coil we place a closed bottle with gibberellic acid in a watery solution.

K: We keep the second coil free for the control group (K). It's also important to make sure that no persons are present during the incubation time, as any outside influence whatsoever is to be avoided.

Fig. 6.6: *Prof. Dr. Schnabl Is measuring the peas*

## 6.8 Experiment evaluation

Another control group (S) is viewed as the standard and may grow without a high-frequency carrier. This group will grow the slowest. After 46 hours the buds of this group of peas grew 6.9 mm on average (figure 6.7).

The control group (K), that had no growth hormone information, yet was exposed to the high-frequency carrier for 46 hours, grew an average of 10.6 mm. We can deduct a growth impulse of the carrier wave at 6.78 MHz of about [100(K-S)/S] = 54 % (fig. 6.8).

The pea group that had access to the transmitted information of the growth hormone gibberellic acid (W) has shown an even faster growth rate, averaging 13.7 mm as the median value of all 12 peas. This means an additional growth impulse of [100(W-K)/K] = 29%, or a total growth impulse of [100(W-S)/S] = 105% which, simply put, means a doubling of the growth rate (figure 6.9).

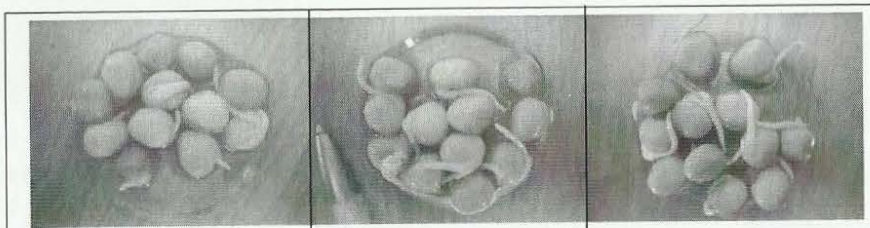


Fig. 6.7: Control **S** *normal germination Result: 6.9 mm, once without and*



Fig. 6.8: Control **K** *with 6.78 MHz waves 10.6 mm and twice* ***with turned on resonant circuit.***



Fig. 6.9: Test pieces **W** ***with gibberellic acid*** *13.7 mm as average*

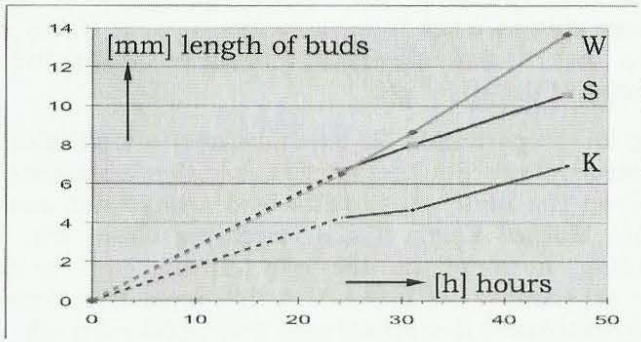
*in length of the measured,* ***46 h*** *germinating root buds,*

## 6.9 Conclusions

Looking at the results of the first test we can see that the biggest growth impulse is connected to the resonant circuit itself, which means the 6.78 MHz carrier wave in the short wave band.



At 54 %, the increase is remarkable and more than just a coincidence. But even this result can be pushed higher to 99 % by using gibberellic acid as a growth hormone through modulation over a distance of 4 meters to transmit the information to budding peas.




(with GA)
(without GA, but with wave)
(without GA, without wave)

Fig. 6.10: *after 24 h of pre-spouting Measuring after 31 h und 46 h*

Admittedly this was just a first test run that is meant to inspire others to replicate it and run further experiments. We ourselves as the authors were really amazed by the rather clear results and we hope the worldwide buyers of the experimental kit will replicate the experiment and confirm our results.
Should neutral institutions run into the same 29 % growth increase when replicating this experiment in direct comparison once with and once without the transmitted information of a medicament with an otherwise identical setup, then this could lead to fundamental consequences for today's understanding of biological communication:

- Rings with delocalized electrons act as magnetic field antennas.
- Organic ring antennas receive, store or transmit signals.
- The rotating electron ring creates a magnetic field.
- The magnetic field holds energy and modulated information.
- Nature communicates in a wireless manner by using the H-field
- Perpendicular to the magnetic field pointer the electrical one is.
- The electrical field vector oscillates in step with the information.
- The modulation is executed by a high-frequency carrier wave,
- and transmits the oscillations over long distances.

Should you have doubts, feel free to replicate the experiment or wait until a report with more reliable data has been published.

# IX.

# Scalar wave reports

The scalar wave is possibly the oldest in mankind used technology. I was able to trace it back to the ancient times and collect evidence that it had played a relevance in the "transmission technology of the gods" [20].

The "grounding" of the pyramids "in the holy lake" should already have been a prerequisite for the energy transfer according to Tesla. He relied on the myth of Antaeus who always had energy by touching the Mother Earth (Gaia). Heracles could win the battle by holding Antaeus in the air cutting the ground connection. By separating the ground in the Tesla transformer, the whole energy transport is stopped also (the LEDs turn off).

For the construction of the experimental station in Colorado Springs from 1899 to 1900, Tesla used historical examples according to his own statement. However, he had not a physical theory which would have been consistent. This is why no records of his theoretical considerations exist.

## 1. Own experiments

Only the field theory gave me the access to the scalar waves. Over the discovery of potential vortex in 1990 and an extension of the field theory [2], various practical physical explanations and inventions derived and a description of the scalar wave as a previously neglected term of the wave equation.

One major motivation was the award of a research prize by the German Association for EMC-Technology in 1994 for my 2 books about "potential vortex". Since that date, I could offer lectures every semester about the research theme [5].

Unfortunately, there are many theories. The replacement with a better physical explanation is perhaps still registered but without sustainability. Own developments in new technologies were required. This was a particular challenge.



### 1.1 The Tesla coil from the workshop of handicrafts

I again retired in my workshop of handicrafts and wound flat coils or I pondered in my study over Tesla books. 1995 from several sides my attention had been drawn to the circumstance that the inventions of Nikola Tesla can be organized in three categories:

The first third has made him world-famous. It concerns the rotary field theory, the asynchronous engine and the today normally used alternating current technology, which we owe him.

The second third concerns technologies and inventions, which were rediscovered by other people partly only years later or even were only pinched and distributed as novelty under another name. Electron microscope, superconduction, electrolyte capacitor, fluorescent lamp, fuse, coaxial cable and a lot more count among that.

The last third however concerns inventions, which until the day of today still aren't understood and await their scientific explanation and technological use. Tesla himself called these achievements his most important inventions, but still owes us a scientific explanation. The scientific world also hasn't got a theory ready and doesn't know to do anything with it. Public research doesn't take place or is prevented by lobbyists.

What remains, are tinkerers of various educational background and qualification, who are trying hard to comprehend the buried experiments of Nikola Tesla off their own bat in the garage or in the hobby cellar.

I felt like one of these, by winding one winding after the next from the inside to the outside. Then I soldered an antenna wire at the inner end of the flat coil, which I in Tesla manner connected electrically with a spherical electrode hung up under the ceiling.

The opposite electrode should be connected to the outer end of the winding, it is said, and the distance between both should be as big as possible. If namely an electrode just is collecting, then the opposite electrode is repelling the same space quanta. According to Tesla's recommendation I did use the earth as opposite electrode and for that tapped the central heating or the grounding of the foundations.

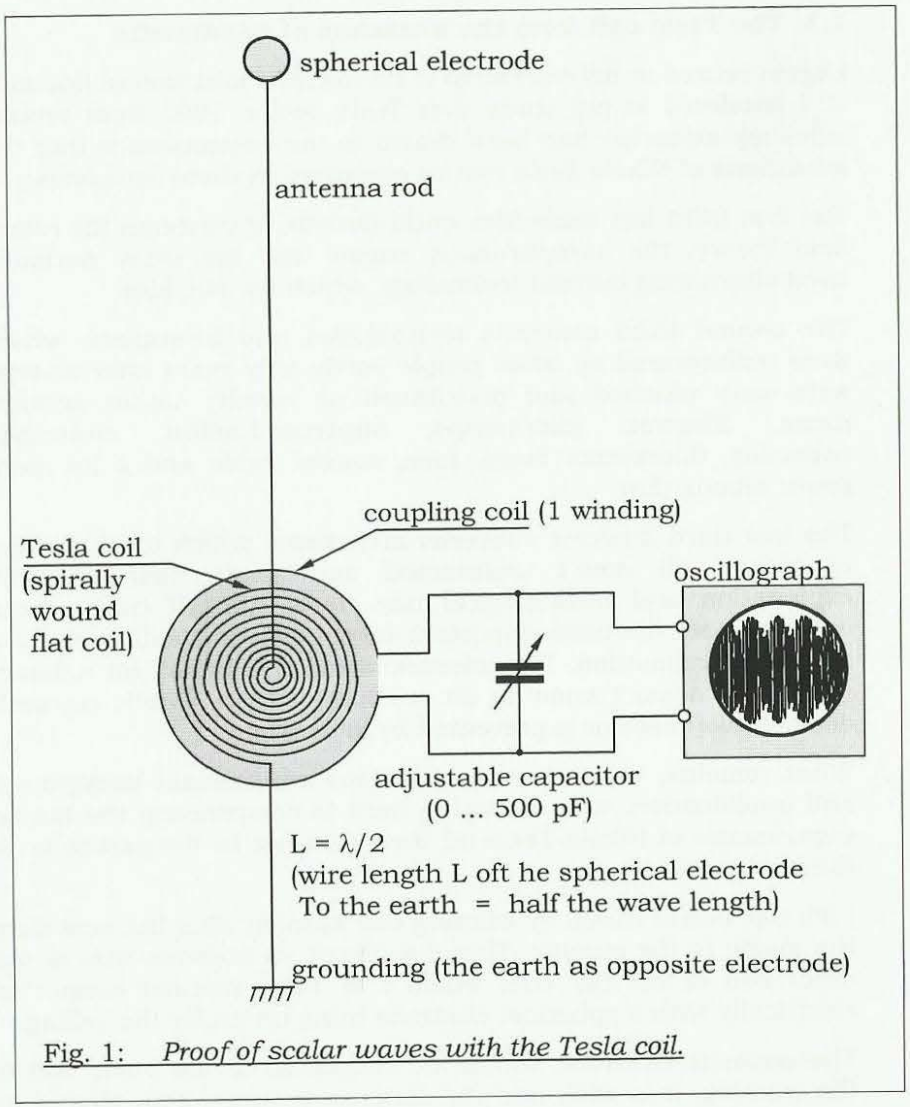



Fig. 1: *Proof of scalar waves with the Tesla coil.*

To take signals only one to two windings as secondary winding were necessary. I connected them with an adjustable air capacitor from an old steam radio to a frequency determining parallel resonant circuit and looked at the taken tension voltage at the oscillograph.



I still had problems with the statement of Tesla, the coupling had to be made loose. Thus the question is asked, how loose? I after that organized two toilet paper rolls of different size, (after the toilet paper had been used, naturally) and pushed them into each other. The smaller toilet paper roll carried on the gable-end the flat coil as primary winding of the air transformer and the bigger one the coupling coil. Now by shifting any wanted degree of coupling could be adjusted to.

### 1.2. Experimental setup

I was astonished myself. Tesla actually was right with his discovery of the scalar waves. With my arrangement they can be clearly distinguished from the Hertzian waves.

The following procedure is recommended:

First of all I seek a source of interference with the adjustable capacitor and tune to maximum amplitude. Then I change the coupling and further optimise in this way. If now the amplitude again decreases from a certain point while approaching the coupling coil, then it concerns the sought-for longitudinal waves. If namely the coupling is too tight, then the received vortices again are driven away by the effect back on the flat coil. They make way.
At last I had found a method to catch the vortices in such a way that they not immediately "ran away" from me again. At once I presented them in the technology centre in St. Georgen. In the time following I improved the technology further and further, used bigger toilet paper rolls and eventually even turn up garbage cans, I varied wire length, wire diameter and the sense of winding.

I had very different success. Sometimes, if at the same time in my workshop of handicrafts the radio worked, it would look as if the received signal would synchronize with the sound waves. Both are longitudinal waves after all. With transverse waves something like that would be unthinkable.
One moreover could observe, how a resonance builds up: first slowly and then faster and faster, so that I sometimes got terribly afraid. Several times we had to repair our oscillograph, after the protective diode at the input amplifier had blown, and that for signals of 50 to 100 millivolt. That was entirely impossible.

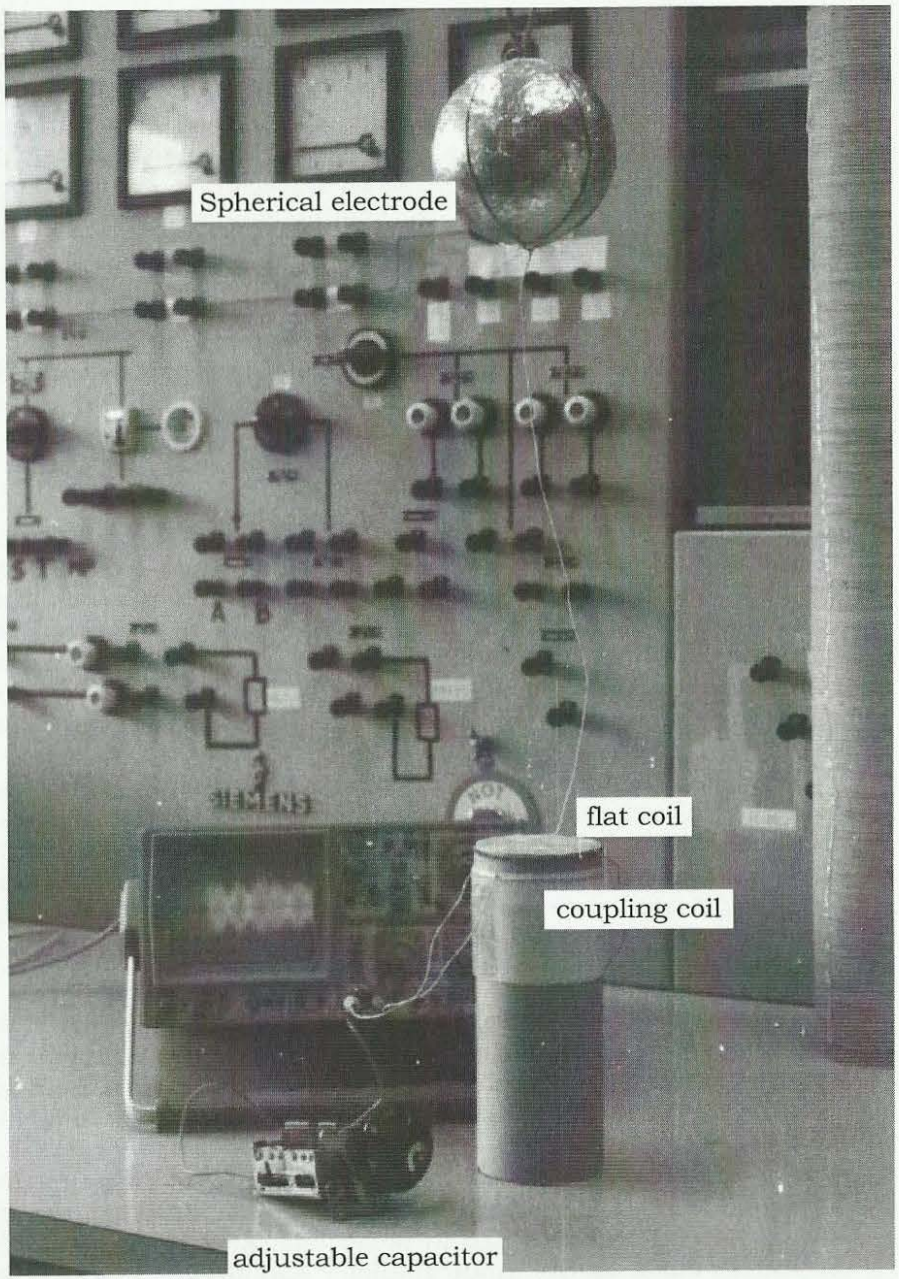



Fig. 2: *The experimental configuration (1st TZS 1995*



Only individual spikes, which were too fast to be seen at the screen, could be to blame. In the case of distant thunderstorm activity I obtained maximum values of more than half a Volt. After that I unclamped the grounding as fast as possible, so that no lightning would be caught, since I didn't have the intention to burn off my workshop.

### 1.3 Biological effectiveness of the Tesla coil

Also the biological effectiveness of the Tesla radiation I could impressively prove with this device. 14.06.1997 a woman, who called herself extremely electrosensitive, participated in the weekend seminar about electrobiology, which I took over from Prof. H.L. König (TU Munich) after his death. That I wanted to test.

I hung up my device in the lecture auditorium and installed the oscillograph in such a way that all could see it. The voluntary test subject however could see neither the public nor the screen. One person every 5 seconds said "now" and the female candidate should say, if I had clamped or unclamped the grounding, if therefore scalar waves were received or not. After a training round her proportion of hits was lying at 100 percent.

According to her statement she could feel it. A further test subject achieved even at the back of the room with a pendulum the correct answer. I myself was surprised by this and I already have repeated this experiment several times with different success. It without doubt depends on the sensitiveness of the test subjects. Every person after all reacts to other signals.

What however has astonished all participants and can't be emphasized enough at all, is the circumstance that it in this case concerns a receiver and not a transmitter.

In the central question who should be believed more, the famous experimental physicist Nikola Tesla or his critics, my experiments with the Tesla coil were the visible proof that we have to take Tesla's statements seriously. Now not only at myself, but also at the students of the polytechnic and the colleagues of my Transfer centre a true Tesla euphoria broke out.

## 1.4 Wrestling for measuring technical insight in the 1st TZS

In every free minute the patents and original writings were studied, which I had myself sent from the Tesla Society in Colorado Springs in the USA. In particular my trainees and diplomands developed a incredible ambition in making a historical Tesla concept work. They built a whole series of various high-tension generators. In the laboratory one could hear crashing and there was a smell of ozone.

22.1.1998 at a presentation of the works for a degree the candidate looked after by me very proudly held a fluorescent lamp in his hand, which in the field of his self-built high-tension generator glowed even without any wire connected, entirely according to the great model.
At all efforts we however laboratory technical weren't able to reach tension voltages of above 511 000 Volt. But at this tension voltage the actual Tesla effects actually start.

Perhaps it was tough luck, but possibly also a chance that we in the laboratories, which I had at my disposal, were forced to work with lower tension voltages and that meant that we gradually had to beak away from the Tesla designs.

Moreover we hadn't at our disposal the precisely controllable spark gaps, which Tesla had developed and used. If one wants to obtain an if possible high tension voltage change (du/dt) for an interaction with neutrinos, then according to today's technology considerably more favourable concepts are offered, for instance with hard switching Power-MOS-Transistors. 50 Kilovolt per microsecond were to meet.

Therefore we changed the technology and worked from now on with fast semiconductor switches. From the laboratory radio now only a hissing and crashing came out of the loudspeaker, if our experiments were running.

At 12.10.1999 we for the first time succeeded to build up a transmission line for Tesla radiation. Doing so the transmitter and receiver were situated in different rooms of my transfer centre.



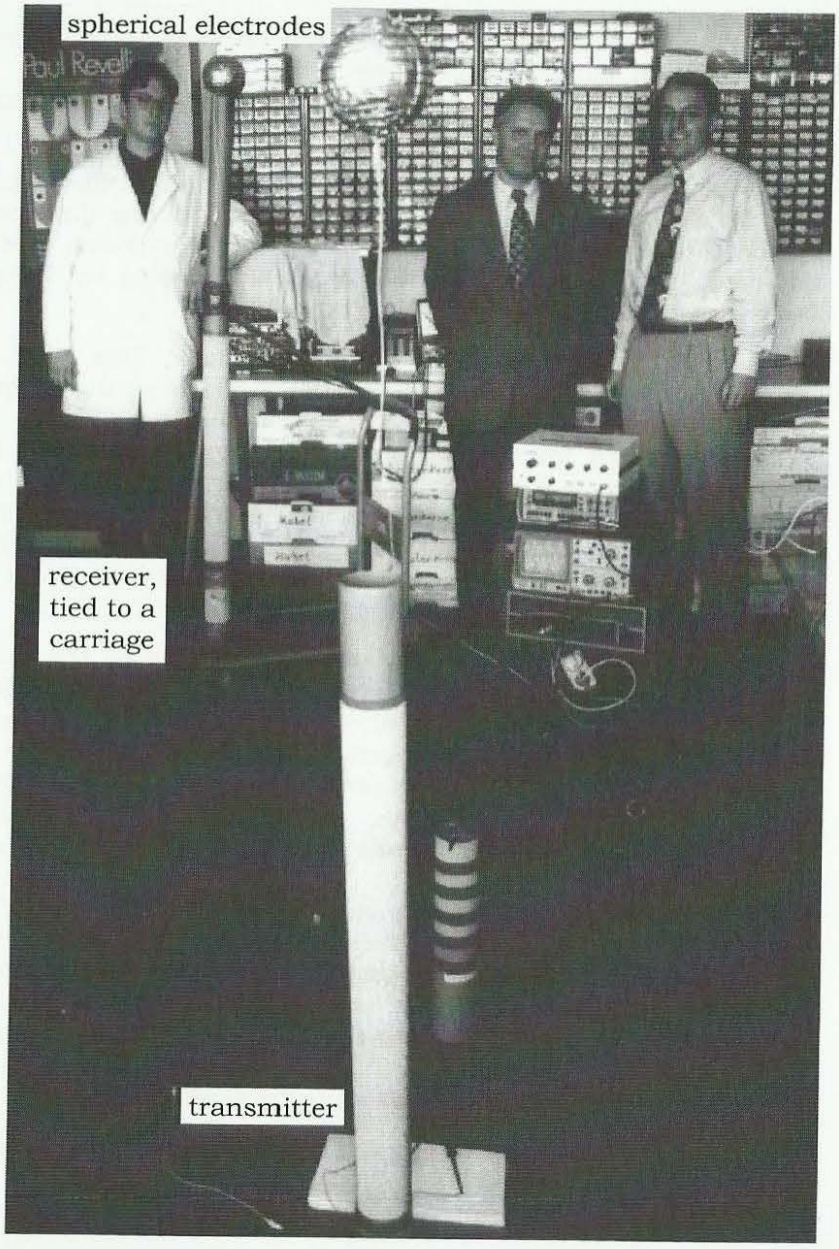



Fig. 3: *Scalar wave transmission line according to Tesla (1999);* from left to right: M.Andresen (MSc), author (TZ-head), Dipl.Ing.M.Rehm (project leader)

The transmitter coil was operated in self-resonance and fed only from a small function generator with 10 Volt. But if the diplomand held a fluorescent lamp near the spherical electrode, then it started to glow.

Following I observed at the oscillograph the signal of the receiver coil, which as well was operated in resonance. If the diplomand switched off the transmitter, also no receiver signal was present anymore. But if it concerned radio waves according to Hertz or Tesla radiation, with that still wasn't answered.

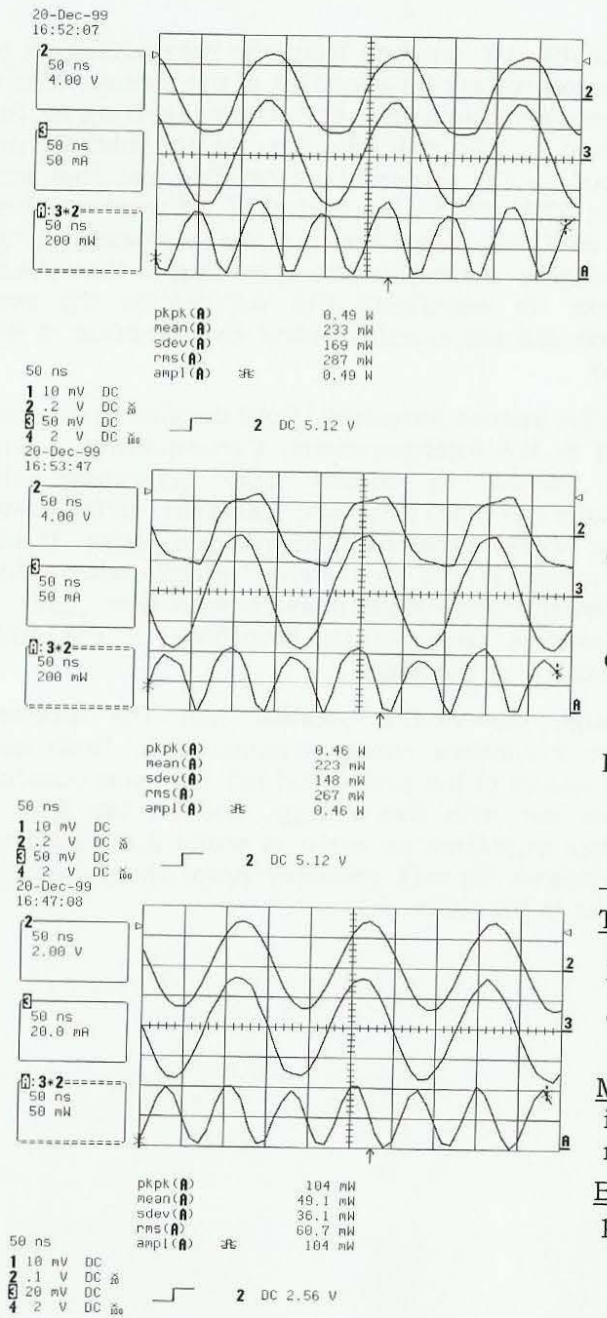
Therefore I prompted still another experiment. This time the colleagues observed at the transmitter the signal at the function generator, while I unclamped and again clamped the receiver. The shouting with joy from the adjoining room indicated that it had been observed, how the receiver reacted upon the transmitter and both are in resonance with each other. Such an effect characteristic for scalar waves, is a radio technical impossibility. In the case of radio with Hertzian waves an ***effect back from the receiver on the transmitter*** is unthinkable by principle.

In the next step we let glow the famous little lamp on the side of the receiver. As a consumer served a small light-emitting diode, of which the light intensity remained unchanged in the case of resonance. To prove this, we placed the receiver on a carriage and rolled the corridor in the TZ up and down with it. If the receiver was only slightly out of tune, then from the then arising fluctuation the ***standing wave nature*** could be observed perfectly.
With the setup it can be demonstrated well, how the law of the square of the distance, of the decrease of the field strength with the square of the distance, known from radio technology hasn't got validity anymore for scalar waves. Very clear also was the energy transmission of scalar waves out of a closed Faraday cage.

### 1.5 effectiveness of the scalar wave transmission line.

In the end we have determined the degree of effectiveness of the scalar wave transmission line.






Measurement record

System resonance: f = 6,7 MHz, Sinus.

distance transmitter-receiver: approx. 2 m

transmitter coil with HF-braid identical to receiver coil: 38 Windings wound spirally and 33 Windings wound cylindrically.

Load for receiver: metal layer resistor (100 Ohm)

Gauge: Quad 200 MHz Oscilloscope: LeCroy 9304C

Current sample: LeCroy AP015 (DC-50MHz)

Differential sample: LeCroy AP032 (Attenuation Rate: 1/20)

---

Top: transmitter power consumption with receiver turned on (at 100 Ω-load): 233 mW

Middle: transmitter idle power: (without receiver) 223 mW

Bottom: receiver power output: 49,1 mW

Fig. 4: *Measurement record for scalar wave transmission line*

An output power of 49 mW resulted from the measurements of the current and tension voltage for a loading of the receiver with a 100 Ohm resistance. Simultaneously, the power taken up by the transmitter amounted to 233 mW. However, if we subtract the idle power consumed by the transmitter from this and that was determined to be at 223 mW for the switched off receiver, then actually only 10 mW are available for the wireless energy transmission. The degree of effectiveness according to that would be at 490% or are we mistaken? Did we change the own consumption? Where did the reactive power consumption of the transmitter remain?

Do we have to give the answer ourselves? No! I decided to exercise restraint in regard to the interpretations. Consequently, I only demonstrate the effects in public and encourage the reproduction. Perhaps the most futuristic statement of Tesla was that he could draw energy from the field with his device. It still continues in the minds of the free energy scene today. They imagine that the energy came from a mysterious zero point or vacuum where particles can not be according to the valid definition. How should it be possible?

Tesla already thought about this question also. His collected energy was always a wireless energy transmission. Tesla said nothing about the source of his power and left the open question how he moved his car with this energy. Did he tap from a technical transmitter anywhere on earth or really a source from the sun or the cosmos? We will probably never know because Tesla took the secret to his grave.



## 2. **NASA-Report/CR-2005-213749,** Advanced Energetics, Vol.II

The report by David S. Alexander is too extensive with 114 pages to be included entirely in the documentary. However, along with the paper from above, it is clear that the study of scalar waves is not a self purpose. We are all looking for new sources of energy which might be worth to exploit. Others are also searching like the American Space Agency NASA [30].

Between the time of the release for my english book "Scalar Waves" in 2003, my visit to Chicago at Argonne National Laboratories in 2004 at the invitation of the National Science Foundation (NSF), where I have personally handed over my book and the date of the NASA report on April 1st, 2005, was not much time left for the editor, especially for the also mentioned experimental validations.

Therefore, the American scientists felt free to question the statements in my collection of material [33]. They have provided much space for the book. It is uncertain whether they also have understood and accept my derivations.

### 2.1 "Dr. Thomas Valone's Writings on Scalar Waves"

The author of the NASA Report introduces (from page 41 on) to some remarkable statements in the topic of the chapter 3: Advanced Electric Concepts. He remarks, that "Some experimenters have performed side-by-side demonstrations that clearly show that the characteristics of longitudinal and transverse electric waves are quite different... Research into and the recognition of the importance of scalar waves is now significantly growing worldwide" [30].

In the focus of scalar waves he examines the statements of two well known representatives more in detail:

- „Dr. Thomas Valone, who has written extensively on ZPE (Zero-Point-Energy) and related phenomena [31, 32]"; and
- „Dr. Konstantin Meyl, who has written an extensive book on scalar waves [33] in which he uses that phenomena as his basis for describing the properties of matter and energy from a viewpoint that is different from what is commonly accepted".

"Dr. Valone defines in the glossary of one of his books [31]", in a typical procedure for scientists, what is meant by longitudinal or transverse waves, as well as by a scalar field or a scalar wave. For the NASA report, the definitions have been adopted:

*„Scalar wave - (see longitudinal wave), also Tesla wave: An oscillating field of pure potential without E and B (electric and magnetic) fields".*

I should comment this, because it can not stand in physics. Fields with no direction can never form a wave and longitudinal waves are characterized by propagating in the direction of the E- or H-field vector. Nobody can get around the rules of physics.
With some other explainations however my experiences are congruent:

*„Scalar waves can penetrate all objects and in fact can traverse the whole universe. Scalar waves thus may in fact, travel faster than light speed c, since no c-limited fields are involved",* as Dr. Valone is quoted in whose opinion on scalar waves "no energy or power transfer occurs".

In my opinion, in contrary to Dr. Valone, scalar waves carry energy, which is a requirement for the wireless transmission of energy. What sort of wave is this, Dr. Valone is emanating? Anyway his wave is incompatible to the wave equation.
The basis should be the vector potential, a postulation in electrodynamics, but unable to describe a wave – puzzling.

On this contradictory basis Dr. Hal Puthoff has even an U.S. Patent [no. 5,845,220] „Communication Method and Apparatus with Signals Comprising Scalar and Vector Potentials without Electromagnetic Fields".

He is, according to NASA's report, as a leading specialist of ZPE (Zero Point Energy). This is a classic "perpetual motion idea" that is completely detached from the scalar wave model to be seen. Dr. Valone represents this as well.

Others prefer the notion of a vacuum energy, a fanciful imagination, that there should be power available, where nothing is, by definition. With such a postulate no serious dispute with colleagues of physics threatens, who are still believing that energy is always bound to particles, i.e. oscillating neutrinos.



## 2.2 "Dr. Konstantin Meyl's Teachings on Scalar Waves"

"Professor Dr.-Ing. Konstantin Meyl began to lecture on scalar waves in Germany in 1996. Dr. Meyl published a book compiled from a series of lectures on scalar waves and related topics that he gave from 1996 to 2003. This book has subsequently been translated from German to English [Ref. 33]. Dr. Meyl was also one of the speakers at the Extraordinary Technology Conference held in Salt Lake City, Utah, in August of 2004, and he presented experimental demonstrations of scalar wave phenomena as part of his lecture on that topic.
Dr. Meyl's book is comprehensive and lengthy as it attempts to explain (by means of a scalar wave approach) a very wide spectrum of topics that include physics, electric phenomena, cosmology, biology, and Earth history.
In the following sections, this report will focus on those topics in Dr. Meyl's book related to the properties of scalar waves and how they may potentially be used for both advanced energy and advanced propulsion applications".

There follow sections that reflect my book [33] in a summary under the headings:

1. Introduction
2. Scalar wave concepts from Dr. Meyl's Book
3. Longitudinal electric waves
4. Dr. Meyl's personal Tesla coil experiments
5. Differences between the near-field and far-field of a transmitted signal
6. Variable velocity of scalar waves
7. Potential efficiency of scalar wave communications
8. Comparison of scalar wave propagation with nerve conduction
9. Vortices as a link between scalar and transverse waves
10. Dr. Meyl's Scalar wave demonstration device
11. A demonstration of (average) scalar wave velocity

The NASA report about my book ends up with the statement: „Meyl claimed that the ratio of the scalar to transverse resonance frequencies (7.1 MHz/4.6 MHz), which is 1.54, is the ratio of the respective velocities. That is, for the conditions of the demonstration, the average velocity of the scalar waves was 1.54 times the velocity of the transverse waves, or 1.54 times the (commonly understood) "speed of light."

Supporting my measured results the NASA report gives more examples, i.e. results from the Borderland Science Research Foundation [34]:

"The BSRF researchers claimed that they have demonstrated that the wave propagation velocities of transverse waves and longitudinal waves are significantly different, even when they are produced by the same signal source.

The wave velocity of transverse waves was determined by measuring the frequency for which low-power radio waves directly coupled to the end of a conductor of known length produced a resonance condition that resulted in a maximum voltage measured at the "far" (nonsource) end of the conductor. Wave velocity was calculated as (resonant) frequency times wave length, which was equal to frequency times conductor length times four. (The factor of four is included because reflected energy and input energy result in a maximum output when the conductor length is one-quarter of the full [electric] wave length.)

The wave velocity of longitudinal waves was determined in a very similar manner; however, the radio waves were ***capacitively*** (i.e., not directly) coupled to one end of a conductor equal in length to the conductor used for the transverse wave velocity measurement. As was done for transverse waves, wave velocity was calculated as (resonant) frequency times conductor length times four. The results of these determinations were as follows:

– transverse wave velocity = $2.44 \times 10^8$ m/s = 0.81 x c; and

– longitudinal wave velocity = $3.74 \times 10^8$ m/s = 1.25 x c.

The velocity of transverse waves in "free space" (i.e., not confined to a conductor or other physical material) has been measured to be $3.00 \times 10^8$ m/s, and this value is commonly referred to as "the velocity of light, c" [Ref. 34]".

In this cited experiment again the longitudinal wave is 1,54 times faster than the transverse wave.

## 2.3 "Demonstration of Tesla's Radiant Energy Patents"

"The BSRF experimenters", as reported, "built a transmitter coil and a receiver coil according to the information and specifications in Tesla's 1900 patent [35]. These coils were technically described as air-core transformers of an approximately 18-in-diameter flat spiral configuration. The coils are referred to as "pancake" coils due to their flat shape.
They showed that with longitudinal waves, a standard incandescent electric light bulb is readily lit to normal brightness using *only a single wire connection* to energize the bulb.
In the next demonstration the Tesla set up was powered instead by longitudinal electric impulses (Fig.2.1). The experimenters placed their fingers approximately 1 in. from the bulbs lit by longitudinal electric impulses and claimed they could feel a ***mechanical force*** radiating from the bulbs and pushing against their fingers (2.1a). However, when a piece of copper foil was hung from a piece of masking tape and brought to within approximately one-half inch of the same impulsepowered bulb, the copper foil was pulled ***toward*** the bulb (2.1b)".



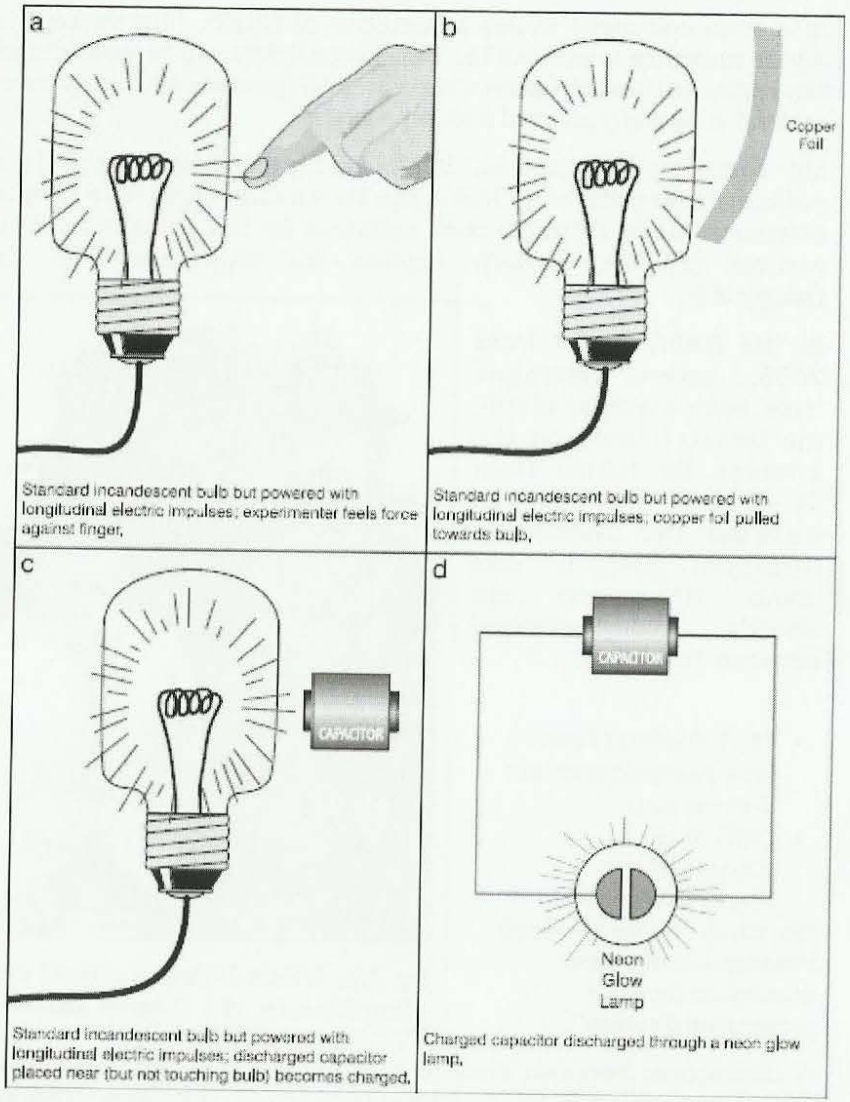



Fig. 2.1: *NASA Report, page 50: Experiments with standard incandescent bulbs powered by longitudinal electric impulses.*

Interesting experiments in addition are those charging (2.1c) and uncharging (2.1d) a capacitor in the field of the lamp.

In a final comment writes a member of BSRF, "that the key is that anyone attempting to replicate Dr. Tesla's experiments will be successful when they realize that Tesla did know what he was doing and his discoveries were not confined to generally accepted electric principles".

My comment on that is, if the accepted field theory is not sufficient, then the time has come for an extension. The proposed extension of the third Maxwell equation for the so-called potential vortices [2] can actually explain the experiments of Tesla completely.

In the NASA report from 2005, several attempts have been made to clarify the terms. Relying on the inventor, Dr. Nikola Tesla [35] and the mathematician Dr. Charles P. Steinmetz [36] it was about 100 years ago already distinguished between two types:

- TEM-Wellen (Transvers Electromagnetic Waves) and
- LMD-Wellen (Longitudinal Electric Waves),

"for which the energy-related vibration is in the same direction as the wave propagation direction".

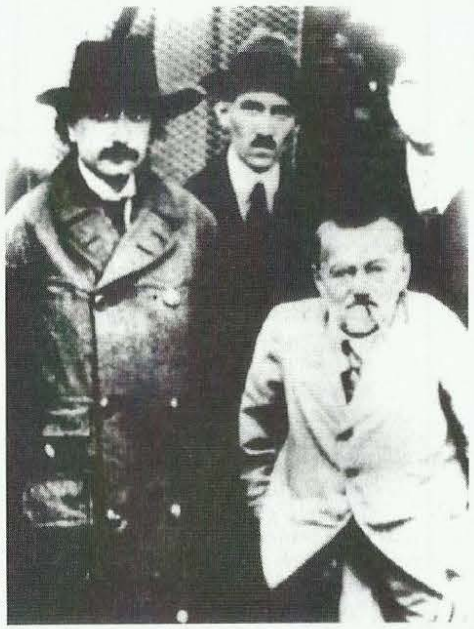


Fig. 2.2: ***Nikola Tesla*** (in the back) with ***Albert Einstein*** & ***Charles Steinmetz***

A distinction between electric and magnetic scalar is missing in the report as well as a delimitation from the term "radiation" preferably used by Tesla. I would like to do so, just to counter the general confusion, as it is especially common in the English-speaking world (using scalar, scalar field or scalar wave equally, although some means the opposite).



## 3. Radiation or Wave?

A suitable model is required to apply a newly discovered physical phenomenon in everyday technology. Parallel to its introduction, a technological impact assessment should be performed, but unfortunately is routinely delayed or neglected altogether in favour of rapid progress and opportunity.

Tesla had described the *biological efficacy of scalar waves* and warned of the dangers of X-ray radiation, but no one would listen. Carefree, children put their feet in X-ray devices found in shoe stores of the past, which were used to check how much spare room there remained within new shoes.

### 3.1 Spark's disease

The general ignorance regarding scalar waves is due to the scientific conflict between Heinrich Hertz and Nikola Tesla. Each claimed error on the other's part, each claimed having demonstrated the real wave as described by Maxwell. Only one would prevail in this conflict, and it turned out to be Hertz.

But in actuality, his historical experiment consisted of an energy transfer, as the receiver was constructed as a spark gap and operated within the near-field! He used both ends of the dipole-antennae, there were spherical electrodes, just like on Tesla's assembly. Therefore, we have to assume that he, in fact was utilizing Tesla-radiation.

However, he had measured merely the unused, even though by his device also emitted transversal waves, and it is only for this that he has been honored. As irony would have it, at Karlsruhe University, where he accomplished the proof in 1888, there is the on page 116 shown Figure 4 at the entrance, depicting field vortices within a dipole's near field, which have almost nothing to do with Hertz'ian waves in the far field.

In the 1930's navy radio operators, also known as sparks, complained about headaches, vertigo, lack of concentration, and malaise. Today, this is called *"spark's disease"* but has withered after high frequency technicians have learned to maximize the efficiency of antennae. Thus, scalar wave proportions, suspected of being responsible for electromagnetic pollution, are being minimized. Today's high frequency technicians are being taught

numerous rules for noise suppression and how to maximize antenna-gain by power adjustment and optimization of antenna geometry.

### 3.2 Measuring the standing wave

A scalar wave technician can rightfully be described as a *"inverse" high frequency technician* as he is doing things differently than what is taught in textbooks. He is intent on maximizing noise signals while electromagnetic waves are considered waste.

A practical scalar wave transmitter would, for example, be a flat, spirally winded Tesla coil, whose outer end is grounded and inner end is connected to a spherical antenna. It is stimulated by ***self resonance***.
If no receiver is present, or if it's running idle, the emitted scalar waves exhibit distinct standing wave behaviour.

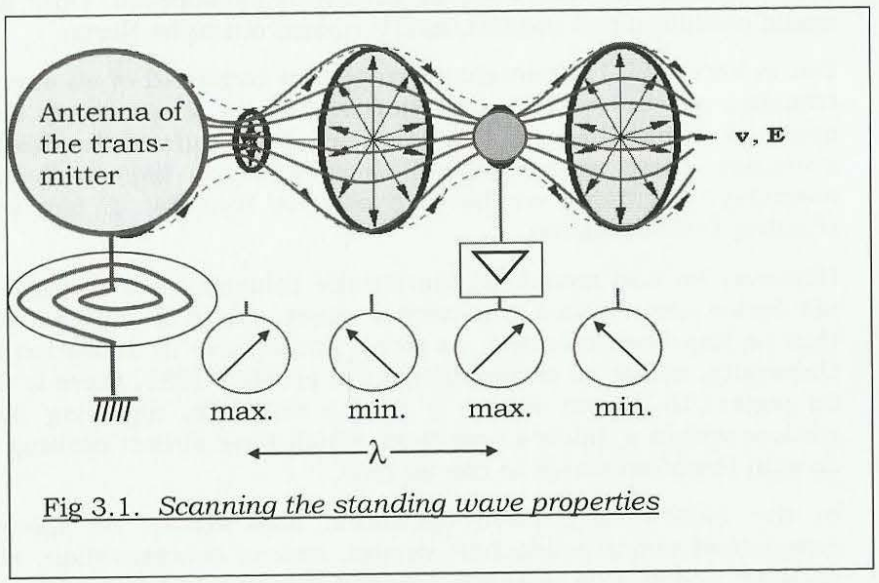



Fig 3.1. *Scanning the standing wave properties*

### 3.3 Optimization of range

From the distance of one measured peak to another, one can determine the wavelength. Multiplying the wavelength with the



operational frequency yields the *velocity of propagation*, which usually differs from that of light. *Upon this velocity depend both the* ***stability of field-vortices*** *and therefore the* ***range*** *of a line of transmission.*

With the experimental assembly patented by Tesla it can be easily proven that using a *larger spherical electrode as the emitting antenna increases amplitude oscillation of vortices, greater velocity of propagation, more stable vortices, and an overall greater range can be attained.*

The same results can be reached by utilizing a higher operational voltage which provide the vortices with greater ***acceleration voltage***, thereby increasing range.

Tesla didn't rely on high voltage without reason, earning him the reputation as the *"master of lightning"*. With his system, he transmitted energy over enormous distances, far beyond an emitter's near field.

Calculations regarding the near field found in today's textbooks only examine its propagation at the speed of light, but that's merely a special case!

What happens to the distribution of electric flux lines of a scalar wave once the receiver's not running idle, but is being fully loaded as required by a wireless transfer of energy?

### 3.4 The field of radiation

A receiver for energy is pretty much the opposite of a receiver for measurements. While measurement of a field calls for the diversion of as little power as possible in order not to distort the data, an energy converter, as utilized within a transponder, alters the field totally by attracting it.

This is also called *"the field of radiation of the antenna"*.

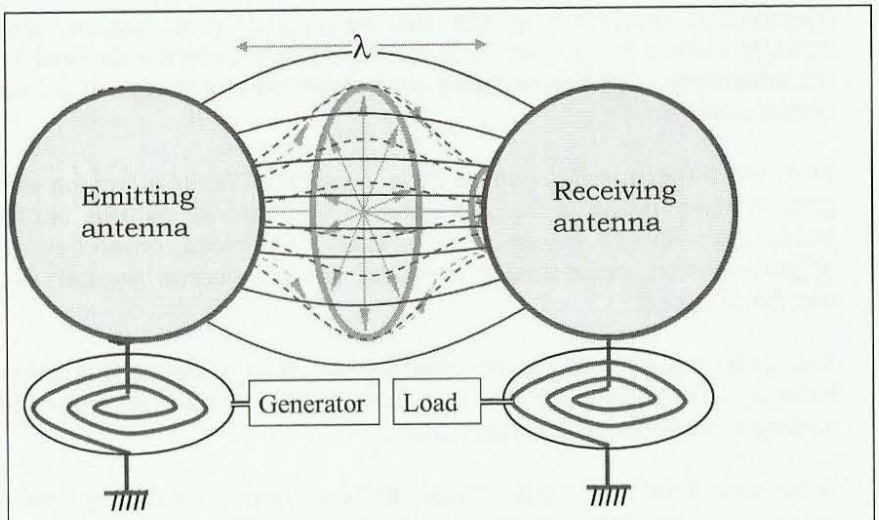



Fig 3.2. *Scalar wave or energetic radiation*

Let's examine the borderline case, which constitutes the energetic optimum: All flux lines emitted end at the receiving antenna.

Thereby, *all wave properties vanish*, wavelength is no longer determinable, and consequently no velocity of propagation definable.

### 3.5 Resonance

Strictly speaking, one can no longer distinguish emitter and receiver. Both are tightly connected by the field. *They form an* ***oscillating circuit*** *operated at* ***selfresonance***.

The necessary conditions for ***resonance*** pertain to:

- *Identical frequency*
- *Opposite phase shift (180°)*
- *Identical wave shape, respectively modulation*

Transponders usually utilize sinusoidal-shaped signals for transmitting energy, so that only frequency (1) and phase (2) are relevant.



*Ideally, when no scatter fields are emitted, no field will be measurable at all during operation, and therefore as a further benefit, there will be no biological effectiveness.*

*The disadvantage of resonant coupling* is the characteristic ***hysteresis***: Upon increasing the distance, the oscillation breaks off eventually, only to be restored by closing the gap.

If there is more than one receiver within range, they will both resonate and draw the necessary power from the emitter. If, however, the emitter is fully loaded already, the receiver located farthest away from it will be the first to terminate resonance.

Apart from these particularities, the *"law of distance squared" doesn't apply* - field strength does not decrease with increasing distance from the emitter.

### 3.6 Dielectric losses

In case of resonance, the radiation field resembles that of a ***capacitor*** with the flux lines running oriented longitudinally from one electrode to the other. As long as no flux line gets lost and none is scattered in from the outside the transmission line's efficiency amounts to exactly 100 percent.

During practical operation however, this special condition is hardly attainable. Some flux lines coil into vortices and form a scalar wave, maintaining their longitudinal orientation. Some of these vortices in turn disintegrate and generate heat.

Capacitors turn hot when operated at high frequencies as well. One speaks of *dielectric losses* and usually faults the isolating materials. However, it is to assume that within a capacitor, disintegrating field vortices generate lost heat in the same way.

If both *noise signals inside a capacitor* as well as *antenna noise* represent scalar waves, and *dielectric losses* as well as *antenna losses* represent vortex losses, it now becomes clear what both of these extreme cases have in common: On the one hand *the radiation field of an antenna* (Tesla radiation, Fig 5.3 left) and on the other hand *the electromagnetic wave* (or Hertz'ian wave, Fig 5.3 right). It is the scalar wave eliminated from Maxwell's equations which is always involved (Fig 5.3, middle).

### 3.7 Overview of scalar waves

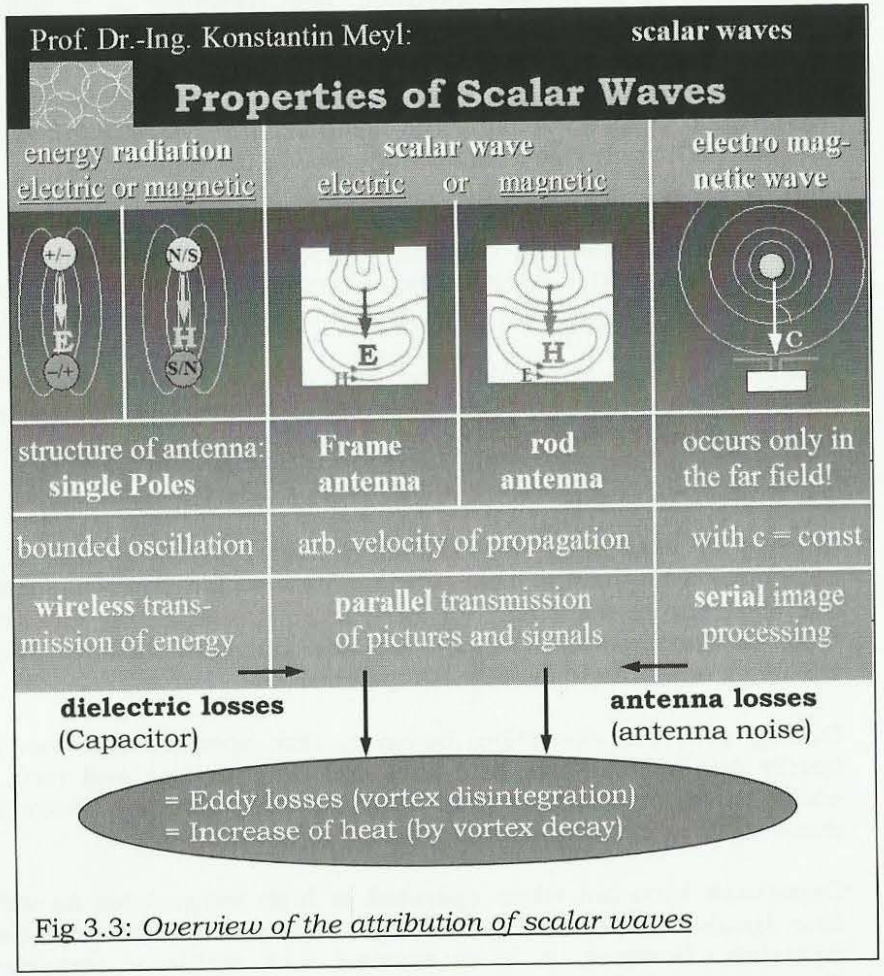



Fig 3.3: *Overview of the attribution of scalar waves*

Where the newly or repeatedly discovered scalar wave answers questions to physical processes, there is a vast gap in all common textbooks.



### 3.8 Noise power of a capacitor

We apply vortex physics to a dielectric with a suitable model representation.

Starting from a wave which roll itself up to form a flat vortex, obviously, the polarization and the propagation velocity would be maintained. However, what happens with the frequency?

The wave will now rotate around a stationary point, the vortex centre. The propagation with the speed of light c is maintained as the rotary-velocity. For a plane circular vortex, where the path for one revolution on the outside is a lot longer than near the vortex centre, arises a longer wave length and as a consequence a lower frequency on the outside, then on the inside.

With this property the vortex proves to be a *converter of frequency:* the vortex transforms the frequency of the causing wave into an even spectrum, that starts at low frequencies and stretches to very high frequencies.

This property we observe as *"white noise"*. The consistent conclusion would be that this concerns the vortex of the electric field. Anyone can, without big expenses, convince him or her-self that the property to change frequency is dependent on position and of the circumstance that vortices can be very easily influenced and that they avoid or whirl around a place of disturbance (i.e. an antenna).

For that, one only needs to tune a radio receiver to a weak and noisy station and move oneself or some objects around, then one is able to directly study the effect of the manipulation of the receiving signal.

But already the fact that the use and measuring of signals is limited by noise, highlights the need to pay attention to the potential-vortex.

Within a limited frequency range the power of the Nyquist or resistance noise is *independent of frequency.*

This should be clarified particularly by the term *"white noise"* analogous to white light, where all visible spectral ranges independent of frequency have the same energy density.

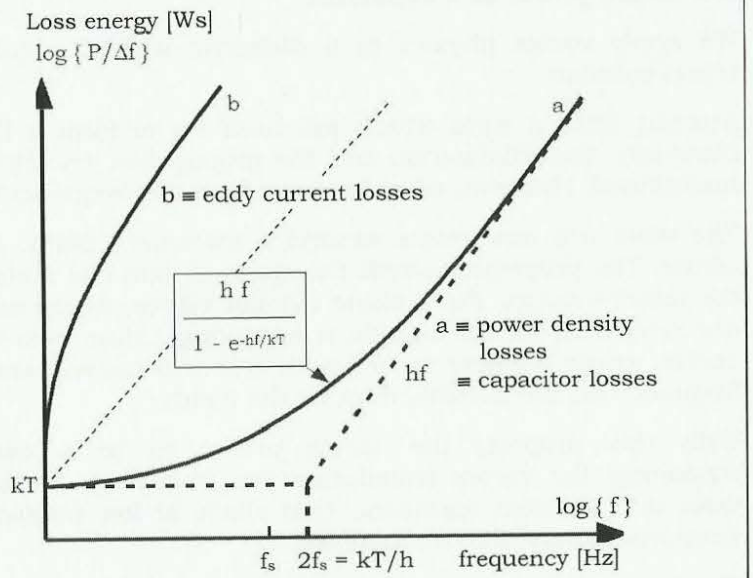



Fig. 3.4: *The power density shown against frequency* for noise (a) according to Küpfmüller [37], as well as for dielectric losses of a capacitor (also a) and for eddy current losses (b) according to Meyl [38], (b in visible duality to a).

But this relation doesn't hold for high frequencies of any magnitude. Here another noise-effect appears that is said to have its cause in the quantum structure of energy [37]. Untouched by possible interpretations an increasing power of the noise is measured, that is more and more proportional to its frequency (Fig. 3.4, curve a).
Interestingly this curve shows a remarkable *duality* to the power output curve of eddy currents, likewise plotted alongside the frequency, which can for instance be measured on eddy current couplings [38] (Fig. 3.4, curve b). This circumstance suggests a dual relationship of the potential-vortex of the electric field in weakly conducting media on the one hand and the eddy current in conductive materials on the other hand.



### 5.9 Capacitor losses dependent on the frequency

Next, the dielectric losses in a capacitor supplied with an alternating current, are measured and also plotted alongside the frequency. At first their progressions are independent of the frequency, but towards the higher frequencies they increase and show the same characteristic course of the curve referring to the power of the noise (fig. 3.4, curve a).

This excellent correlation leads to the assumption that the dielectric losses are nothing but *vortex losses*. These vortex phenomena, caused by time-varying fields, are not only found in ferromagnetic and conductive materials but equally as dual phenomena in dielectric and non-conductors.

Examples of practical applications are induction welding and the microwave oven. The process can be described in other words as follows: in both examples the cause is posed by high-frequency alternating fields that are irradiated into a dielectric as an electromagnetic wave, there roll up to potential-vortices and eventually decay in the vortex centre. The desired and used thermal effect arises during this diffusion process.

The author, in collaboration with a college at the university for theoretical physics in Konstanz as part of a bachelor thesis, recently succeeded in finding a conclusive proof. For this purpose the measured dielectric losses of a standard MKT capacitor were calculated from their frequency dependence and compared.

This systematically designed case deviates starkly from the conventionally derived characteristics in accordance with the Lorenz-model, the latter of which is at odds with reality and has long been known to be so and criticized by experts.

In contrast to that, the characteristic of the potential-vortex losses come much closer to the truth (Fig. 3.5).

Prof. Dr. Konstantin Meyl, Summer Semester 2010,
**Supervisor** of the student Timm Treskatis at the
**University of Konstanz**, Germany [39]

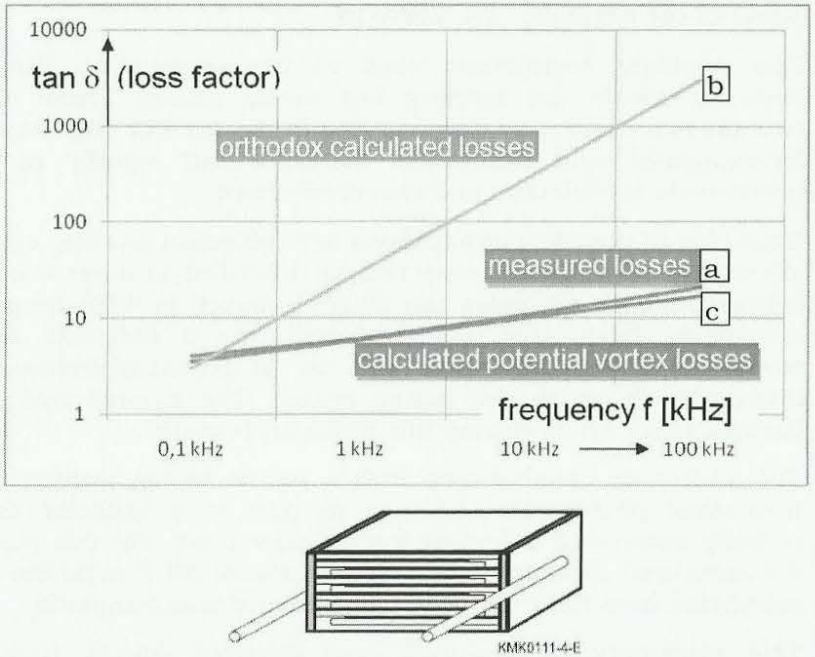



Fig. 3.5: *Experimental prove of calculated losses (qualitative comparison) with a MKT-capacitor (Siemens-Matsushita)*

a: measured dielectric losses of the MKT-capacitor

b: standard calculation according to Lorentz model

c: calculation as potential vortex losses according to Meyl model.



### 3.10 The visible proof

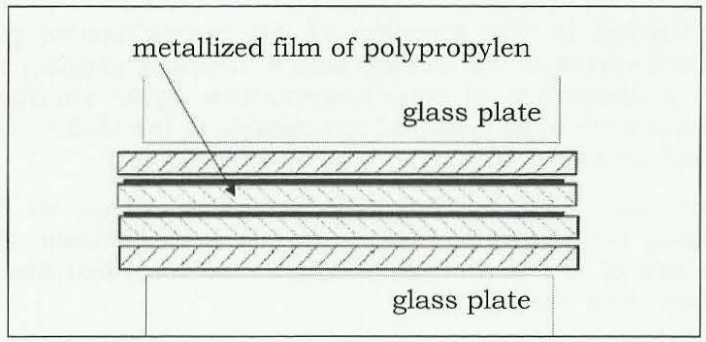
The striving in the direction of the vortex centre gives the potential-vortex of the electric field a *structure shaping property*. As a consequence of this *concentration effect* circular vortex structures are to be expected comparable to the visible vortices in flow dynamics (i.e. tornadoes and whirlwinds).

At the same time as the dual anti-vortex arises, so does the diverging eddy current. It takes on, as is well-known, the given structure of the conductor, which in the technical literature is referred to as *"skin effect"*.

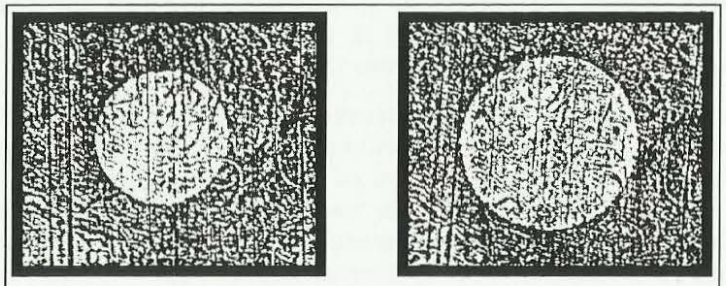
Now if conductor and non-conductor meet, as they do in a capacitor, then at the boundary area visible structures will form. Circles would be expected, if the eddy current on the inside striving towards the outside is as powerful as the compressing *potential-vortex* drawing in from the outside.

Actually such circular structures are observed on the aluminium of high tension capacitors when they are in operation for a longer period of time. The formation of these circles, the cause of which until now is considered to be unsolved, is already experimentally investigated and discussed on an international level by scientists [40, 41].

These circular vortex structures can be seen as a visible proof for the existence of potential-vortices of the electric field [2].




a) measurement set up according to Yializis and others [40]



b) after 40 hours c) after 52 hours

Fig. 3.6: *Measurement set up (a) and photo of vortex structure in a metallized polypropylene layer capacitor at 450 V/ 60 Hz/ 100°C and 110 fold magnification Observation of the formation of a vortex (b) and (c) According to Yializis et al. [40].*



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