

# Scalar Waves: Theory and Experiments<sup>1</sup>

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(TRANSLATION BY BEN JANSEN)

**Abstract**—It will be shown that scalar waves, which normally remain unnoticed, are very interesting in terms of their practical use for information and energy technology because of their special attributes. The mathematical and physical derivations are supported by practical experiments. The demonstration will show the following: (1) the wireless transmission of electrical energy, (2) the reaction of the receiver to the transmitter, (3) free energy with an over-unity-effect of about 10, (4) transmission of scalar waves with 1.5 times the speed of light, and (5) the inefficiency of using a Faraday cage to shield scalar waves.

## Tesla Radiation

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

It is a historical experiment, because 100 years ago, the famous experimental physicist Nikola Tesla measured the same wave properties as I. From him stems a patent concerning the wireless transmission of energy (Tesla, 1900). Since he also had to find out that much more energy arrives at the receiver than is taken up by the transmitter, he spoke of a “magnifying transmitter.”

Based on the effect back on the transmitter that Tesla sees, Tesla 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, lies at 7.8 Hz, however, Tesla comes to the conclusion that his wave has 1.5 times the speed of light (Tesla, 1905).

As founder of the diathermy, Tesla had already 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, it hardly has medical importance.

The discovery of Tesla radiation is denied and isn't mentioned in the textbooks anymore. For this there are two reasons: (1) No high school has ever rebuilt a “magnifying transmitter.” The technology simply was too costly and too expensive. For this reason, the results have not been reproduced, as is im-

**Maxwell equations** (rot  $\equiv$  curl):

$\text{rot } \mathbf{E} = -\delta\mathbf{B}/\delta t$	$\text{rot } \mathbf{H} = \mathbf{j} + \delta\mathbf{D}/\delta t$
$\mathbf{B} = \mu \cdot \mathbf{H}$	$\mathbf{j} = 0$
$\mathbf{D} = \epsilon \cdot \mathbf{E}$	

$\text{rot rot } \mathbf{E} = -\mu \cdot \delta(\text{rot}\mathbf{H})/\delta t = -\mu \cdot \epsilon \cdot \delta^2 \mathbf{E} / \delta t^2$

$\mu \cdot \epsilon = 1/c^2$

**wave equation:**

$\Delta \mathbf{E}$	$= \text{grad div } \mathbf{E} - \text{rot rot } \mathbf{E}$	$= \frac{1}{c^2} \frac{\delta^2 \mathbf{E}}{\delta t^2}$
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Fig. 1. The vectorial part of the wave equation (derived from the Maxwell equations).

perative to an acknowledgement of Tesla radiation. 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 to 4 Volts low tension. I sell the experiment as a demonstration-set so that it is reproduced as often as possible. The experimental kit fits in a case and has been sold 50 times in the last 4 weeks. Some universities can already confirm the effects. The measured degrees of effectiveness lie between 500 and 1000%. (2) The other reason why this important discovery could fall into oblivion is seen in the absence 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.

### 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  $\mathbf{E}$ ; Figure 1), which results from the Maxwell equations, and in a scalar part (grad div  $\mathbf{E}$ ; Figure 2), according to which the divergence of a field pointer is a scalar. We have to ask ourselves, "Which properties have this wave part, which founds a scalar wave?"

If we derive the field vector from a scalar potential  $\phi$ , 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).

**Wave equation:**

Laplace-operator	$\text{rot } \mathbf{E} = 0$ longitudinal wave	$\text{div } \mathbf{E} = 0$ transverse wave	$c =$ speed of light
$\Delta \mathbf{E} = \text{grad div } \mathbf{E} - \text{rot rot } \mathbf{E} = \frac{1}{c^2} \frac{\delta^2 \mathbf{E}}{\delta t^2}$			

$\text{Div } \mathbf{E} \neq 0$  is a scalar  $\Rightarrow$  **scalar wave!**

$\mathbf{E} = -\text{grad } \phi$

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(1)

$\text{grad div } \mathbf{E} = -\text{grad } \frac{1}{c^2} \frac{\delta^2 \phi}{\delta t^2}$

$\text{div } \mathbf{D} = \rho$

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(2)

$\text{div } \mathbf{E} = -\text{div grad } \phi$

(3)

$\text{div } \mathbf{E} = \rho/\epsilon$

**plasma wave:**

$$\Delta \phi = \frac{1}{c^2} \frac{\delta^2 \phi}{\delta t^2} - \frac{\rho}{\epsilon}$$

i.e. = longitudinal Langmuir-wave  
or: = longitudinal electric wave (vortex)

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

### Vortex Model

The Tesla experiment and my historical rebuild, however, show more solutions. Such longitudinal waves obviously exist even without plasma in the air and even in vacuum. Thus, the question is asked, "What does the divergence  $\mathbf{E}$  describe 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?

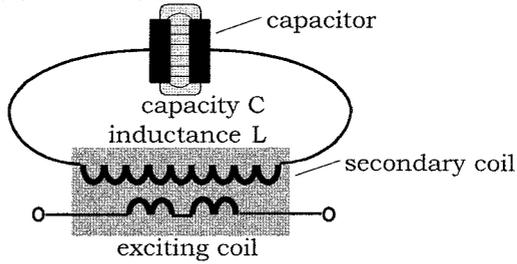
I have answered this question by extending Maxwell's field theory for vortices of the electric field. These so-called potential vortices are able to form structures, and they propagate in space because of their particle nature as a longitudinal shock wave. The model concept is based on the ring vortex model of Hermann von Helmholtz, which Lord Kelvin made popular. In my books (Meyl, 1996, 1998, 1999, 2002), the mathematical and physical derivations are described.

In spite of the field theoretical set of difficulties, every physicist will initially seek a conventional explanation. He will try the following two approaches.

1. **closed resonant circuit**

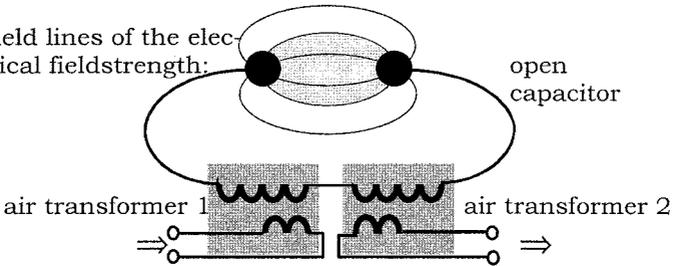
resonance frequency:  

$$f = \frac{1}{2\pi\sqrt{LC}}$$



2. **separating the resonant circuit**

Field lines of the electrical field strength:



3. **resonant circuit with open capacitor**

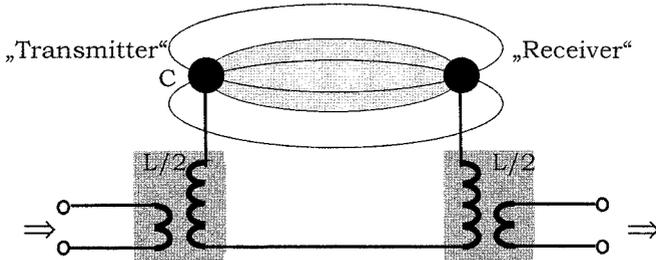


Fig. 3. Interpretation as an open resonant circuit.

*Resonant Circuit Interpretation*

Tesla had presented his experiment among to, among others, Lord Kelvin, and 100 years ago, Tesla had spoken of a vortex transmission. In the opinion of Kelvin, however, vortex transmission by no means concerns a wave but rather radiation. Kelvin 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 (Figure 3). If both electrodes of the capacitor are pulled apart, then between both stretches an electric field. The field lines start at one sphere, the transmitter, and they bundle up again at the receiver. In this manner, a high-

er degree of effectiveness and a very tight coupling can be expected. In this manner, without doubt some, but not all, of the effects can be explained.

The inductance is split up in two air transformers, which are wound in a completely identical fashion. 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 most, equal to the input voltage—but it is substantially bigger!

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

The measured degree of effectiveness lies despite the exchange at 1000%. If the law of conservation of energy is not to be violated, then only one interpretation is left: The open capacitor withdraws field energy from its environment. Without consideration of this circumstance, the error deviation of every conventional model calculation lies at more than 90%. In this case, one should do without the calculation.

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

Also, in the open question regarding the transmission velocity of the signal, the resonant circuit interpretation fails. But the HF-technician still has another explanation on the tip of his tongue, as follows.

### *Near Field Interpretation*

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

In my experiment, the transmitter is situated in the mysterious near zone. Also, Tesla always worked in the near zone. But he who asks for the reasons will discover that the near field effect is nothing but the scalar wave part of the wave equation. My explanation is as follows: The charge carriers which oscillate with high frequency in an antenna rod form longitudinal standing waves. As a result, the fields in the near zone of a Hertzian dipole are also longitudinal scalar wave fields. Figure 4 shows clearly how vortices are forming and how they come off the dipole.

As is the case for the charge carriers in the antenna rod, the phase angle be-

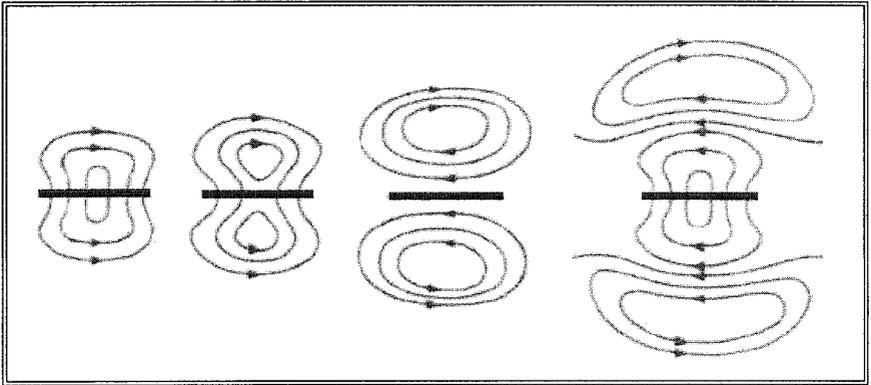


Fig. 4. The coming off of the electric field lines of the dipole.

tween current and tension voltage amounts to 90 degrees and occurs in the near field; also, the electric and the magnetic field phase shifted 90 degrees. In the far field, however, the phase angle is zero degrees. In my interpretation, the vortices are breaking up, they decay, and transverse radio waves are formed.

### *Vortex Interpretation*

The vortex decay, however, depends on the velocity of propagation. Calculated at the speed of light, the vortices have already 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 don't have a charge, on the average, over time. As a result, they are able to penetrate solids in an almost unhindered manner. Particles with this property are called neutrinos in physics. The field energy which is collected in my experiment, according to that property, 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 from my receiver, every attempt at near field interpretation goes wrong. After all, does the transmitter installed in the near field zone supply less than 10% of the received power? However, the 90% which it concerns here cannot stem from the near field zone!

### **Experiment**

At the function generator I adjust the frequency and amplitude of the sinusoidal signal, with which the transmitter is operated. At the frequency regulator I turn significantly, until the light-emitting diodes at the receiver glow

brightly, whereas those at the transmitter go out. At this point, an energy transmission takes place.

If the amplitude is reduced so far that it is guaranteed that no surplus energy is radiated, then a gain of energy also takes place by energy amplification. If I take down the receiver by pulling out the earthing, then the lighting up of the LED signals the mentioned effect back on the transmitter. The transmitter thus feels as 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 run down and there, at approximately 4.7 MHz, the receiver again glows, but less brightly, and is 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 this theory, 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, in spite of this fact, the receiver lamps glow! By turning 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 tunneling!

### Note

<sup>1</sup>This paper is based on a presentation made by the author at the Amsterdam conference of the Society for Scientific Exploration, October 2000.

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Theory and Experiments. by: Prof. Dr.-Ing. Konstantin Meyl. Introduction. 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 of about 5Å 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.