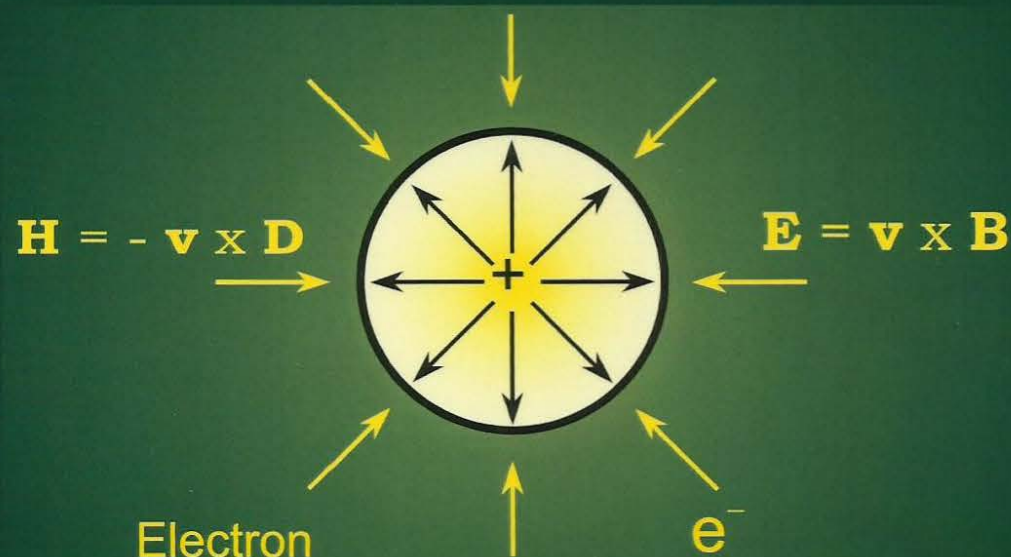


**Konstantin Meyl**

## **From Objectivity to a Unified Theory**



Proposals for a new interpretation of the atomistic, materialistic and scientific world view, based on recently discovered potential vortices

Potential Vortex Vol. **2** 

Potential Vortex Vol. 2

## **From Objectivity to a Unified Theory**

by **Prof. Dr. Konstantin Meyl**

The ambitious aim of a holistic unified theory is achieved by a consequent utilization of the principle of causality. In doing so, the first step is to remove the electron from Maxwell's theory, to be finally derived as a calculable structure of a potential vortex.

The field-theoretical approach replaces the former electric source field free of vortices, by a vortex field free of quanta, that is, by the field of the potential vortices. This proves to be the result of a strict mathematical derivation, which does without the need for postulates or neglects. The approach consists of two equations of transformation (given on the envelope).

As a consequence, well-known paradoxes of the theory of relativity are solved, if a measure of length dependent on the field constitutes the base of the theory of objectivity, if thus gravitation, temperature and all known interactions, explained by a single physical phenomenon, back up the holistic theory of everything.

Proposals for a new interpretation of the atomistic, materialistic and scientific world view, based on recently discovered Potential vortices

**2**

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**Professor Dr.-Ing. Konstantin Meyl**

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**Preface** (belonging to the 1<sup>st</sup> Edition 1992)

As the subheading suggests, this second volume of the book series on Potential Vortexes contains various proposals for a reinterpretation of the physical and scientific world view. It is based on the first volume (from 1990). The introduction to the subject and the repetition of the derived Dual Field Equations in the first volume and of the possible world equation are, therefore, very brief. It, however, has been written in such a manner that it remains comprehensible by itself without necessarily having read the first volume.

*Konstantin Meyl*

Villingen-Schwenningen, May 1992

[www.meyl.eu](http://www.meyl.eu)

*First english translation by the help of  
Dipl. Inf. Ben Jansen, 2003 and  
Dipl. Ing. Steve Bublies 2014,  
revised by Tristan-Fredric Itschner 2014.*

## Preface (belonging to the 2<sup>nd</sup> Edition 2012)

The first edition was sold out within a few years. A reprint was intended at first, after the contents had been transferred unabridged to the seminar and lecture script EMUV Part 1. As part of the collection of material, the ideas were discussed and analyzed in the subsequent period.

Interestingly nothing has been found to be unnecessary or false. Instead reasonable additions and aspects have came up, which go beyond the constraints of the scope of the new edition.

Therefore, the decision has been made to split the content of the first edition into two volumes.

The derivation of the theory of objectivity, which replaces the theory of relativity without its errors or paradoxes, the derivation of gravity and the holistic theory (Theory of Everything) right up to the question of temperature and universality fill the present second volume in its second edition.

I have left out the chapters on the vortex model of the quanta, the new atom model and the structure and computation of elementary to be able to present these in detail in the third volume.

INDEL-publishing department

*Konstantin Meyl*

[www.meyl.eu](http://www.meyl.eu)

Villingen-Schwenningen, January 2012

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## 1. Approach: Vortex Physics

Upon the roots of our physical understanding, we find a fundamental principle that is, until today, not doubted and that is regarded as elementary: the principle of causality. Every result of a measurement, every interpretation is checked for causality and only after passing this examination it is accepted and published.

This principle of cause and effect is established, not only in physics, but also in many other disciplines of science. If an effect is observed, one asks immediately for the cause.

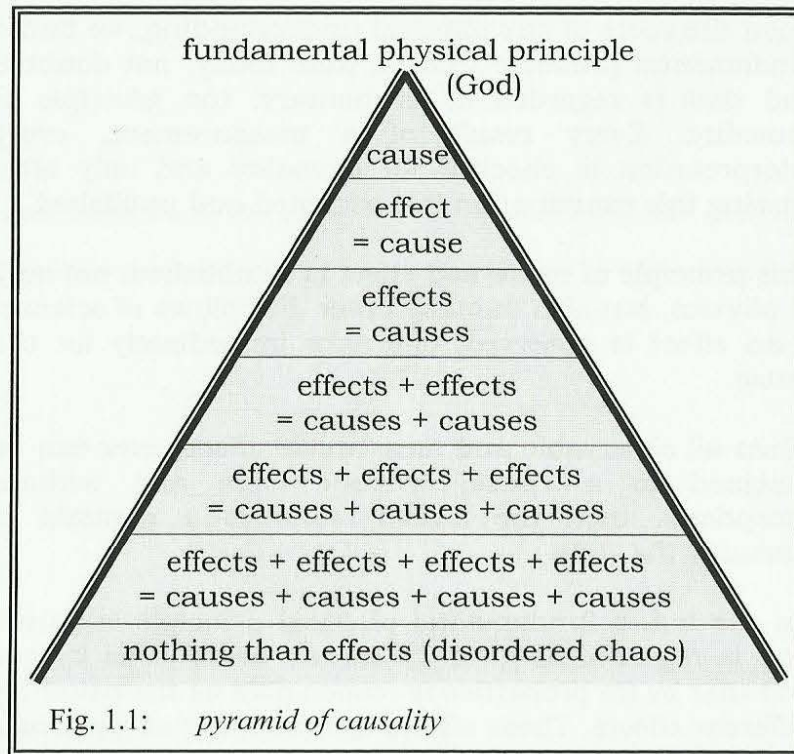
When all observable and measurable effects ever can be assigned to a cause, without force and without exceptions, then the logical result is a pyramid of causality (fig. 1.1).

On the top, a fundamental physical principle is found, that is regarded as given by nature or as given by god and that by its properties is responsible as the cause for different effects. These effects again appear as the cause for new effects and so on.

Sometimes we detach ourselves so far from the top of the pyramid that a direct reference to the describable effects cannot be done anymore, so the impression could arise that it concerns an isolated and independent subject. We should take care not to think in such a monocausal way, because delimitations and avoidance of interdisciplinary working methods will inevitably lead us to a dead end.



### 1.1 Causality



This pyramid of causality represents the vision of a "unified theory", like the one demanded and sought for by numerous research scientists. But as long as it is not found, we will have to deal with unsolved problems of causality. For this, any number of examples can be given.

A physical principle based on the principle of causality is the vortex. The eddy current demonstrates this in a clear way.

The cause of its origin is an alternating field. According to Faraday's law of induction, this induces a voltage that in a conducting medium results in a current, according to Ohm's law. Around this current, according to Ampère's law, an alternating field forms, that points perpendicular to the current and interferes with the original alternating field. This induced field, first of all, is an effect that superimposes the cause and itself becomes the cause. The effect that follows from this further superimposes and forms a new cause, etc. In this manner, vortices form.

*Vortices are a consequence of the principle of causality.*

Our physical view of life strictly obeys to the rules of causality, the principle of cause and effect. But there are numerous cases, where causality, at first, could not be fulfilled anymore. Here alternative solutions had to be found to not endanger this very effective principle. A few examples should clarify this:

1. Technically it is impossible to produce a magnetic monopole. When a north pole is produced then the accompanying south pole is also formed. In the same way, only the positive and negative pole can be combined into the so-called dipole. In the microcosm, however, we observe monopoles. Electrons are such particles. To restore causality we must grant the microcosm its own laws that are not valid in the macrocosm! But this monocausal hypothesis contradicts the observation that the microcosm represents an image of the macrocosm and vice versa. Doubts, if this assertion is allowed, are reasonable.



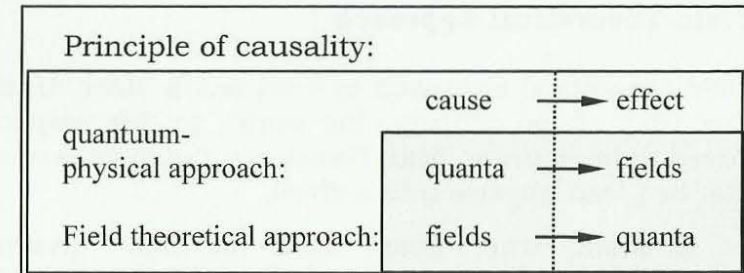
2. Charges of similar sign repel each other and, thus, the distance increases. Inside an atomic nucleus, positively like charged protons are next to each other at the smallest possible space without any repulsion taking place. Arithmetically seen, all atomic nuclei would have to literally explode.

But because this did not happen, so shortly afterwards a new and supposedly fundamental interaction, the strong interaction, was introduced to save causality. Nevertheless, this interaction now keeps the similarly charged particles in a not explained manner next to each other. Causality could be obtained only by the introduction of a new fundamental phenomenon.

3. When causality should remain the supreme principle, it should be demanded with priority for the fundamental phenomena of physics. Instead, in quantum electrodynamics, the particle is attributed the same physical reality as the field. With the wave-particle duality, Heisenberg has given the corresponding formula of compromise. This slaps the face of the principle of cause and effect.

#### **Violations of the principle of causality, examples:**

- monopoles exist
- starting point for the strong interaction
- fields and quanta are a cause at the same time
- hypothetical particles (gluons, quarks, etc.)
- transmission with speeds faster than light
  - ◆ with photons (University of Berkeley)
  - ◆ with microwaves (University of Cologne)
  - ◆ with laser beams (Technical Univ. Vienna)



Causality, in principle, allows only two approaches for a solution: the *quantum physical approach*, which holds the quanta as the cause for the fields, and the *field-theoretical approach*, wherein only the fields act as the cause. For both approaches there are good arguments. The field theorists cite that fields can exist also in the vacuum, so that there exist fields without particles but never particles without fields. Contrary the quantum physicists hold that somewhere, even when quite far away, there exist particles and that the measurable fields merely are their action at a distance.

Both approaches first arouse the impression to be fully equal. In the course of the discoveries in the area of quantum physics, the corresponding approach has been able to establish itself. But it is therefore demanded that all phenomena have to be understood as a consequence of particles. So *gravitons* should make gravitation possible, should *gluons* hold everything together and the *quarks* form the basic building parts. Meanwhile it is merely worked with *hypotheses*. Out of poverty quantum physics meanwhile has said goodbye to strict causality, after the number of violations of causality has risen to such a large degree and in every respect there is a lack of models of explanation. It seems as if the dead end is reached, as if the quantum physical approach, to a large extend, is exhausted.



## 1.2 Field-Theoretical Approach

The field-theoretical approach is a lot much older. Until the last turn of the century, the world, in this respect still, used to be in order. Max Planck, by the discovery of quanta, has lead physics into a crisis.

Albert Einstein, who, apart from his light quanta hypothesis, was in his soul actually a field theorist, wrote: „Is it feasible, that a field theory allows us to understand the atomistic and quantum structure of reality?“. This question is answered by almost all with *No*. But I believe that, at present, nobody knows anything reliable about it“ [1-1].

By the way, the "No" can be justified by the fact that the field description according to Maxwell is by no means able to describe the formation of structure, so that it is not possible for quanta to occur as a consequence. The field-theoretical approach could, obstructed by Maxwell's field theory, not further be pursued and this has not changed until today.

Maxwell is in no way blamed at this point, because he was already dead when Heaviside and Hertz restated his field equations, as Sommerfeld expresses [1-2]. This cleaning especially effected Tesla's findings on longitudinal wave phenomena, whereby in the dispute between Hertz and Tesla, the former had prevailed with its transverse EM wave. But the dispute has not been decided yet by this dogma.

Nevertheless, it would be an omission to not at least try this approach and examine it with regard to its efficiency.

With the well-known formulation, the Maxwell theory offends the claim for causality, since it is field theory

and quantum theory at the same time. Maxwell himself did not know quanta, but today we know that the fourth Maxwell equation is a quantum equation:

$$\operatorname{div} \mathbf{D} = \rho_{\text{el}}. \quad (1.1)$$

According to this, the electric field is a source field, whereby the individual charge carriers, like e.g. electrons, act as sources to form in their sum the space charge density  $\rho_{\text{el}}$ . The other three Maxwell equations are pure wave equations.

This was probably the reason for Pauli to call „the electric elementary quantum  $e^-$  a stranger in Maxwell-Lorentz' electrodynamics“[1-3].

The principle of causality and the field-theoretical approach at first demand a source-free electric field:

$$\operatorname{div} \mathbf{D} = 0. \quad (1.2)$$

Only by the generation of quanta, a source field can form as a special case. The necessary approach for the calculation of the electron has to fulfil the principles of duality in every case.

The electromagnetic wave teaches us the duality between the  $\mathbf{E}$  and the  $\mathbf{H}$  field, which are oriented perpendicular to each other and are in a fixed relation to each other. If one of them is a vortex field then the dual field must also be a vortex field.

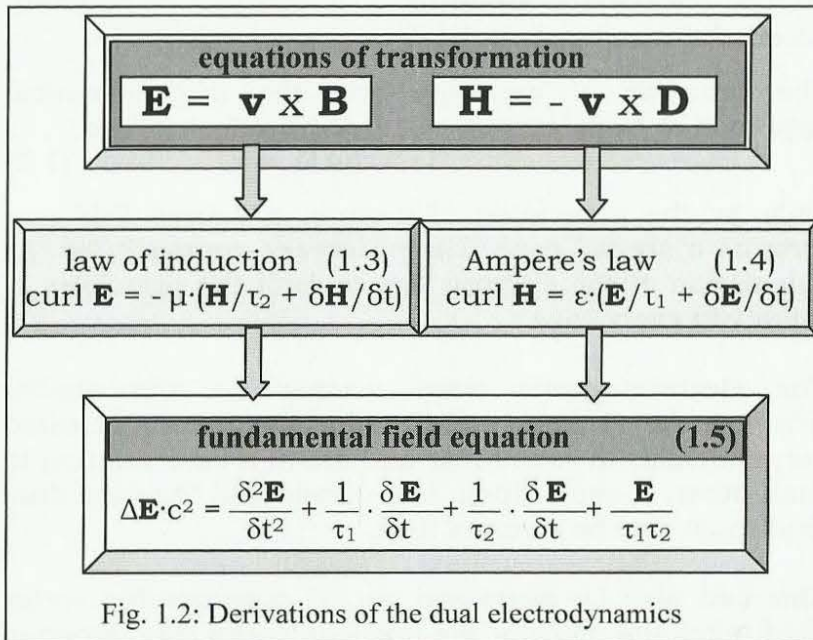
This can also be expressed as: *"A quantum-free vortex field takes the place of the previous vortex-free quantum field"*.



### 1.3 Dual Electrodynamics

An approach, in principle, can be chosen freely. In the case of the overriding field theory two equations of transformation form the approach, which are already stated in textbooks and experimentally proven.

That is why the whole field-theoretical derivation does without one postulate. It is pointed to the fact that these equations on their part cannot be derived and should be interpreted rather philosophically than physically.



From this approach the extended field theory is derived directly, without the need to add or discard a term. The extended field theory consists of the well-known law of

Ampère extended by the dielectric displacement  $\mathbf{D}$  from Maxwell, and of Faraday's law of induction, which is extended by the vector of potential density  $\mathbf{b}$  by means of the derivation. This is done, as presented in Potential Vortex volume 1 and in numerous publications [1-4], by application of the curl-operator to the respective field vector (curl  $\mathbf{E}$  or curl  $\mathbf{H}$ ) and by evaluation of the resulting terms.

Maxwell's field equations are contained in the solution and thereby continue to be valid. Their disadvantage, however, is that without the extension  $\mathbf{b}$  not a single quantum physical postulate can be derived. If we add this extension and insert the equations into each other without additions and without omissions, this time a central solution is the result, which is called *fundamental field equation*.

Since the fundamental field equation has eigenvalues under certain boundary conditions and describes structures, various quantum postulates can be described by it, from the quantum properties of the elementary particles over the Schrödinger equation and the inhomogeneous Laplace's equation up to the derivation of the Golden Proportion. That justifies the assumption that this is, possibly, the long sought-for *world equation*. (eq.1.5).

The since long sought-for „*Theory of Everything*“, the big unification theory is in fact getting closer.



## 2. About the Objectivity of Interactions

The quantization of nature asks for a phenomenon capable of forming a structure. The potential vortex has exactly this quality due to its contraction effect. Therewith it exerts a pressure from all directions and forms known structures. The most frequent structure is a sphere.

Possibly it had been a big mistake to zero the structure-forming potential vortices in the field theory. As a result, this negatively effects all areas of physics, leading to postulates and distorted conceptions.

### 2.1 Vortices in Micro- and Macrocosm

For a limited structure, it is also necessary to have an expanding vortex inside counteracting the force of the contracting vortex from the outside.

Examples:	<i>expanding vortex</i>	<i>contracting vortex</i>
• quantum physics	<i>collision processes (several quarks)</i>	<i>gluons (postulate!)</i>
• nuclear physics	<i>repulsion of like charged particles</i>	<i>strong interaction (postulate!)</i>
• atomic-physics	<i>centrifugal force of the enveloping electrons</i>	<i>electrical attraction, Schrödinger equation</i>
• classical mechanics	<i>centrifugal force (inertia)</i>	<i>gravitation (cannot be derived?!)</i>
• astro-physics	<i>inertia of the stars at galaxy rotation</i>	<i>cohesion of the galaxies (Strings, dark matter?)</i>

Let us consider some examples and thereby look for the expanding and contracting forces.

- In quantum physics, one conceives the elementary particles consisting of quarks. Irrespective of the question, which physical reality should be attributed to this model conception, one thing remains puzzling: The quarks should run apart, or you should try to keep together three globules, which are moving violently and permanently hitting each other. For this reason, glue particles were postulated, the so-called gluons, which now should take care of the reaction force; however, this reaction force is nothing but a postulate.
- In nuclear physics, it concerns the force which keeps together the atomic nucleus, which is composed of many nucleons, and this force is responsible for the well-known great stability. Although in this case equally charged particles are close together, particles which usually repel each other. Between the theoretical model and practical reality there is an enormous gap, which should be overcome by introducing a new counteracting force. But the nuclear force called strong interaction is nothing but a postulate, too.
- In atomic physics, the electric force of attraction between the positive nuclear charge and the negatively charged enveloping electrons counteracts the centrifugal force. In this case, the complementary vortex takes care of the certain structure of the atomic shell, which obeys the Schrödinger equation as eigenvalue solutions. But this equation, irrespective of its efficiency is, to this point, purely a mathematical postulate, as long as its origin is not clear.



- In Newtonian mechanics, the centrifugal force (expansion) as a result of the inertia and gravitation (contraction) as a result of the attraction of masses are balanced. But the „gravitation“ blocks every attempt to formulate a unified field theory. Furthermore, this time, it is the contracting vortex, of which is said *cannot be derived nor integrated*.
- In astrophysics, we look at an unknown galaxy, then it revolves around its center and, in doing so, keeps its shape to a large extent? Despite rotation of its own as an elliptic shape, a barred or even a spiral galaxy virtually does not change its characteristic form. *From this follows that the inner stars of a galaxy are considerably slower on their way than the outer stars!* But exactly the opposite is expected.

According to *Kepler's law*, the outermost stars would have to orbit extremely slow in order not to be hurled into space as a result of the centrifugal force. But then, a galaxy would not be able to preserve its structure. The spiral form, as it has already been observed and classified by *Hubble*, merely would be an accidental exception as a momentary picture, by no means the most often encountered case. We have to take note of the fact, that the structure and in particular the cohesion of a galaxy cannot be explained by *Kepler's laws*.

[2-1 Kap. 10.1: *The basic laws of the universe start to fall apart: "What is the matter with the galaxies? They rotate at their periphery much faster, than the laws of physics allow. Or is something wrong with these venerable laws? The astronomers and physicists stand for the dilemma and to have to decide between the two alternatives: feign the observations or did we calculate wrong results for centuries?"* translated from „Bild der Wissenschaft“].

It is remarkable how, in the domain of the contracting vortex, postulates are accumulating. But this has not always been the case.

In ancient Greece, 2400 years ago, Demokrit undertook an attempt to formulate unified physics. He traced all visible and observable structures in nature back to vortices, each time formed of a vortex and its complementary vortex. This phenomenon appeared to him to be so fundamental that he put the term "*vortex*" equal to the term for "*law of nature*". The term "*atom*" originates from Demokrit (460-370 BC).

From this perspective, physics of ancient times had already been more advanced than today's physics, which, using Maxwell's approximation, neglects the contracting vortex and excludes fundamental phenomena from the field description or is forced to replace them by model descriptions and numerous postulates.

What we need is a new field approach, which cancels this flaw and in this point supersedes Maxwell's theory. It is found within the *Equations of transformation* (2.1 and 2.2).

The new and field-theoretical approach contains Maxwell's equations indeed, but surpasses these in one point. It describes *potential vortices* and their propagation in space as a *scalar wave*. In doing so, a conclusive answer can be given to the often-asked question of the medium and the mediated particles, which is a prerequisite for every *longitudinal wave*.

Vortex structures with particle nature are mediated and the field itself functions as a medium.

Does that also answer the question concerning the aether?



## 2.2 The Aether Question

Do you know the Maxwell experiment? No, you would not be able to, since the intellectual father quickly retracted the experiment after it did not work out. Today one speaks of the *Michelson experiment* and it may be connected with any other names (Morley, etc.).

In his light theory, *Maxwell* had determined a particular and constant value for the speed of light and for that there should be a physical reason, which should have its cause in the aether. By means of proving this aether *Maxwell* wanted to prove his theory, but this enterprise thoroughly went wrong.

The consideration was as follows: If the Earth is rotating and moving through the cosmos, then one should be able to detect an aether wind and different values for  $c$  in the different points of the compass.

*Maxwell* found support for his project in Berlin (Germany) at the observatory, since with the aberration of the stars, *Bradley* previously had described an observation, which could be considered as evidence for an aether. The director of the observatory assigned his assistant *Dr. Michelson* with the task to carry out a corresponding proof of an aether, this time in a terrestrial experiment. But such an aether could not be proven, and so *Maxwell* had to accept it as a severe strike against his *light theory*.

Seven years later *Maxwell* got the acknowledgement, from a completely other area of physics through the experiments concerning the radio transmission of *Heinrich Hertz* (University of Karlsruhe 1888).

Until today, the question has remained unanswered why astrophysics can prove the aether, whereas the detection in a terrestrial laboratory fails to confirm that an aether exists.

But as definition for the cause of  $c$ , the aether cannot be abolished as long as it is unsettled why the light is propagating with  $c$  out of all possible velocities. The question then is asked, "*What determines the propagation of light from today's point of view?*"

Now, by means of outside fields, the light can be slowed down. At present the world record lies at less than 65 kilometers per hour in a *Bose-Einstein condensate*. If electromagnetic fields determine the speed of light, if, in addition, field or gravitational lenses should confirm this, then the field takes over the task of the aether.

At this point, the new field-theoretical approach shows its capabilities. The equations of transformation say that a moving **H**-field transforms to a resting **E**-field and vice versa,

(see book-cover:  $\mathbf{E} = \mathbf{v} \times \mathbf{B}$  and  $\mathbf{H} = -\mathbf{v} \times \mathbf{D}$ )

that thus in the place of a moving aether, the aether wind, a resting aether is found. In doing so, the dual field partners merely exchange places. Therefore, it is a wild-goose chase wanting to measure an aether wind with gauges which underlie the same field. *Michelson* had to fail.



### 2.3 Transformation Equations of the EM-Field

Until now, the question concerning the aether could not be solved with any existing approach. Only the new field-theoretical approach proves the unambiguous and clarification, free of contractions, of the question concerning the aether. We hence, without exception, work with this approach which is anchored tightly in textbook physics, free from postulates and with unmatched superiority.

The two equations of transformation, on the one hand are the law concerning the unipolar induction according to Faraday (2.1) and on the other hand the dual formulation (2.3), which Grimsehl calls *equation of convection* [2-2], shall serve as basis. Grimsehl bypasses the question for the correct sign by means of forming a modulus. Pohl draws detailed distinctions of cases and dictates the formulation for each case of the dual law [2-3]. The sign eventually should be chosen according to the definition of the orientation of the field pointers.

Also Simonyi gives both equations and the appropriate experiments each time [2-4].

$$\boxed{\mathbf{E} = \mathbf{v} \times \mathbf{B}} \quad (2.1) \text{ and}$$

$$\boxed{\mathbf{H} = -\mathbf{v} \times \mathbf{D}} \quad (2.2)$$

with:  $\mathbf{B} = \mu \cdot \mathbf{H}$  (2.3\*) and  $\mathbf{D} = \varepsilon \cdot \mathbf{E}$  (2.4\*)

$$\boxed{\mathbf{E} = \mu \cdot \mathbf{v} \times \mathbf{H}} \quad (2.3) \text{ and}$$

$$\boxed{\mathbf{H} = -\varepsilon \mathbf{v} \times \mathbf{E}} \quad (2.4)$$

If we assume that the carrier of an electric field is moving with the non-accelerating relative velocity  $\mathbf{v}$  with regard to the reference system used by the observer, then a magnetic  $\mathbf{H}$  field is observed, which stands perpendicular both to the direction of the  $\mathbf{E}$  field and to the direction of  $\mathbf{v}$ . If the motion takes place

perpendicular to the area formed by  $\mathbf{E}$  and  $\mathbf{H}$  field, then the  $\mathbf{H}$  field is again observed and measured as an  $\mathbf{E}$  field. There will occur a superimposition of the fields.

Equation 2.4 inserted in equation 2.3 by using the definition for the speed of light  $c$ :

$$\varepsilon \cdot \mu = 1/c^2 \quad (2.5)$$

give the result:

$$\mathbf{E} = -\varepsilon \cdot \mu \cdot [\mathbf{v} \times (\mathbf{v} \times \mathbf{E})] \quad (2.6)$$

$$\mathbf{E} = -(1/c^2) \cdot \underbrace{[\mathbf{v} \cdot (\mathbf{v} \cdot \mathbf{E}) - \mathbf{E} \cdot (\mathbf{v} \cdot \mathbf{v})]}_{= 0, \text{ as } \perp} \quad (2.6^*)$$

$$\mathbf{E} = + (\mathbf{v}^2/c^2) \cdot \mathbf{E} \quad (2.7)$$

We first consider the theoretical case that no superimposition is present and that the observer, as it were, sees himself. The result is trivial: the relative velocity  $\mathbf{v}$  must be the speed of light  $c$

$$\mathbf{v} = c \quad (2.8)$$

If if the speed of light is assumed, the two equations of transformation turn into each other. They now are identical both mathematically and in their physical expressiveness. For this case, it actually is possible to derive the dual law (2.2) straight from the *Faraday's law* (2.1).

For a wave propagating with the speed of light, to name an example, the field strength propagating along is always equal to the causing field strength, which depends on position.

If, besides the evaluation of the values, also the circumstance is considered that it concerns vectors, then at this place a problem as a matter of principle of Maxwell's theory becomes obvious, which has been



pointed occasionally, i.e. at the German Physical Society [2-5, DPG].

The derivation of the speed of light from two vector equations requires that  $c$  also has to be a vector. The questions are *“How does the velocity vector  $\mathbf{v}$  suddenly becomes the scalar and the constant factor  $c$  not pointing in all directions of space?”*

Is therefore, for mathematical and physical reasons, Maxwell's theory in essential parts erroneous according to a statement of the German Patent Office?”

The constancy of the speed of light is a fact that can be derived. We at first will be content with the clue that for every observation with the speed of light, with the eyes or a gauge constructed corresponding to our perception, the vector in all its components each time is correlated to itself, and that actually the orientation of direction gets lost. Under these for  $c$  and with equal rights also for  $v$  relevant circumstances we are entitled to calculate further with these values.

## 2.4 Vortices – a superimposed superimposition

An observer, who is moving with  $v$  slower than  $c$ , will besides the original  $E$ -field also observe a motion field  $E_v$  depending on the velocity  $v$ , which disappears, if  $v$  becomes zero.

$$E_v = (v^2/c^2) \cdot E_0$$

$$\text{and} \quad E_v (v = 0) = 0 \quad (2.9)$$

What he catches sight of and is able to register with gauges in the end is the overlap of both field components. But not only one overlap occurs. In the case of vortex fields, the effect overlaps the cause and itself becomes the cause for a new effect. The overlapped cause produces a further effect, which for its part is overlapping.

Vortices, thus, arise if superimpositions for their part are superimposing and that theoretically reach to infinity. In addition, we ask *“do vortices represent a fundamental physical principle?”*

In the field-theoretical approach this interpretation seems to experience a mathematical confirmation since also the fields are overlapping in vortex structures.

According to that, we owe our observations and our being so the relative movements and the vortex formation. If reversed there would not be any movement, fields, light or matter and as a result would not exist. If we observe the sky, then everything visible follows the movement of the Earth, of the solar system and the whole galaxy, which is moving with an unknown galactic velocity, and all movements take place in vortex structures.



- The field  $E_0$  overlaps the motion field  $E_v$

$$E = E_0 + E_v = E_0 \cdot (1 + v^2/c^2) \quad (2.10)$$

This super positioning may be traced back to our approach 2.3 and 2.4:

$$E = E_0 + \mathbf{v} \times \mathbf{B} \quad (2.11)$$

Alternatively we could have taken eq. 2.11 from several textbooks [2-4], disclaiming the derivation.

- For infinite super positioning:

$$E = E_0 + E_1 + E_2 + E_3 + E_4 + \dots + E_n + E_{n+1} + \dots \quad (2.12)$$

- with  $E_{n+1} = E_n \cdot (v^2/c^2) \quad (2.13)$

- results in the power series, which converges under the condition that  $v < c$ ,

or:  $q = (v^2/c^2) < 1 \quad (2.14)$

$$E = E_0 \cdot [1 + (v/c)^2 + (v/c)^4 + (v/c)^6 + \dots + (v/c)^{2n} + (v/c)^{2(n+1)} + \dots] \quad (2.15)$$

$$E = E_0 \cdot [1 + q + q^2 + q^3 + q^4 + \dots] = 1/(1-q) \quad (2.16)$$

As a result of the power series development the well-known square root  $\sqrt{1-(v^2/c^2)}$  of Lorentz occurs in squared form. It determines the relation of the observed and the causing field strength of the electric or the magnetic field (similar derivation).

$$\boxed{\left(1 - \frac{v^2}{c^2}\right) = \frac{E_0}{E}} \quad \boxed{\left(1 - \frac{v^2}{c^2}\right) = \frac{H_0}{H}} \quad (2.17)$$

## 2.5 Lorentz Contraction and Dilatation Field

Physically, the found relation describes a dilatation field dependent on velocity. Thus, the field strength increases if the relative velocity  $v$  increases, or inversely no difference is observable anymore if  $v$  goes towards zero.

If we compare this in a purely mathematical using the *length contraction* of the *Lorentz transformation*,

$$1 - \frac{v^2}{c^2} = \left(\frac{L}{L_0}\right)^2 \quad (2.18)$$

then it becomes obvious that, from a physical perspective, the *Lorentz contraction* should be the result of the changed field conditions, which a body moving at relativistic speed encounters with regard to a resting body.

$$1 - \frac{v^2}{c^2} = \frac{E_0}{E} = \frac{H_0}{H} = \left(\frac{L}{L_0}\right)^2 \quad (2.19)$$

In our observer system, where the field  $E_0$  exists, a measurement rod is of proper length  $L_0$ . In another system, which is moving with the speed  $v$  relative to the observer, as a consequence of the prevailing field  $E$  the corresponding measurement rod has a length  $L$ . Equation 2.19 gives the relation between eq. 2.17 and 2.18.

Accordingly the following proportionality true:

$$\boxed{E, H \sim 1/L^2} \quad \text{und} \quad \boxed{E_0, H_0 \sim 1/L_0^2} \quad (2.20)$$

***The field determines the dimensions!***



The resulting proportionality is of most elementary importance. We use it in the case of the piezo speaker and know it from the curvature of space and deflection of light in the presence of extreme fields. If we as an observer are exposed to the field, in which also the object observed is situated, then we encounter the dilemma of not being able to perceive the influence.

If we, for example, would sit inside a rocket, we would become smaller with faster velocity, and we would notice nothing since we also would shrink to the same extent (principle of Boscovich).

That concerns every measurement of velocity in general, and the speed of light  $c$  in particular which is measured in *meters per second*. But if the field determines  $c$  and in the same way the length measure, which is given in *meters*, then both are connected by a direct proportionality, and we will not have the slightest chance to measure the speed of light.

If  $c$  is changed, then this applies to the measurement path in the same way. Now the variable is measured by itself, and as a result  $c$  is measured, a constant value. We still cannot see the change because our eyes scan all objects optically and that means with  $c$ , the speed of light.

## 2.6 $c$ becomes a Measuring Constant

It is the nightmare of each and every measurement engineer if the gauge depends on the factor to be measured. No wonder, the theorem of addition of velocities apparently loses its validity as in every case the same  $c$  is being measured, independent of the direction with which the source of radiation is moving [2-1, p. 115]. The simple result is:

***The speed of light is a constant of measurement and not a constant of nature***

If, however, the light is scanned with the speed of light, then all components of the light vector correlated with themselves resulting in the same constant value  $c$ , then the vector of the speed of light loses its orientation in space and becomes a scalar factor.

Maxwell's equations already anticipate this circumstance, but without providing an explanation why this is correct. Only the new field approach can answer the open question. With the derivation of an axiom of physics – one also can say a stumbling block – has been overcome.



### 3. Gravitation as an Influence of the Magnetic Field

A scientist with an outstanding idea comes very often across the fact that another scientist previously had the same idea, and this scientist has made a similar experience as well. Is it possible that discoverers are in fact merely rediscoverers of much older knowledge?

#### 3.1 Boscovich and the Respiration of the Earth

The mathematical formulation of the dependence of the measure of length on the field (eq. 2.20), however, should be rather new. But the physical consequences were already described by the Jesuit priest *Roger Joseph Boscovich from Dalmatia* in 1755 [3-1].

Boscovich was a Professor of mathematics and theology in Rome and spoke about the world, on the one hand, being deformable, similar to rubber, but on the other hand, we are not able to perceive this effect, because our body is made of the same material and obeys all changes. „*In an absolute way, we can neither recognize the place, nor distances, or orders of magnitude*“, Boscovich wrote in his book on “*space and time*” and how these are perceived by us. He suspects that the Earth, unobservable for man, “*is respiring*”.

Actually, a terrestrial observer is positioned closer to the sun at daytime than at night. Thus he is exposed to a slightly stronger field during the day and, as a result, he is correspondingly smaller. He and all objects next to him are subject to fluctuations of size to the same degree, and, therefore, this “*respiration*” of the earth cannot be detected.

It cannot be detected using a tape measure or an optical measurement instrument and, at the same time, be a fact present in reality. Merely from a neutral perspective, we can succeed in recognizing the actually existent curvature of space (fig. 3.1).

An example of this is the duration of sunshine at the equator, which lasts longer than should be expected from the spherical shape of the Earth. This indicates that the Earth is bent towards the sun.

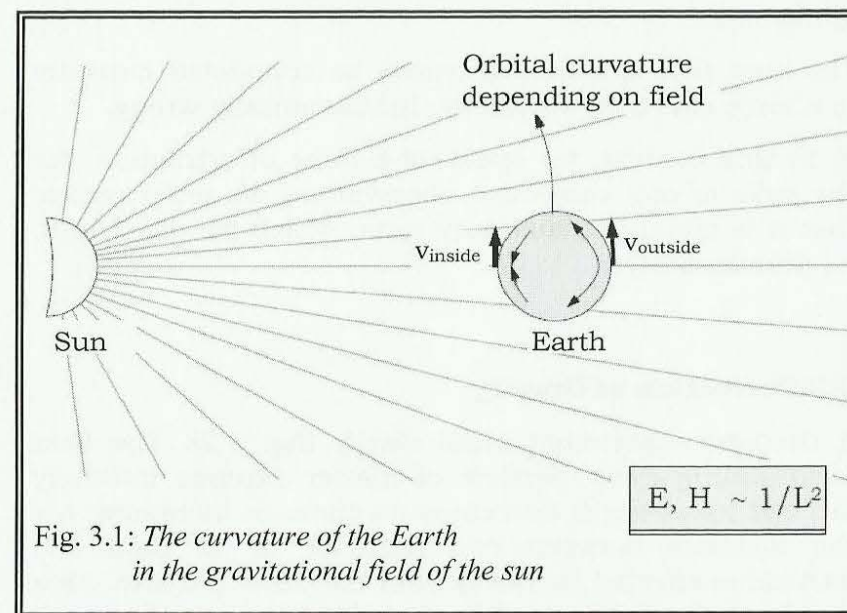


Fig. 3.1: The curvature of the Earth in the gravitational field of the sun



Another example is the influence of the field on the orbital velocity of the earth, measured in meters per second. The meters during daytime are smaller than during night. This is the reason why the Earth is moving slower on the side turned towards the sun, like a track vehicle making a turn. If the chain on the inside of the tracks moves slower than on the outside the vehicle turns.

The rotation of the earth around the sun along an orbit is, therefore, by no means a result of the centrifugal force or of the force of attraction of the sun. The *circular motion* is simply and solely a *result of the field influence of the sun*.

Thinking that gravitation would be connected causally to a force effect, is, obviously, fundamentally wrong.

If, in this context, we speak of a force of attraction, for the sake of our subjective observation, we must realize that it is merely an auxiliary term, which we use due to its practicability.

### 3.2 Derivation of Gravity

A thought experiment shall clarify (fig. 3.2). The field surrounding every particle of matter extends infinitely far, but its strength decreases as distance increases. Let the distance between two particles be  $L$ ; then one particle is effected by the field of the other particle. As a result of the field, the length  $L$  becomes smaller and, therefore, the field that determines size (the gravitational field) increases, which in turn causes a reduction of the length, etc.

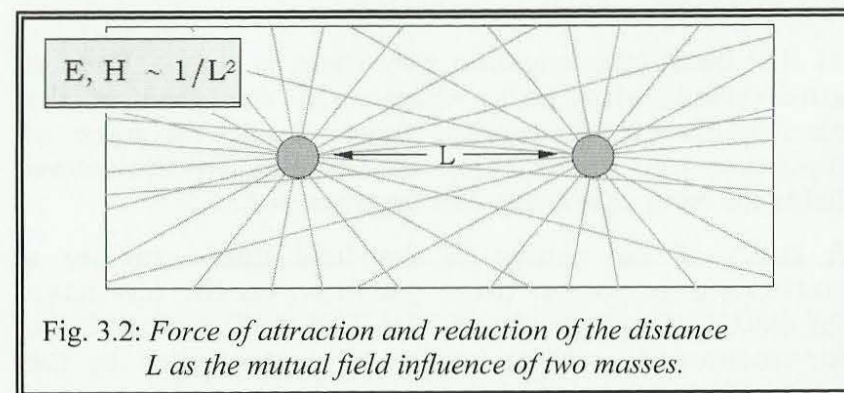


Fig. 3.2: *Force of attraction and reduction of the distance  $L$  as the mutual field influence of two masses.*

As a consequence, one can observe that both particles are moving closer to each other. We speak of a force of attraction, because we cannot register the influence of the field with our senses.

In this way, the consistent result that we and our environment must be smaller at daytime, than in the night, will remain hidden. We experience the effect merely indirectly as the gravitational pull of the earth.

The dependency of length on the field is responsible for the electromagnetic interaction and similarly for the gravitation as well, because we do not see the cause for a subjectively observed force effect. Hence, the following conclusion is equally valid for both interactions:

*Two elementary particles, or two accumulations of matter consisting thereof, are able to reduce the distance between each other, because of their fields, which we interpret as a force of attraction.*

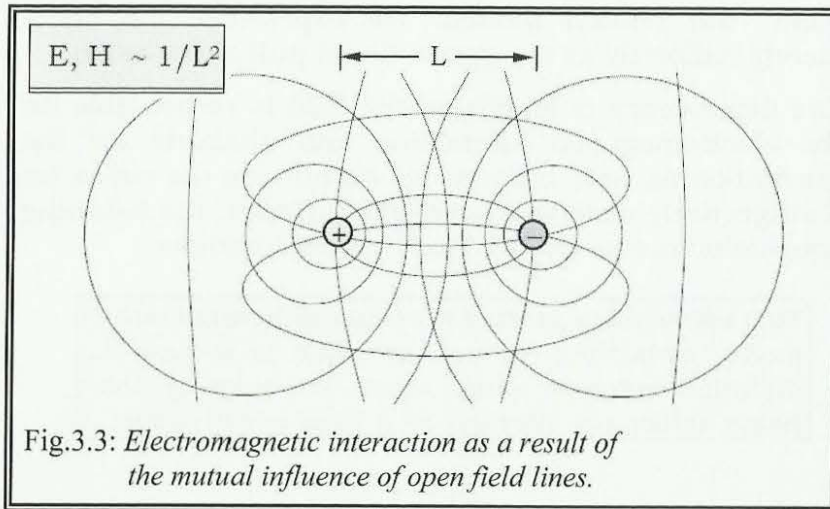


### 3.3 Electromagnetic Interaction

At this point, the question why there is only a force of gravitational attraction, whereas in the case of the electromagnetic interaction there is also a force of repulsion, and the question which fields are the causal fields for each other, are still unanswered.

A study of the course of the field lines provides a convincing answer to these question, on the one hand for electrically charged particles and on the other hand for uncharged particles, which are not effected by the electromagnetic interaction.

At first we will consider electrically charged particles, e.g. electrons, protons or ions. All these particles have in common that *field lines of the electric field* extending towards infinity *are open*. By means of this field, the particle is able to interact with its environment.

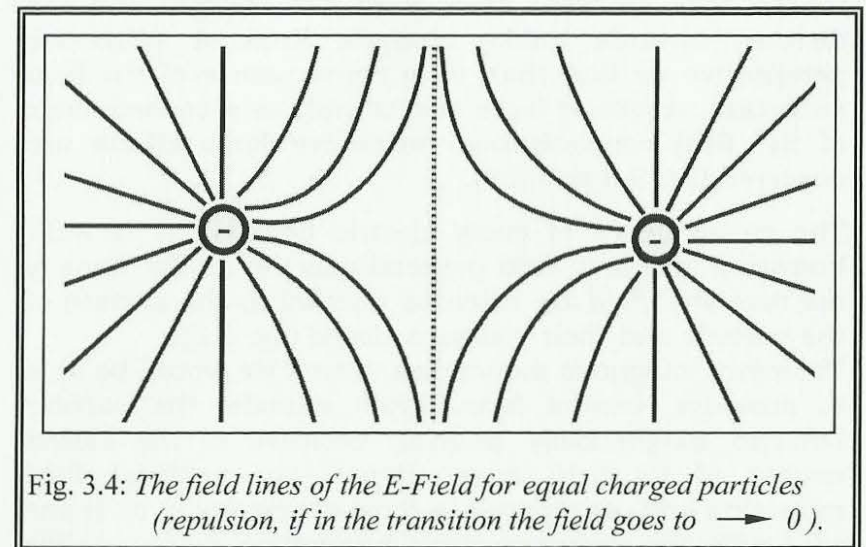


We measure a charge and an electromagnetic force effect. In the case of unequal charges, it is well-known that a field amplification and attractive acting forces are observed, whereas for equal charges a field reduction is the case and repulsion is observed.

If we state a relation between the field conditions and the electromagnetic interaction as a proportionality

$$(E \sim 1/L^2),$$

then the particle is, in reality, able to influence its distance to other particles merely by means of its electric field. For unequal charges, there is a concentration of field lines, whereas one particle remains in the focused field of the other, and vice versa. Thus a contraction of all lengths occurs, which we observe as an attraction (fig. 3.3).





For equal charges the opposite is true, in which even a local field minimum can occur (fig. 3.4). If the field goes towards zero on the dashed line, then the distance will go towards infinity (according to  $L^2 \sim 1/E$ ).

Consequently, the observable effect that both bodies repel each other reaches towards infinity.

Actually the *electromagnetic interaction* proves to be a *result of the field-dependent length contraction*.

***The electromagnetic interaction of a particle is a result of the influence of the open field lines arising from it, on the dimensions of the space, in which it is.***

It is important that the field lines are open, for which reason they are bent away from like charges and are directed towards unlike charges. From a subjective perspective we find that, as a consequence of the field reduction, repulsive force effects and, as a consequence of the field concentration, attractive force effects are observed (fig. 3.3 and 3.4).

The consequence of every electric field is, as is well-known, a magnetic field perpendicular to it. The *lines of the magnetic field* are oriented parallel to the surface of the particle and their *course is closed* (fig. 3.3).

Therefore, magnetic monopoles, which we would be able to measure, cannot form. From outside, the particle behaves magnetically neutral, because of the closed course of its field lines. Hence, an artificial field reduction and, as a result, a force of repulsion, as is the case with the electromagnetic interaction, is impossible in principle.

### 3.4 Importance of the Closed Vortex-Lines

The effect of the magnetic field is, thus, limited to a geometrical manipulation of the environment, that is, the curvature of space; we, therefore, founded the phenomenon of attraction of masses and of gravitation in general.

Because gravitational field lines do not bundle up, this effect will turn out to be considerably weaker. Hence, gravitation is many powers of ten less intensive than the electromagnetic interaction.

In addition, every charged body has a mass, with which it obeys gravitation. Let us remember the comparison of the derivations (vol. 1).

Maxwell's theory states that, in the static case, E and H field are decoupled every time the other field disappears. Even if, as a result of the unipolar induction, for every open field line, the other one is oriented perpendicular to it, then this other line simply coils around the open line and form a closed loop. Therefore, according to the doctrine drawn from Maxwell's theory, it is stated that it cannot be influenced anymore from the outside, and can be neglected.

This is a fatal error in reasoning.

The proportionality ( $E \sim 1/L^2$ ) is naturally valid for open field lines in the same manner as for closed ones. These fields also lead to an observable force of attraction.



The summary states as:

***If exactly those fields are neglected, which are responsible for gravitation, then we must not be surprised if we do not understand gravitation and its nature.***

The influence of the closed field lines responsible for the gravitation is due to the fact that the correspondingly weak lines do not bundle up. Secondly, there cannot exist a force of repulsion due to the fact that closed field lines cannot be influenced from outside. And thirdly, it is observed that all charged bodies also have a mass. All these three statements of the field lines model perfectly describe the physical reality.

***Gravitation is a result of the influence of the field lines with a closed course running parallel to the surface of the particles, on the dimensions of the space, in which they are.***

Fig. 3.5 shows uncharged bodies and their field lines of the E field and of the closed H field oriented perpendicular to the former. Such bodies without charge (e.g. neutrons or non-ionized atoms) behave electrically neutral to the outside, but they have a mass because of the closed field lines, whereby the field lines of the H field dominate over those of the E field.

Using the field lines interpretation, which was, by the way, already preferably used by Faraday, gravitation proves to be, to this point, a neglected influence of the electromagnetic field.

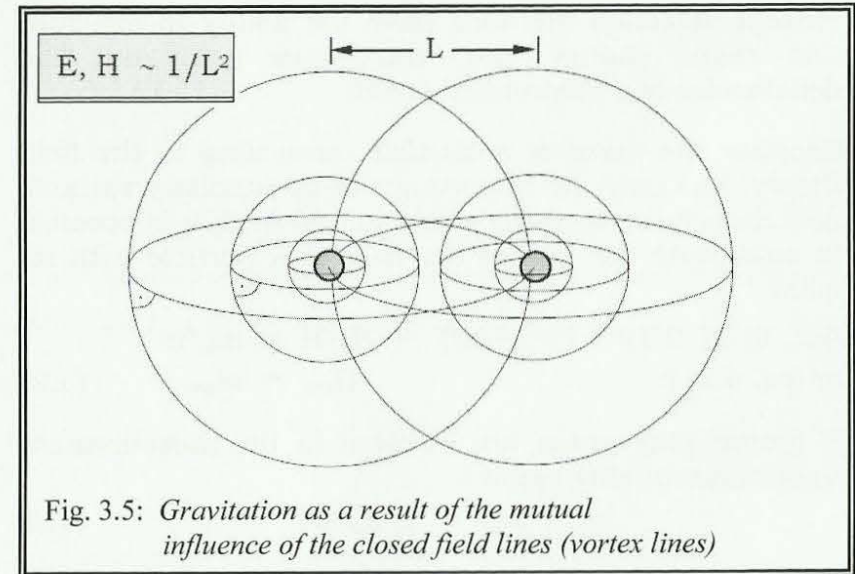


Fig. 3.5: Gravitation as a result of the mutual influence of the closed field lines (vortex lines)

For the first time, the grand unification of the interactions is successful. The long sought-for *unified theory* is within reach.

### 3.5 On the Calculation of the Proton Radius

The gravitational theory based on the field-dependent measure of length can be examined by the example of the variable proton radius. Two particles, one involved by the other, do not only reduce their distance between each other, but at the same time also their field-dependent radii. For example, if a proton is measured using an electron, then the fields add up:

$$(H_p + H_e) \sim 1/R^2. \quad (3.1)$$



Present detection methods have the ability to measure this slight change and, thus, can point out the deficiencies of a theoretical model.

Because the mass of a particle, according to the field theory, has only the importance of an auxiliary variable as a descriptive quantity of the actual field, it is possible to substitute the size of the field of a particle with its mass.

Acc. to eq. 2.19:  $1 - (v^2/c^2) = H_0/H = m_0/m$   
or (eq. 4.21):  $H_{ges} \sim m_{ges}$  (3.2)

If proton plus muon are involved in the measurement the proportionality applies:

$$(m_p + m_\mu) \sim 1/R_p^2\{\mu\} \quad (3.3)$$

with the proton radius  $R_p\{\text{measuring particle}\}$ . However, if an electron is involved, the proportionality is valid:

$$(m_p + m_e) \sim 1/R_p^2\{e\} \quad (3.4)$$

The measurements differ by the relation of

$$\begin{aligned} R_p\{\mu\} / R_p\{e\} &= \sqrt{(m_p + m_e) / (m_p + m_\mu)} \\ &= \sqrt{(1836 + 1) / (1836 + 207)} = 0.9483 \quad (3.5) \end{aligned}$$

According to the detection method the calculated change of the proton radius is 5.17%.

The measurement using heavy muons provides more accurate results for  $R_p\{\mu\}$ . The measured result, published in Nature by Pohl et al [3-2], showed:

$$R_p\{\mu\} = 0.84184 (\pm 0.00067) \text{ fm}$$

In 2013 the same team of authors measured an even more accurate value [3-3]:

$$R_p\{\mu\} = 0.84087 (\pm 0.00039) \text{ fm} \quad (3.6)$$

The sought-for relation should be compared with the radius of the proton, using electrons as measurement partners, such as published by Sick [3-4] (2011, 2012):

$$R_p\{e\}_{\text{Sick}} = 0.886 (\pm 0.008) \text{ fm} \quad (3.7)$$

$$R_p\{\mu\} / R_p\{e\} = 0.84087 \text{ fm} / 0.886 \text{ fm} = 0.949 \quad (3.8)$$

Especially the latest measured result from 2013 provides a shrinking of the proton of about 5.1%. This has to be compared with the calculated difference of 5.17% (equation 3.5). Practical and theoretical value are nearly identical. Other and older published values, as well as the CODATA value are more or less in the tolerance range:  $R_p\{e\}_{\text{CODATA}} = 0.8775 (\pm 0.0051) \text{ fm}$ .

The large scatter range of the measurements, carried out since 1962, supports the hit ratio.

If no single model is known by today's quantum physics simply to explain the discrepancy in the measured values, the field-theoretical approach reveals its impressive performance with consequences concerning many parts of physics like electrodynamics and quantum physics.

### 3.6 Mathematically Justified Predictions

For the planned measurements using muons on deuterium or helium nuclei, predictions are possible on this mathematical basis. I expect, through the replacement of electrons by muons, a reduction of the core radius; e.g. 2.69% in case of deuterium core (using mass of deuteron:  $m_D = 3670,5 m_e$ ):

$$\begin{aligned} R_D\{\mu\} / R_D\{e\} &= \sqrt{(m_D + m_e) / (m_D + m_\mu)} \\ &= \sqrt{(3670,5 + 1) / (3670,5 + 206,8)} = 0.9731 \quad (3.9) \end{aligned}$$

1.82% for a tritium- or helium-3-core ( $m_{Tr} = 5497 m_e$ ):



$$R_{Tr}\{\mu^-\} / R_{Tr}\{e^-\} = \sqrt{(m_{Tr} + m_e) / m_{Tr} + m_\mu)} \\ = \sqrt{(5497+1)/(5497 + 207)} = 0.9818 ; \quad (3.10)$$

1.38% in case of the helium-4-core ( $m_{He} = 7294 m_e$ ) with one muon and 2.70% if two muons are involved:

$$R_{He}\{\mu^-\} / R_{He}\{e^-\} = \sqrt{(7294+2)/(7294+1+207)} = 0.9862 \quad (3.11)$$

$$\text{resp.:} \quad = \sqrt{(7294+2)/(7294+ 2*206)} = 0.9730 . \quad (3.12)$$

The planned experiments in Villigen, Switzerland, at the PSI by the MUSE group, 2 years from now, for the radius of deuterium (prediction: 2.7%) and helium-4 (1.4-2.7%, according to prediction) could contribute to the confirmation of the simple formula (3.5). But my mathematical prediction indicates a decrease of the influence if the involved particle mass increases. Therefore the measured result is threatened by loss of significance. I would desire the measurement of a lightweight particle, such as the antimuon  $\mu^+$ . In this case, a difference of 30% should occur.

***For the same reason, the classical electron radius is so much larger than any measured radius!***

From the perspective of quantum physics, which does not know the dependency of particle radii on the field, an error analysis is not necessary. The field-theoretical approach would, however, take into consideration another influence, because of the scattering of muons, due to the 200 times smaller distance to the proton, its calculated charge distribution might come into effect [derivation in volume 3]. However, this requires an extremely close proximity to the proton, so, in my opinion, this influence is very small compared to the effect of the field-dependent length contraction and, therefore, a neglect of this effect should be justified.

#### 4. Recording of Space and Time

If observations should force us to touch the sacred physical laws, then we should first of all judge our measuring technique critically from all sides and bring it to an usable state. I suggest, we start with the devices, with which the dimensions of space and time are recorded, with the tape measures for the measurement of length and the chronometers, our clocks.

We must find out, why comets are slowed down if they approach the sun seemingly by the hand of a ghost and when departing are again accelerated, although no forces at all act on the celestial bodies from outside.

We must find out, why in Australian mines and shafts deeply under the earth another value for the gravitational constant  $G$  is being measured than on the surface of the earth [4-1]. Physicists of the University of Queensland in Brisbane determined, that  $G$  for measurements underneath the earth is about one percent larger than the corresponding, since centuries in laboratories determined value.

Another research, published in the journal Science, which is based on measurements inside a drilling hole in Michigan, confirms the Australian data [4-2].

The results can hardly be imagined, if an universal constant should lose its constancy. Let us start with a validation of the measurement of time.



### 4.1 Time Dilatation and Particle Decay

We are standing in front of a measuring technical debacle, because we have fixed our calendar to the rotation of its own of the earth. We call a  $360^\circ$  turn a day, divide it in 24 hours of 60 minutes each and every minute in 60 seconds. In doing so, we determine the duration of a second.

A clock according to this definition is only then exact, if it follows the changes of the earth to the same extent. *Our chronometers are nothing but the improved model of a sundial.*

We still have to get rid of a fundamental misunderstanding. It concerns the problem of the time dilatation.

From the relativistic view, in moving systems clocks should go wrong. But how does one want to explain a time dilatation physically, if it merely represents a purely mathematical result of the length contraction actually taking place on the one hand and the postulate of a constant speed of light on the other hand?

So the slowing down of the rate of decay of instable particles at high speeds willingly is cited as "proof" for time dilatation. "The most cited example for the time dilatation is the "long-living" meson. The  $\mu$ -meson is a charged particle, which exists only  $2,2 \cdot 10^{-6}$  seconds if it is observed at rest. Then it decays ... About 10 % of the mesons from the sun reach the earth's surface. Even if they fly with approximately the speed of light, they at least must have used  $30 \cdot 2,2 \cdot 10^{-6}$  seconds, in order to reach the earth. Their "life" has therefore by the movement been extended to a multiple.

To the supporters of the theory of relativity, here the time dilatation is revealed. This "proof" however is of no

value, as long as "the structure and the mechanism of decay of the particle are not known", like W. Theimer expressed himself [4-3].

On the basis of the new field theory, the **approach** is resting.

- a. The particles do not decay by themselves, but only by a corresponding disturbance from the outside.
- b. The decay time is the statistical average during which such a disturbance can occur and take effect.
- c. The elementary particles consist of an integral and finite number of elementary vortices, which can not decay anymore for their part.
- d. If the compound particles are exposed to the disturbing range of influence of high-frequency alternating fields, then they are stimulated to violent oscillations and, in that way, can be torn apart into individual parts.
- e. As disturbing factor, the high-frequency fields of neutrinos flying past are considered primarily.
- f. Authoritative for the threshold of decay and, therewith also for the rate of decay, is the distance, with which the neutrinos fly past the particle.
- g. The distance becomes larger, the smaller the particle is. If the particle thus experiences a relativistic length contraction, then it will, statistically seen, to the same extent become more stable!

*That has nothing to do at all with time dilatation*, as this proposal for an interpretation shows. The same effect also occurs if atomic clocks are taken for a fly in a plane and compared to identically constructed clocks on earth.



The time was stipulated by us and therefore should be able to keep its universal validity.

*We are entitled to demand a simultaneity, after all we are the ones, who tell what simultaneity is!*

Is it possible to prove the approach? Yes!

## 4.2 The Clock Paradox

Let us first summarize: It may be shown that a fast moving particle, which is thus length-contracted to exactly the same extent (Lorentz's square root), becomes more stable and longer-living. If relativists place an atomic clock based on radioactive decay in a plane and detect a difference in the passed time between the one, which has been flown around and a second identically constructed clock, which has stayed at the ground, then they experimentally detected a very small length contraction, which really occurred, and by no means a time dilatation, as they claim.

Now in addition we owe Einstein that the aether has been abolished, and from that follows that it cannot matter in which direction the plane travels. If therefore both clocks are placed inside separate planes, one plane traveling towards west and the other towards east, and when both planes meet again on the other side of the globe, then according to Einstein's theory it should not be possible to determine a difference in time, if both planes constructed identically were moving with identical velocity. But this is not the case.

Actually a difference in time is measured, which however cannot be calculated using the theory of relativity, yes, which is completely incompatible with this theory and clearly convinces anyone that the effect actually cannot have to do anything with a time dilatation, that the moving clocks merely go wrong and we have to ask for the reason [4-4].

These experiments were carried out with atomic clocks, which are constructed as caesium resonators and work with an exactness of one second in 300000 years. As a resonator serves a quartz crystal, which is controlled by an ion current of caesium atoms, which have lost the outermost electron of their shell. The system is fed back, because the oscillating quartz, controlled by the caesium ions, again adjusts the caesium vapour by radio wave and finally its own atomic controlling current (fig.: 4.1).

The reason for the measured difference in time is seen in the field and especially in the different gravitational field. The centrifugal force directed opposite to the gravitational force is at least not the same, because for a flight westward along the equator the speed of the plane  $v_f$  should be subtracted from the velocity of rotation of the earth  $v_E$ , whereas for eastward direction it should be added:

Centrifugal

$$\text{force: } F_{1,2} = (m/R) \cdot (v_E \pm v_f)^2 = m \cdot R \cdot (\omega_E \pm \omega_f)^2 \quad (4.1)$$

$$\text{with: } R = 6378 \text{ [km]} \quad (\text{radius of the earth}),$$

$$v_E = \omega_E \cdot R = 0,465 \text{ [km/s]} \quad (\text{rotation speed of the earth})$$

$$v_f = \omega_f R = \pi \cdot R / t_0 \quad (\text{speed of the plane}) \quad (4.2)$$

and the duration of the journey:  $t_0$  [s] .



For the steering quanta supplied by the caesium resonator with the energy:

$$E_{1,2} = \int_0^R F_{1,2} dR = m \int_0^R R \cdot (\omega_E \pm \omega_f)^2 dR = \quad (4.3)$$

$$E_{1,2} = \frac{1}{2} \cdot m \cdot R^2 \cdot (\omega_E \pm \omega_f)^2 = \frac{1}{2} \cdot m \cdot (v_E \pm v_f)^2 \quad (4.4)$$

now the energy balance is put up.  
(generally the energy of a quantum of radiation):

$$E_{1,2} + E_q = E_{ges} \quad \text{resp.} \quad E_{ges} - E_q = E_{1,2} = \Delta E \quad (4.5)$$

and the change of the reference frequency is calculated:  
in general:

$$E = h \cdot f = m \cdot c^2 \quad \text{resp.} \quad m = h \cdot f / c^2 \quad (4.6)$$

and specifically with eq. 4.4 and 4.6:

$$\Delta E = h \cdot \Delta f = E_{1,2} = h \cdot f \cdot (v_E \pm v_f)^2 / (2c^2) \quad (4.7)$$

With the change in frequency is connected directly a change of the at the two clocks readable times  $t_{1,2}$ :

$$\Delta f / f = \Delta t_{1,2} / t_0 \quad \text{resp.} \quad \Delta t_{1,2} = t_0 \cdot \Delta f / f \quad (4.8)$$

(eq. 4.7 applied to eq. 4.8 results in)

$$\Delta t_{1,2} = t_0 \cdot (v_E \pm v_f)^2 / (2 \cdot c^2) \quad (4.9)$$

For a journey around half the earth,  $t_0 = \pi \cdot R / v_f$  (4.2)

where one clock is flown westwards and the other one eastwards results in a difference in time of:

$$\Delta t = \Delta t_1 - \Delta t_2 \quad (4.10)$$

$$\Delta t = [(v_E + v_f)^2 - (v_E - v_f)^2] \cdot \pi \cdot R / (v_f \cdot 2 \cdot c^2) \quad (4.11)$$

$$\Delta t = 2 \cdot v_E \cdot \pi \cdot R / c^2 = \underline{207} \text{ [ns]} \quad (4.12)$$

According to the calculation, the difference in time should amount to 207 ns. Interesting of the result is undoubtedly that the velocity of the planes does not matter. It is cancelled out.

In October 1971, caesium atomic clocks were sent around the world in scheduled planes in the Hafele-Keating experiment. To be able to estimate the inaccuracy in time of the clocks and with that the measurement error, four clocks were used. Between the westward journey ( $273 \pm 7$  ns) and the eastward journey ( $59 \pm 10$  ns) a difference in time of 214 nanoseconds was determined.

This result, determined under strict scientific conditions, once more proves the correctness of the theory of objectivity by confirmation of the calculated value. That is, however, not valid for the special theory of relativity, because it does not appear in the calculation at all...

Result:

<u>calculated</u> acc.to the <b>Theory of Objectivity:</b>	<u>207</u> [ns]
<u>measured</u> by Hafele and Keating [4-4]	<u>214</u> [ns]
<u>expected</u> acc. to the <b>Theory of Relativity:</b>	<u>0</u> : <u>wrong.</u>

Whoever at this point thinks that we would have less problems with dimensions of space, I must disappoint. The determination of the linear measures ends similarly in a fiasco.



### 4.3 Irony of the Measuring Technique

As long as the „foot measure“ depended on the shoe size and the „cubit“ on the forearm of the tailor, the world still was alright. Science, however, requests a reproducible quantity for comparison, and that can be fetched at the *Bureau International des Poids et Mesures* in Sèvres near Paris. The *original meter* is a Platinum alloy. Because the length of the metal always depends on temperature, it is stored at a constant temperature of 0° Celsius. Now, in addition, there exists a field dependency, an electrostriction resp. magnetostriction.

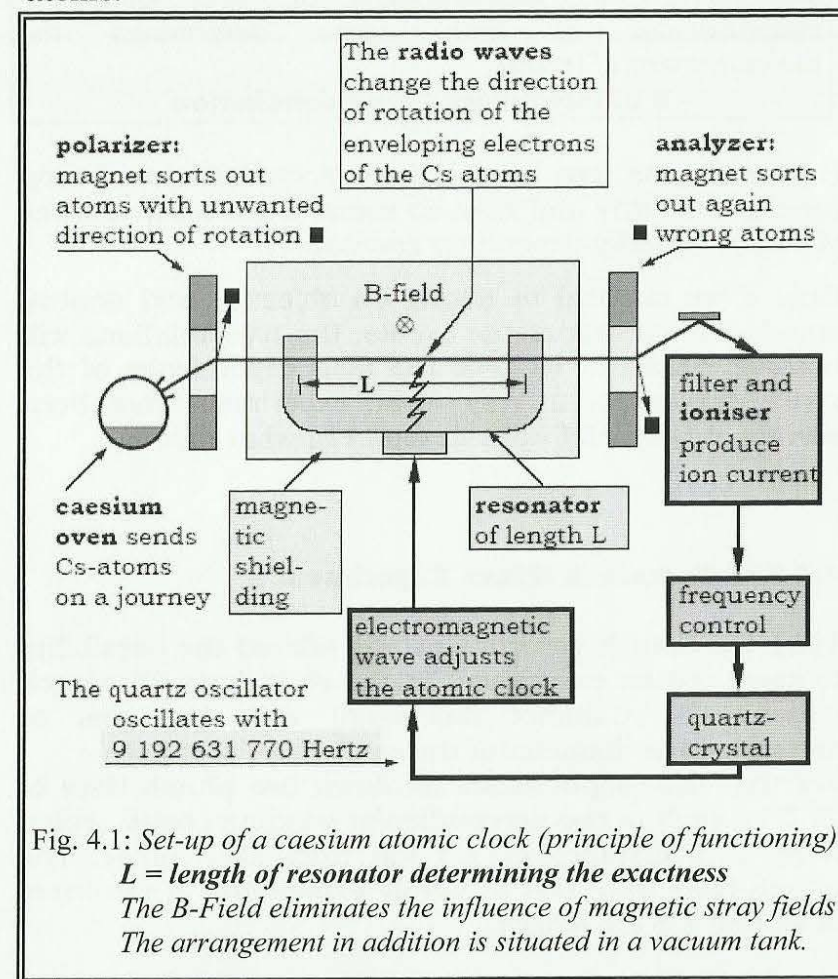
The newest definition for the length measure, the meter, acts as a blow for liberty and thus marks the abyss, at which we are standing: The length is determined by means of a measurement of transmission time of an electromagnetic wave, e.g. of a light signal. It is said that using this determination a higher reproducibility should be obtained.

Actually a photo optical facility to measure length is as exact as the built-in facility to measure time. In addition, a constancy of the speed of light is taken as a prerequisite, and that is given in meters per second. From a change of the speed of light for instance of 10% a change in length of 10% as well would result.

Because we see this process with the help of our eyes as well with the speed of light, we never can see the change. We neither can technically measure it, because all gauges we construct are built up correspondingly to our sensory impression.

Let us record: The linear measure is determined and defined by a measurement of transmission time, because a higher precision and reproducibility can be obtained, than with a rule or the original meter.

The exactness in time of the atomic clocks again depends on the free flying path ( $L$  in fig. 4.1) of the atoms.





For the caesium clocks of the Physikalisch Technische Bundesanstalt in Braunschweig, Germany, the resonator length amounts to several meters. The clock is used world-wide as a standard.

*The irony thus lies in the fact, that a geometric length determines the measurement of time and the measurement of time again determines the measurement of length*

**– a classic closed loop conclusion –**

How does one free oneself from a capital closed loop conclusion? Why and how do signal transmission times of clocks actually depend on gravitation?

Only if we succeed in taking an objective and neutral standpoint outside of the events, the true relations will become visible to us. For the field dependency of the space measures, a very clear experiment has been carried out, which I want to report in what follows.

#### 4.4 The Tamarack Mines Experiment

1901 the French government was offered the possibility to carry out an experiment in the shut down Tamarack mines near Calumet (Michigan) with the goal to determine the diameter of the earth more precisely.

For that the geophysicists let down two plumb lines of 27.2 kg each in two perpendicular winding shafts, which were at a distance of 1.3 km from each other. The plumb-lines were tied to hardly expandable piano wires of as well 1.3 km length.

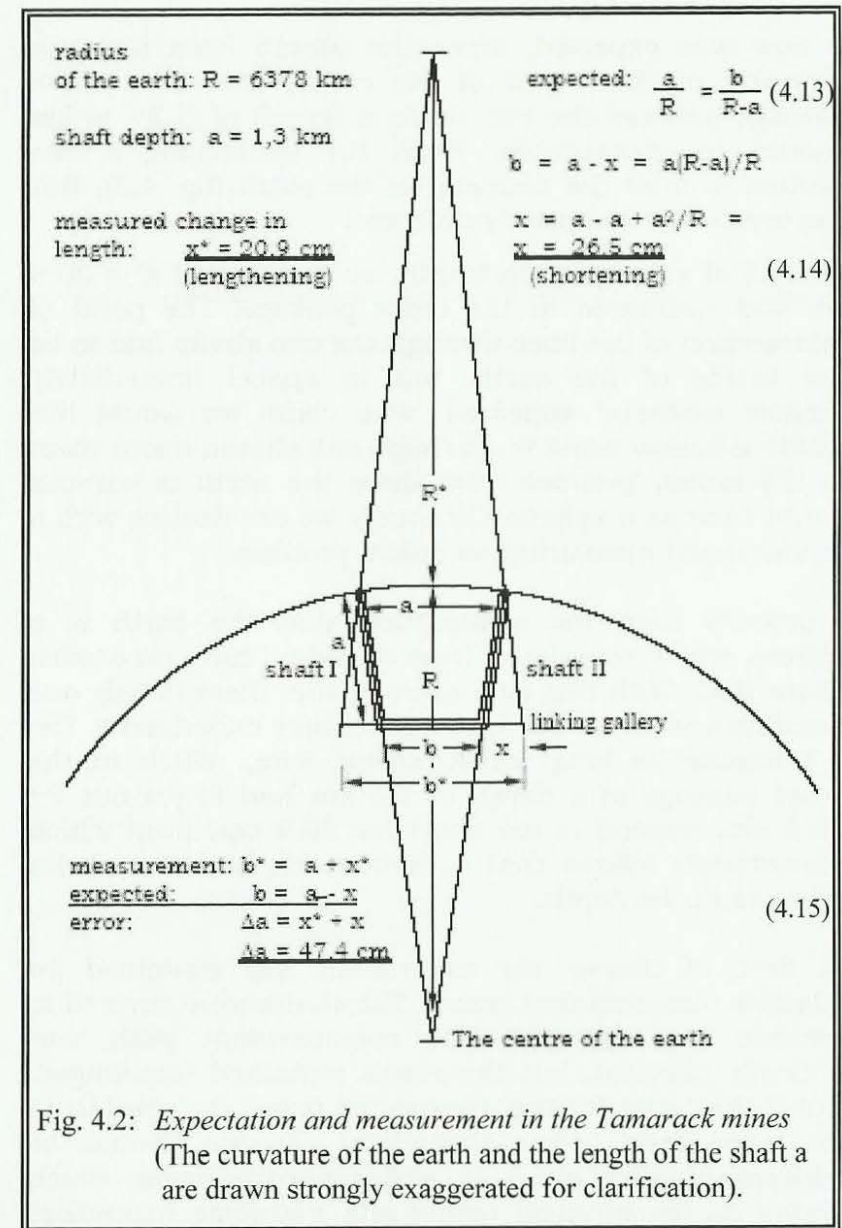


Fig. 4.2: Expectation and measurement in the Tamarack mines (The curvature of the earth and the length of the shaft  $a$  are drawn strongly exaggerated for clarification).



It now was expected, since the plumb lines hung in direction of the center of the earth, that in a cross passage between the two shafts a length of  $(1.3 - x)$  km should be measurable. From the shortening  $x$  one wanted to infer the diameter of the earth (fig. 4.2). But the result was completely different.

Instead of a decrease in length, an increase of  $x^* = 20.9$  cm was measured in the cross passage! The point of intersection of the lines through the two shafts had to be not inside of the earth, but in space! Immediately „hollow earthers“ appeared, who claim we would live inside a hollow world<sup><ii></sup>. Perhaps one should shoot them to the moon, because from there the earth is without doubt seen as a sphere. Obviously we are dealing with a fundamental measuring-technical problem.

I proceed from the assumption that the earth is a sphere, which we inhabit from outside; I have no doubts about that. With this as a prerequisite, there is only one possible answer to the Tamarack mines experiment: The 1.3 kilometers long measurement wire, which in the cross passage at a depth of 1.3 km had to jut out for 26.5 cm, instead is too short for 20.9 cm, from which immediately follows that it, howsoever, had shrunk for 47.4 cm in the depth.

At first, of course, the experiment was examined for possible measurement errors. The shafts were covered to exclude any draught. The measurement path was optically checked, but the result remained unchanged. But if the cause for the unexpected result does not lie in the experiment, then theoretical physics should be addressed, after all it is still the experiment which shows us the physical reality and not some theoretical model concept.

#### Calculational verification of the measured shortening:

$$\text{Volume of the globe: } V = (4/3) \cdot \pi \cdot R^3 \quad (4.16)$$

and of the inner sphere

$$\text{in depth } a: V_a = (4/3) \cdot \pi \cdot (R-a)^3 \quad (4.17)$$

resulting in the

$$\text{relative change: } \frac{\Delta V}{V} = \frac{V - V_a}{V} = 1 - \left(\frac{R-a}{R}\right)^3 = 1 - \left(1 - \frac{a}{R}\right)^3 \quad (4.18)$$

$$\text{from } m = V \cdot \rho \quad \text{for a constant density } \rho \quad (4.19)$$

$$\text{and: } m = \phi / \sqrt{G \cdot 4 \cdot \pi \cdot \mu} = A \cdot \mu \cdot H / \sqrt{G \cdot 4 \cdot \pi \cdot \mu} \quad (4.20)$$

$$\text{follows: } m \sim V \sim H \quad (4.21)$$

resp. The relative change:

$$\frac{\Delta H}{H} = \frac{\Delta m}{m} = \frac{\Delta V}{V} = 1 - \left(1 - \frac{a}{R}\right)^3 = \underline{0.061\%} \quad (4.22)$$

According to the theory of objectivity the length of the measurement wire is field dependent on:

$$H \sim 1/a^2 \quad \text{and} \quad H_a \sim 1/(a-\Delta a)^2 \quad (4.23)$$

and the

$$\text{relative change: } \frac{\Delta H}{H} = \frac{H_a - H}{H} = \left(\frac{a}{a-\Delta a}\right)^2 - 1 \quad (4.24)$$

Shortening of the rule  $\Delta a$  is calculated from the comparison of equations 4.22 and 4.24:

$$\frac{\Delta H}{H} = 1 - \left(1 - \frac{a}{R}\right)^3 = \left(\frac{a}{a-\Delta a}\right)^2 - 1 \quad (4.25)$$

$$\Delta a = a \cdot (1 - 1/\sqrt{2 \cdot (1 - a/R)^3}) \quad (4.26)$$

$$\underline{\Delta a = 40 \text{ [cm]}} \quad (\text{result of the calculation})$$

for comparison:

$$\underline{\Delta a = 47 \text{ [cm]}} \quad (\text{measurement value}). \quad 4.15)$$



In this book the derivation of a useful explanation is already found: The speed of light and therewith also the linear measure depend on the field. The measurement wire accordingly becomes shorter if it is exposed to a larger field strength ( $E \sim 1/L^2$ ). We can verify the measured shortening by calculation (see the calculation in the box).

In doing so, we first determine the change of the field strength, which is to be expected at a depth of 1.3 km. We are here dealing with the closed H field lines, which are responsible for the gravitation. In a past derivation it has been shown that a gravitating mass can be converted into a magnetic field.

Between a mass  $m$  and a field strength  $H$  hence exists a proportionality (4.21), in the same way as between the same mass and its volume if a constant density is present (4.19).

The result is accordingly a relative decrease of the volume of the earth and the corresponding mass being under the measurement place, as well as a relative decrease of the radial component of the field strength, but a corresponding relative increase of the tangential component of the field of 0.061% (4.22 and 4.18).

In the gallery, the measurement wire, however, is spread out in the direction of the tangential component of the field lines, and that shortens the measurement wire as a result of the field dependency of the linear measures (4.23). From the above increase in field the calculational shortening of the measurement rod of 40 cm results, which compared to the measurement result should also serve as a confirmation of the theory of objectivity, which was taken as a basis.

#### 4.5 Experiences from Space Travel

The good correspondence between the calculated shortening of the measurement wire and the until-now not-understood measurement in the Tamarack mines shows qualitatively and quantitatively the correctness and useful applicability of the theory of objectivity, of the field dependency of the linear measures.

Our measurement laboratories are normally situated on the earth's surface, where approximately identical field relations are present. But if we leave the usual measurement environment and move the laboratory for instance in the sky, then we experience a complete mystery. Here the reversed conditions prevail as in the mines experiment, in which in the inside of the earth, for an increase of the field strength, a length shortening was measured. *In the sky the field strengths decrease and the linear measures correspondingly increase.*

Astronaut Roosa made this experience in the Apollo 14 mission. While he alone in his capsule orbited the moon, he described to mission control that he could see the lunar module and observe his two colleagues at their work on the moon. Nobody wanted to believe the astronaut, since he was orbiting at a height of 180 km.

Commander Armstrong (Apollo 11) indicated at the first landing on the moon that the target crater Mackensen, 4.6 km in diameter measured from the earth, just has the size of a soccer field. Astronaut Scott (Apollo 15) called Mount Hardley, which is said to be 4.8 km high, a practice hill for skiing. Perhaps they somewhat have exaggerated, but a true core in the statements is always present.

Actually the gravitational field of our satellite is considerably weaker than that of the earth. On the



surface of the moon there is only one sixth of the gravitational pull of the earth.

$$\frac{\text{Pull to the earth}}{\text{Pull to the moon}} = \frac{g_E}{g_m} = \frac{M / R^2}{m_m / R_m^2} = \frac{M}{m_m} \cdot \frac{R_m^2}{R^2} = 6,0375 \quad (4.27)$$

everywhere on the surface of a sphere:  $A = 4\pi R^2$ , as well as in space eq. 4.20 is valid:

$$m \sim \phi = A \cdot B = 4\pi R^2 \cdot \mu H \sim R^2 \cdot H$$

and eq. 4.23 for the field dependency:  $H \sim 1/L^2$

$$\text{and further: } 6,0375 = \frac{g_E}{g_m} = \frac{H_E}{H_m} = \frac{L_m^2}{L_E^2} \quad (4.28)$$

resulting in the length expansion on the moon:

$$L_m (\text{Moon}) : L_E (\text{earth}) = \sqrt{6,0375} = \underline{2,457} \quad (4.29)$$

If, for the sake of comparison, we stick to the details of size, as they are measured by our laboratory on earth, then the astronauts on the way to the moon together with the lunar module and their rover had grown by a factor  $\sqrt{6}$ , then the first footprint is 2.5 times as large as on earth, then the astronauts were moving like giants in the scenery of a model of the railroad.

(because of:  $E \sim 1/L^2$ ).

On the moon there exists almost no atmosphere, for which reason the astronauts had imagined a wonderful view of the star-spangled sky, at least before they started. After the landing they were bitterly disappointed. The sky was black and not one single star could be seen! They have brought many photographs, but nowhere stars have been photographed, they apparently have moved outside the range of vision

(according to the comment in the Cambridge encyclopaedia of Astronomy [4-5]).



Fig. 4.3: taken from *Illustrierte Wissenschaft* No. 11 (1997) p. 62

Many will still remember that the first pictures, which the space telescope Hubble took in 1990, were completely blurred. The problem obviously was that the mirrors had been adjusted on earth and not in space. Only after the optics had been given glasses in 1994, sharp pictures could be radioed to earth. Somehow the distance to the stars had changed. The telescope had become short-sighted, resp. the distance to the star-spangled sky appeared to be gotten larger.

We already know why. If we depart from the gravitational field of the earth, the field strength decreases and the observable distances increase! The 5% deviation was already sufficient for the highly sensitive telescope, which should have been reckoned for the near earth orbit. This proved to be fatal.



#### 4.6 Spherical Aberration

It is true that the problem of the changed length relations is known to the experts under the term of a "spherical aberration". But with that it is neither qualitatively nor quantitatively understood.

Only the theory of objectivity soundly gives reasons for why the astronaut Roosa has seen his colleagues almost 3 times as large, why weather satellites at a height of 1500 km are approx. 25% larger and why communications satellites at a 36000 km high geostationary orbit even increase to the 6.64 fold of their original size.

It also explains, why the neutral point between earth and moon, at which the attraction of masses of both celestial bodies mutually cancel, was not reached at the point where it had been expected by the moon rockets.

We, the inhabitants of the earth, are adapted completely to the conditions on the earth's surface. If we find our way well in the dimensions of space and time, as we observe them, then that must not be valid by all means for science, because its task is to uncover the secrets of nature.

On the other hand it should be paid attention to the fact, that man sees everything with speed of light, with the optics of his eyes, and that speed by no means has to be constant. Solely the definition of the speed of light  $c$  as a linear measure per unit of time points to the direct proportionality between  $c$  and a length  $L$

$$c \sim L$$

(4.30)

If a rule has proven to be unusable for measuring a distance, then we will experience the same disaster if we measure optically, i.e. with the speed of light. Obviously both, the length  $L$  and the speed of light  $c$  depend in the same manner on the respective local field strength. On the one hand, both measurement techniques lead to the same result, but on the other hand what cannot be measured with one method, neither can be measured with the other.

To prove the constancy, it is normal to measure the speed of light optically. But since there exists a proportionality between measurement variable and measurement path, the unknown variable is being measured with itself. This measurement fault in all cases delivers a constant value in principle.

In contrast to the textbook opinion of today by no means a constancy of the speed of light can be assumed. In the case of the 300,000 km/s in a vacuum measurable, it concerns a capital measurement error, at best a constant of measurement, but never ever a constant of nature.

Was the famous experiment by Michelson and Morley unnecessary, the result trivial? And how about the postulate of the universality of the speed of light?

If we for that consider a cube (fig. 4.4). And we assume that the speed of light is a vectorial quantity, which in our experiment is for instance in one direction twice as large, as in the direction of the other two space axes. By means of the mentioned influence of the speed of light on the spatial length, as a consistent consequence, the cube is pulled along this edge apart to a cuboid. We however register this spatial body with our eyes, which



is with the speed of light and that has increased proportionally to the length of the edges, for which reason we as subjective observer still see a cube in front of us and not a cuboid.

If we trust an apparent objective measurement more than our senses and measure the three lengths of the edges of the cuboid again with a rule then we get three times the same length, which is a cube.

We probably are dealing with an optical deception using the true meaning of the word.

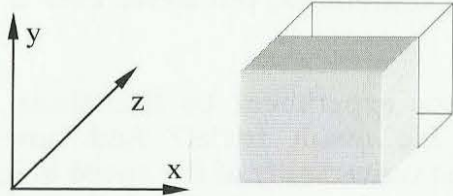
The speed of light is proportional to the measurement path.
The variable speed of light is being measured with itself.
The result at all events is a constant value.
<p><math>c = \text{const}</math> is based on a measurement which is faulty from the principle.</p> <p>Because of <math>c \sim r</math>: physical length contraction:</p> 

Fig. 4.4: Derivation of the field-dependent Lorentz contraction.

If the universality and constancy of the speed of light, postulated by Einstein, in reality does not exist at all, we in no way would be capable to register this; neither to observe nor to measure it.

#### 4.7 Field Dependent Speed of Light

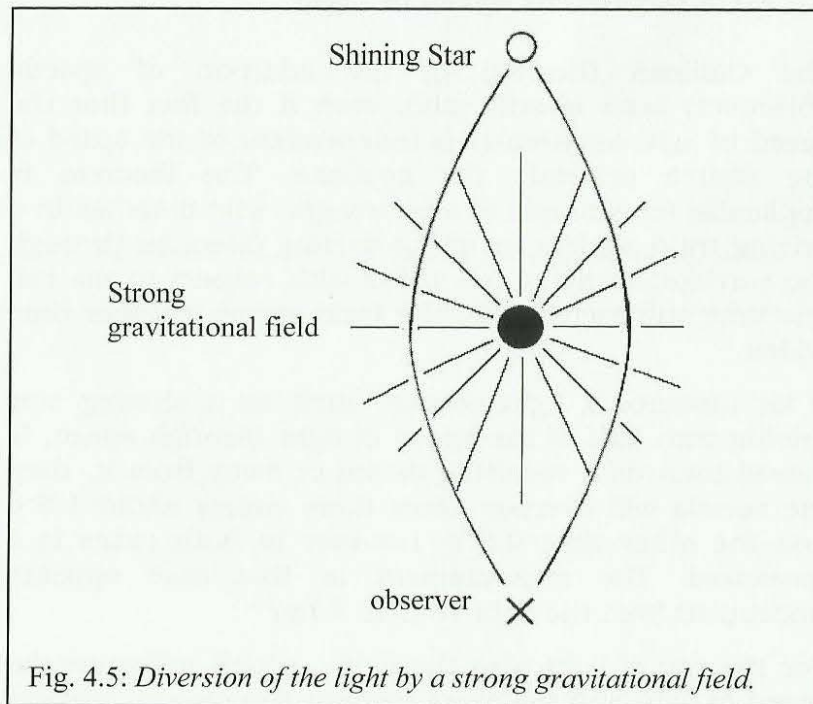
The Galilean theorem of the addition of speeds objectively seen is still valid, even if the fact that the speed of light apparently is independent of the speed of the source pretends the opposite. The theorem is applicable for example to a passenger, who marches in a driving train against or in the driving direction through the corridor, bringing his speed with respect to the rail one time subtracted from the train speed, another time added.

If for instance a light source, such as a shining star driving with half of the speed of light through space, is moved towards a receiving device or away from it, then the speeds will overlap. Once there comes about  $1.5c$  and the other time  $0.5c$ , however in both cases is  $c$  measured. The measurement in this case appears uncoupled from the light source. Why?

For the ray of light also the fields, which influence the speed of light and the measurement equipment, overlap. As a consequence, a measuring technician, who is exposed to this overlapping field, will always observe and "measure" the identical speed of light. The observer as a result imagines, there is an universality of the speed of light, and yet he measures only his measuring apparatus.

The ray of light of a star is diverted towards the sun, if it passes very close to the sun on its way to us, like this has been observed for the first time during an eclipse of the sun in 1919 (fig. 4.5).



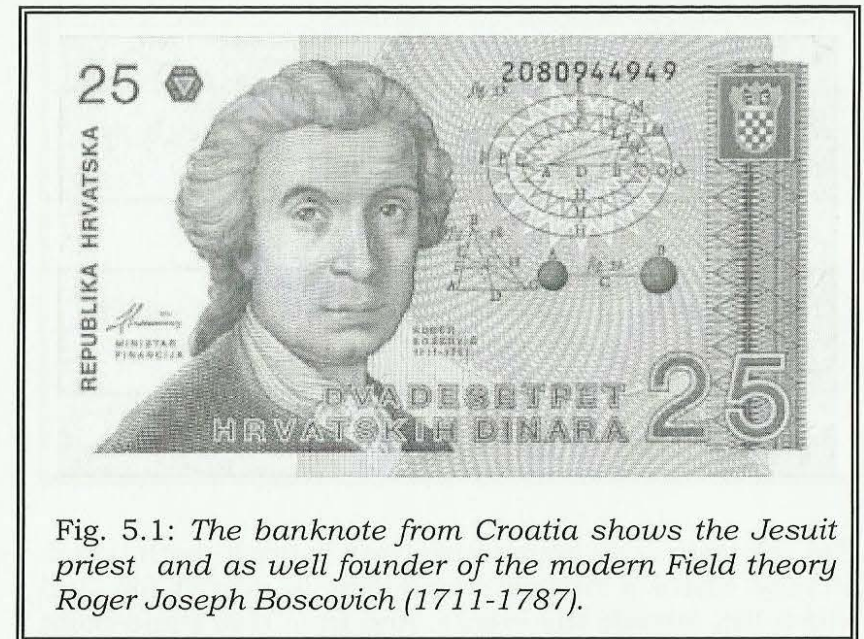


Quite obviously the field of the sun also slows down the speed of light. On the side of the ray of light which is turned towards the sun, the field is somewhat larger and the speed of light correspondingly is slower than on the side which is turned away, and with that the ray of light changes its direction in the observable manner. Exactly this relation willingly is interpreted as a consequence of a curvature of space.

The extremely strong field of a black hole can divert the light down to a circular path, in order to in this way catch and bind it. The light now orbits the black hole like planets the sun.

## 5. Objectivity versus Relativity

The derivation has made it possible to mathematically secure the theoretical working model of Boscovich. In 1755 *Boscovich* points out the optical deception, which our observation underlies, if absolute orders of magnitude in our neighborhood should change and our perception would change also. Then also all metric and optical measurement results would underlie this change.





### 5.1 From Subjectivity to Objectivity

Following the idea of Boscovich, I distinguish below between subjectivity and objectivity.

<ul style="list-style-type: none"> <li>The following physical standpoints can be distinguished:</li> </ul>		
<b>subjectivity</b> (laboratory physics, observable)	<b>relativity</b> (mediator role) (transformation)	<b>objectivity</b> (not observable)
<ul style="list-style-type: none"> <li>Exemplary theories and their representatives:</li> </ul>		
Newton Maxwell	Poincaré Einstein	Boscovich (Meyl)
<ul style="list-style-type: none"> <li>With the associated transformation:</li> </ul>		
Galilei-transf. at $c = \infty$	Lorentz-transf. $c = \text{constant}$	(Meyl-transf.) $c = \text{variable}$

Fig. 5.2: Physical standpoints

The *relativity* is a compromise lying between both points of view where a neutral standpoint is strived for, and which lies outside the events. And from this standpoint the objectively taking place and events are being observed. The theory of relativity consequently is a pure observer theory with strongly restricted scope on the basis of the Lorentz-transformation.

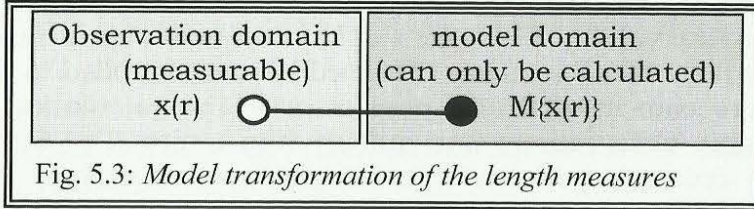
Theories of classic physics (i.e. Newtonian mechanics), fall in the domain of *subjectivity*. The results and regularities are observed in a terrestrial laboratory, if possible, isolated from the environment where they have absolute validity. Here the *Galilei-transformation* is valid. But if these subjectively observed laws are applied to the microcosm in quantum physics or to the calculation of cosmic observations one quickly hits limits. The better the resolution of the microscopes and telescopes the clearer the “*outside*” observer realizes how much the laws of classic physics lose their validity.

Astrophysics successfully reaches for the *theory of relativity*, which delivers with the curvature of space in the vicinity of mass centers useful explanations. Here the dependence of the spatial dimensions on the field could already be established. In contradiction to this fundamental relation, it is said to play no role whatsoever in quantum physics or in all terrestrial laboratory experiments. But with what right may physical regularities from one domain be ignored in others? There can only exist one physical reality and that should be sought for.

What we need is *objectivity*. Behind all the apparently disconnected phenomena of physics work lay quite simple laws which cannot be observed and are until now not recognized by us. Objective physics in the words of Goethe is, “*the one which holds the world together in the heart of hearts*”. I call this, already by Boscovich suggested point of view, *theory of objectivity*. The access to the model domain of objectivity must be made mathematically by means of a transformation, since it is blocked for us by means of measurements or observations [2-1, S. 123-133].



The transformation back into the observation domain must be made according to the same mathematical relations



In this way the quantum properties of the elementary particles can be calculated with high accuracy and agreement with the values which until now could only be measured (see potential vortex, vol. 3).

## 5.2 The Objective Point of View

The question is asked, “*how does one take an objective physical standpoint, which evades every observation?*” The answer leads to a transformation to which all perceptible and measurable relations must be submitted to. If we, for instance, measure the distance  $r$  to a point light source and then the propagation of the light  $c$  and the propagation time  $t$  determine the distance measure:

$$r = c \cdot t \quad (5.1)$$

If there occurs a little change of the distance  $\Delta r$ ,

$$\Delta r \approx dr = c \cdot dt + t \cdot dc \quad (5.2)$$

then two causes should be considered: Either the propagation time or the speed of light have changed. By doing so, the two possible standpoints already would have been found.

The *relativistic point of view*, which proceeds from the assumption of the speed of light being constant ( $dc = 0$ ), says: the propagation time ( $dt$  or  $\Delta t$ ) varies

$$dr = c \cdot dt \quad \text{or} \quad \Delta r = c \cdot \Delta t \quad (5.3)$$

and we are dealing with a clock problem. For relativistic velocities, a length contraction occurs and from that follows a time dilatation necessarily.

But actually no specific statement can be made about the constancy of the speed of light, besides what we can observe, measure, and scan, everything with  $c$ . Hence we can only observe the constancy. With that the theory of relativity remains a pure observer theory, exactly as *Albert Einstein* originally called it into existence. This standpoint follows the motto “*What cannot be observed, is of no interest to the physicist*”.

The *objective standpoint* strives for more, for a description of the processes actually taking place. This time we proceed from the assumption of a universal and constant time ( $dt = 0$ ) with the argument, “*The time measure is an immutable definition and the physicist, who dictates this, determines what is simultaneous*”. Then there is no place for time travel and for clocks going wrong.

Therefore the speed of light can take all possible values ( $dc$  or  $\Delta c$ )

$$dr = t \cdot dc \quad \text{or} \quad \Delta r = t \cdot \Delta c \quad (5.4)$$

always in strict proportionality to the length measures.



Thus the measured length and distance measures should be transformed and, in the end, it is the unit “meter”, which should be replaced by an objective measure.

With that, the necessary *transformation for variable  $c$*  would be outlined. This transformation will be enqueued in the file of the big transformations. From it the *Lorentz-transformation for  $c = \text{constant}$*  emerges as a special case, like the transformation the *Galilei-transformation* follows from  $c = \infty$ .

How should the relation of the subjective to the objective “meter” be determined. - By means of the relation of the relevant fields (eq. 2.20) or by means of the square root of Lorentz. We have already successfully gone through it in a concrete example [see 2-1, Chapter 7].

### 5.3 General and Special Theory of Relativity

Albert Einstein distinguishes between general and special theory of relativity. Whereas the special (SRT), still is linked tightly to the prerequisites of the Lorentz-transformation, the general (GRT), deals with an extension to arbitrary systems which do not have to be inertial systems. I would like not to dwell upon the GRT, as Einstein designed it, and merely note that every generalization represents a possible source of errors and has to be well founded.

In the case of our derivation, the general case resulted of its own accord. Let us turn back: If the root of Lorentz was still a component of the derived field dilatation (2.17) and equally of the length contraction (2.18), then it canceled out in the comparison of both results (2.19).

With that, the important result, the proportionality (2.20), which among others results in the gravitation, becomes independent of the speed of light and the relative velocity  $v$ . This last step is obvious and yet still completely new.

It cannot be found by looking to Einstein, who in another way found his GRT and his description of the gravitation.

Even when striving for the same goal deviations in the results, it cannot be excluded because of the differences in the derivation. For this reason I additionally mark the derived general relativity by me (GRT') to avoid confusion.

Let us speak again about the difference to the special relativity (SRT). This deals with the one-dimensional case of the uniform motion of a reference system in x-direction ( $\mathbf{v} = v_x$ ), as specified by the Lorentz transformation where only the x-components and not those in y- or z-direction are being transformed.

As already mentioned, this is a purely theoretical case, which in practice occurs next to never. Normal is circular, and vortical, and with accelerated motion where the velocity component permanently changes its direction.

The derived result of the general relativity (GRT') does justice to this circumstance. Even if this at first only has been derived for the x-direction it nevertheless is valid equally in y- and z-direction. It even remains valid for the case that we base on a path of arbitrary form of a spatial field vortex. In this case some components continually occur in all directions of space so that the *relative velocity  $v$  just as the speed of light  $c$  loses its vectorial nature*. With that, the transition of the SRT to the GRT is carried out.



By means of the spatial swirling the electric and magnetic field pointers at the same time turn into scalar factors by taking over the function of the aether. Let us remember that even Einstein in his GRT was forced to again introduce the aether, which in the SRT was still unnecessary.

It therefore makes a difference in the transformation of physical factors if we base on a one-dimensional (SRT) or a three-dimensional spatial description (GRT). Length measures in x-direction in both cases must be converted using the root of Lorentz. Usually the relativistic  $\gamma$ -factor is introduced, which is inverse to the *root of Lorentz*

$$\gamma = 1/\sqrt{1-v^2/c^2} \quad \text{with} \quad x_0/x = \gamma \quad (5.5)$$

If individual length measures would be subject to a length contraction following the  $\gamma$ -factor, then a volume  $V$  according to the SRT, must be transformed with  $\gamma$ , according to the GRT' however with  $\gamma^3$ .

It is a well-known relativistic increase in mass is converted with the  $\gamma$ -factor and in the same manner to that proportional energy

$$E = m c^2.$$

However, if we correlate the energy to the volume  $V$  and in that way determine an energy density  $w$ , then the difference between SRT ( $w \sim \gamma^2$ ) and GRT' ( $w \sim \gamma^4$ ) again has its maximum effect.

#### 5.4 Transformation Table

Being transformed are:		SRT	GRT'	GOT
Length measures	$L$ [m] (length contraction eq. 28.16)	$\sim 1/\gamma$	$\sim 1/\gamma$	$\sim 1/\gamma$
Areas	$A$ [m <sup>2</sup> ] (circular motion)	$\sim 1/\gamma$	$\sim 1/\gamma^2$	$\sim 1/\gamma^2$
Volumes	$V$ [m <sup>3</sup> ] (vortical motion)	$\sim 1/\gamma$	$\sim 1/\gamma^3$	$\sim 1/\gamma^3$
Time measures	$t$ [s]	$\sim 1/\gamma$	$\sim 1/\gamma$	= const.
Velocities	$v$ [m/s] ( $v = L/t$ )	= const.	= const.	$\sim 1/\gamma$
	$c$ [m/s]	= const.	= const.	$\sim 1/\gamma$
Constants of material	$\varepsilon$ [As/Vm] ( $\varepsilon \cdot \mu = 1/c^2$ )	= const.	= const.	$\sim \gamma$
	$\mu$ [Vs/Am]	= const.	= const.	$\sim \gamma$
Relativistic mass	$m$ [kg] (increase in mass)	$\sim \gamma$	$\sim \gamma$	$\sim \gamma^2$
	[= $VAs^2/m^2$ ]			
Energy	$W$ [VAs]	$\sim \gamma$	$\sim \gamma$	= const.
Energy density	$w$ [VAs/m <sup>3</sup> ] ( $w = W/V$ )	$\sim \gamma^2$	$\sim \gamma^4$	$\sim \gamma^3$
<b>E</b> -, <b>H</b> -field strength	<b>E</b> [V/m]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma$
( $w = (\varepsilon \cdot E^2 + \mu \cdot H^2)/2$ )	<b>H</b> [A/m]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma$
Power density	<b>p</b> [VA/m <sup>2</sup> ] (Poynting vector <b>p</b> = <b>E</b> x <b>H</b> )	$\sim \gamma^2$	$\sim \gamma^4$	$\sim \gamma^2$
<b>D</b> -field, <b>B</b> -field	<b>D</b> [As/m <sup>2</sup> ]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma^2$
( <b>D</b> = $\varepsilon \cdot \mathbf{E}$ ; <b>B</b> = $\mu \cdot \mathbf{H}$ )	<b>B</b> [Vs/m <sup>2</sup> ]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma^2$
Power	$P$ [VA]	$\sim \gamma$	$\sim \gamma^2$	= const.

Table 5.4: Influence of the Lorentz-transformation in the:  
**SRT** (special theory of relativity): one-dimensional,  
**GRT'** (general theory of relativity): three-dimensional,  
to a large extent corresponding to the GRT of Albert Einstein,  
**GOT** (general theory of objectivity)



A relation to the field factors of the E and H field are for instance provided by the energy density of a wave field

$$w = (\epsilon \cdot E^2 + \mu \cdot H^2)/2 \quad (5.6)$$

According to that, the field intensity in the one-dimensional case of the SRT should be converted with the  $\gamma$ -factor, in the case of the GRT' however with  $\gamma^2$ , in accordance with the derivation in chapter 2.

In the domain of the GOT, all length measures should be transformed. The respective dimension gives information, to which power the  $\gamma$ -factor occurs (table 5.4). The unit of meter is responsible for that.

Let us take a critical look at the root of Lorentz. The velocity  $v$  occurring in it, of whatever this may consist, is dependent on the field according to equation 2.17. Strictly speaking it would not be constant anymore and would not belong in a general instruction for transformation at all.

Only what is valid for  $v$  is valid to the same extent for  $c$ . Since only the proportion of  $v/c$  occurs in the root of Lorentz every influence depending on field or of other nature will have no effect on  $v/c$  and the value of the root of Lorentz. In any case it will retain its value. It fulfills for itself the condition of the *Lorentz invariance*.

Accordingly, the case of the relative velocity  $v$  does not depend on the absolute value but only on the relation to the speed of light. In addition, the restriction to values of  $v < c$  is normal if the speed of light is seen as an upper limit.

### 5.5 Discussion Concerning the Root of Lorentz

mathematical consideration:	$v = 0$	$v < c$	$v = c$	$v > c$
Abbreviations: $\beta = v/c$	$0 <$	$\beta < 1$	$\beta = 1$	$\beta > 1$
and: $\gamma = 1/\sqrt{1 - \beta^2}$	$1 <$	$ \gamma  < \infty$	$\gamma = \pm \infty$	imaginary
and: $\gamma^2 = 1/(1 - \beta^2)$	$1$	positive	$\gamma = +\infty$	negative
and: $\gamma^4 = 1/(1 - \beta^2)^2$	$1 <$	positive	$\gamma = +\infty$	positive
<u>Examples:</u>				
Increase in mass, energy $\sim \gamma$ for SRT and GRT	$1$	positive	$\pm \infty$	complex
Field strength in GRT: $\mathbf{E}, \mathbf{H} \sim \gamma^2$ and mass in GOT: $m \sim \gamma^2$	$1 <$	$\mathbf{E}, \mathbf{H} < \infty$ positive	$+\infty$	$\mathbf{E}, \mathbf{H} < 0$ negative
Energy-, power density $\sim \gamma^4$ (Poynting vector) in GRT:	$1 <$	$\mathbf{P} < \infty$ positive	$\mathbf{P} = +\infty$	$\mathbf{P} < \infty$ positive

Table 5.5: Discussion concerning the root of Lorentz

$$\sqrt{1 - \beta^2} = 1/\gamma = \sqrt{1 - (v^2/c^2)} \quad (5.7)$$

*Consequences are i.e.:*

- The special theory of relativity SRT only is defined for  $v < c$
- For  $v > c$  particles with a complex mass, but with a real energy density (according to GRT') would result.
- From the point of view of the theory of objectivity (GOT) the mass should be taken negative-real (e.g. neutrino-properties).



Let us first draw, purely mathematically, a case distinction for different velocity domains of  $v$ . For  $v = 0$  the root of Lorentz becomes "1" and the Lorentz transformation turns into the Galilei transformation.

Connected to this is today's well-known and technically used domain up to the limit of  $v = c$ . It is virtually impossible to accelerate a mass particle to the speed of light since mass, field, and energy would grow towards infinity, made clear in the table 5.4. Particles as fast as light, like photons, hence cannot have a mass. At  $v = c$  a singularity is present.

In a "real" field theory an upper limit must not be present. Hence, the case for  $v > c$  should be required theoretically. Only later we will be able to judge if this makes sense physically. At first we only want to examine the case mathematically. Mass, field, and energy now have a finite value again, resulting in a complex, purely imaginary mass, a negative field, and in doing so, as already stated before, a positive energy and power density.

### 5.6. The Neutrino Faster Than Light

At one time there was the textbook opinion that it is physically impossible to fly faster than sound. This erroneous statement even could be proven "*scientifically*". It was believed that a supersonic airplane would fly off the observation space and with that would not be real anymore, thus from a mathematical viewpoint would be complex. Anyone who has flown from Paris to New York getting off a Concorde can confirm that everything at any moment of the flight was real. Only the observer is deceived if the airplane flies somewhere else than he perceives it to be.

Is the speed of light also such a "*sonic barrier*", by which the majority of the scientists since Einstein until today still hold to be insurmountable?

How should one physically imagine a complex mass?

Let us remember the alternating current teachings, where it is normal to work with complex values, since the mean values of the oscillating alternating currents, tension voltages, and fields are zero.

Calculating with mean values would result in zero energy and power. Hence complex factors are introduced and the root mean square values are calculated and measured instead of the mean values. Could a complex mass analogously not concern an oscillating particle, a particle, which is faster than the speed of light?

In the domain of speeds faster than light, for  $v > c$ , the power series (2.16) does not converge anymore and every observer theory and every observation will fail because particles faster than light run away from their own visible appearances. Every measurement and every



observation inevitably is behind and hardly can be assigned to the actual cause.

That way for instance measured neutrino events (with  $v > c$ ) are being connected with celestial observations (with  $c$ ) with which they have nothing to do with.

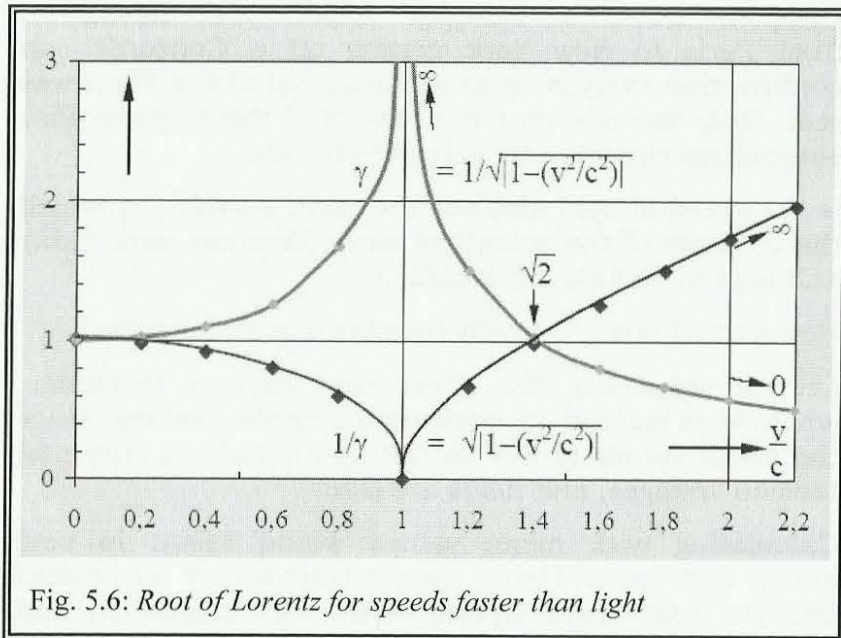


Fig. 5.6: Root of Lorentz for speeds faster than light

However, if we describe the domain  $v > c$  in the complex plane then astonishing results are found, which can be verified physically: a complex length dilatation with increasing velocity goes along with a loss of complex mass.

The oscillating fields, energy and power density however would be real with negative sign.

Thus, there would result particles carrying energy with an opposite poled field with an oscillating mass and if necessary an oscillating charge.

Without static mass and charge these particles hardly would interact with normal matter which leads to an enormous ability of penetration. The only physical particles which have such a property are the **neutrinos**.

### 5.7 Neutrino Power

With that, a usable and an extremely efficient model description has been found for these particles. Also the energy of these particles can be calculated with considerable orders of magnitude and is available as an energy source everywhere and any time.

If, for instance, in a converter for space energy a neutrino should be converted into a resting charge carrier (with  $v = 0$ ) then two steps are necessary:

1. First the neutrino must be slowed down to 1.414 times the speed of light (fig. 5.6). Doing so energy is spent and not won. For instance the converter can cool down.
2. Afterwards the characteristic rotation of its own has to be taken away from the neutrino with which the ring-like vortex spins around itself by permanently putting its inside to the outside and vice versa. In that way the vortex center is closed and the particle acquires localization. It becomes a charge carrier.



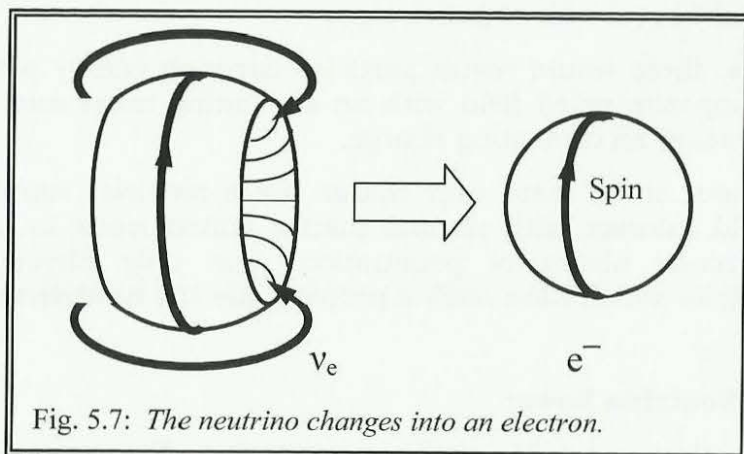


Fig. 5.7: The neutrino changes into an electron.

Even if the representation in the complex plane represents only an auxiliary description, the model nevertheless seems to be efficient because, despite its complex mass and charge, the neutrino carries a real energy nevertheless. In any case, it is represented in that way to an observer who measures the relation with the speed of light, and who, in the relativistic scheme of things, scans the relation.

Today, as noted previously, even the sonic barrier has become permeable and no scientist dares to physically deny this fact and even prove his mistake mathematically anymore.

What should hinder an oscillating particle, like a neutrino, to be faster than the light? Some time, one will as well become accustomed to that...

## 6. Unified Theory

With the theory of objectivity, the sought-for goal of a "theory of everything" (TOE), of an universal theory, seems to have moved within reach. If in the nineteenth century still promising field theories and approaches were being discussed, then the latest theory of relativity by Einstein had destroyed all hopes for such a theory. As a consequence, science has become very much more modest and understands a TOE only as the unification of all known interactions.

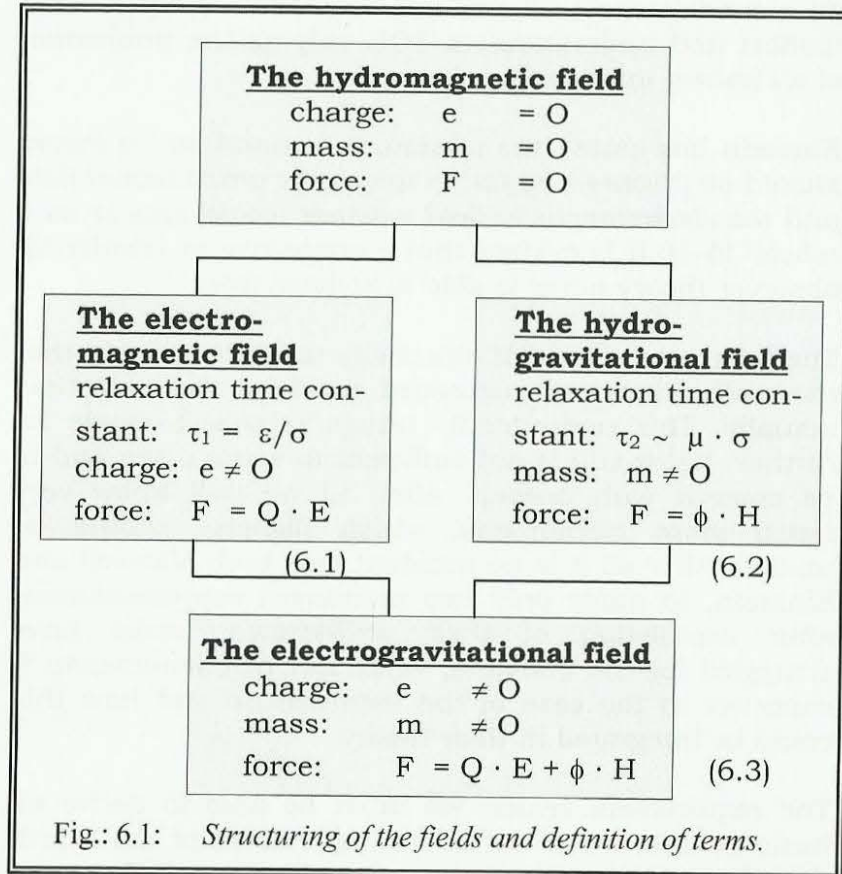
Einstein has stated the minimum demand so: *"a theory should be favoured by far, in which the gravitational field and the electromagnetic field together would appear as a whole"* [6-1]. It is evident that a subjective or relativistic observer theory never is able to achieve this.

The presented theory of objectivity made it possible that the unification has succeeded here for the first time actually. This undoubtedly brings science a whole lot further, but it still is not sufficient to settle down and to be content with oneself. After all we still know very much more phenomena, which likewise should be unified. After all it is no accident that both Maxwell and Einstein, to name only two prominent representatives, after completion of their well-known works have struggled for the question, what sort of phenomenon it concerns in the case of the temperature and how this could be integrated in their theory.

The requirement reads: We must be able to derive all basic factors, which influence our system of units with their basic units, as a compulsionless result from the new theory.



Besides the dimensions of space and time, which determine our continuum, the explanation and unification of the basic factors mass and charge has to be tackled. If we have succeeded in doing so, we will also tackle the problem of the fifth and last basic factor, which until now has put itself in the way of any unified theory as the question of fate, the problem of temperature!



### 6.1 Structure of the Field Theory

In contrast to Maxwell's theory, the new field theory, which we derived from duality, is also able to describe fields, in which no particles and no quanta exist. It probably is justified and useful in the sense of a clearer communication, to give the new field a name of its own. The author recommends the introduction of the term "hydrotic field". In it should be expressed, which importance *water* has for both the like named potential vortex and this field.

The hydrotic field is favored particularly by polar materials and by a high dielectricity. *Water* is a corresponding material dominating in the biosphere of our planet.

Whereas we had to correct the concept of a vortex-free electric field, which we had until now, we can adopt the description of the magnetic field unchanged. This then should also be valid for its name. The new field which consists of both correspondingly is called hydromagnetic field.

In fig. 6.1 we recognize the structure. At the top stands the "hydromagnetic field", which is described mathematically by the equations of dual electrodynamics. It *does not know quanta* and as logical consequence neither *charge nor mass*. If we insert these equations, Ampère's law and the dually formulated Faraday's law of induction, into each other, then there results, as a mathematical description of our space-time continuum, the fundamental field equation. As a new physical phenomenon, the potential vortex appears, which gives the hydromagnetic field a new and important property: this *field* can be *quantized*.



*The starting-point is the wave, which for corresponding interference effects can spontaneously roll up to a vortex, which as highly concentrated spherical vortex finds a new right to exist and finds to a new physical reality.*

The particles formed in the described manner show specific properties of their own. We now are able to attribute to them, for instance, a charge or a mass. And these properties also can be investigated and described individually and isolated from each other. Thus the two special cases are formed, strange by nature, on the one hand the well-known "*electromagnetic field*", describable with the help of Maxwell's equations and on the other hand the new "*hydrogravitational field*".

If we combine the results of the two special cases, e.g. by adding the force effects of electric charges and accelerated masses, then we obtain a field, which we accordingly should call "*electrogravitational*". This case is not at all unknown. Already Niels Bohr in this way has calculated the radii of the electron orbits in the hull of his model of the atom, to mention only one example. We can summarize:

*The hydromagnetic field is the all encompassing and thereby the most important field. Apart from that the electromagnetic field of the currents and the eddy currents and the hydrogravitational field of the potentials and the potential vortices merely describe the two possible and important special cases. For reasons of pure usefulness for every special case a characteristic factor of description is introduced, the charge and the mass.*

The discovery and introduction of the hydromagnetic field allows for the desired unification, because the electromagnetic resp. Maxwell-field, which describes the electromagnetic interaction, and the hydrogravitational field of the gravitation can be derived from this field as a consequence of the formation of quanta.

The kind of the interaction is caused by the course of the field lines of the field quanta which form as spherical vortices: the open field lines make the *electromagnetic interaction* possible. And the field lines with a closed course lead to *gravitation*. Both are a direct result of the field dependent speed of light.

A more perfect unification seems hardly possible.

*The interactions are a result of the field dependent speed of light!*

- \* **electromagnetic interaction**  
(by open field lines)
- \* **gravitation** (by closed field lines)
- \* **strong interaction** (does not exist)
- \* **weak interaction** (only special aspect)

#### **Auxiliary terms**

(description of quantum properties):

- **mass**
- **charge**
- **temperature**
- **Planck's quantum of action**



## 6.2 Unification of the Interactions

As the next step, the unification with the strong and the weak interaction is required, but it could be shown that those do not exist at all. It just concerns misinterpretations with much fantasy, which should help explain the difference between a wrong theory and the physical reality.

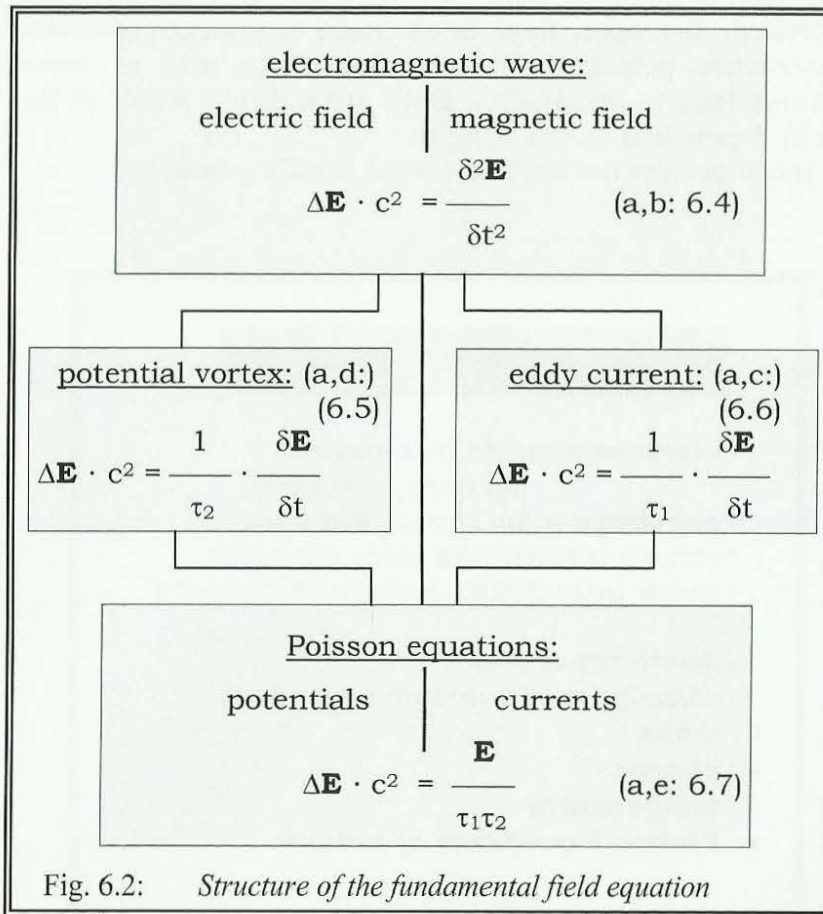


Fig. 6.2: Structure of the fundamental field equation

Numerous auxiliary terms for the description of the quantum properties exist, like for instance *mass*, *charge* or *Planck's quantum of action*. The prerequisite for their usability naturally is the existence of the quanta. But until these have found to a physical reality, the auxiliary terms are unnecessary. The hydromagnetic field does not know quanta, quantum properties or auxiliary descriptions. It will be shown that, according to our expectation, also the *temperature* is a typical quantum property, which is placed within the group of the auxiliary terms. In this way also the temperature is fitted into the unified theory without compulsion.

Without the auxiliary terms, introduced by us for reasons of usefulness, the fundamental field equation is left with its description of a spatial-temporal principle. If a world equation should exist, then this field equation has the best prerequisites.

For the fundamental field equation, the division in four parts is repeated like already for the hydromagnetic field (fig. 6.1). It likewise consists of four individual parts, the wave (b), the two vortex phenomena (c and d) and the time independent term (e) (fig. 6.2).

Whereas the duality still is combined in the wave, it comes to light clearly for the vortices to be again combined in the fourth case. Here arise, however potentials and currents, which again can react and oscillate with each other, for instance as an L-C-resonant circuit in an electronic circuit, with which the principle is repeated.



### 6.3 Temperature

This principle is shown clearer for the phenomenon of temperature as in all other cases. If we start at the top in fig. 6.2 we have an electromagnetic wave, which is absorbed and thus becomes a vortex. If the vortex falls apart, then eddy losses appear. We observe that the temperature rises and propagates in the well-known manner.

We have arrived in the bottom box, but this again can be taken as the top box for the now following process, because the *equation of heat conduction is a vortex equation* of type c or d! We discover a *self-similarity*:

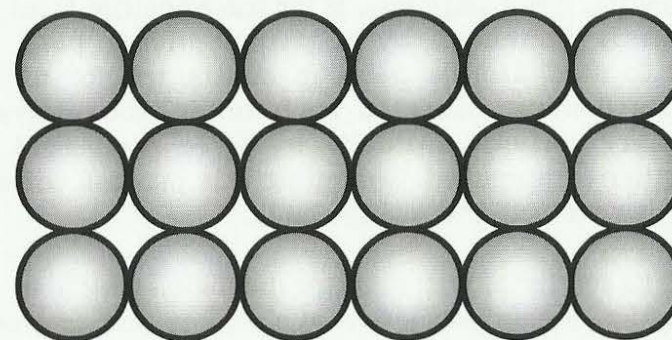
***The spatial-temporal principle formulated mathematically by the fundamental field equation can be carried over into itself time and again.***

Following the atomistic view, in the case of heat it concerns kinetic energy of the molecules, which carry out more or less violent oscillations. In the case of gaseous materials with this concept based on mechanical models, successful calculations are actually possible, like for instance the speed distribution of gases won by Maxwell from theoretical considerations concerning probability.

But the attempt to apply the formulae of the kinetic theory of gases to solids and liquids only succeeds, if additional supplements and improvements are introduced.

*Temperature is the oscillation of contraction of the elementary vortices resulting from the speed of light depending on field strength.*

a) at absolute zero temperature:



b) if thermally excited:

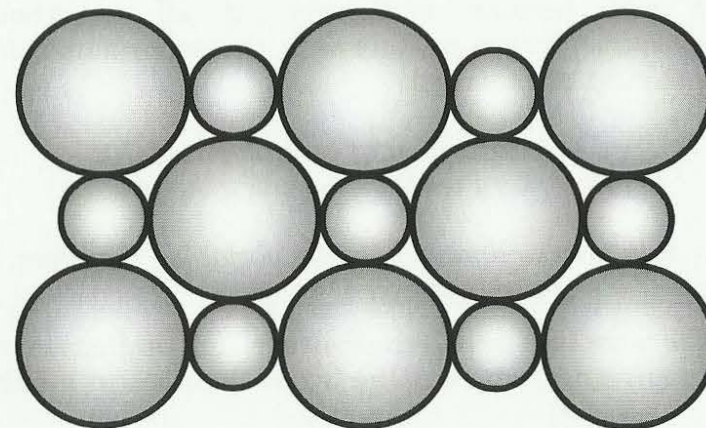


Bild 6.3: *Temperature as an oscillation of size for the speed of light depending on field strength*



Since at all events it concerns temperature, thus the same physical quantity, of course also an uniform interpretation should be demanded, which in addition should stand in full accord to the presented design of an integrated theory (TOE).

Against the background of the new theory of objectivity we consider, what happens, if for instance the local field strength is increased by a particle flying past. The matter located at this point is contracted for a short time. By coming closer to each other, the individual elementary vortices mutually reinforce their field and are further compressed. Sometime this process comes to a stop, is reversed and swings back.

At the same time, every single particle, which in this way carries out an oscillation of size, has an effect on its neighbours with its field, to also stimulate these to the same oscillation, but delayed by some time. This phenomenon spreads in all directions. The propagation only will become stationary, if all neighbouring elementary vortices pulsate with the same amplitude. It now should be recorded:

*The oscillation of contraction of the elementary vortices we call temperature.*

*Also this thermodynamic state variable, therefore, is a result of the variable speed of light.*

At the absolute zero temperature, no oscillation takes place anymore, whereas the upper limit lies in infinity.

## 6.4 Aspects of Thermodynamics

Since the cause for temperature represents an oscillation of the local electromagnetic field strength around the cosmic field strength, the following phenomena must be considered as excitation and cause, as dictated by the fundamental field equation:

1. Electromagnetic waves (b) are able to stimulate matter particles to synchronous oscillations of contraction by their alternating field. In doing so energy in form of heat is transferred to the particles, with the result that their temperature is increased. The wave is absorbed completely, if the thermal oscillation corresponds with the frequency of the wave.

*We speak of thermal radiation.*

2. But also the two dual vortices, the eddy current (c) and the potential vortex (d) can cause oscillations of contraction. This immediately becomes clear, if we consider a vortex as the special case of the wave, in which the oscillation takes place around a more or less stationary vortex centre. In the case of the decay of vortices, of the transition of energy from vortices to matter, the increase in temperature is measurable.

*In the case of this process of diffusion we speak of eddy losses and of heat loss.*

3. Particles flying past, in particular unbound and free movable charge carriers (e) produce an alternating field for other fixed particles. In doing so, kinetic energy can be transformed in temperature, thus in energy of pulsation. A good example is the inelastic



collision. But it can also be pointed to numerous chemical reactions. Whoever searches for a concrete example, takes two objects in his hands and rubs them against one another. In that case the particles which are at the frictional surfaces are being moved past each other at a very small distance, in this way causing oscillations of pulsation, which propagate into the inside of the objects according to the thermal conductivity.

*We speak of friction heat.*

This model concept provides sound explanations for a whole number of open questions (fig. 6.4).

The discussed oscillation of contraction shows two characteristic properties, which must be looked at separately: the amplitude and the frequency.

**Temperature** describes solely the amplitude of the oscillation of size.

The **heat energy** however is determined by both, by the amplitude as well as by the frequency.

Consequently the ideas of temperature and heat energy should be kept strictly apart. It therefore is not allowed to set this oscillation equal to the electromagnetic wave in tables of frequency.

To be correct two tables should be given, one for the wave, characterized by a propagation with the speed of light, and another one for oscillations of contraction, thus for stationary phenomena and phenomena bound to matter. The latter indeed can likewise propagate relatively fast by fluctuations of pressure in the case of

acoustic sound frequencies or by free movable charge carriers in the case of heat conduction, but the velocity of propagation for sound or heat is, as is well-known, still considerably smaller than the speed of light. Thus an assignment without doubts can be made as to which kind of oscillation it concerns.

1. **Temperature** occurs independent of the state in which the matter is (unified theory).
2. Temperature even occurs in **solids**, where a purely kinetic interpretation fails (unification).
3. Each elementary particle is carrier of a temperature.
4. **Expansion** with increasing temperature because of the increasing need for room for larger amplitude of oscillation (principle: bi-metal-thermometer).
5. For **solids**, the thermal oscillation of size is primarily passed on by the electrons in the atomic shell. Good electric conductors therefore at the same time also have a high thermal conductivity. (principle: electrical resistance thermometer).
6. For **gases**, the entire atoms carry out this task, for which reason a kinetic auxiliary description becomes applicable.
7. For extreme amplitudes of oscillation the atoms partly or entirely lose their shell electrons, when they change into the **plasma state**.

Fig. 6.4: Answers to open questions of thermodynamics

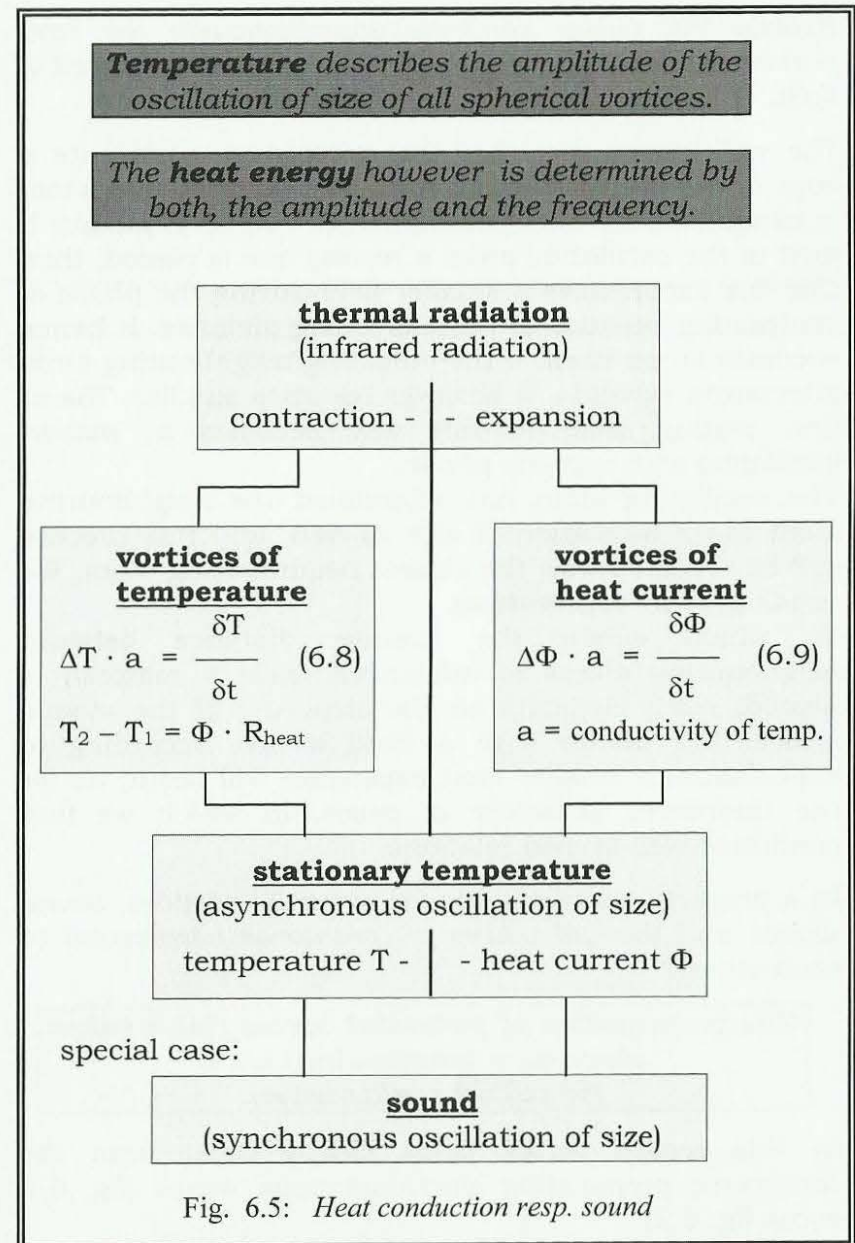


### 6.5 Sound

The close relationship of longitudinal sound waves to the oscillations of contraction of thermally heated matter becomes particularly clear for ultrasound, where the heat arising in the inside of the body, which is exposed to sound, can be measured directly. The fundamental difference consists of the fact that the produced sound waves not only have the same frequency, but also the same phase, which does not need to be the case for temperature. The oscillations of size of the temperature apparently uncoordinatedly occurring, which as a rule occupy more space if the intensity increases, form a "thermal noise".

The oscillation of size with the same phase is not realizable at all in a spatial formation of particles, with one exception, the case that all particles expand and afterwards again contract simultaneously and with similar time. We can observe such a synchronization of the pulsation oscillations of all elementary vortices in the case of a **pulsar**. To us, a pulsar looks like a "lighthouse" in space, which shines with a fixed frequency.

In reality it can as well concern a constantly shining sun, which carries out a synchronized, thermal oscillation of size, like a gigantic *low-frequency loudspeaker*. During the phase of contraction of the star its emitted light stays back. To us the pulsar looks dark. In addition, the field strength is extremely increased and the light is correspondingly slowed down. During the phase of expansion, the conditions are reversed and we observe a flash of light.





*Exactly the pulsar confirms unambiguously the here presented theory of the variable, field-dependent speed of light.*

The well-known fact that the microcosm represents a copy of the macrocosm suggests already that each atom is capable of the same oscillation of size as a pulsar: If next to the oscillating atom a resting one is placed, then this one experiences a smaller field during the phase of contraction because of the increasing distance. It hence becomes larger itself. If the pulsating neighbouring atom afterwards expands, it however becomes smaller. The at first resting atom in this way becomes a "pulsar" *oscillating with opposite phase*.

The oscillating atom has stimulated the neighbouring atom to an oscillation of size as well, and this process will be repeated with the closest neighbouring atom. We speak of **heat conduction**.

To which extent the average distance between neighbouring atoms is influenced while a material is heated, solely depends on the structure of the atomic lattice. For matter with a fixed lattice, according to expectation, a smaller heat expansion will occur, as for the unordered structure of gases, in which we find confirmed well-known relations.

In a property charactersitic for potential vortices, *sound waves and thermal waves of contraction* correspond to each other:

***The propagation of potential vortex fields takes place as a longitudinal wave (so called scalar wave).***

In this regard vortex fields clearly differ from the transverse propagating electromagnetic waves (fig. 6.5 versus fig. 6.2).

## 6.6 Basic Principle of Cybernetics

Surely information can also be attributed to the potential vortex. But how should information be formed? Is **information** a form of **energy**? Energy occurs as a consequence of the **formation of potential vortices**. Without this phenomenon there would not be any energy. Can information be described by means of a mathematical equation?

To be able to answer these questions, we subject the *fundamental field equation to a control technical analysis*. If it actually concerns a world equation, then an answers should be possible.

We take up Ampère's law

$$\text{rot } \mathbf{H} = \varepsilon \cdot (\mathbf{E}/\tau_1 + \delta \mathbf{E}/\delta t) \quad (6.10)$$

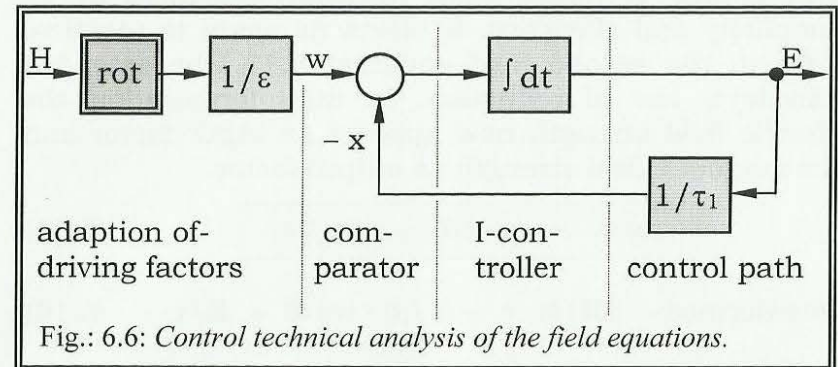
and remodel it according to the time derivative

$$\delta \mathbf{E}/\delta t = (1/\varepsilon) \cdot \text{rot } \mathbf{H} - \mathbf{E}/\tau_1 \quad (6.11)$$

If the equation now is integrated over the time,

$$\mathbf{E} = \int [(\text{rot } \mathbf{H})/\varepsilon - \mathbf{E}/\tau_1] dt \quad (6.12)$$

a **signal flow diagram** can be drawn (fig. 6.6):





The structure of a control circuit is clearly visible. The individual paragraphs are described in an analogous way as for a technical control system. The execution of the curl operation on the field pointer of the magnetic field strength  $\mathbf{H}$  and the multiplication with  $1/\varepsilon$  accordingly form an *adaptation of driving factors*. In the *comparator*, the difference for control from driving factor  $w$  and controlling factor  $x$  is formed and supplied to an *integral controller*. The *control path has a purely proportional behaviour* and consists of the processing of the measurement value of the electric field strength  $\mathbf{E}$  with  $1/\tau_1$ , in which  $\tau_1$  describes the relaxation time of the eddy currents.

In technical control systems, such a structure is found remarkably seldom, although it has an invaluable advantage: it possesses a *stability in principle*. Not a single adjustment of the controller exists, in which the closed regulatory circuit could become unstable, because it shows a *proportionally delaying behaviour of first order*. Possible changes of the adjustment of the controller or of the control path merely take effect on the speed, with which the regulatory circuit is able to follow changes of the driving factor.

This control technical basic principle convinces by its simplicity and efficiency. It meets us again in identical form in the second field equation 6.13, the extended Faraday's law of induction. In dual formulation the electric field strength now appears as input factor and the magnetic field strength as output factor.

$$-\text{rot } \mathbf{E} = \mu \cdot (\mathbf{H}/\tau_2 + \delta\mathbf{H}/\delta t) \quad (6.13)$$

transformed:  $\delta\mathbf{H}/\delta t = -(1/\mu) \cdot \text{rot } \mathbf{E} - \mathbf{H}/\tau_2 \quad (6.14)$

and integrated:  $\mathbf{H} = - \int [(1/\mu) \cdot \text{rot } \mathbf{E} + \mathbf{H}/\tau_2] dt \quad (6.15)$

Both *regulatory circuits are coupled and connected with each other*, by deriving their driving factor each time from the controlling factor of their dual partner. Is this structure actually efficient and meaningful?

Every regulatory circuit needs a target value, which is dictated from the outside. Let us think of the numerous control systems in nature. At all events a higher intelligence would be necessary for all the target values. This problematic case is comparable to the question of what existed first: the egg from which a hen hatches or the hen without which no eggs can exist. *Without a given target, evolution would not exist.*

The *connected regulatory circuit structure* provides the appropriate answer: cybernetic systems, which usually and as is well-known strive to a state of balance, get their *target value from their dual "partner"*. It is crucial that correspondingly dual systems are self-sufficient and can form and develop independently out of themselves, without target values of a third side. This basic principle of cybernetics undoubtedly is brilliant.

If out of the nowhere something like the cosmos or like life on earth should form, then the *connected regulatory circuit structure* based on duality is probably the only possible and conceivable one. Thus it merely concerns the *control technical representation of the fundamental field equation*.

The question for the efficiency not only concerns the stability, but equally the possibility of both systems to oscillate and to communicate with each other by the coupling and the associated exchange of information.







### 6.8 Information

The search for an answer for numerous philosophers and physicists was tantamount to the search for a world formula. Of course it must not be forgotten that a formula only is a mathematical description and never the physical reality itself. It is a mathematical tool in the hand of a person and not the world or the cosmos itself, which he tries to understand.

What keeps the world together in the heart of hearts, has to be more than only a pure apparatus of formulas. Actually the fundamental field equation tells us more. It reveals us a basic *principle based on duality* in which the dual partners mutually dictate target values and goals. This principle convinces by its simplicity and efficiency. Apart from the "*self regulation*" it obviously also has the fundamental possibility of a "*self organization*" and the "*generation of information*".

The field equations thus are the starting-point for the formation not only of matter and energy, but also of information. Accordingly holds:

**Information is nothing but a structure  
of electric or magnetic vortex fields.**

This statement is new and to a large extent incompatible with the world conception of Norbert Wiener, who is seen as the founder of cybernetics. From *N. Wiener* stems the sentence: "information is information, not matter and not energy".

We hold against it that obviously a fairly direct connection exists. We have worked out that only the vortex can show a stable adaptive regulatory circuit structure. Only the vortex and not the wave exists in two forms of formation, dual to each other, and the *principle of duality* again is the prerequisite for the formation of information, of self organization and finally for the evolution. In fig. 6.8 well-known dual partnerships are listed. From it follows in a consistent way that for the *production of information* vortices should be considered without exception.

electric field	magnetic field
potential	current
capacitor	coil
Faraday's law	Ampère's law
potential vortex	eddy current
convergence	divergence
dielectricity	permeability
non-metal	metal
isolator	electric conductor
tuned cavity	antenna
cold	hot
Yin	Yang
female	male
minus	plus
introverted	extroverted
stability	dynamics
water	fire
implosion	explosion

Fig. 6.8: Table of dual correspondences



### 6.9 Evolution

But how can this so important duality occur, how can it form? This question is closely associated with the question of the formation of vortices. The signal flow diagram (fig. 6.7) says that the dual regulatory circuits  $F_1$  and  $F_2$  can only exist by the coupled circuit, which provides them the necessary target values and at the same time forwards the respective information. In this manner the oscillations and the more or less damped wave  $F_1$  and  $F_2$  communicate with each other.

Waves and vortices serve solely the  
***mediation of information and energy.***

With that falls a central role upon the wave, so that vice versa is valid:

Without wave no vortices, no duality and  
***consequently no evolution can exist.***

According to today's state of knowledge, the basic principle of cybernetics forms the basis for matter and energy as well as for information. Since the wave can only serve for the transmission of information, the principle of duality and the *vortex* will function as *carriers of information*.

We are entitled, to speak of *vortex information*. This by no means is characterized by special frequencies or modulations of frequencies. This is prevented by the property of the vortices which allows them to change the frequency. On the other hand various configurations of vortices are possible and numerous combinations and modulations are conceivable.

### 6.10 Medicine

Doctors are involved in it in daily practice. They are dealing with living beings, which are constructed completely dually from the reproduction down to the processes of metabolism and cell functions, where energy and information exchange is the basis of health.

If the doctor knew more about the cybernetic principle, he would know better the respective dual opponent, then he could increase his healing success significantly and would not have disturbed the highly sensitive control circuits by prescribing pills.

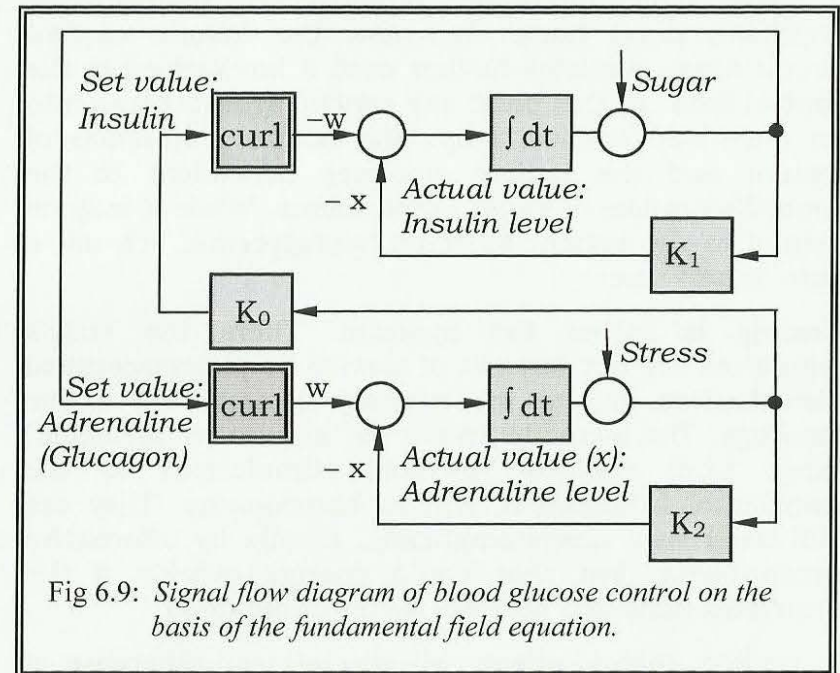


Fig 6.9: Signal flow diagram of blood glucose control on the basis of the fundamental field equation.



This is, for example, made clear by reference to the blood sugar regulation. Here the adrenaline is assumed to be the opponent for insulin. The intake of sugar preparations acts as a disturbance in the insulin control circuit and the stress occurs as a disturbance in the adrenaline control circuit.

The doctor's recommendation to diabetics, whose nominal value has dropped to too low values, should include the control of the stress of the patient. Since the set value comes from the dual control circuit, for the doctor the only possibility is to focus his treatment on the dual adrenaline control circuit.

If sugar preparations are administered instead, the physician must know that now the insulin control circuit down-regulates further until it has arrived at the control limit. At this point any control system turns into an open-loop control, stops the body's production of insulin and the patient becomes dependent of the controlled intake of sugar preparations. While it may be helpful to the patient in acute hypoglycemia, it's not a cure in any case.

Healing is rather the opposite. There the body's regulators are not put out of service by pharmaceutical disturbances, but to the contrary brought out of the blockage. The methods known as "alternative medicine" range from energetic medical stimulations to the transfer of information, e.g. in homeopathy. They are still used very unsystematically, mostly by alternative practitioners, but that could change quickly if the principles indicated here are better understood.

A unified theory affects all disciplines, otherwise it would not be what it claims to be.

### 6.11 Philosophy of Nature

Seen in the view of the philosophy of nature now two dual points of view are possible. The optimistic one would be:

*We and our environment are a result of the cybernetic principle and of the duality.*

If really everything should be electromagnetism, a phenomenon which can not be grasped directly by humans, then the pessimist would come to the conclusion:

*Everything is nothing. What we observe is nothing but a deception of the senses.*

Perhaps therefore famous philosophers of antiquity, like Empedokles or Demokritos, have ended their life in the crater of the Etna. According to the theory of the atom by Demokritos (470 to 380 B.C.) the formation of matter, earth and celestial bodies will occur by means of a formation of vortices.

Empedokles (482 to 420 B.C.) was the first to develop a theory based on four elements, which was continued and improved by Plato (428 to 348 B.C.) and Aristotle (384 to 322 B.C.). Accordingly these elements are changeable into each other and mixable with each other. From them all bodies are made up.

The terms "air, water, fire and earth", with which the philosophers have described the four elements, are of course not identical with the ones in our translation and conception world, but they were used in a philosophical sense as a substitute for the description of the respective basic principle.

There also have been different approaches, to translate these terms differently, e.g. by an assignment to the four states of matter (solid, liquid, gaseous, plasma). But the ancient texts do not get easier to read in that way.







## 7. Table of Formula Symbols

<u>Electric field</u>		<u>Magnetic field</u>	
<b>E</b> V/m	Electric field strength	<b>H</b> A/m	Magnetic field str.
<b>D</b> As/m <sup>2</sup>	Electric displacement	<b>B</b> Vs/m <sup>2</sup>	flux density
U V	Tension voltage	I A	Current
<b>b</b> V/m <sup>2</sup>	potential density	<b>j</b> A/m <sup>2</sup>	Current density
$\epsilon$ As/Vm	Dielectricity	$\mu$ Vs/Am	Permeability
Q As	Charge	$\phi$ Vs	Magnetic flux
e As	Elementary charge	m kg	Mass
$\tau_2$ s	Relaxation time constant of the potential-vortices	$\tau_1$ s	Relaxation time constant of the eddy currents

### other symbols and Definitions:

Specific electric conductivity	$\sigma$	Vm/A
Electric space charge density	$\rho_{el}$	As/m <sup>3</sup>
Dielectricity	$\epsilon = \epsilon_r \cdot \epsilon_0$	As/Vm
Permeability	$\mu = \mu_r \cdot \mu_0$	Vs/Am
Speed of light	$c = 1/\sqrt{\epsilon \cdot \mu}$	m/s
Speed of light in a vacuum	$c_0 = 1/\sqrt{\epsilon_0 \cdot \mu_0}$	m/s
Time constant of eddy currents	$\tau_1 = \epsilon/\sigma$	s

### Concerning vector analysis:

**Bold print** = field pointer (vector)

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