

# Principles for the Theory and its Agreement with Experiment

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*Motto:*

*"The difference between a good experiment and a good theory is in the fact that the theory gets old quickly and it is replaced by another one, based on more perfect ideas. It will be forgotten quickly. The experiment is something else. The experiment, which has been thought well and performed carefully, will step in the science forever. It will become its part. It is possible to explain such experiment differently in different periods of times."*

P. L. KAPICA

*"The laws of nature are so grandiose, that they have to evoke admiration. We can fully relish the feeling only if we can share it with someone. This is not easy affair, however, to share that feeling. The deeper the man plunge into the unknown, the less fellow-travelers one has. In the end of the process, when he arrives there for real where no one else has been before, he is alone."*

H. SELEY

*"No scientist can have and even require a guarantee, that his opinions will not be contradicted in the future. He can only hope, that he will set the sufficiently valid and significant relations between the facts, which, even if they will be contradicted later, will serve as a basis of the discoveries of new facts and new coherencies."*

J. D. BERNAL

## **Abstract**

*All is building on experiments. The theory is valid if and only if it can explain everything earlier known experiments and can predict something new in physics, which will be confirmed in the future. Metrology must be paramount. All equations must be dimensionally correctly, that is, to use the correct units for each physical quantity. Correct nomenclature and correct terminology.*

*Form of the interference field must be non-linear.*

*Form of Intensity of the Moving Charge Electric Field must be asymmetrical.*

*Kinetic energy of a charge moving at the velocity of  $v$  has two different values:*

***Kinetic energy against direction of motion as wave***

$$T_{kin\ ad} = mc^2[\ln |1+v/c| - (v/c)/(1+v/c)]$$

**Kinetic energy in direction of motion as particle**

$$T_{kin\ id} = mc^2[\ln |1-v/c| + (v/c)/(1-v/c)]$$

*Wave - particle duality as kinetic energy against and In direction of motion.*

*Physicist must have a healthy arrogance, do not be afraid criticize of the great physicists, if he is adamantly confident on the basis of experiments metrological and mathematically about their truth. Not afraid to speak out about errors in the theory and about their consequences.*

*Physicist must have a flight and constantly looking partners, who can discuss with him, who can jointly develop and explore.*

## 1. Introduction

Through the work of Max Planck, Albert Einstein, Louis de Broglie, Arthur Compton, Niels Bohr, and many others, current scientific theory holds that all particles also have a wave nature (and vice versa).<sup>[1]</sup> This phenomenon has been verified not only for elementary particles, but also for compound particles like atoms and even molecules. For macroscopic particles, because of their extremely short wavelengths, wave properties usually cannot be detected.<sup>[2]</sup> Wave–particle duality is an ongoing conundrum in modern physics. Most physicists accept wave-particle duality as the best explanation for a broad range of observed phenomena; however, it is not without controversy.

Albert Einstein, who, in his search for a Unified Field Theory, did not accept wave-particle duality, wrote:<sup>[4]</sup>

This double nature of radiation (and of material corpuscles)...has been interpreted by quantum-mechanics in an ingenious and amazingly successful fashion. This interpretation...appears to me as only a temporary way out...

The pilot wave model, originally developed by Louis de Broglie and further developed by David Bohm into the hidden variable theory proposes that there is no duality, but rather a system exhibits both particle properties and wave properties simultaneously, and particles are guided, in a deterministic fashion, by the pilot wave (or its "quantum potential") which will direct them to areas of constructive interference in preference to areas of destructive interference. This idea is held by a significant minority within the physics community.<sup>[5]</sup>

When in this idea we will replace the "quantum potential" by "electromagnetic potential" (or by "interference of electromagnetic waves"), the idea will be accepted large majority of physicists.

In 1900 Max Planck hypothesized that the frequency of light emitted by the black body depended on the frequency of the oscillator that emitted it, and the energy of these oscillators increased linearly with frequency (according to his constant  $h$ , where  $E = h\nu$ ).

Theoretical Planck's oscillator we can replace with circulating electron along ellipse around the nucleus of an atom between two Bohr's energy levels, while electron moving alternately with acceleration and deceleration. This electron really blinks. When an electron moves at the speed of a higher Bohr energy levels (from afnucleus) to lower (towards perinucleus) radiates spectral lines of certain thickness (really blinks). For example, spectral line Halfa 656.281 + - 1.4 nm.

From the thickness of the spectral lines

we can easily identify the smallest (in afnucleus) and largest (in perinucleus) the speed of the electron around the nucleus of an atom, taking into account the kinetic energy of the electron in the direction of movement and against the movement if we know that according to the Doppler principle is the lowest wavelength (highest frequency) and against the direction of motion of the electron is a wavelength of the highest (lowest frequency).

$\frac{v}{c}$	Front of electron $\left[ \ln \left  1 - \frac{v}{c} \right  + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$	Behind of electron $\left[ \ln \left  1 + \frac{v}{c} \right  - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$
Electron 0.0027171 <i>It is v/c in the direction of motion (id)</i>	3.704855771252357587814e-6 1.8931773275045679448456131 eV  Lambda <sub>id</sub> (v/c=0.0027171) = hc/E <sub>k,id</sub> = =654.900051928391151 nm  4.577682611525892171951e+14 Hz 1.8931773275 eV	
Electron 0.0027212 <i>It is v/c against the direction of motion (ad)</i>		3.6890835634754294761e-6  1.885117746 eV  Lambda <sub>ad</sub> (v/c= 0.0027212)=hc/ E <sub>k,ad</sub> = = 657.69999384 nm

Lambda<sub>ad</sub> (v/c= 0.0027212042)=hc/ E<sub>k,ad</sub> = 657.699993842 nm = Lambda<sub>ad</sub> = c/ f<sub>min</sub>=  
= 657.7 nm against the direction of motion of electron, moving with speed v = 0.0027212042c.

Electron is in perinucleum. Frequency 4.577682611526e+14 Hz

Lambda<sub>id</sub> (v/c=0,002717146) = hc/E<sub>k,id</sub> =654.9 nm = Lambda<sub>id</sub> =

=c/ f<sub>max</sub>= 654.9 nm in the direction of motion of electron

moving with speed v = 0.002717146c. Electron is in afnucleum.

Frequency 4.5581945872e+14 Hz.

The wings<sup>[16]</sup> of spectral line H $\alpha$  are 1 nm.

(658.68 nm – 657.7 nm = 0.98 nm, 654.9 nm – 653.92 nm = 0.98 nm).

Physics in the past formulated at least part of the truth about the physical phenomena. Some ideas, even if they were doubtful and rejectable, are still valid today:

1. Electron radiates electromagnetic waves if and only if moves with acceleration from the higher Bohr's energy levels to a lower. In atom, as a source of electromagnetic waves, then it then, when it moves from afnucleum to perinucleum along the ellipse. If the electron moves with decelerated motion, when it absorbs energy, while moving from a lower to a higher energy level, in the direction from perinucleum to afnucleum along the ellipse with of very small eccentricity. Eccentricity of the ellipse is maximal, when electron radiates head of series. Minimal, almost zero, eccentricity corresponds to edge series.

Faulty arguments leveled against classical physics - the electron is moving with acceleration along of a spiral towards the nucleus - we will find in Beiser<sup>[19]</sup> 5.7 The failure of classical physics, p.120, Fig.5.12: "Electron in an atom should be according to classical physics, rapidly converge to the nucleus, because as a result of its acceleration radiates energy."

Because the electron flashes **4.56794e+14** times per second, i.e. emits energy **4.56794e+14** times per second and absorbs energy **4.56794e+14** times per second (for spectral line **H $\alpha$** ). Electron creates in the transmission medium, electromagnetic wave **4.56794e+14** times per second and absorbs energy **4.56794e+14** times per second (for spectral line **H $\alpha$** ) - Beiser's argument is unfounded.

Electron is no oscillator. Atom resembles to the solar system with the same "planets" (electrons) and different distances from the nucleus. Electron in atom not to skip, but moves continuously with great speed, which increases from the value **0.002717146 c** (in afnucleum) to **0.0027212042 c** (in perinucleum). Then decreases from the value **0.0027212042 c** (in perinucleum) to **0.002717146 c** (in afnucleum) etc.

Changing the speed of the electron is repeated **9.1358772e+14** times per sec. (spectral lines **H $\alpha$** ).

2. The quantum harmonic oscillator as the quantum-mechanical analog of the classical Planck's harmonic oscillator we can replace with circulating electron along ellipse around the nucleus of an atom between two Bohr's energy levels, while electron moving alternately with acceleration and deceleration. Linear harmonic oscillator is only the projection of the real motion of the electrons along the ellipse in the plane perpendicular to the plane of the ellipse.

Linear harmonic oscillator is only the projection of the real motion of the electrons along the ellipse in the plane perpendicular to the plane of the ellipse.

Or more accurately, is only the projection -of rotating ellipses (Sommerfeld's ellipses around perinucleus) - in a plane perpendicular to the plane of the ellipses.

In quantum mechanics are used so imprecise and imperfect expressions of motion of electrons around the nucleus.

### ***Definition of particle***

The main characteristic of the particle:

Particle as a source exists if and only if repeatedly speeds up and slows down its movement in source along ellipse (when blinks).

Particle as a source, creates in the transmission medium, electromagnetic wave, that spreads in all directions with the velocity  $c/n$ , regardless of the source movement, where  $n$  is the refractive index of the transmission medium.

In other words, particle, which is the source, can not become the transmission medium and remain in it.

Particle that is the source, remain in the source.

### **Definition of waves**

The main characteristic of the waves is the energy transfer through a transmission medium.

And no transfer of the substance (= of real particles) from the source to the transmission medium.

Wave exists if and only if there is not a source.

In the case of electromagnetic waves, see **2.1.3 The electromagnetic field. Maswell's equations, p. 28<sup>[3]</sup>**

electric field intensity  $E$  and the magnetic induction  $B$

are both associated with the intensity of a moving charge

$$\mathbf{E}_{\text{mov}} = \mathbf{E}_{\text{still}} \left(1 - \frac{v}{c} \cos \vartheta\right)^2 = E_{\text{still}} + B \quad \text{where} \quad B = \frac{E_{\text{still}}}{c} \left(2 + \frac{v}{c} \sin \phi\right)$$

The force acting on the moving electric charge is

$$\begin{aligned} \mathbf{F} &= Q\mathbf{E}_{\text{mov}} = Q\mathbf{E}_{\text{still}} \left(1 - \frac{v}{c} \cos \vartheta\right)^2 = Q\mathbf{E}_{\text{still}} \left(1 + \frac{v}{c} \sin \phi\right)^2 = \\ &= Q\mathbf{E}_{\text{still}} + Q\mathbf{E}_{\text{still}} \left(2 + \frac{v}{c} \sin \phi\right) \frac{v}{c} \sin \phi \end{aligned}$$

whereby  $-\cos \beta = \sin \phi$

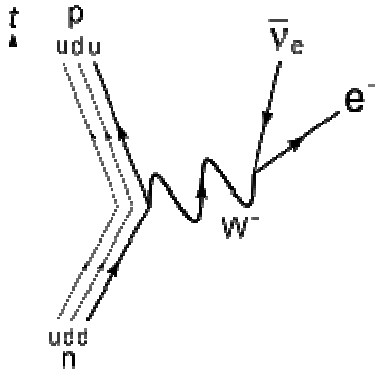
$$\mathbf{F} = \mathbf{F}_{\text{el}} + \mathbf{F}_{\text{m}} = Q\mathbf{E} + Q(\mathbf{v} \times \mathbf{B})$$

### **Neutron, $\beta$ electron, gamma rays**

Gamma rays have frequencies above 10 exahertz ( $10^{19}$  Hz), and therefore have energies above 100 keV and wavelength less than 10 picometers, often smaller than an atom. Gamma rays from radioactive decay commonly have energies of a few hundred keV, and almost always less than 10

MeV. The upper limit for such energies is about 20 MeV, and there is effectively no lower limit (they are sometimes classed as x-rays if their frequencies are lower than  $10^{19}$  Hz).

$\beta$  electron is emitted from the neutron



The Feynman diagram for beta decay of a neutron into a proton, electron, and electron antineutrino via an intermediate heavy W boson.

In the "stable" neutron, electron orbits around the center-of-mass with speed greater than  $0,999994c$ .

If will start beta decay of a neutron,  $\beta$  electron has kinetic energy in direction of motion  $80\ 398$  MeV (it is W<sup>-</sup> boson), proton is moving at a speed  $0,023337c$ , and radiates  $\gamma$  ray.

Planck:  $80\ 398$  MeV =  $h \cdot f$ , f is frequency circulation electron around center of mass in neutron in center-of-mass coordinate system.

Neutron (Proton and an electron orbiting a common center of mass) Beta decay is mediated by the weak force.

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## 2. Theory

### 2.1. Form of Intensity of the Moving Charge Electric and Magnetic Field

#### 2.1.1 Intensity of the Moving Charge Electric Field

Let us have a system of coordinates (x, y, z) connected with the medium causing propagation of light. Let the electric field intensity in this medium propagate at speed c in all directions. It is known from Coulomb's law that intensity of the still standing charge in relation to the system of coordinates (x, y, z) decreases with the square of distance from that charge then represented by hyperboles symmetrical to the charge, illustrated in section as follows:

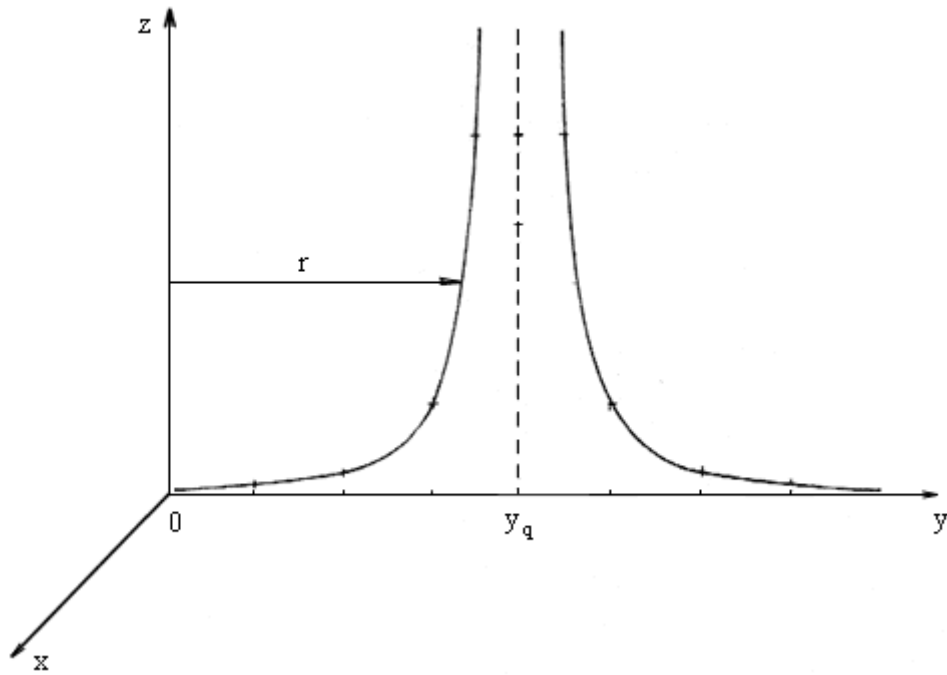


Fig. 2.1. The intensity of the stillstanding charge

$r$  - distance of the hyperbole point from the beginning

Charge  $q$  is situated at level  $yz$  and in the distance of  $y_q$  from the beginning in the direction of axis  $y$ .

Let us now examine what would happen with the form of curves representing the intensity of the electric field, if charge  $q$  will move in a uniform straight line motion in the direction of the axis  $y$  at a constant speed  $v$ . Let's thus join firmly the system of coordinates  $(x', y', z')$  with the charge  $q$ , see Fig. 2.2.

$r$  - distance of the hyperbole point from the beginning

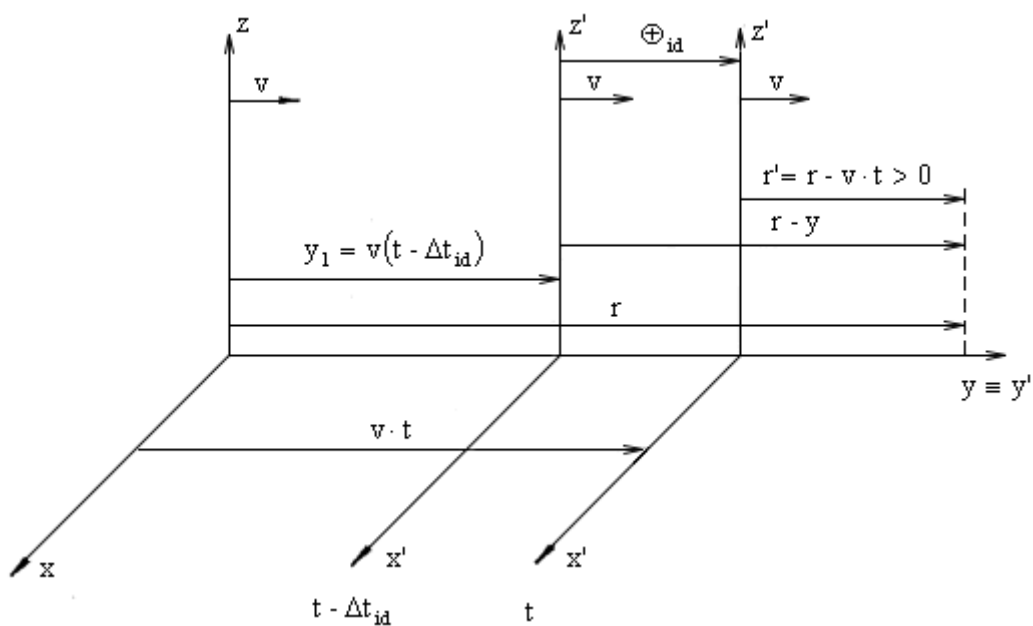


Fig. 2.2. The system of coordinates  $(x', y', z')$

Distance  $r'$  is measured in direction of axis  $y'$  from the charge (or from the beginning  $O'$  respectively), while it is valid

$$r' = r - vt \quad (2.1)$$

At the moment  $t_0=0$  both systems become identical.

When  $t - \Delta t_{id}$ , the charge finding itself at the distance of  $y_1 = v(t - \Delta t_{id})$  would emit intensity propagating at speed  $c$ , which at the moment of  $t$  would come to point  $r$  in time of

$$\Delta t_{id} = \frac{r - y_1}{c} = \frac{r - v(t - \Delta t_{id})}{c} \quad (2.2)$$

thus

$$\Delta t_{id} = \frac{r - vt}{c - v} \quad (2.3)$$

The index  $_{id}$  means that is the case of propagation of the electric field intensity in direction of the charge motion.

Let the  $\oplus_{id}$  be the distance between the position of the charge at the moment of  $t - \Delta t_{id}$  (i.e. when the charge has emitted the intensity to point  $r$ ) and position of the charge at the moment  $t$ , when the intensity emitted "has reached" the point  $r$ .

At the time of  $\Delta t_{id}$  the charge will cover the distance of

$$\oplus_{id} = v \cdot \Delta t_{id} = \frac{v(r - vt)}{c - v} = \frac{v}{c - v} r' \quad (2.4)$$

This is the distance at which the charge "outrun" the intensity propagated in direction of the charge motion. Consequently the intensity of the moving charge in relation to the system of coordinates  $(x, y, z)$  will change its form in the respective  $\oplus$  of various  $r$ : it will be deformed (see Fig. 2.3 )



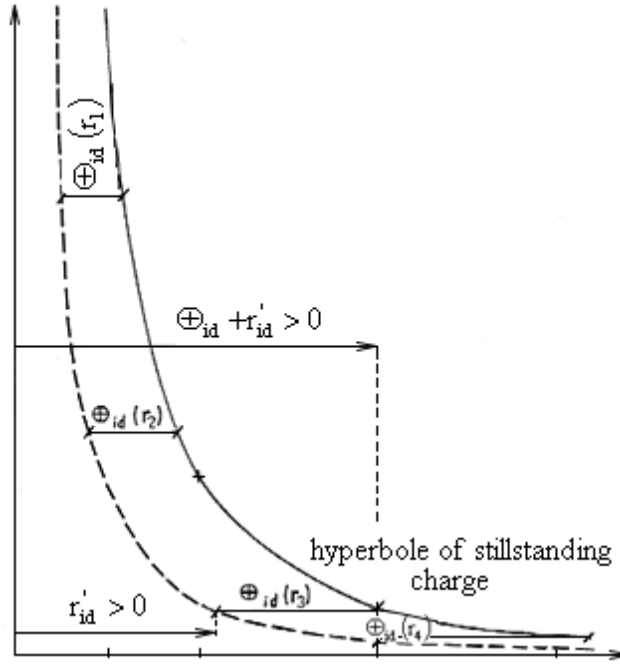


Fig. 2.3. The intensity of the moving charge in the direction of the motion  $E_{mov}^{id}$

It is evident that with increasing distance  $r_i$  ( $i = 1, 2, 3, \dots$ ) the respective "retardation of intensity"  $\oplus_{id}(r_i)$  also increases, as can be seen in equation (2.4). As the intensity of the moving charge in the direction of the motion  $E_{mov}^{id}$  at point  $r'$  and moment  $t$  equals the intensity of the stillstanding charge at point  $(r' + \oplus_{id})$  at the moment of intensity emittance  $t - \Delta t_{id}$ , then:

$$E_{mov}^{id}(r') = E_{still}(r' + \oplus_{id}) \quad (2.5)$$

From the Coulomb's law:

$$E_{still}(r' + \oplus_{id}) = \text{const} \frac{1}{(r' + \oplus_{id})^2} \quad (2.6)$$

$$E_{still}(r') = \text{const} \frac{1}{r'^2} \quad (2.7)$$

$r$  are distances of points of hyperbola from the beginning of the non-dashed system,  $r'$  are distances of points of hyperbola from the beginning  $O'$  in a dashed system,  $r, r'$  are variables of the same function  $E_{still}$  (represented by hyperbolas). In other words, there is distance  $r$ , that numerically equals  $r' + \oplus_{id}$  distance. Such distance  $r'$  numerically equals  $r' - \oplus_{id}$  distance, both being variables of the same function  $E_{still}$ . For detail refer to (2.6) and (2.7). The issue concerns the same Coulomb's law.

By substituting of (2.5) and (2.4) we get

$$E_{mov}^{id}(r') = \text{const} \frac{1}{(r' + \oplus_{id})^2} \quad (2.8)$$

Then by utilizing (2.3) , (2.6) and (2.7) we calculate

$$\frac{E_{\text{mov}}^{\text{id}}(r')}{E_{\text{still}}(r')} = \frac{r'^2}{(r' + \oplus_{\text{id}})^2} = \left(1 - \frac{v}{c}\right)^2 \quad (2.9)$$

that is

$$E_{\text{mov}}^{\text{id}} = E_{\text{still}} \left(1 - \frac{v}{c}\right)^2 \quad (2.10)$$

Thus we managed to express the intensity of the moving charge in direction of motion by means of the intensity of the stillstanding charge in the given point. Analogically we express the intensity of the electric field of the moving charge against the direction of motion (indexes  $_{\text{ad}}$ ), see Fig. 2.4

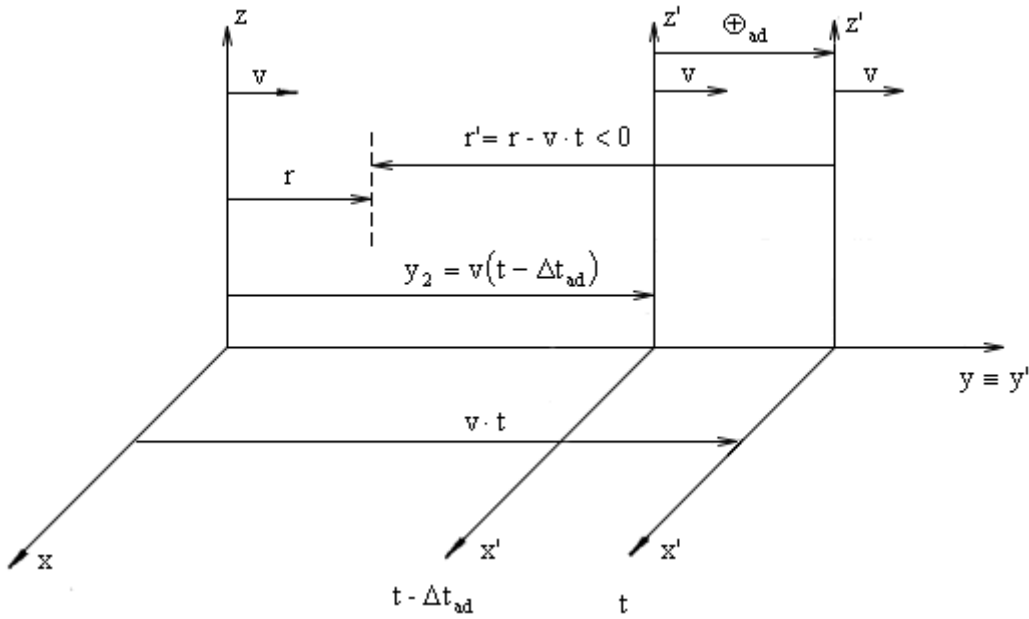


Fig. 2.4. The distance  $\oplus_{\text{ad}}$

The charge moving at the speed of  $v$  parallel to the axis  $y$  is situated (at the moment  $t$ ) in the distance of  $v \cdot t$  from the axis  $z$ .

At the moment  $t - \Delta t_{\text{ad}}$  the charge, situated in the distance of  $y_2 = v(t - \Delta t_{\text{ad}})$  will emit the intensity to the point  $r$ .

This intensity will reach at the moment  $t$  just the point  $r$  in time of

$$\Delta t_{\text{ad}} = \frac{y_2 - r}{c} = \frac{v(t - \Delta t_{\text{ad}}) - r}{c} \quad (2.11)$$

from where

$$\Delta t_{\text{ad}} = \frac{vt - r}{c + v} \quad (2.12)$$

$\oplus_{\text{ad}}$  is the distance between the position of the charge at the moment  $t - \Delta t_{\text{ad}}$  i.e. when the charge emitted the intensity to the point  $r$  and the position of the charge at the moment  $t$ , when the emitted intensity "has reached" the point  $r$ .

The charge will cover the distance

$$\oplus_{\text{ad}} = v \cdot \Delta t_{\text{ad}} = \frac{v}{c+v} (v \cdot t - r) = \frac{-v}{c+v} r' \quad (2.13)$$

at time  $\Delta t_{\text{ad}}$ , while  $r' < 0$  and  $\oplus_{\text{ad}} > 0$ .

This is the distance by which the intensity that propagates in the direction opposite to the movement of the charge, is shifted against the intensity of the stillstanding charge in the direction away from the charge, see Fig. 2.5.

Analogously to equations (2.5) - (2.10) we achieve the following:

$$E_{\text{mov}}^{\text{ad}}(r') = E_{\text{still}}(r' + \oplus_{\text{ad}}) \quad (2.14)$$

$$E_{\text{still}}(r' + \oplus_{\text{ad}}) = \text{const} \frac{1}{(r' + \oplus_{\text{ad}})^2} \quad (2.15)$$

$$E_{\text{still}}(r') = \text{const} \frac{1}{r'^2} \quad (2.16)$$

$$E_{\text{mov}}^{\text{ad}}(r') = \text{const} \frac{1}{(r' + \oplus_{\text{ad}})^2} \quad (2.17)$$

$$\frac{E_{\text{mov}}^{\text{ad}}(r')}{E_{\text{still}}(r')} = \frac{r'^2}{(r' + \oplus_{\text{ad}})^2} = \left(1 + \frac{v}{c}\right)^2 \quad (2.18)$$

$$E_{\text{mov}}^{\text{ad}} = E_{\text{still}} \left(1 + \frac{v}{c}\right)^2 \quad (2.19)$$

The form of intensity for  $v=0.5c$  see Fig. 2.6.

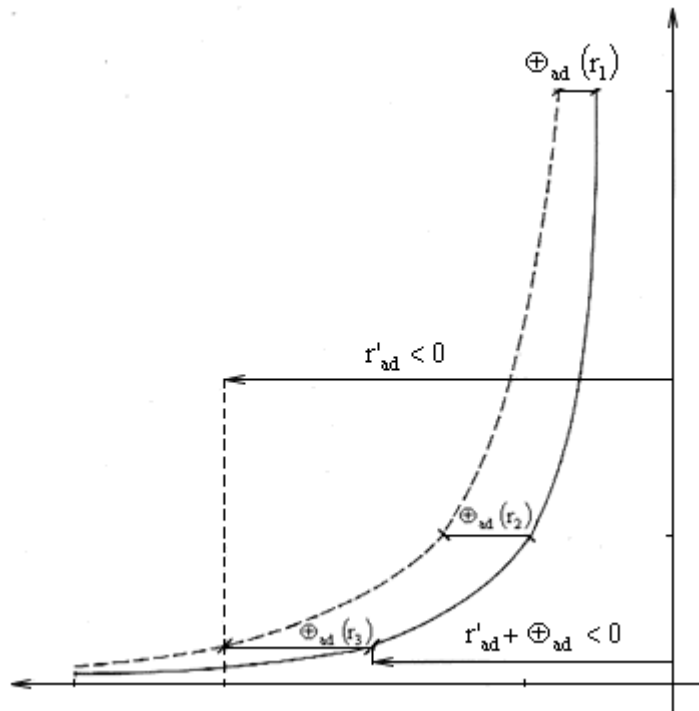


Fig. 2.5. The intensity of the electric field by means of the moving charge against the direction of motion  $E^{ad}$

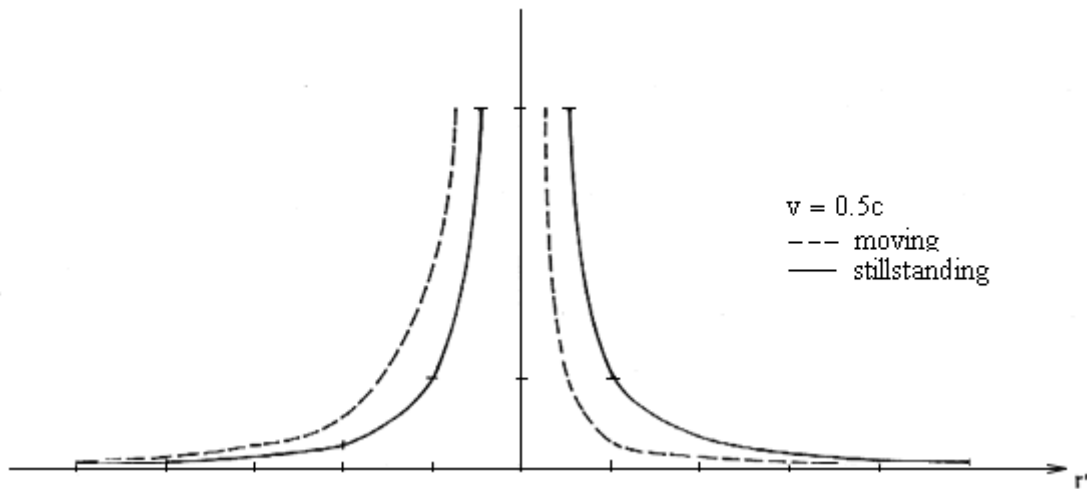


Fig. 2.6. The form of intensity for  $v = 0.5c$

The equations (2.10) and (2.19) are placeable by common equation

$$E_{\text{mov}} = E_{\text{still}} \left( 1 - \frac{v}{c} \cos \vartheta \right)^2 \quad (2.20)$$

where  $\vartheta$  is the angle between the direction of the charge motion (the speed  $v$ ) and the direction of propagation of intensity.

At level  $xy$ , the section of the intensity hyperboloid is, for the stillstanding charge, the circle with its centre in the charge, for the moving charge it is the case of all types of Pascal's screw s2.10. tocks with the charge at the beginning of the coordinates, see Fig. 2.7, Fig. 2.8, Fig.2.9, and Fig. 2.10.

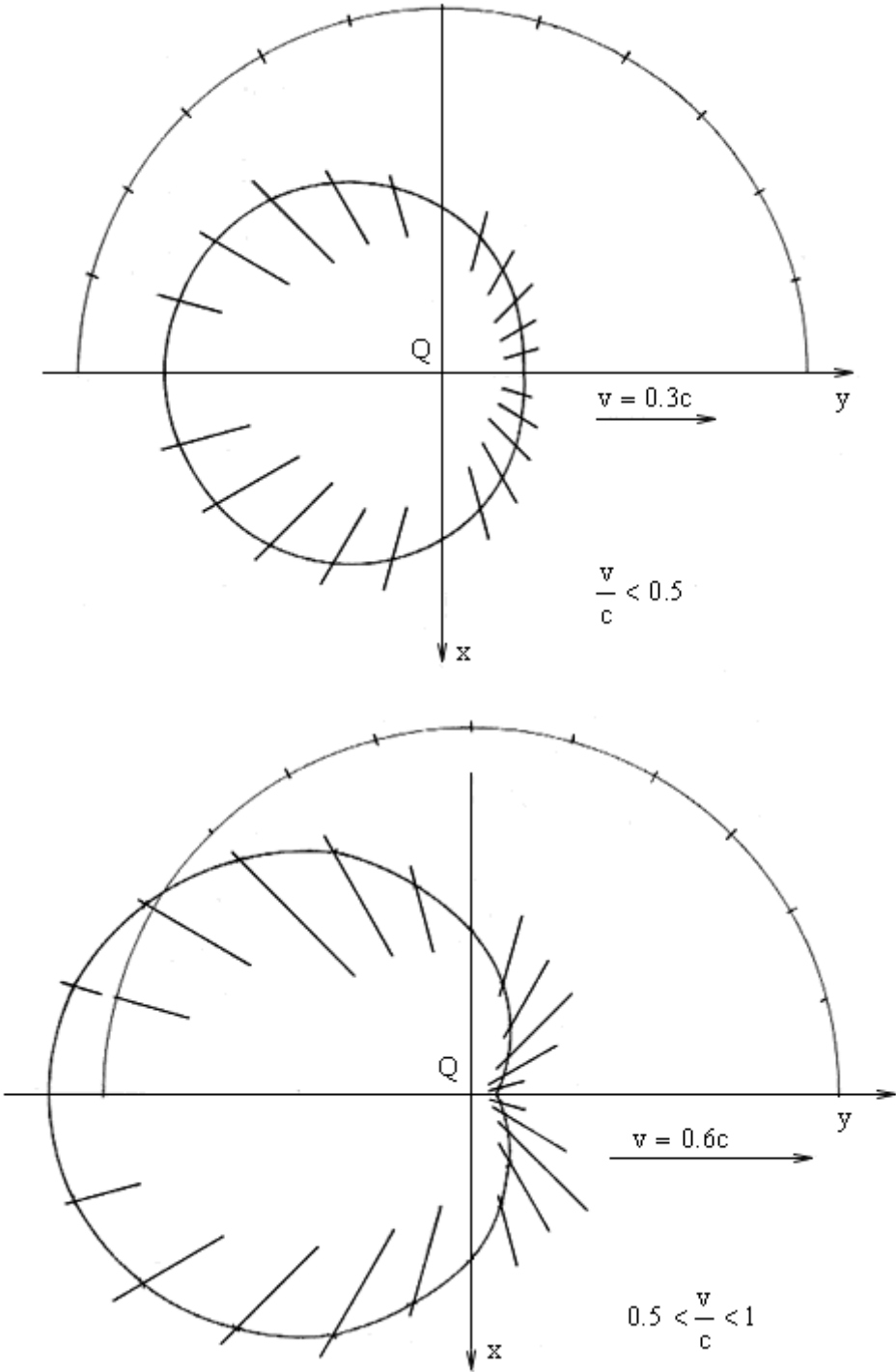


Fig. 2.7, 2.8. At level  $(x, y)$  section of the "hyperloid" of the intensity for various speeds of the moving charge have a shape of all types of Pascal's screw stocks with charge at the beginning of the coordinates

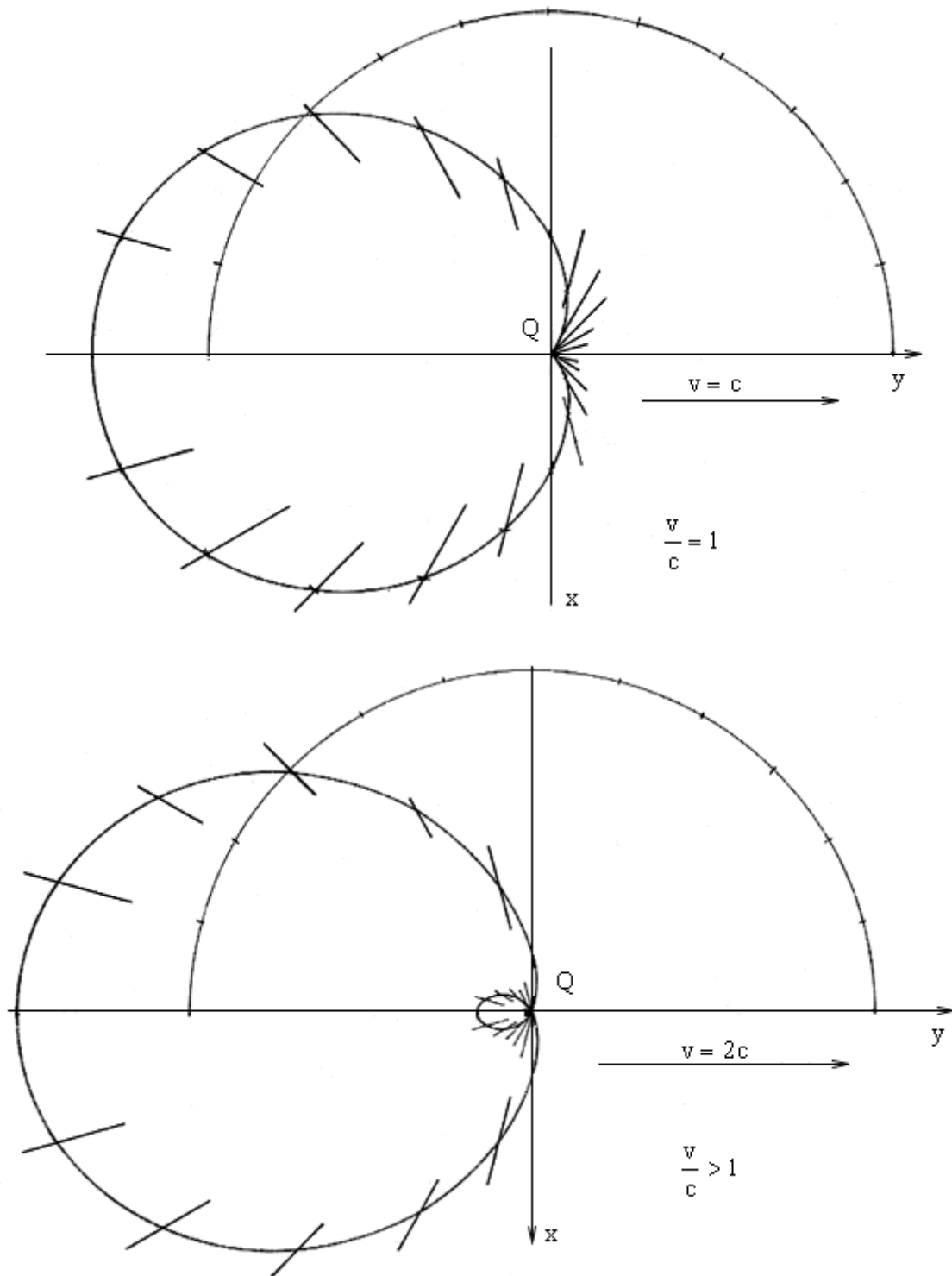


Fig. 2.9, 2.10. At level  $(x, y)$  section of the "hyperboloid" of the intensity for various speeds of the moving charge have a shape of all types of Pascal's screw stocks with charge at the beginning of the coordinates

### 2.1.2 Kaufmann's Experiment

In the period from 1901 to 1906, Kaufmann wrote a number of works, the most coherent of them seems to be concerning experimental evidence of "the changeability of mass with speed". We shall revalue his experiment and will prove - on the basis of the theory given in the preceding section 2.1.2 - the subject is the influence of intensity of the moving charge on the magnitude of the deviation of influence of intensity of the moving charge on the magnitude of the deviation of beta-rays in the crossed electromagnetic field, and not the changeability of mass with speed.

The attempt is done through a short correct description for sake of qualitative examination of the experiment, utilising some of the measured and calculated values given by Kaufmann in [8]

Beta-rays from Ra source, moving at speed  $v \in < 0.48c; 0.99c >$  are simultaneously deflected in the crossed electric and magnetic field, see diagram in Fig. 2.11.

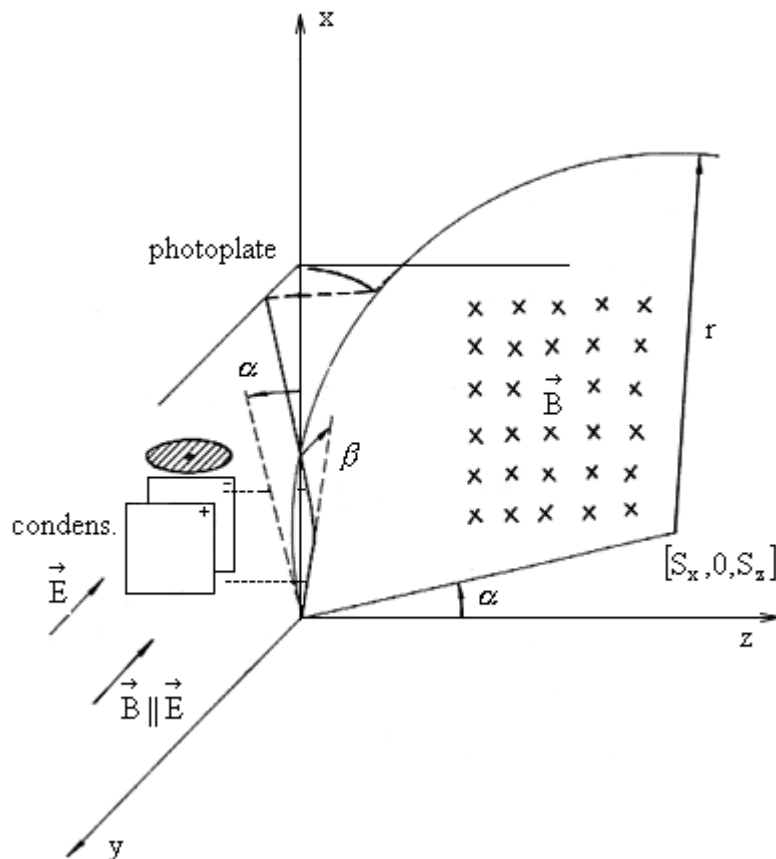


Fig. 2.11. Kaufmann's Experiment - diagram

The device is situated in the evacuated glass vessel. The rays go out from the Ra source, pass the electric screen and create a small spot on a photographic plate.

When the electric field will be created on the condenser plates PP', the additional stripe in the y-direction will arise apart from the non-diverting middle spot close to 0 (consisting of gamma and little diverting  $\alpha$ -rays).

When the entire device is situated between the poles of the U-shaped magnet (with the electric field switched off), the stripe will arise in the direction of the axis z.

While at the magnetic field we have the movement of electrons along circles expressed in the following equations

$$(x - S_x)^2 + (z - S_z)^2 = r^2 \quad (2.21^*)$$

$$S_x = 1.0979 \text{ cm}$$

$$S_{z1} = 65.0608 \text{ cm}$$

$$S_{z2} = 5.8505 \text{ cm}$$

$$r_1 = 65.0684 \text{ cm}$$

were  $r_2 = 5.9348 \text{ cm}$

in the electric field we first have the movement along straight line

$$y = -xtg\beta \quad (2.22^*)$$

- electrons are emitted from the source under the angles  $\beta \in <1^{\circ}35', 5^{\circ}>$  then they move between the condenser plates along the parabola

$$y = (x - 0.246)^2 \frac{e}{m} \frac{E}{2v_0^2 \cos^2 \beta} - xtg\beta \quad (2.23^*)$$

then again along the straight line

$$y = 1.969 \cdot \frac{0.246}{0.270} tg\beta \quad (2.24^*)$$

The points of intersection of straight lines (2.24\*) with the level of the photographic spot  $x = x'^2 = 3.969$  will give us the deviation  $y$ .

The values  $E$  used in the calculations

$$E = 205.5 \cdot 10^{10} \quad 328 \cdot 10^{10} \quad 409.5 \cdot 10^{10} \quad (\text{for } v = 0.48c) \quad (2.25^*)$$

would give, after substituted into (2.23\*) and (2.24\*) the deviations

$$y = 0.2363 \quad 0.3873 \quad 0.4985 \quad \text{which are almost four times bigger as those acquired } (y_0) \text{ by Kaufmann.}$$

Considering our theory on  $\frac{E_{\text{mov}}^{\text{id,ad}}}{c}$  and the values (2.25\*) be multiplied by  $\left(1 - \frac{v}{c}\right)^2$  we achieve deviations identical with the results of Kaufmann's experiment, see table 1. Thus the theory under 2.1. concerning the intensity of the moving charge of the electric field may be regarded experimentally confirmed.



**Table 1.**

	1631 V	2603 V	3250 V
$y_b[\text{cm}]$	0.1236 0.1119	0.1493 0.1302	0.1664 0.1616
$\beta$	2°	3°11'	4°30'
$y[\text{cm}]$	0.23626	0.3873	0.4985
$y_T[\text{cm}]$	0.0629	0.09947	0.12557
$y_T$ -theoretical value (our new theory): $y_T \sim y_b$			

[8] KAUFMANN, W.: Annalen der Physik, Vierte Folge, Band 19, Leipzig 1906, Verlag von Johann Ambrosius Barth, page 487-552

Kinetic energy of electron (proton)  $T_{kin id} = mc^2 [\ln |1-v/c| + (v/c) / (1-v/c)]$  in direction of motion of electron (proton), where  $v$  is velocity of electron (proton) and  $m$  is mass of electron (proton)<sup>[2]</sup>. It's own kinetic energy of the electron (proton).

Kinetic energy of electron (proton)  $T_{kin ad} = mc^2 [\ln |1+v/c| - (v/c) / (1+v/c)]$  against direction of motion of electron (proton), where  $v$  is velocity of electron (proton) and  $m$  is mass of electron (proton). Represents the wave energy, which creates electron (proton) in transmission medium.

Electron (proton) as a source exists if and only if repeatedly speeds up and slows down its movement in source along ellipse (when blinks).

Electron (proton) as a source, creates in the transmission medium, electromagnetic wave, that spreads in all directions with the velocity  $c/n$ , regardless of the source movement, where  $n$  is the refractive index of the transmission medium. In other words, electron (proton), which is the source, can not be a transmission medium and remain in it.

The main characteristic of the waves is the energy transfer through a transmission medium.

And no transfer of the substance (= of real electron, proton) from the source to the transmission medium.

Wave exists if and only if there is not a source.

In the case of electromagnetic waves, see

**2.1.3 The electromagnetic field. Maswell's equations, p. 28<sup>[2]</sup>** electric field intensity  $E$  and the magnetic induction  $B$  are both associated with the intensity of a moving charge

$$E_{\text{mov}} = E_{\text{still}} \left( 1 - \frac{v}{c} \cos \vartheta \right)^2 = E_{\text{still}} + B \quad \text{where} \quad B = \frac{E_{\text{still}}}{c} \left( 2 + \frac{v}{c} \sin \phi \right)$$

The force acting on the moving electric charge is

$$\begin{aligned}
F &= QE_{\text{mov}} = QE_{\text{still}} \left(1 - \frac{v}{c} \cos \vartheta\right)^2 = QE_{\text{still}} \left(1 + \frac{v}{c} \sin \phi\right)^2 = \\
&= QE_{\text{still}} + QE_{\text{still}} \left(2 + \frac{v}{c} \sin \phi\right) \frac{v}{c} \sin \phi
\end{aligned}$$

whereby  $-\cos \beta = \sin \phi$

$$F = F_{e1} + F_m = QE + Q(v \times B)$$

What is the relationship Lorentz derived from the asymmetrical form of the intensity of the moving charge. To derive it we do not need Lorentz's transformations equations, that is we do not need SPACE-TIME.

We do not need local time, or covariant equations or physical simultaneity definition or invariant interval. In other words, in physics we do not need Einstein's theory of relativity.

From the asymmetrical form of the intensity of the moving charge we can derive Gauss law, Faraday's law and derive the 4th Maxwell's equation, by a Maxwell thinks up and not derived !

**The electromagnetic field. Maswell's equations.** (Cited from [2] pages 27 – 30):

„Let us take the equation (2.20) in the vector form:

$$E_{\text{mov}} = E_{\text{still}} \left(1 - \frac{v}{c} \cos \vartheta\right)^2 \quad (2.21)$$

The force acting on the moving electric charge is

$$\begin{aligned}
F &= QE_{\text{mov}} = QE_{\text{still}} \left(1 - \frac{v}{c} \cos \vartheta\right)^2 = QE_{\text{still}} \left(1 + \frac{v}{c} \sin \phi\right)^2 = \\
&= QE_{\text{still}} + QE_{\text{still}} \left(2 + \frac{v}{c} \sin \phi\right) \frac{v}{c} \sin \phi
\end{aligned} \quad (2.22)$$

whereby  $-\cos \beta = \sin \phi$

It is known, in line with the classical theory, that a magnetic field is created by the moving charges and electric currents. The result is that the moving charge creates its own magnetic field of induction  $B_q$ . It continues in this field in motion. According to Lorentz, the force acting on the moving charge in the electromagnetic field at speed  $v$  in the magnetic field of induction  $B$  and in the electric field of the following intensity  $E$  it is valid:

$$F = F_{e1} + F_m = QE + Q(v \times B) \quad (2.23)$$

Let us compare the equations (2.22) and (2.23) .

Intensity  $E$  of the electric field according to Lorentz equals to our intensity  $E_{\text{still}}$ .

As the forces acting on the acting on the moving charge are equal, it must be valid

$$\mathbf{E}_{\text{still}} \left( 2 + \frac{v}{c} \sin \phi \right) \frac{v}{c} \sin \phi = \mathbf{v} \times \mathbf{B} \quad (2.24)$$

With regard to the fact that both the direction  $\mathbf{E}_{\text{still}}$  and the direction of the vector  $\mathbf{v} \times \mathbf{B}$  are identical, for the absolute values it is possible to write

$$E_{\text{still}} \left( 2 + \frac{v}{c} \sin \phi \right) \frac{v}{c} \sin \phi = v \cdot B \cdot \sin \phi$$

i.e.

$$B = \frac{E_{\text{still}}}{c} \left( 2 + \frac{v}{c} \sin \phi \right) \quad (2.25)$$

This means that the charge moving at speed  $v$  creates around itself its own magnetic field of the

$$B = \frac{E_{\text{still}}}{c} \left( 2 + \frac{v}{c} \sin \phi \right)$$

following induction:

while the vectorial equation is in force

$$\mathbf{v} \times \mathbf{B} = \mathbf{E}_{\text{mov}} - \mathbf{E}_{\text{still}} \quad (2.26)$$

Where from

$$\mathbf{E}_{\text{mov}} = \mathbf{E}_{\text{still}} + \mathbf{v} \times \mathbf{B} \quad (2.27)$$

The intensity of moving charge comprises in itself also the magnetic field induction  $\mathbf{B}$  created by the charge moving at speed  $v$ .

Based on (2.27) Maxwell's equations which are always valid (not only in static) acquires form:

1.

$$\nabla \cdot \mathbf{E}_{\text{mov}} = \nabla \cdot (\mathbf{E}_{\text{still}} + \mathbf{v} \times \mathbf{B}) = \nabla \cdot \mathbf{E}_{\text{still}} + \nabla \cdot (\mathbf{v} \times \mathbf{B}) = \frac{\rho}{\epsilon_0} \quad (\dots \text{Gauss law}) \quad (2.28)$$

$$\text{because} \quad \nabla \cdot (\mathbf{v} \times \mathbf{B}) = 0 \quad (2.29)$$

$$2. \quad \nabla \cdot \mathbf{B} = 0 \quad \dots\dots \text{there are no magnetic charges} \quad (2.30)$$

$$3. \quad \nabla \times \mathbf{E}_{\text{mov}} = \nabla \times [\mathbf{E}_{\text{still}} + (\mathbf{v} \times \mathbf{B})] = \nabla \times \mathbf{E}_{\text{still}} + \nabla \times (\mathbf{v} \times \mathbf{B})$$

$$\text{becose in the statics} \quad \nabla \times \mathbf{E}_{\text{still}} = 0$$

$$\text{further} \quad \nabla \times (\mathbf{v} \times \mathbf{B}) = \mathbf{v}(\nabla \cdot \mathbf{B}) - \mathbf{B}(\nabla \cdot \mathbf{v})$$

We use (2.29) and except of constant it is valid

$$\nabla \cdot \mathbf{v} = \frac{\partial}{\partial t} \quad (2.31)$$

Then

$$\nabla \times \mathbf{E}_{\text{mov}} = -\frac{\partial \mathbf{B}}{\partial t} \quad (\dots \text{Faraday's law}) \quad (2.32)$$

4. Amper's law in statics

$$c^2 \nabla \times \mathbf{B}_{\text{stat}} = \frac{\mathbf{j}}{\epsilon_0} \quad (2.33)$$

$$\mathbf{B}_{\text{dyn}} = \mathbf{B}_{\text{stat}} + (\mathbf{B}_{\text{dyn}} - \mathbf{B}_{\text{stat}}) = \mathbf{B}_{\text{stat}} + \mathbf{B}_Q$$

Total magnetic field

$$\mathbf{B}_{\text{dyn}} = \mathbf{B}_{\text{stat}} + \mathbf{B}_Q \quad (2.34)$$

where

$$\mathbf{B}_Q = \mathbf{B}_{\text{dyn}} - \mathbf{B}_{\text{stat}} \quad (2.35)$$

Let's calculate  $c^2 \nabla \times \mathbf{B}_{\text{dyn}} = c^2 \nabla \times \mathbf{B}_{\text{stat}} + c^2 \nabla \times \mathbf{B}_Q$

For own magnetic field  $B_Q$  of the charge moving at speed  $v$  it is possible to write:

$$c^2 \mathbf{B}_Q = (\mathbf{v} \times \mathbf{B}_Q) \times \mathbf{v} \quad (2.36)$$

$$\nabla \times [(\mathbf{v} \times \mathbf{B}_Q) \times \mathbf{v}] = (\mathbf{v} \times \mathbf{B}_Q)(\nabla \cdot \mathbf{v}) - \mathbf{v}[\nabla(\mathbf{v} \times \mathbf{B}_Q)] =$$

$$= \frac{\partial(\mathbf{v} \times \mathbf{B}_Q)}{\partial t} = \frac{\partial(\mathbf{E}_{\text{mov}} - \mathbf{E}_{\text{still}})}{\partial t} = \frac{\partial \mathbf{E}_{\text{mov}}}{\partial t}$$

because  $\nabla(\mathbf{v} \times \mathbf{B}) = 0$  ,  $\nabla \cdot \mathbf{v} = \frac{\partial}{\partial t}$  ,  $\mathbf{E}_{\text{mov}} = \mathbf{E}_{\text{still}} + \mathbf{v} \times \mathbf{B}$

and because  $\frac{\partial \mathbf{E}_{\text{still}}}{\partial t} = 0$  (2.37)

i.e.  $c^2 \nabla \times \mathbf{B}_{\text{dyn}} = \frac{\mathbf{j}}{\epsilon_0} + \frac{\partial \mathbf{E}_{\text{mov}}}{\partial t}$  (2.38)

what represents the 4th Maxwell's equation“.

**Consequence :** Form of Intensity of the Moving Charge Electric Field is asymmetrical.

## 2.2 The non-linear form of the interference field

Until recently it has been assumed that the shape of the interference field is "linear". The corresponding fraction of the shift of the interference fringes is directly proportional to the corresponding part of the wave length. If, for example, the distance of two interference fringes is divided into 100 divisions and the shift of 23 divisions is detected, we thus assume that the change

occured over a length of  $\frac{23}{100} \cdot \frac{\lambda}{2}$ .

In other words, the shift of the fringes is considered to be equivalent to the change of length. This view corresponds to the linear form of the interference field, see Fig. 2.12.

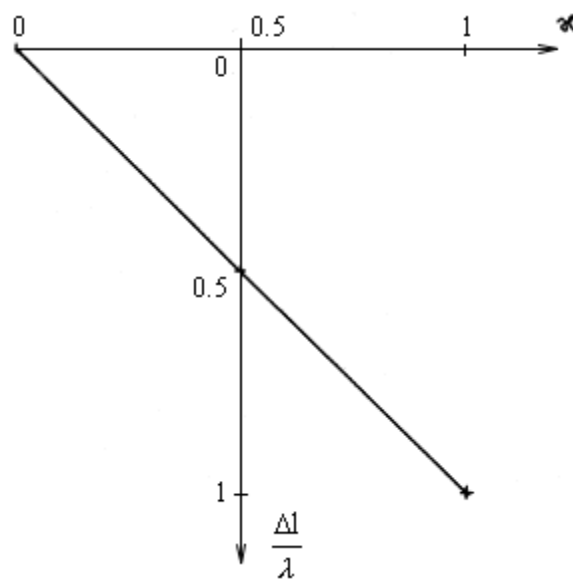


Fig. 2.12. The "linear" form of the interference field

What justifies our assumption that the interference field is linear? Is the assumption correct?

In physics we are used to picture the experimental results through curves which are not "saw-tooth" as is the case with the linear interference field, but which have a nicely rounded shape. Let us replace the "saw-tooth" linear interference field by some rounded non-linear interference field.

Let us choose sinusoids or semi-circles instead of the sawtooth abscissas. In case of semi-circles according to Fig. 2.13 we get:

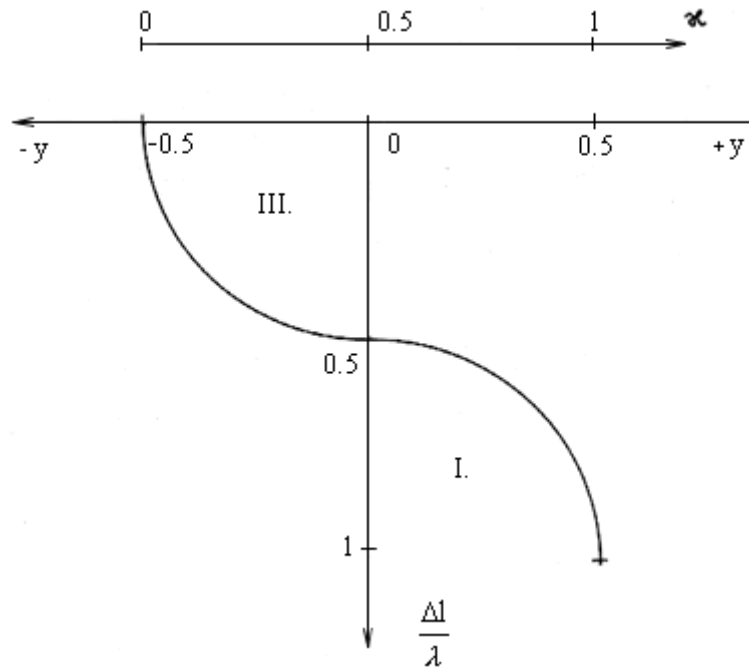


Fig. 2.13. The non-linear form of the interference field

in the 3rd quadrant:  $y^2 + \left(\frac{\Delta l}{\lambda}\right)^2 = 0.5^2$ , as

$$\kappa - 0.5 = y \quad \kappa^2 - \kappa + 0.5^2 + \left(\frac{\Delta l}{\lambda}\right)^2 = 0.5^2$$

$$\kappa_{12} = 0.5 \pm \sqrt{0.25 - \left(\frac{\Delta l}{\lambda}\right)^2} \quad (2.46)$$

In the shifted 1st quadrant

$$(\kappa - 0.5)^2 + \left(\frac{\Delta l}{\lambda} + 1\right)^2 = 0.5^2$$

$$\kappa_{12} = 0.5 \pm \sqrt{0.25 - \left(\frac{\Delta l}{\lambda} + 1\right)^2} \quad (2.47)$$

### 2.2.1. Fizeau's Experiment

Let us revalue the results of the Fizeau's experiment from the aspect of non-linear interference field. Fizeau [6] used light of wave length  $\lambda = 0.526 \mu\text{m}$ , two tubes, each  $L=1.4875$  m long in which water flowed at speed  $u=7.059$  m/s. As the experiment is generally known, we shall not describe it in detail. We shall only reassess its results.

$$\frac{\Delta l}{\lambda} = 0.4103$$

The relation  $\frac{\Delta l}{\lambda}$  corresponds to equal values of the shift of fringe  $\kappa$  supposing the interference field to be linear. In reality the experimentally observed values from the interval ranged from 0.167 to 0.307 in the average of  $\bar{\kappa} = 0.23016$ . That was explained by Fresnel's theory of partial drag of ether with the drag coefficient  $\alpha$ . Should we consider the non-linear form of the interference field, then according to (2.46) we get

$$\kappa = 0.5 \pm \sqrt{(0.25 - 0.41^2)} = 0.22$$

which is in line with the experimentally observed mean value  $\bar{\kappa}$ . We do not need any coefficient  $\alpha$ . Fizeau's experiment confirms also that the interference field has a non-linear form.

### 2.2.2. Harres's Experiment

Harres [7] used two wavelengths of light

$$\lambda_{625} = 0.625 \mu\text{m} \quad \lambda_{535} = 0.535 \mu\text{m}$$

which were passing through ten firmly fastened prisms in a rotating apparatus at speed 400-600 revolutions/min. According to [7], if the drag coefficient  $\kappa = \alpha$  is not included

$$\frac{\Delta l}{\lambda} = \frac{200 n^2 \pi}{z_m \lambda c} 0.20409 + \frac{200 \pi}{z_m \lambda c} 0.00188$$

were  $z_m = 0.99727z$ ,  $z$  - is the number of sideral time seconds required by the apparatus to make 50 revolutions.

After the arrangement

$$\frac{\Delta l}{\lambda_{625}} = \frac{1.70148214}{z} \tag{2.48}$$

$$\frac{\Delta l}{\lambda_{535}} = \frac{2.00028242}{z} \tag{2.49}$$

The average value  $\bar{z} = 5.11$  (tab. 1) after substitution in (2.48) gives

$$\frac{\Delta l}{\lambda_{625}} = 0.333$$

Substituting  $\frac{\Delta l}{\lambda}$  to (2.46) we get

$$\kappa = 0.5 - 0.3755 = 0.1245$$

According to the experiment  $\kappa_{\text{Harres}} = 0.132$  is again in line with the theory of the non-linear interference field. The comparison of Harres's experimental values that do not include the drag coefficient  $\alpha$  with both linear and non-linear form of the interference field, as well as the results of Fizeau's experiment, are shown in Fig. 2.14.-2.21.

Fig. 2.14.-2.21. The comparison of Harre's experimental values which do not comprise the drag coefficient with both linear and non-linear form of the interference field, as well as the results of Fizeau's experiment.

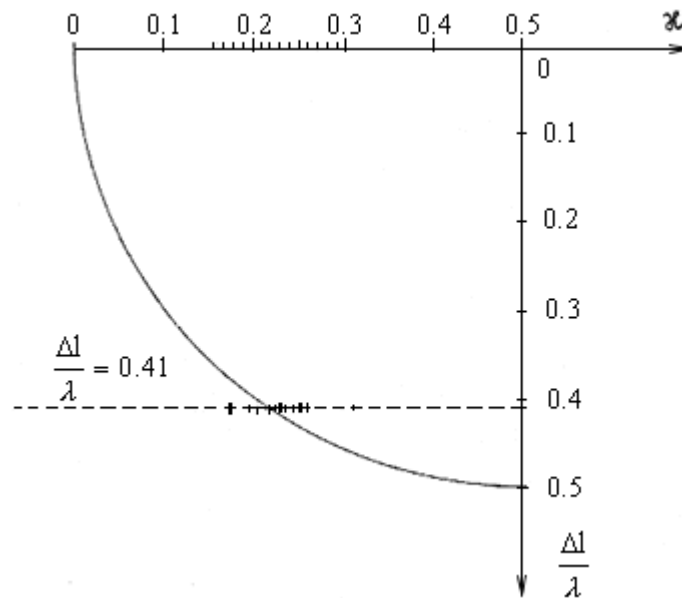


Fig. 2.14. Fizeau's experiment [6] p. 392



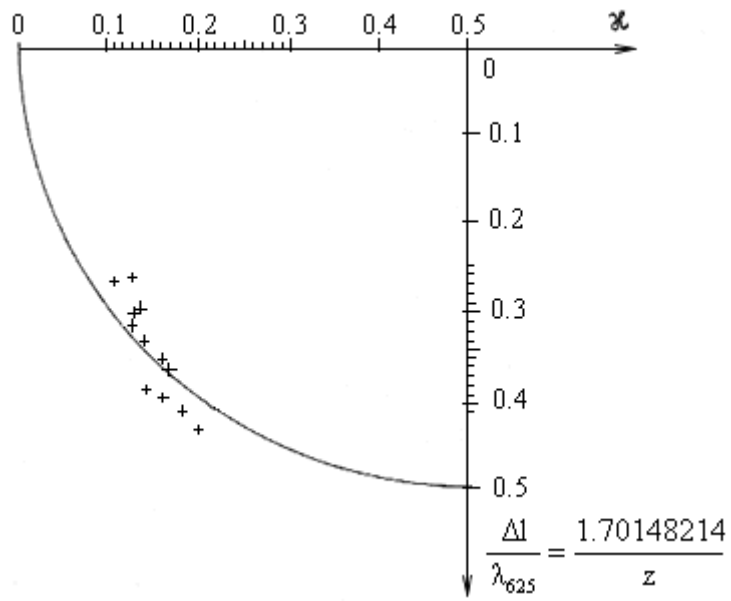


Fig. 2.15. [7] Tab. 1., 1. Reihe

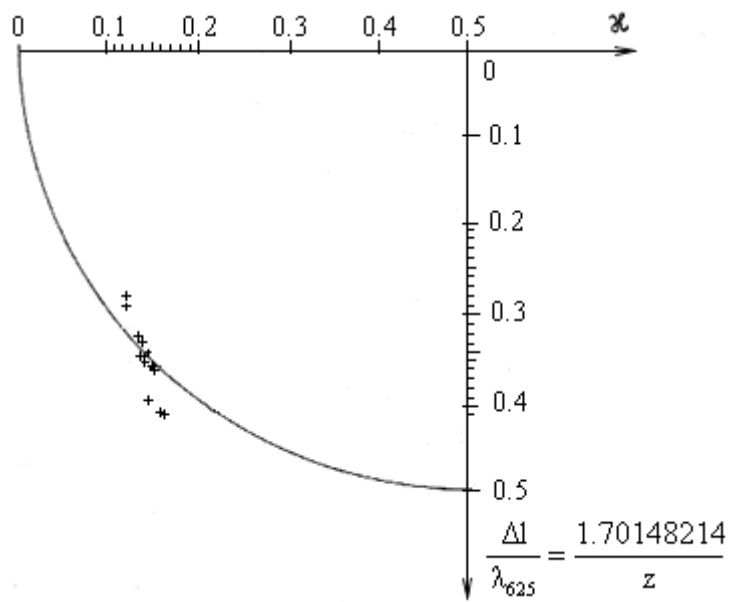


Fig. 2.16. [7] Tab. 1., 2. Reihe

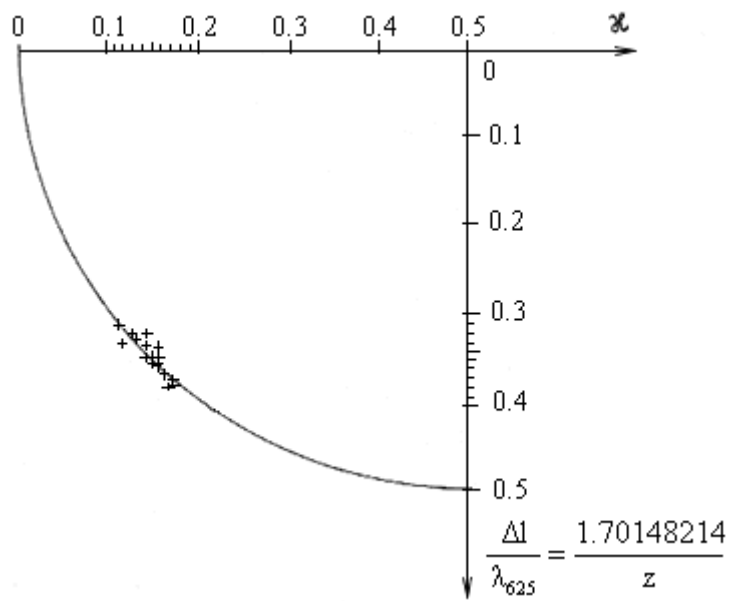


Fig. 2.17. [7] Tab. 1., 3. Reihe

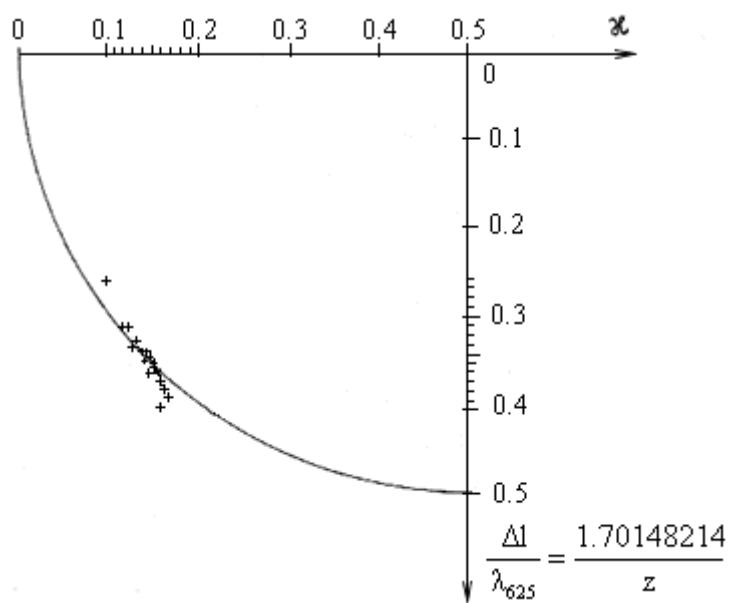


Fig. 2.18. [7] Tab. 1., 4. Reihe

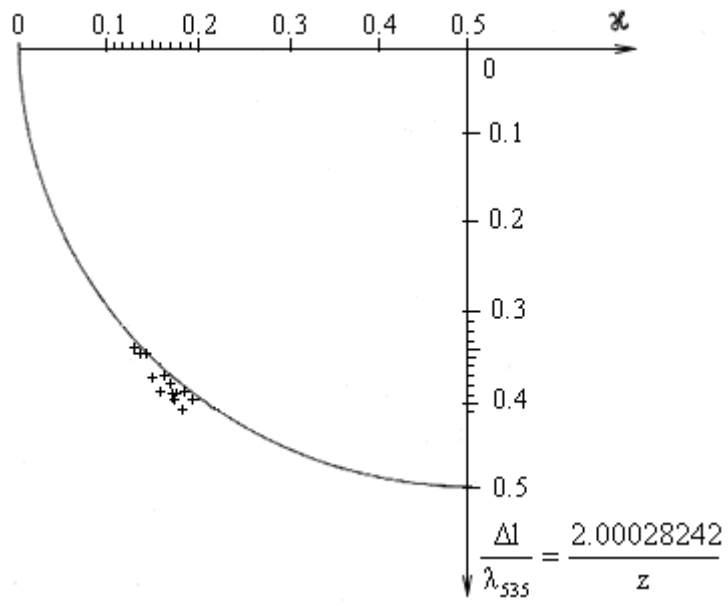


Fig. 2.19. [7] Tab. 2., 1. Reihe

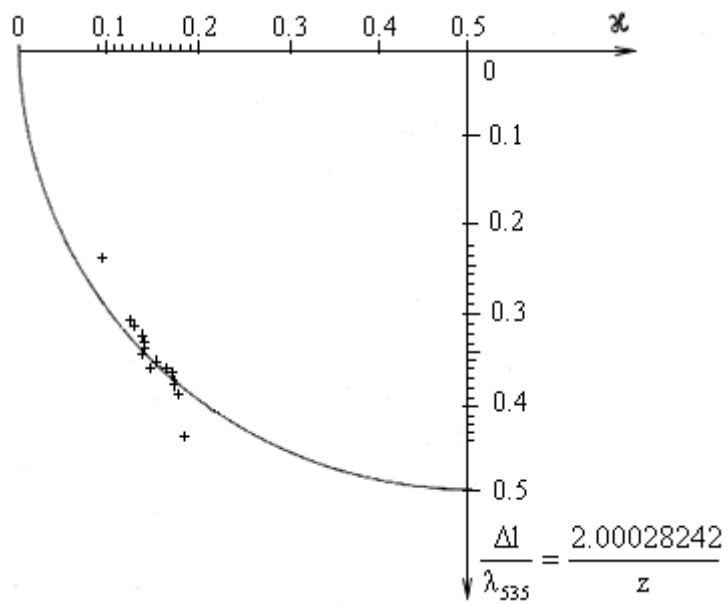


Fig. 2.20. [7] Tab. 2., 2. Reihe

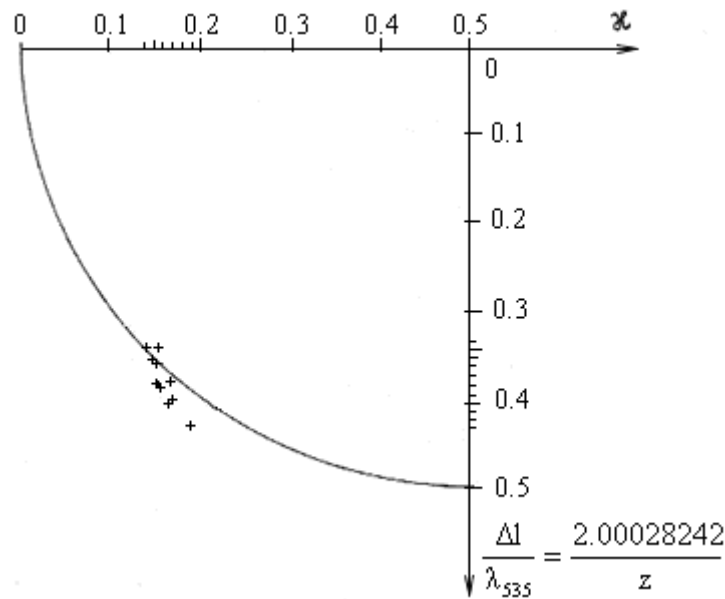


Fig. 2.21. [7] Tab. 2., 3. Reihe

This is simultaneously proves that the drag coefficient always equals one and the interference field has a non-linear form. Consequently, the interference fields are identical only for the shift of the interference fringes about 0 and/or 100 and 50 divisions.

**Consequence :** Form of the interference field is non-linear: (from [2] pages 34 – 39 ).

### 3. Calculation of the kinetic energy $T_{kin}$ of a body moving at the velocity of $v$

For the sake of simplicity let us consider for instance the gravitational field of the Earth. Analogically to (2.20) for the intensity of the gravitational field one could write:

$$g_{mov} = g_{still} \left( 1 - \frac{v}{c} \cos \vartheta \right)^2 \quad (3.1)$$

Let us consider the physical processes in which kinetic energy is transformed into potential one and potential energy is transformed into kinetic one. There is a state in which the potential energy equals total energy of the body (while the kinetic energy equals zero) and the state in which kinetic energy equals the total energy of the body (while the potential energy equals zero). These extreme will help us to calculate the kinetic energy of body. For the potential energy we have

$$dW_p = m g_{still} dh \quad (3.2)$$

By integrating and utilizing of the relation (3.1) we have

$$T_{kin} = \int dW_p = \int_0^h m g_{still} dh = \int_0^h m \frac{g_{mov}}{\left( 1 - \frac{v}{c} \cos \vartheta \right)^2} dh$$

By substituting  $g_{\text{mor}} = \frac{dv}{dt}$ ,  $\frac{dz}{dt} = v$

we get

$$T_{\text{kin}} = m \int_0^v \frac{v dv}{\left(1 - \frac{v}{c} \cos \vartheta\right)^2} \quad (3.3)$$

Solving by substitution  $1 - \frac{v}{c} \cos \vartheta = z$

we get

$$T_{\text{kin}} = \frac{mc^2}{\cos^2 \vartheta} \left[ \ln \left| 1 - \frac{v}{c} \cos \vartheta \right| + \frac{\frac{v}{c} \cos \vartheta}{1 - \frac{v}{c} \cos \vartheta} \right] \quad (3.4)$$

while  $\vartheta$  isn't  $\frac{\pi}{2}$ ,  $\frac{3\pi}{2}$

For  $\vartheta = 0^\circ$  we have the kinetic energy in the direction of motion

$$T_{\text{kin}_0} = mc^2 \left[ \ln \left| 1 - \frac{v}{c} \right| + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right] \quad (3.5)$$

For  $\vartheta = 180^\circ$  we have the kinetic energy against the direction of motion

$$T_{\text{kin}_{180}} = mc^2 \left[ \ln \left| 1 + \frac{v}{c} \right| - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right] \quad (3.6)$$

If  $0 < \frac{v}{c} = x \ll 1$  (i.e.  $v \ll c$ )

utilizing the series  $\ln(1 \pm x)$   
 $(1 \pm x)^{-1}$

the equations (3.5) and (3.6) will be changed in the equation  $T_{kin id} = T_{kin ad} = \frac{1}{2} m v^2$

complying with the Newton's mechanics. In Table 2 the values of the kinetic energy are  $T_{kin ad}$ ,  $T_{kin id}$

$$\frac{m_0 c^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

The total energy according to Einstein

**Table 2. Calculation of the kinetic energy  $T_{kin}$  of a body moving at the velocity of  $v$  according to Einstein and according to Vlcek**

$v/c$	Vlcek's theory - kinetic energy against direction of motion as wave $T_{kin ad} = mc^2[\ln  1+v/c  - (v/c)/(1+v/c)]$	Vlcek's theory - kinetic energy in direction of motion as particle $T_{kin id} = mc^2[\ln  1-v/c  + (v/c)/(1-v/c)]$	Vlcek's theory $m = m_0 = const$ $(T_{kad} + T_{kid})/2$	Einstein's theory $T_{kin} = mc^2 - m_0 c^2$
0.1	0.00439 $mc^2$	0.0057 $mc^2$	0.0050 $m c^2$	0.0050 $m c^2$
0.2	0.0156 $mc^2$	0.0268 $mc^2$	0.0212 $m c^2$	0.0200 $m c^2$
0.3	0.0316 $mc^2$	0.0719 $mc^2$	0.0517 $m c^2$	0.0480 $m c^2$
0.4	0.0508 $mc^2$	0.1558 $mc^2$	0.1033 $m c^2$	0.0910 $m c^2$
0.5	0.0722 $mc^2$	0.3068 $mc^2$	0.1895 $m c^2$	0.1550 $m c^2$
0.6	0.0950 $mc^2$	0.5837 $mc^2$	0.3393 $m c^2$	0.2500 $m c^2$
0.7	0.1174 $mc^2$	1.1293 $mc^2$	0.6233 $m c^2$	0.4010 $m c^2$
0.8	0.1434 $mc^2$	2.3905 $mc^2$	1.2669 $m c^2$	0.6670 $m c^2$
0.9	0.1680 $mc^2$	6.6974 $mc^2$	3.4327 $m c^2$	1.2930 $m c^2$
0.99	0.1906 $mc^2$	94.3948 $mc^2$	47.294 $m c^2$	6.9200 $m c^2$
1.0	0.1931 $mc^2$	infinite	infinite	infinite

Direct measurement of the speed in the experiments Kirchner<sup>[3], [4]</sup>, Perry, Chaffee<sup>[5]</sup> For  $v/c = 0.08-0.27$  can not yet prove the validity of Vlcek's theory<sup>[2]</sup> or Einstein's theory<sup>[1]</sup>.

### Consequences

The main differences between Einstein's theory [1] and the latest knowledge [2] are:

1. Form of Intensity of the Moving Charge Electric Field is asymmetrical,
2. Form of the interference field is non-linear,
3. Kinetic energy of a charge moving at the velocity of  $v$  has two different values:

Kinetic energy of charge

$T_{kin id} = mc^2 [\ln |1-v/c| + (v/c) / (1-v/c)]$  in direction of motion of charge

where  $v$  is velocity of charge.

Kinetic energy of charge

$T_{kin} = mc^2 [\ln |1+v/c| - (v/c) / (1+v/c)]$  against direction of motion of charge

where  $v$  is velocity of charge.

These are the main differences between Einstein's theory and the latest knowledge.

For example:

Lambda hyperon 2286.46 MeV in direction of motion and pion  $\pi_0$  : 134.9766(6) MeV against direction of motion are in the proton at speed of proton  $v = 0.8022863362c$

hyperon  $\chi_c(2645)^+$  2646.6 MeV in direction of motion and pion  $\pi_0$  : 139.57018(35) MeV against direction of motion are in the proton at speed of proton  $v = 0.819183027c$

hyperon 6.165 GeV in direction of motion and meson  $K^-$  493.7 MeV against direction of motion are in the alpha particle at speed of alpha particle  $v = 0.7533c$

Electron in direction of motion, electron neutrino against direction of motion are in the electron at speed of electron :  
from  $v = 0.1c$  to  $v = 0.9c$

Muon in direction of motion, muon neutrino against direction of motion are in the electron at speed of electron :  $v = 0.995308032046c$

Tauon in direction of motion, tauon neutrino against direction of motion are in the electron at speed of electron :  $v = 0.99971316674c$

$W^{+,-}$  boson in direction of motion and neutrino against direction of motion are in the electron at speed of electron :  $v = 0.99999364465781184c$

Z boson in direction of motion and neutrino against direction of motion are in the electron at speed of electron :  $v = 0.999994396590953c$

See you please Decay modes in

K Nakamura et al (Particle Data Group) 2010 J. Phys. G: Nucl. Part. Phys. 37 075021

[http://www.trendsphysics.info/data/Great\\_table\\_of\\_elementary\\_particles.pdf](http://www.trendsphysics.info/data/Great_table_of_elementary_particles.pdf)

Shortened great table of elementary particles. <http://www.trendsphysics.info/>

Consider the experiments at CERN and particle decay mode see [9], [10] and [11].

**Table3. Kinetic energy** in direction of motion and **Kinetic energy** against direction of motion

v/c	Front of electron, proton, neutron, deuteron, He-3, α-particle	Behind of electron, proton, neutron, deuteron, He-3, α-particle	Decay modes
	$\left[ \ln \left  1 - \frac{v}{c} \right  + \frac{\frac{v}{c}}{1 - \frac{v}{c}} \right]$	$\left[ \ln \left  1 + \frac{v}{c} \right  - \frac{\frac{v}{c}}{1 + \frac{v}{c}} \right]$	
v/c	<b>Kinetic energy</b> in direction of motion as particle $T_{kin id} = mc^2 [\ln  1-v/c  + (v/c)/(1-v/c)]$	<b>Kinetic energy</b> against direction of motion as wave $T_{kin ad} = mc^2 [\ln  1+v/c  - (v/c)/(1+v/c)]$	Decay modes
<b>Electron</b> <b>0.0027171</b>  <i>It is v/c in the direction of motion (id)</i>	<b>3.704855771252357587814e-6</b> <b>1.8931773275045679448456131 eV</b>  <b>Lambda<sub>id</sub> (v/c=0,0027171) = hc/E<sub>k,id</sub> =</b> <b>=654.900051928391151 nm</b> <b>4.577682611525892171951e+14 Hz</b> <b>1.8931773275 eV</b>		
<b>Electron</b> <b>0.0027212</b> <i>It is v/c against the direction of motion (ad)</i>		<b>3.6890835634754294761e-6</b>  <b>1.885117746 eV</b>  <b>Lambda<sub>ad</sub> (v/c= 0.0027212)=hc/ E<sub>k,ad</sub> =</b> <b>= 657.69999384 nm</b>	
<b>Proton</b> <b>0.075</b>	<i>Down quark / p:</i> <b>0.0031195396</b> <i>Down quark: 2.92697 MeV</i>	<i>Up quark / p:</i> <b>0.0025532197</b> <i>Up quark: 2.4MeV</i>	
<b>Proton</b> <b>0.081622</b>	<i>Down quark / p:</i> <b>0.00373026153466</b> <i>Down quark: 3.5 MeV</i>	<i>Up quark / p:</i> <b>0.00299917404444</b> <i>Up quark: 2.814 MeV</i>	
<b>Proton</b> <b>0.08878</b>	<i>Down quark / p:</i> <b>0.004458901351</b> <i>Down quark: 4.18366 MeV</i>	<i>Up quark / p:</i> <b>0.0035171</b> <i>Up quark: 3.3 MeV</i>	
<b>Proton</b> <b>0.094686</b>	<i>Down quark / p:</i> <b>0.0051156918494</b> <i>Down quark: 4.8MeV</i>	<i>Up quark / p:</i> <b>0.003971527848360625619647345217</b> <i>Up quark: 3.72637 MeV</i>	
<b>Neutron</b> <b>0.5848408</b> <b>45620205</b>	<b>K<sub>0</sub>/n<sub>0</sub> : 0.5296214734</b> <b>K<sub>0</sub> 497.614 MeV</b>	<b>γ+γ/n<sub>0</sub>:</b> <b>0.09146217425</b> <b>85.934692341921 MeV</b> <b>f = 2.0778917e+22 Hz</b> <b>gamma rays γ + γ</b>	<b>π± + e<sup>-</sup> + νe</b> <b>or</b> <b>π± + μ<sup>-</sup> + νμ</b> <b>or</b> <b>π<sup>0</sup> + π<sup>0</sup> + π<sup>0</sup></b> <b>or</b> <b>π+ + π<sup>0</sup> + π-</b>
<b>Neutron</b> <b>0.5998353</b>	<b>η/n<sub>0</sub> : 0.58309194</b> <b>Eta meson η 547,853 MeV</b>	<b>γ /n<sub>0</sub> :</b> <b>0.0949650261957629</b> <b>89.22585075 MeV</b>	<b>γ + γ or</b> <b>π<sup>0</sup> + π<sup>0</sup> + π<sup>0</sup></b> <b>or</b> <b>π+ + π<sup>0</sup> + π-</b>



		f=2.1574715663e+22Hz...gamma rays $\gamma + \gamma$	
Neutron 0.6849950 294204886	$\eta'(958)/n_0$ : : 1,01938622 Eta prime meson $\eta'(958)$ 957.78 MeV	$\gamma + \gamma/n_0$ : 0.115236174677 108.27192004399 MeV f = 2.61800349e+22Hz gamma rays $\gamma + \gamma$	$\pi^+ + \pi^- + \eta$ or $(\rho^0 + \gamma) / (\pi^+ + \pi^- + \gamma)$ or $\pi^0 + \pi^0 + \eta$
Proton 0,713	c quark / p: 1.23604749426877325552441352943 c quark: 1160 MeV 1.16–1.34 GeV	s quark / p: 0.122017381046594648248703501967  s quark=114.485493763640 MeV	
Proton 0.72585	c quark / p: 1.35355827716301434378382094041 c quark: 1270 MeV 1.16–1.34 GeV	s quark / p: 0.125144314084389679454468504977 s quark: 117.41941 MeV	
Proton 0.73333	c quark / p: 1.42815727326988258696780184681 c quark: 1340 MeV 1.16–1.34 GeV	s quark / p: 0.126968600233165927497518619193  s quark= 119.1311MeV	
Alpha particle 0.7407951 089788	$\Lambda^0 b 5620, 2/\alpha$ : 1.507815448036779679 45  bottom Lambda $\Lambda^0 b$ 5620.2MeV	$/\alpha$ : 0.128792111445433901352418448281  480.0570425830862480785 MeV	See $\Lambda^0 b$ decay modes
Alpha particle  0.7533042 89775682	$\Omega^- b / \alpha$ : 1.653977124861525696970279 bottom Omega $\Omega^- b$ 6165 MeV	$K^+ / \alpha$ : 0.131853826242866291292162163867 491.469214760347149777 MeV/c <sup>2</sup> 2.20778523965285 MeV/c <sup>2</sup> less than $K^+$ mezón 493.677 MeV/c <sup>2</sup>	( $\Omega^- + J/\psi$ seen)
Alpha particle		$K^+ 493,677/\alpha$ : 0.132446141970785886546924052729	$\mu^+ + \nu_\mu$ or $\pi^+ + \pi^0$ or $\pi^0 + e^+ + \nu_e$
Alpha particle 0.76	1,73955031102652091827762535859	0.133495627231878595513070972611	
Neutron 0.8103668 245118	$\Sigma^+ c / n_0$ : 2.610675166291363936 2452.9 MeV/c <sup>2</sup>	( $\pi^0/n_0$ : 0.1436585501770159947294269 ) ( $\pi^+ /n_0$ : 0.1485475979299 ) 0.145903730876811430637395356989 137.08609408352 MeV/c <sup>2</sup> pion $\pi^0$	$\Lambda^+ c + \pi^0$
Proton 0.8105263 656822	$\Sigma^+ c / p^+$ : 2.614273770499822 2452.9 MeV	0.145943178944838051921943801563 136.934405138965 MeV pion $\pi^0$	$\Lambda^+ c + \pi^0$
Neutron 0.8210911 79644426	$\Omega^0 c / n_0$ : 2.868560360466584 Charmed $\Omega^0 c$ 2695.2 MeV	$\pi^+ / n_0$ : 0.1485571948556745469313451 139.57919697 MeV/c <sup>2</sup> pion $\pi^+, \pi^-$ $\pi^- = 139.57018 + - 0.00035$ MeV	See $\Omega^0 c$ decay modes

Proton 0.8212451 756	$\Omega_0 c / p^+$ : 2.87251443916512034719619 2,87251449930788853 2.695.2 $\pm$ 1.7 MeV 6.9 $\pm$ 1.2 $\times$ 10 <sup>-14</sup> s	Proton $v/c = 0.82188$ $\pi^+ / p^+$ : 0,1487523587588583023819511724 139.5701751 MeV 139.57 = $\pi^{-+}$	See $\Omega_0 c$ decay modes
Proton 0.9928305	Higgs Boson /p: 133.54335827671029218747501724 Higgs Boson 125300 MeV	0.191354813279005033975005068774 179.542872167240022072 MeV	
Proton 0.994637	Top quark /p: 180.2249215745799592957129 Top quark: 169 100MeV	/p: 0.19180643378644112290601 179.9666087792708 MeV	
Proton 0,994766	Top quark /p: 184.8078143171624183434454 Top quark: 173 400MeV	0.1918386835588782289730044404 179.996867838181577 MeV	
Electron 0.9953080 32046	Muon/e: 206.768282237446856567 Muon 105.658366838 MeV = = kinetic energy of elektron in direction of motion of electron	Muon neutrino /e: 0.1919741907309481 Muon neutrino 98.0986022063665 keV = kinetic energy of elektron against direction of motion of electron < 170 keV	
Electron 0.9964255 842514595 54502	$\pi^-/e^-$ : 273.13204749023558573115849192 139.5701835 MeV/c <sup>2</sup> $\pi$ minus $\pi^-$ 139.57 MeV	$\nu_\mu/e^-$ : 0.192253577576789948957123447070 72 98.2413720670523951317 keV/c <sup>2</sup> = kinetic energy of elektron against direction of motion of electron < 170 keV Muon neutrino $\nu_\mu$	$\mu^+ + \nu_\mu$
Electron 0.9997131 6674	Tauon/e: 3477.18894397593998486635332040  Tauon 1776.84 $\pm$ 0.17 MeV = kinetic energy of elektron in direction of motion of electron	neutrino /e: 0.193075472235437055495057927120 1 Muon neutrino 98.0988323306154745516 keV = kinetic energy of elektron against direction of motion of electron < 170 keV Tauon neutrino $\nu_\tau$ < 15.5 MeV	
Electron 0.9999936 446578118	W+ BOSON/e: 157334.973580134140866955192245 W+ BOSON = 80 398 $\pm$ 0,25 MeV	neutrino/e: 0.193145591724398274765062819532 8 Muon neutrino 98.6971868371602593582305116066 keV < 170 keV Tauon neutrino $\nu_\tau$ < 15.5 MeV	
Electron 0.9999943 96590953	BOSON Z/e: 178449.695724220005270274923361 BOSON Z = 91 187.6 MeV = 91. 1876 GeV	neutrino/e: 0.19314577970768356308259999253 Muon neutrino 98.69728289641413473723244731 keV < 170 keV Tauon neutrino $\nu_\tau$ < 15.5 MeV	

## Resume:

1. The principle of A. Einstein :  
All is building on experiments.

The theory is valid if and only if it can explain everything  
earlier known experiments and can predict something new in physics,  
which will be confirmed in the future.

2. The principles of the old classical physicists:

Metrology is paramount.

All equations must be dimensionally correctly, that is, to use the correct units for each physical quantity.

3. I must have correct nomenclature and correct terminology.

If I have wrong terms (e. g. ether), at first, I must define them (e. g. medium). Only then I can explain an experiment correctly. I can't explain an experiment correctly on the basis of wrong terms.

4. Form of the interference field is non-linear,  
**Fizeau's Experiment**- We do not need any drag coefficient .  
**Harres's Experiment**

5. Form of Intensity of the Moving Charge Electric Field is asymmetrical,  
The relationship Lorentz derived from the asymmetrical form of the intensity of the moving charge.  
To derive it we do not need Lorentz's transformations equations, **that is** we do not need **SPACE-TIME**.

We do not need local time, or covariant equations or physical simultaneity definition or invariant interval. In other words, in physics we do not need Einstein's theory of relativity.

From the asymmetrical form of the intensity of the moving charge we can derive Gauss law, **Faraday's law and derive the 4th Maxwell's equation, by a Maxwell thinks up and** not derived !

6. . Kinetic energy of a charge moving at the velocity of v has two different values:

**Kinetic energy** against direction of motion **as wave**

$$T_{\text{kin ad}} = mc^2[\ln |1+v/c| - (v/c)/(1+v/c)]$$

**Kinetic energy** in direction of motion **as particle**

$$T_{\text{kin id}} = mc^2[\ln |1-v/c| + (v/c)/(1-v/c)]$$

7. Wave - Particle Duality as Kinetic Energy Against and In Direction of Motion.  
For example:

Lambda hyperon 2286.46 MeV in direction of motion and pion  $\pi_0$  : 134.9766(6) MeV against direction of motion are in the proton at speed of proton  $v = 0.8022863362c$

hyperon Chi c (2645)+ 2646.6MeV in direction of motion and pion  $\pi_0$  : 139.57018(35) MeV against direction of motion are in the proton at speed of proton  $v = 0.819183027c$

hyperon  $\Lambda_c$  6,165 GeV in direction of motion and meson  $K^-$  493.7 MeV against direction of motion are in the alpha particle at speed of alpha particle  $v = 0.7533c$

Electron in direction of motion, electron neutrino against direction of motion are in the electron at speed of electron :  
from  $v = 0.1c$  to  $v = 0.9c$

Muon in direction of motion, muon neutrino against direction of motion are in the electron at speed of electron :  $v = 0.995308032046c$

Tauon in direction of motion, tauon neutrino against direction of motion are in the electron at speed of electron :  $v = 0.99971316674c$

$W^{+,-}$  boson in direction of motion and neutrino against direction of motion are in the electron at speed of electron :  $v = 0.99999364465781184c$

Z boson in direction of motion and neutrino against direction of motion are in the electron at speed of electron :  $v = 0.999994396590953c$   
See you please Decay modes in

K Nakamura et al (Particle Data Group) 2010 J. Phys. G: Nucl. Part. Phys. 37 075021

[http://www.trendsinphysics.info/data/Great\\_table\\_of\\_elementary\\_particles.pdf](http://www.trendsinphysics.info/data/Great_table_of_elementary_particles.pdf)

Shortened great table of elementary particles. <http://www.trendsinphysics.info/>

Consider the experiments at CERN and particle decay modes see [9] , [ 10] and [11].

[9] Great table of elementary particles. <http://www.trendsinphysics.info/>

[10] K Nakamura et al (Particle Data Group) 2010 J. Phys. G: Nucl. Part. Phys. 37 075021

[11] Particles, waves and trends in physics <http://www.trendsinphysics.info/>

8. Physicist must to have a healthy arrogance, do not be afraid criticize of the great physicists, if he is adamantly confident on the basis of experiments metrologically and mathematically about their truth.

Not afraid to speak out about errors in the theory and about their consequences.

9. Physicist should have a flight and is constantly looking partners, who can discuss with him, who can jointly develop and explore.

So synergistically increases the understanding of our universe and thus increasing the sophistication of our civilization.

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