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Unified Absolute Relativity Theory N3

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Electric and magnetic fields in a wave

For energy conservation, the electric and magnetic fields in a wave must have a phase shift of 90º, not at phase as in Maxwell equations. So, Maxwell equations are wrong.

Electric and magnetic fields:

$$E = E_0 \sin(kx - wt) \;; \qquad B = B_0 \cos(kx - wt) \;; \qquad E_0 / B_0 = c$$

Energy density:

$$\rho_E = \frac{\varepsilon_0 E^2}{2} \;; \qquad \rho_B = \frac{B^2}{2\mu_0}$$

$$\rho_E = \frac{1}{2}\varepsilon_0 E_0^2 \sin^2(kx - wt) \;; \qquad \rho_B = \frac{1}{2\mu_0} B_0^2 \cos^2(kx - wt)$$

$$\frac{1}{2}\varepsilon_0 E_0^2 \sin^2(kx - wt) + \frac{1}{2\mu_0} B_0^2 \cos^2(kx - wt) = K \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad \frac{E_0^2}{B_0^2}\sin^2(kx - wt) + \frac{1}{\varepsilon_0\mu_0}\cos^2(kx - wt) = \frac{2K}{\varepsilon_0 B_0^2}$$

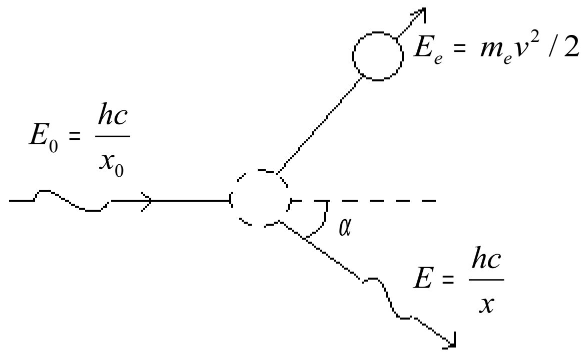
$$\frac{E_0^2}{B_0^2} = \frac{1}{\varepsilon_0\mu_0} = c^2 \qquad \Leftrightarrow \qquad c^2 = \frac{2K}{\varepsilon_0 B_0^2}$$

$$K = \frac{\varepsilon_0 E_0^2}{2} = \frac{B_0^2}{2\mu_0} \;; \qquad \frac{E_0}{B_0} = c$$

If the fields are in phase, where goes the energy when both fields are equal to zero?

Exact Compton Scattering

The official derivation of the formula of the Compton scattering is wrong. Also the usual empiric formula is wrong.



Empirical formula:

$$x = x_0 + x_e(1 - \cos\alpha) \ ; \quad x_e \text{ -- Electron Compton wavelength}$$

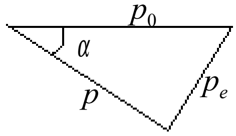
Exact formula:

Conservation of energy:

$$E_0 = E + \frac{1}{2} m_e v^2 \qquad \text{and} \qquad m_e v = p_e$$

$$E_0 = E + \frac{p_e^{\ 2}}{2m_e} \qquad \Leftrightarrow \qquad p_e^{\ 2} = 2m_e(E_0 - E)$$

Conservation of momentum:



$$p_e^{\ 2} = p^2 + p_0^{\ 2} - 2pp_0 \cos\alpha$$

$$p^2 + p_0^2 - 2pp_0\cos\alpha = 2m_e(E_0 - E) \quad \text{and} \quad E_0 = p_0 c \quad \text{and} \quad E = pc$$

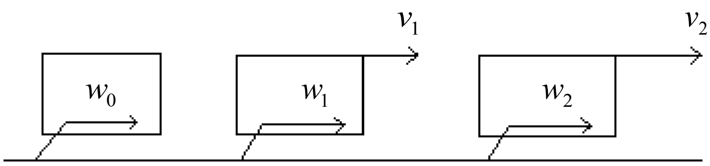
$$p^2 + p_0^2 - 2pp_0\cos\alpha = 2cm_e(p_0 - p) \quad \text{and} \quad p_0 = \frac{h}{x_0} \quad \text{and} \quad p = \frac{h}{x}$$

$$\Leftrightarrow \qquad x = x_0 \frac{x_e\cos\alpha - x_0 - \sqrt{(x_e\cos\alpha - x_0)^2 - x_e^2 + 2x_0 x_e}}{x_e - 2x_0}$$

The empiric formula gives very good results.

The wrong relative speed formula

The Einstein's relative speed formula is wrong.



$$w_1 = c^2 \frac{w_0 + v_1}{c^2 + v_1 w_0} \qquad (1)$$

$$w_2 = c^2 \frac{w_0 + v_2}{c^2 + v_2 w_0} \qquad (2)$$

$$w_2 = c^2 \frac{w_1 + v}{c^2 + v w_1} \qquad (3)$$

Substituting w2 from (2) and w1 from (1):

$$\Leftrightarrow \qquad v = c^2 \frac{v_2 - v_1}{c^2 - v_1 v_2} \qquad (4)$$

The formula (4) is the Einstein's relative speed formula but this formula is wrong because the formula (3) is also wrong.

True (3) formula:

From (1) $\qquad w_0 = c^2 \frac{w_1 - v_1}{c^2 - v_1 w_1} \qquad (5)$

From (2) $$w_0 = c^2 \frac{w_2 - v_2}{c^2 - v_2 w_2} \qquad (6)$$

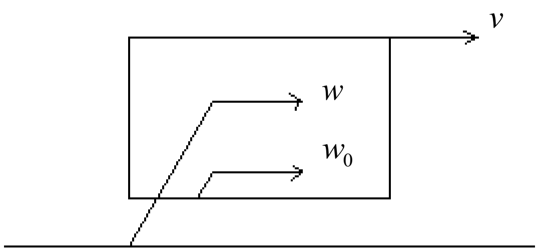
Equalling those two formulas:

$$w_2 = \frac{w_1(c^2 - v_1 v_2) + c^2(v_2 - v_1)}{w_1(v_2 - v_1) + c^2 - v_1 v_2} \qquad (7)$$

This is the true relation between w2 and w1 so the formulas (3) and (4) are wrong.

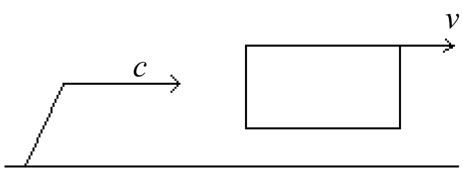
Formulas (1) and (2):

$$w = c^2 \frac{w_0 + v}{c^2 + v w_0} \qquad (8)$$



This formula gives the propagation speed of the light in a glass (for example) with a rest propagation speed w0.

As is proved by the astronomic aberration, the relative speed of light to a detector that is moving with speed v is:



$$w = c - v \qquad (9)$$

Macroscopic relative speed:

$$v = v_2 - v_1 \qquad (10)$$

Fizeau's moving water experiment proves the meaning of the formulas (1) and (2) and that they don't give a relative speed.

Wavelength and frequency in optical media

Fizeau's running water experiment is a proof that Lorentz's equations are valid in optical media.

Lorentz's equations:

$$x = \frac{x_0 - vt_0}{\sqrt{1 - v^2/c^2}} \quad ; \quad f = \frac{cf_0\sqrt{c^2 - v^2}}{c^2 - vw_0} \quad ; \quad w = c^2\frac{w_0 - v}{c^2 - vw_0}$$

$$w_0 = c - \Delta w_0 \; ; \quad v = c - \Delta v$$

⇔

$$x = x_0\frac{\Delta v - \Delta w_0}{\sqrt{2c\Delta v}} \quad ; \quad f = f_0\frac{\sqrt{2c\Delta v}}{\Delta v + \Delta w_0}$$

$$\Delta v = \frac{n+1}{n-1}\Delta w_0 \; ; \quad \Delta w_0 = \frac{kf_0^{\,2}}{2c}$$

⇔

$$x = \frac{\sqrt{k}}{\sqrt{n^2 - 1}} \quad ; \quad f = \frac{c\sqrt{n^2 - 1}}{n\sqrt{k}}$$

$$k = 1.9\times 10^{-34} m^2; \quad f_M = \frac{c}{\sqrt{k}} = 2.17\times 10^{25}\,Hz$$

$w = xf = c/n$; n – Refractive index

Imaginary frequencies are from longitudinal waves with speeds greater than light speed.

$$w = \sqrt{c^2 - kf^2} = c/n$$

Absolute Relativity Test Experiment

Orthodox physics says that inside a medium the wavelength of the light is:

$$x_A = \frac{x_0}{n} \quad ; \qquad \text{n – Refractive index}$$

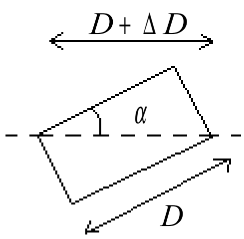
According to Absolute Relativity the wavelength is:

$$x_B = \sqrt{\frac{k}{n^2 - 1}} \quad ; \qquad k = 1.91 \times 10^{-34} m$$

For $x_0 = 650nm$ and n = 1.5 for glass

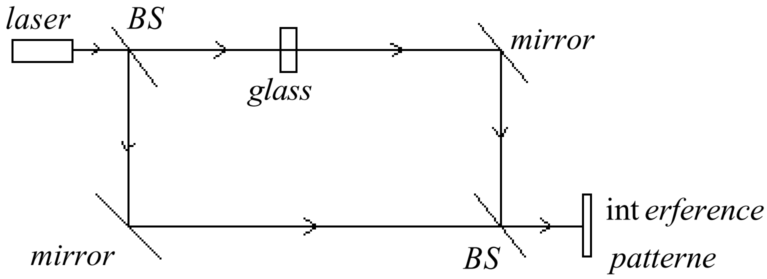
$$x_A = 4.3 \times 10^{-7} m \quad ; \qquad x_B = 1.24 \times 10^{-17} m$$

Inside a piece of glass that suffers a small rotation there is a variation of the internal phase of the light.



$$\Delta D = \Delta \varphi = D\left(\frac{1}{\cos\alpha} - 1\right)$$

Experiment:



For D = 0.002m and a rotating angle of 0.5º
According to orthodox physics:

$$\Delta\varphi = 7.6\times 10^{-8} \;; \qquad \frac{\Delta\varphi}{x_A} = 0.18$$

According to UART:

$$\frac{\Delta\varphi}{x_B} = 6\times 10^{9}$$

This interferometer can be used for very small angle variation detection:

$$\Delta D = \frac{1.24\times 10^{-17}}{4} = 3.1\times 10^{-18}$$

$$\alpha = \sqrt{\frac{2\Delta D}{D}} = 5.6\times 10^{-8} rad = 0.011''$$

It’s possible to detect much smaller angles.

Proof of the validity of the Absolute Relativity

Abstract – According to orthodox physics and Absolute Relativity Theory the wavelengths of the light inside glass has very different values.
This experiment proves that Absolute Relativity is correct.

Wavelength of the laser light in the air:

$$x_{OUT} = 6\times 10^{-7} m$$

Wavelength of the same light inside glass according to orthodox physics:

$$x_{IN1} = \frac{x_{OUT}}{n} \qquad \text{and} \qquad n = 1.5$$

$$x_{IN1} = 4\times 10^{-7} m$$

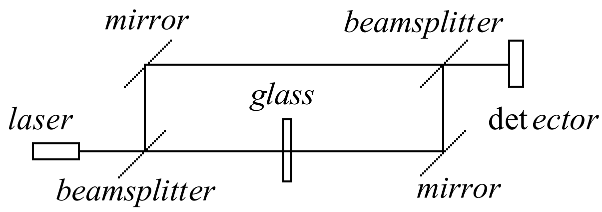
Wavelength of the same light inside glass according to Absolute Relativity:

$$x_{IN2} = \frac{\sqrt{S}}{\sqrt{n^2 - 1}} \qquad \text{and} \qquad S = 1.9\times 10^{-34} m^2$$

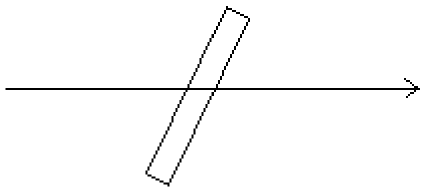
$$x_{IN2} = 1.24 \times 10^{-17} m$$

Experiment description

This experiment is based on an interferometer:



Turning the glass one degree:



$d = 3mm \leftrightarrow d'$

$$\Delta d = d' - d = d\left(\frac{1}{\cos 1} - 1\right) = 4.6 \times 10^{-7} m$$

According to orthodox physics the movement of the glass generates a variation of phase equivalent to more or less one wavelength.

According to Absolute Relativity the variation of phase is more or less 3.7×10^{10} wavelengths.

Conclusion:

As it’s very easy to see at the detector the variation of the fringes with the movement of the glass is very rapid and equivalent to a great number of wavelengths.

So, Unified Absolute Relativity Theory is correct.

Is the Universe rotating?

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From the study of the position angles and polarization of high luminosity classical-double radio sources, it appears that the difference between the position angles of elongation and of polarization are highly organized, being generally positive in one half of the sky and negative in the other. The effect was first noticed amongst a sample of 94 3CR sources and later confirmed in three independent samples. Such a phenomenon can only have a physical explanation on a cosmic scale; an attractive theory is that it demonstrates the existence of a universal vorticity, that is, that the Universe is rotating with an angular velocity ~ 10^{-13} rad yr^{-1}. This would have drastic cosmological consequences, since it would violate Mach's principle[1,2] and the widely held assumption of large-scale isotropy.

SI units unification proof

We are going to prove that the usual magnetic dipole moment is only a momentum.

$$I.Area = q\frac{cx_e}{4\pi} = qLV$$

I – Electric current; q – Electric charge; c – Light speed;
x_e -- Electron Compton wavelength; L – Distance; V – Speed

Momentum:

$$p = mv = qA$$

m – mass; v – speed; A – Magnetic vector potential

If $qA = qLV$; A = LV

We must to prove that A = LV

But we know that:

$$\frac{dA}{dx} = v \quad \Leftrightarrow \quad A = LV$$

So: $I : Area = mv = p$

Circulation = $\frac{h}{2m} = \frac{xc}{2} = LV$

A = LV = Circulation

Bohr magneton is a momentum:

$$\mu_B = IA = \frac{qcx_e}{4\pi} = 9.274 \times 10^{-24}$$

Doppler effect

The Doppler effect of the light is a proof that light speed is relative.

For frequency:

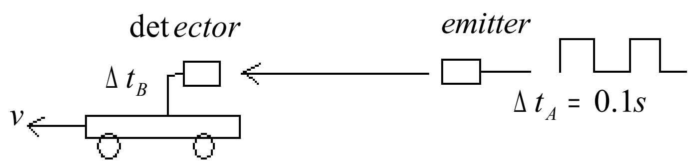
$$f = f_0 \frac{c + v_D}{c + v_E}$$

v_D -- Detector speed; v_E -- Emitter speed

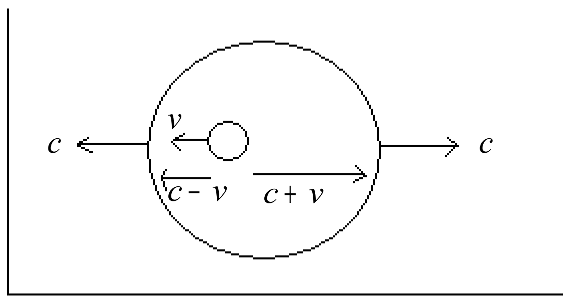
For time:

$$\Delta t_B = \Delta t_A \frac{c}{c \pm v}$$

$$\Delta T = \Delta t_B - \Delta t_A = \Delta t_A \frac{v}{c}$$



$$v = 3 \times 10^4 \qquad \Leftrightarrow \qquad \Delta T = 10\mu s$$



Relative speed to the emitter.

If light speed is absolute there will be no Doppler shift.
A relative speed can be faster than light.

Wien's displacement law

The Wien's law gives the wavelength or the frequency for the maximum intensity of a blackbody radiator with the temperature.

But some thing is wrong because the wavelength and the frequency don't obey the relation:

$$xf = c \quad ; \quad c \text{ – Light speed in vacuum}$$

$$x_{MAX} = \frac{F}{T} \quad \text{and} \quad F = 2.898 \times 10^{-3} \quad \text{(SI units)}$$

$$f_{MAX} = \frac{ukT}{h} \quad \text{and} \quad u = 2.82144$$

x - Wavelength; T – Temperature; f – Frequency; k – Boltzmann constant;
h – Planck constant.

F is a force:

$$F = \frac{q^2}{4\pi \varepsilon_0 R^2} \quad \text{and} \quad R = \frac{x_e}{2\pi}$$

q – Electron charge; ε_0 -- Vacuum permittivity; x_e -- Electron Compton wavelength;

True value of F:

$$F = 1.5485 \times 10^{-3} N$$

$$x_{MAX} = \frac{F}{T} \quad ; \quad f_{MAX} = \frac{cT}{F}$$

$$\frac{c}{F} = \frac{uk}{h} \quad \Leftrightarrow \quad u = 9.2958$$

Dark Matter are Death Stars

Mass of the local universe:

$$M_U = 1.75 \times 10^{53} kg$$

Period of rotation of the universe:

$$T_U = 4.3 \times 10^{17} s$$

Lifetime of a star:

$$t = 3.2 \times 10^{17} s$$

Total number of stars:

$$N_T = 8.8 \times 10^{22}$$

Live stars -- 16.7% -- $N_L = 1.5 \times 10^{22}$

Death stars -- 83.3% -- $N_D = 7.3 \times 10^{22}$

True age of the local universe:

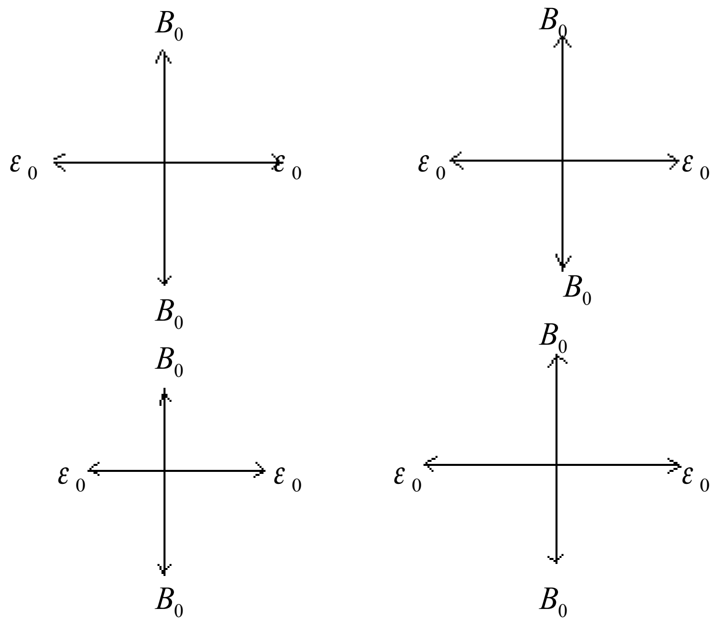
$$T_0 = \frac{t.N_D}{2} = 1.2 \times 10^{40} s$$

The universe is much older than we suspected.
Its why there are galaxies with almost zero dark matter and some has almost only dark matter.

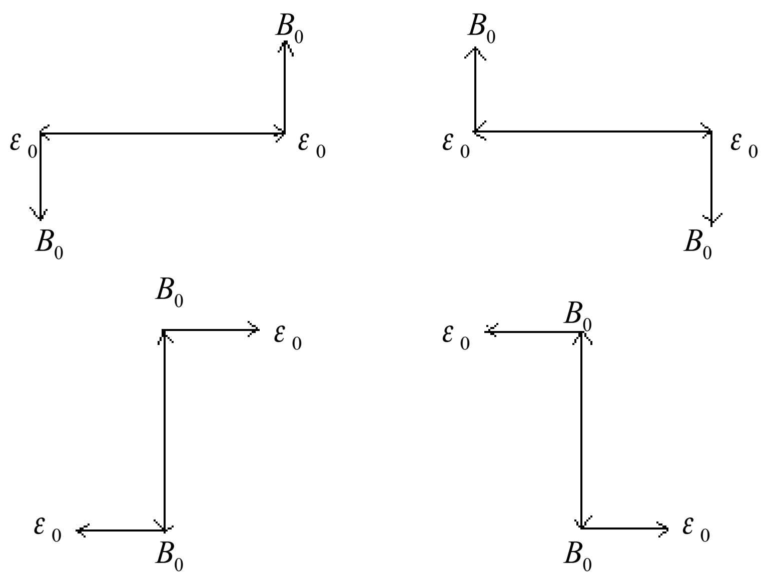
The nothing and everything

The existence exists forever.
The nothing and everything is made of two things: speed and distance.
Speed is equal to magnetic field and distance is equal to permittivity.

The nothing:



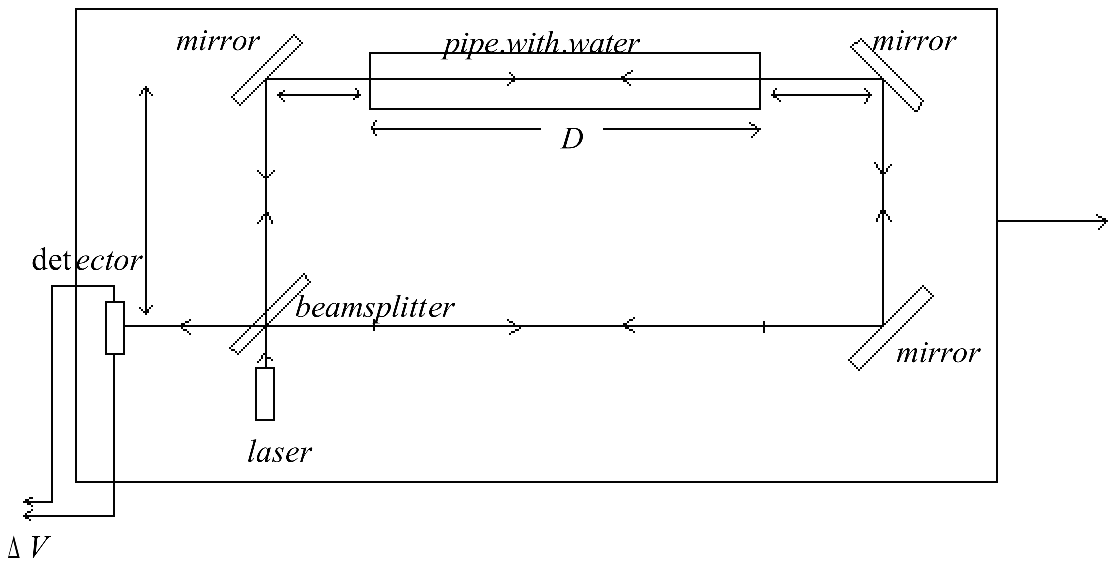
The nothing decays to four types of wave-particles:



The total speed and distance remains equal to zero as the energy.
Two particles have positive mass and the other two negative mass.
Two charged particles and two neutral.

Linear Sagnac Experiment

This experiment is a version of the Sagnac experiment made with linear speed. So, the system is an inertial referential. It will prove if light speed has or not relative speed.



The device has a laser diode (λ =6.5x $10^{-7}\,m$, P= 3.5mW), a 50% - 50% beam splitter, three mirrors, a pipe filled of water with two glass windows, another one with vacuum and a light detector .

The laser beam is divided on the splitter and travels in two directions in the mirrors circuit. Then they are joined again and went to the detector where the variable interference pattern generates the voltage ΔV .

The device moves in the exterior of a car so, the movement relative to the rest air will sum and subtract to light speed. According to relativity theory this is impossible.

Times of the light rays:

$$\begin{cases} t_1 = k + \frac{D}{w} + \frac{D}{c - v} \\ t_2 = k + \frac{D}{w} + \frac{D}{c + v} \end{cases} \quad \text{and} \quad t = t_1 - t_2$$

$$t = \frac{2Dv}{c^2} \quad ; \quad D = 0.33m \quad ; \quad t = 7.34 \times 10^{-18} v$$

Space phase shift:

$$\Delta t = 7.34 \times 10^{-18} \Delta v \quad \text{and} \quad \Delta x = c \Delta t \quad \Leftrightarrow \quad \Delta x = 2.2 \times 10^{-9} \Delta v$$

Voltage variation on the detector:

$$\Delta V = V \frac{\Delta x}{\lambda / 2} \quad \text{with} \quad \lambda = 6.5 \times 10^{-7} m \quad \Leftrightarrow$$

$$\Leftrightarrow \quad \Delta V = V \times 6.8 \times 10^{-3} \Delta v$$

In our device $V = 60mV$, so for a $\Delta v = 100km/h = 27.8m/s$:

$$\Delta V = 11.3mV \quad ; \quad \frac{\Delta V}{V} = 19\%$$

We have made the experiment (2008-06-02), made 20 measures and found always a voltage variation of 10 mV.

So, we have proved that light speed is not constant and that it sums to the speed of the receptor.

Method of Solving Any Equation

We use the program QBASIC to solve the equations.

Equation a:

$$x^3 - 9x^2 + 26x - 24 = 0$$

```
x = 1
FOR N=1 TO 10000 STEP 1
x = (9x^2 - 26x + 24) / x^2          ⇔   x = 4
PRINT x
NEXT N
```

```
x = 1
FOR N=1 TO 10000 STEP 1
x = 24/(x^2 - 9x + 26)               ⇔   x = 2
PRINT x
NEXT N
```

$x^2(x-9)+26x-24=0$

$x=(24-26x)/(x-9)/x$ ⇔ $x=3$

Some equations converge to the solutions. The initial x is any value, but some values don’t converge.

Equation b:

$$Log(x)+x=10$$

```
x = 2
FOR N=1 TO 10000 STEP 1
x = 10 - LOG(x)                      ⇔   x = 7.92942
PRINT x
NEXT N
```

Equation c:

$$Sin(x)+Log(x)+x=4$$

```
x = 2
FOR N=1 TO 10000 STEP 1
x = 4 - SIN(x) - LOG(x)              ⇔   x = 2.475725
PRINT x
NEXT N
```

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The method also works for systems:

$$\begin{cases} yx^3 - 2y^2x + 4 = 0 \\ y^3x - 3y^2x^2 + 5 = 0 \end{cases}$$

$x = 2$
$y = 3$
FOR N=1 TO 10000 STEP 1
$y = (2y^2x - 4)/x^3$ ⇔ $y = 17.97625$
$x = (y^3x + 5)/3/y^2/x$ ⇔ $x = 5.992943$
PRINT x, y
NEXT N

This method must be better study.
Try to find other solutions.

Method of the Solutions Equations

Only for real solutions. Instead of solving the equation we solve the solutions equations.

$x^2 - 5x + 6 = 0$; solutions: a, b

$$\begin{cases} a + b = 5 \\ ab = 6 \end{cases}$$

Program:

$a = 10$
FOR n=1 TO 10000 STEP 1
$b = 6/a$
$a = 5 - b$
PRINT a, b
NEXT n

$x^3 - 9x^2 + 26x - 24 = 0$; solutions a, b, c

$$\begin{cases} a+b+c=9 \\ ab+ac+bc=26 \\ abc=24 \end{cases}$$

Program:

```
a = 10
b = 20
FOR n=1 TO 10000 STEP 1
c = 9 - a - b
b = (26 - ac)/(a + c)
a = 24/b/c
PRINT a, b, c
NEXT n
```

$x^4 - 10x^3 + 35x^2 - 50x + 24 = 0$; solutions a, b, c, d

$$\begin{cases} a+b+c+d=10 \\ ab+ac+ad+bc+bd+cd=35 \\ (a+b)cd+ab(c+d)=50 \\ abcd=24 \end{cases}$$

Program:

```
a = 10
b = 20
c = 30
FOR n=1 TO 10000 STEP 1
d = 10 - a - b - c
c = (35 - ab - bd - ad)/(a + b + d)
b = (50 - acd)/(cd + a(c + d))
a = 24/b/c/d
PRINT a, b, c, d
NEXT n
```

Complex solutions:

$n^2 + 2n + 10 = 0$; solutions: $a = x + iy$, $b = x - iy$

$$\begin{cases} 2x = -2 \\ x^2 + y^2 = 10 \end{cases}$$

$n^3 - 2n^2 + 2n - 40 = 0$; solutions: a, $b = x + iy$, $c = x - iy$

$$\begin{cases} a + 2x = 2 \\ 2ax + x^2 + y^2 = 2 \\ a(x^2 + y^2) = 40 \end{cases}$$

$n^4 - 3n^3 + 4n^2 - 42n + 40 = 0$; solutions: a, b, $c = x + iy$, $d = x - iy$

$$\begin{cases} a + b + 2x = 3 \\ ab + 2ax + 2bx + x^2 + y^2 = 4 \\ (a + b)(x2 + y2) + 2abx = 42 \\ ab(x^2 + y^2) = 40 \end{cases}$$

Room-Temperature Superconductor

Condition for the existence of a superconductor:

$$c = \sqrt{\frac{Gm}{R}}$$

The orbital speed of the particles must be equal to light speed.

$$\frac{m}{R} = \frac{c^2}{G_e} \quad ; \qquad G_e = \frac{q_e^{\ 2}}{4\pi \varepsilon_0 m_e^{\ 2}} = 2.78 \times 10^{32}$$

G_e -- Gravitational constant of the electron

$$A = \frac{m}{R} = 3.23 \times 10^{-16}$$

Superconductor composite substance:

$$m = m_1 + n.m_2$$

$$R = \frac{R_1 + R_{nm}}{2} \ ; \qquad V_{nm} = nV_m$$

$$R_{nm} = \sqrt[3]{n} R_2$$

$$R = \frac{R_1 + \sqrt[3]{n} R_2}{2} \qquad \Leftrightarrow \qquad 2\frac{m_1 + n.m_2}{R_1 + \sqrt[3]{n} R_2} = A$$

$$x = 2m_1 - AR_1 \ ; \qquad y = 6m^2 x^2 - A^3 R_2{}^3$$

$$8n^3 m_2{}^3 + 12n^2 m_2{}^2 x + ny + x^3 = 0$$

$$AR_1 > 2m_1$$

One Room-temperature Superconductor

O -- $m_1 = 2.66 \times 10^{-26} kg$; $R_1 = 2.24 \times 10^{-10} m$

Zn -- $m_2 = 1.1 \times 10^{-25}$; $R_2 = 2.4 \times 10^{-10}$

⇔ n = 0.326

$OZn_{0.326}$ or ZnO_3

The zinc oxide doped with two more oxygen atoms is a room-temperature superconductor.

The palladium charged with deuterium is not a superconductor.

Other examples:

ZnF

$CuO_{3.2}$

H 1.67 -27 1.99																	He 6.64 -27 2.59
Li 1.15 -26 2.16	Be 1.50 -26 1.56											B 1.79 -26 1.52	C 1.99 -26 1.60	N 2.33 -26 2.05	O 2.66 -26 2.24	F 3.15 -26 2.17	Ne 3.35 -26 2.38
Na 3.81 -26 2.93	Mg 4.04 -26 2.45											Al 4.48 -26 2.21	Si 4.66 -26 2.36	P 5.14 -26 2.63	S 5.32 -26 2.57	Cl 5.88 -26 2.93	Ar 6.63 -26 3.15
K 6.49 -26 4.12	Ca 6.65 -26 3.42	Sc 7.46 -26 2.86	Ti 7.95 -26 2.56	V 8.46 -26 2.35	Cr 8.63 -26 2.26	Mn 9.12 -26 2.29	Fe 9.27 -26 2.30	Co 9.78 -26 2.20	Ni 9.74 -26 2.14	Cu 1.05 -25 2.20	Zn 1.09 -25 2.38	Ga 1.16 -25 2.61	Ge 1.21 -25 2.73	As 1.24 -25 2.68	Se 1.31 -25 2.92	Br 1.33 -25 3.40	Kr 1.39 -25 3.67
Rb 1.42 -25 4.94	Sr 1.45 -25 4.19	Y 1.48 -25 3.52	Zr 1.51 -25 3.14	Nb 1.54 -25 2.90	Mo 1.59 -25 2.75	Tc 1.64 -25 2.66	Ru 1.68 -25 2.66	Rh 1.71 -25 2.65	Pd 1.77 -25 2.62	Ag 1.79 -25 2.77	Cd 1.87 -25 3.00	In 1.91 -25 3.20	Sn 1.97 -25 3.24	Sb 2.02 -25 3.37	Te 2.12 -25 3.50	I 2.11 -25 3.80	Xe 2.18 -25 4.53
Cs 2.21 -25 5.92	Ba 2.28 -25 4.89	Lu 2.91 -25 4.42	Hf 2.96 -25 3.46	Ta 3.00 -25 3.23	W 3.05 -25 3.06	Re 3.09 -25 3.02	Os 3.16 -25 2.98	Ir 3.19 -25 3.01	Pt 3.24 -25 2.95	Au 3.27 -25 3.07	Hg 3.33 -25 3.46	Tl 3.39 -25 3.66	Pb 3.44 -25 3.74	Bi 3.47 -25 3.96	Po 3.47 -25 4.06	At	Rn

Table of m and R of the elements

Example: Hydrogen $m = 1.67 \times 10^{-27}$; $R = 1.99 \times 10^{-10}$

Calculation of R:

Density $\rho = \dfrac{m}{\frac{4}{3}\pi R^3}$ $\Leftrightarrow$ $R = \sqrt[3]{\dfrac{3m}{4\pi\ \rho}}$

True Planck units

Planck units are wrong because we can't mix the macroscopic gravitational constant with other microscopic units. Planck scale is a myth.

If we change the gravitational constant by the value for the electron everything works fine.

$$G = 6.67 \times 10^{-11} \qquad \rightarrow \qquad G_e = \frac{q_e^{\,2}}{4\pi\ \varepsilon_0 m_e^{\,2}} = 2.78 \times 10^{32}$$

Vacuum energy particle:

$$E = \left(\frac{\varepsilon_0}{\mu_0}\right)^2 = 310MeV$$

$$m = \sqrt{\frac{137\pi\ .h.c}{G_e}} = 5.53 \times 10^{-28} kg$$

$$x = \sqrt{\frac{hG_e}{137\pi\ .c^3}} = 4 \times 10^{-15} m$$

$$t = \sqrt{\frac{hG_e}{137\pi\ .c^5}} = 1.33 \times 10^{-23} s$$

Electron charge:

$$q_e = \sqrt{\frac{2G_e\varepsilon_0}{137^2\pi}} m = 1.6 \times 10^{-19}$$

Electron mass:

$$m_e = \sqrt{\frac{hc}{2 \times 137\pi\ .G_e}} = 9.1 \times 10^{-31}$$

$$G_0 = \frac{q_e^{\,2}}{4\pi\ \varepsilon_0 m^2} = 7.56 \times 10^{26}$$

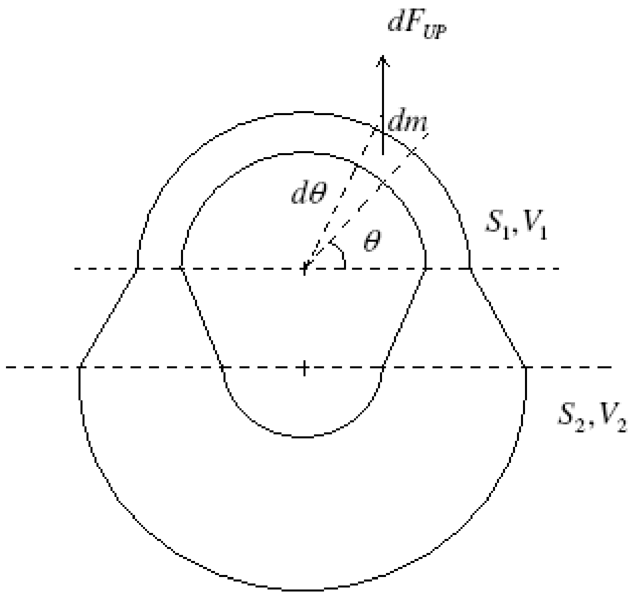
$$\frac{G_e}{G_0} = 2 \times 137^2 \pi^2$$

$$\frac{E}{E_e} = \frac{310}{0.51} = \sqrt{2\pi}\,137$$

Energy of the electron:

$$E_e = \frac{\varepsilon_0^2}{\sqrt{2\pi}\,.137\mu_0^2}$$

Force in a nozzle



A circular pipe forms a closed loop with two different sections and speeds. We will derive the formula of the force generated in the nozzles or expansion chambers, using the moment conservation principle. We assume a uniform flow and a constant speed.

Outflow formula: $S_1V_1 = S_2V_2$ and $S_2 / S_1 = n$

$$dF_{UP} = \frac{V_1^{\,2}}{R} sen\theta.dm \quad \text{and} \quad dm = \rho.S_1R.d\theta \quad \Leftrightarrow$$

$$\Leftrightarrow \quad F_{UP} = \rho.V_1^{\,2}S_1\int_0^{\pi} sen\theta.d\theta \quad \Leftrightarrow \quad F_{UP} = 2\rho.S_1V_1^{\,2}$$

The total vertical component of the up force is proportional to the mass per volume ρ, to the section of the pipe S_1 and to the squared speed of the liquid $V_1^{\,2}$. The same for the down force:

$$F_{DOWN} = 2\rho.S_2V_2^{\,2}$$

To agree with the principle of the linear moment conservation, the system can't generate movement. That means the total force must be equal to zero. So the force in the expansion chambers must be equal to:

$$\Leftrightarrow \quad 2F_{EXP} = 2\rho.S_1V_1^{\,2} - 2\rho.S_2V_2^{\,2}$$

Notice that the speed in both expansion chambers has opposite directions but in one we have acceleration and in the other a deceleration, so both forces have the same direction – down. Notice also that the friction force has no influence in the system but, to be sure we can suppose a system composed of two elements in counter-rotation. So:

$$F_{EXP} = \rho.S_1V_1^{\,2}\left(1 - \frac{1}{n}\right)$$

For a real and open expansion chamber $n = \infty$, and the force in the chamber is independent of the geometry of it:

$$\underline{F = \rho.S_1V_1^{\,2}}$$