Relativity Theory B

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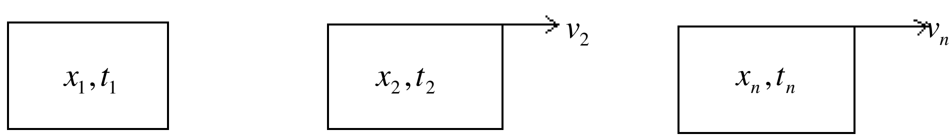
Introduction – Everything is relative, including light speed.
From a particular and evident property of the Lorentz's equations we have derived a theory that agrees with all known experimental data and works for atomic and sub atomic scales, but it also works for gravity at macroscopic scales.

Basis of the theory

From the Lorentz equations:

$$\begin{cases} x = \dfrac{x_0 + vt_0}{\sqrt{1 - v^2/c^2}} \\ t = \dfrac{t_0 + vx_0/c^2}{\sqrt{1 - v^2/c^2}} \end{cases} \Leftrightarrow \quad c^2t^2 - x^2 = c^2 t_0{}^2 - x_0{}^2$$

For n relative frames with v_n relative speeds:



$$\begin{cases} x_2 = \dfrac{x_1 + v_2 t_1}{\sqrt{1 - v_2{}^2/c^2}} \\ t_2 = \dfrac{t_1 + v_2 x_1/c^2}{\sqrt{1 - v_2{}^2/c^2}} \end{cases} \Leftrightarrow \quad c^2 t_2{}^2 - x_2{}^2 = c^2 t_1{}^2 - x_1{}^2$$

$$\begin{cases} x_n = \dfrac{x_1 + v_n t_1}{\sqrt{1 - {v_n}^2 / c^2}} \\ t_n = \dfrac{t_1 + v_n x_1 / c^2}{\sqrt{1 - {v_n}^2 / c^2}} \end{cases} \quad \Leftrightarrow \quad c^2 {t_n}^2 - {x_n}^2 = c^2 {t_1}^2 - {x_1}^2$$

$$\begin{cases} x_n = \dfrac{x_2 + (v_n - v_2) t_2}{\sqrt{1 - (v_n - v_2)^2 / c^2}} \\ t_n = \dfrac{t_2 + (v_n - v_2) x_2 / c^2}{\sqrt{1 - (v_n - v_2)^2 / c^2}} \end{cases} \quad \Leftrightarrow \quad c^2 {t_n}^2 - {x_n}^2 = c^2 {t_2}^2 - {x_2}^2$$

So:

$$c^2 {t_1}^2 - {x_1}^2 = c^2 {t_2}^2 - {x_2}^2 = \cdots = c^2 {t_n}^2 - {x_n}^2 \quad \Leftrightarrow$$

$$c^2 {t_n}^2 - {x_n}^2 = k \quad \text{(Constant)}$$

The orthodox relativity use $k = 0$ for light waves and a small positive value for particles, but as we have demonstrate k is a constant with only one value for all wave particles.

One direct consequence is that light speed is variable with the frequency.

Derivation and Generalization of the Planck's Formula

The Planck's formula $E = hf$ is not correct for all electromagnetic spectrum.

Magnetic wave equation: $B = B_0 \sin\left[\dfrac{4\pi^2}{x^2}\left(c^2 t^2 - x^2\right)\right]$

Energy of the magnetic field: $E = \dfrac{B^2 x^3}{2\mu_0}$

$$E = \frac{x^3}{2\mu_0} B_0{}^2 \sin^2\left[\frac{4\pi^2}{x^2}\left(c^2t^2 - x^2\right)\right] \quad \text{and} \quad c^2t^2 - x^2 = k$$

$$\Leftrightarrow \quad E = \frac{x^3}{2\mu_0} B_0{}^2 \frac{16\pi^4 k^2}{x^4} \quad \Leftrightarrow \quad E = \frac{16 B_0{}^2 \pi^4 k^2}{2\mu_0 x}$$

And $x = \frac{w}{f}$ $\Leftrightarrow$ $E = \frac{c}{w} hf$

General Planck's formula: $E = \frac{c}{\sqrt{c^2 - kf^2}} hf$

Calculation of *k* and the two proton masses

Almost no one knows but the proton has two values of mass.

-- Experimental energy value:

$$E_p = 938.272013 MeV = 1.50327736 \times 10^{-10} J$$

According to Einstein:

$$E = mc^2 \quad \Leftrightarrow \quad m = 1.67262164 \times 10^{-27} kg$$

-- Experimental value by direct measurement of the hydrogen mass:

$$m_H = 1.00794u \quad \text{and} \quad u = 1.660538782 \times 10^{-27} kg$$

This is the actual measured value. Not 1.007825 that with an also chosen abundance of deuterium had been calculated to seems that the Einstein's formula is correct.

Subtracting the electron mass:

$$m_p = 1.67281253 \times 10^{-27} kg$$

(The simple subtraction is a valid approximation.)

According to our theory, the light speed is *w*:

$$c^2t^2 - x^2 = k \quad \text{and} \quad w = x/t \quad \text{and} \quad t = 1/f \quad \Leftrightarrow$$

$$w = \sqrt{c^2 - kf^2} \qquad (f \text{ is the frequency})$$

So the formula of the energy is:

$$E = m(c^2 - kf^2) \quad \text{and} \quad E = \frac{hcf}{\sqrt{c^2 - kf^2}} \quad \Leftrightarrow$$

$$\Leftrightarrow \quad k = h^2c^2\frac{m_pc^2 - E}{E^3}$$

c = visible light speed (not all electromagnetic waves)
h = Planck's constant

$$\Leftrightarrow \quad k = 1.9925698 \times 10^{-34} m^2$$

The existence of a k with a very low value agrees with all known experimental data and allows the unification of the relativity with the quantum mechanics.

The mass of hydrogen is not 1.007825u, which is the value given by the Einstein's formula $E = mc^2$, but 1.00793u and the abundance of deuterium is not 1.1×10^{-4}, in a particular water, but 1×10^{-5} that is the known value in the universe.
It's obvious that the mass of the proton can't depend of the abundance of deuterium in a particular water at earth surface with a known variable abundance of deuterium.

Abundance mass equation

$$(1-x)m_H + xm_D = 1.00794$$

x – abundance of deuterium
mD – deuterium mass ; mH – hydrogen mass

$$m_D \approx 2m_H \quad \Leftrightarrow \quad m_H = \frac{1.00794}{1+x}$$

Abundance in a particular water at earth -- $x = 1.14\times10^{-4}$ $\Leftrightarrow$

$$\Leftrightarrow \quad m_H = 1.007825$$

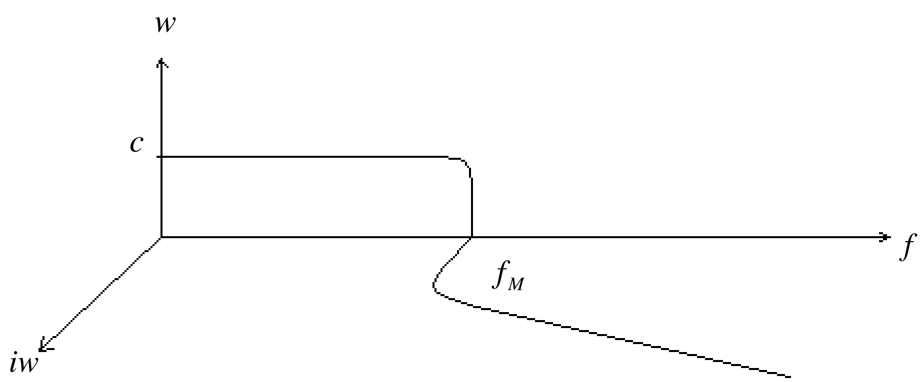
Abundance in the universe -- $x \approx 1\times10^{-5}$ $\Leftrightarrow$

$$\Leftrightarrow \qquad m_H = 1.00793$$

The value of deuterium abundance for hydrogen gas at earth surface is 0.0026% or 2.6×10^{-5}. So why the physicians maintain the value of 1.00794. It's simple, because the chemistrians, that have measured the value, know that it is correct and don't allow the change of the value.

Speed of the electromagnetic waves

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



For $w = 0 \qquad \Leftrightarrow \qquad f_M = \dfrac{c}{\sqrt{k}}$

Matter frequency -- $f_M = 2.12380154 \times 10^{25}\, Hz$

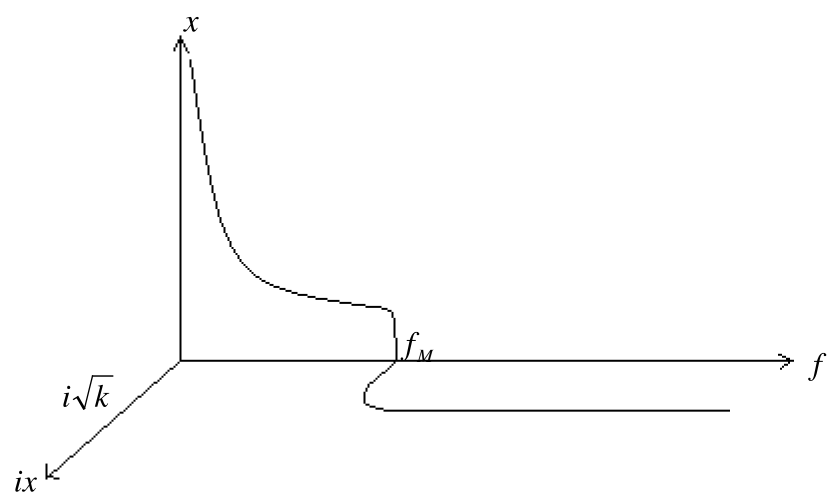
As we can see for low frequency waves, like light, the speed appears as a constant but the speed changes a lot exactly for the frequencies related with subatomic particles, the scale where classic relativity fails.

The small variation of speed for low frequencies is allowed by all known experimental data.

For frequencies greater then f_M the waves have imaginary speeds and wavelengths that mean they are longitudinal waves.

Wavelength of a wave-particle

$$x = \frac{\sqrt{c^2 - kf^2}}{f}$$



$$\sqrt{k} = \lambda_k = 1.41158415 \times 10^{-17}\, m$$

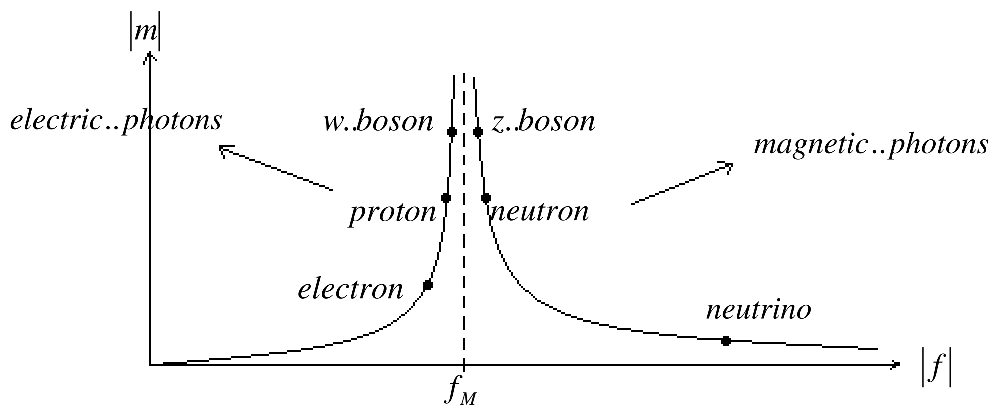
Energy of a wave particle

$$E = \frac{hcf}{\sqrt{c^2 - kf^2}} \qquad \text{and} \qquad E = mw^2$$

$$m(c^2 - kf^2) = \frac{hcf}{\sqrt{c^2 - kf^2}} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad m = \frac{hf}{(c^2 - kf^2)^{3/2}}$$

Mass of a wave particle

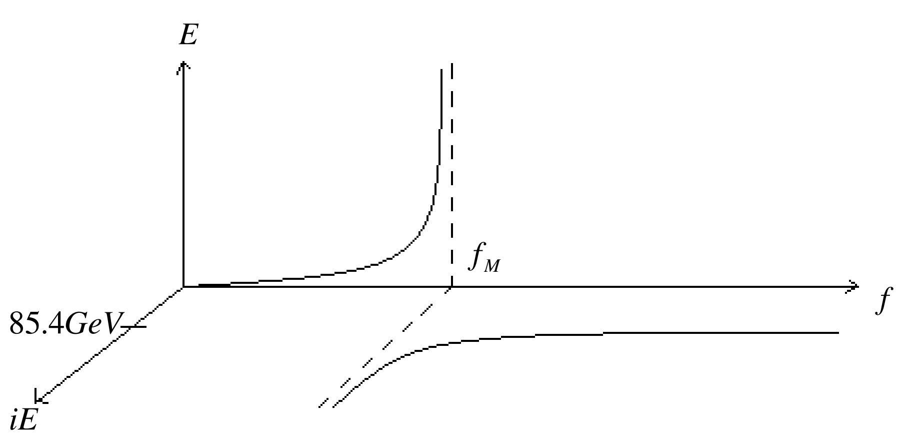


To explain all the existing particles, frequencies and masses must be positive and negative.

The sum of all that exists is equal to zero.

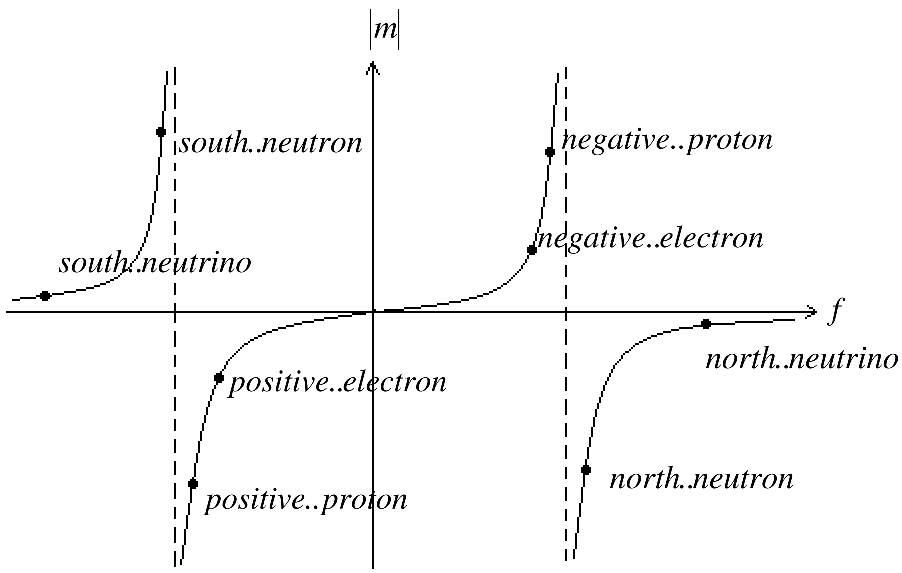
The masses of neutral particles are imaginary.

Energy of a wave particle



The energies of the neutral particles are imaginary.

General wave particle symmetry



Unified force

According to our theory the light speed is variable, so around the particles exists a field of speed variation or an acceleration field. The variation of speed with time is equivalent of the variation of the squared speed with space.

The forces must be explained by only one mechanism and only one formula.

$$w = \sqrt{c^2 - kf^2} \quad \Leftrightarrow \quad w = \frac{\sqrt{c^2 t^2 - k}}{t}$$

Acceleration:

$$g = \frac{dw}{dt} \qquad \Leftrightarrow \qquad g = \frac{kf^3}{w}$$

Force:

$$F = mg \qquad \text{and} \qquad m = \frac{hcf}{w^3}$$

Force between two equal particles:

$$\Leftrightarrow \qquad F = \frac{khc}{x^4} \qquad \text{or}$$

$$\Leftrightarrow \qquad F = \frac{kh(c^2 - v^2)^2 f_0^{\ 4}}{c^3 (w_0 + v)^4}$$

Unified force between two electrons

$$F_{ee} = \frac{chk}{x^4} \qquad \text{and} \qquad x_e = 2.426 \times 10^{-12} m$$

$$F_{ee} = 1.12 \times 10^{-12} N$$

Electric force:

$$F_{\varepsilon} = \frac{q_e^{\ 2}}{4\pi\varepsilon_0 R^2} = \frac{chk}{x^4} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad R = 1.435 \times 10^{-8} m$$

Rydberg constant:

$$R_H = 1.0968 \times 10^7 m^{-1}$$

Rydberg wavelenght:

$$\lambda_H = \frac{1}{R_H} = 9.1127 \times 10^{-8} m$$

$$\lambda_H = 4\pi 137 R_e \qquad \text{and} \qquad R_e = 5.3\times10^{-11} m \quad \text{(Bohr radius)}$$

$$\lambda_H = 2\pi R$$

$$\lambda_H = \frac{8\varepsilon_0{}^2 h^3 c}{m_e q_e{}^4}$$

The Rydberg wavelength is that of the potential energy of an electron in the lower orbit.

$$\lambda_H = 2x_e 137^2$$

Force in hydrogen atom

Rydberg constant: $R_H = 1.096776\times10^7 m^{-1}$

Rydberg wavelength: $\lambda_H = \frac{1}{R_H} = 9.11763\times10^{-8} m$

Rydberg frequency: $f_H = \frac{c}{\lambda_H} = 3.28805\times10^{15} Hz$

Orbital frequency: $f_{OR} = 2f_H$

Orbital speed: $v = 137 x_e f_{OR}$ and $x_e = 2.426\times10^{-12} m$

Bohr radius: $R = \frac{v}{2\pi . f_{OR}} = 5.3\times10^{-11} m$

Centript acceleration: $g = \frac{v^2}{R}$

$x_e = 2.426\times10^{-12}$ $m_e = 9.11\times10^{-31}$ $g_e = 1.327\times10^{18}$

$x_p = 1.32\times10^{-15}$ $m_p = 1.6728\times10^{-27}$ $g_p = 7.762\times10^{27}$

$g = \sqrt{g_e g_p}$ $m = \sqrt{m_e m_p}$

$$F = mg = 3.857\times10^{-6}N$$

$$F = \frac{chk}{x^4} = 3.857\times10^{-6} \qquad x = \sqrt{x_e x_p}$$

Force between two protons

$$F = \frac{chk}{x^4} \quad \text{and} \quad x = 1.32\times10^{-15}$$

$$F = 12.77N$$

$$F = \frac{q_e^{\,2}}{4\pi\varepsilon_0 R^2} \quad \Leftrightarrow \quad R = 4.25\times10^{-15}$$

$$R = \pi.x$$

Force between a proton and a neutron

Total binding energy: $E = \frac{hkc}{x_{NP}^{\,3}} = 2.2MeV$ $x_N = i1.4\times10^{-17} = i\sqrt{k}$

$$x_{NP} = 4.8\times10^{-16}$$

$$x_{NP} = \sqrt{4\pi.x_P x_N} = 4.8\times10^{-16}\sqrt{i}$$

$$F_{PN} = \frac{khc}{x_{NP}^{\,4}} = -718.7N$$

Force between two neutrons

$$F_{NN} = 1.01 \times 10^{9} N$$

Wavelength in tritium ^{3}H

2N+1P -- instable

$$E = 8.25 MeV = \frac{khc}{x^{3}} \qquad x = 3.084 \times 10^{-16}$$

$$x = \sqrt[3]{16\pi^{2} x_{N}{}^{2} x_{P}}$$

Wavelength in ^{3}He

2P+1N – stable

$$E = 7.8 MeV$$

$$x = 3.1 \times 10^{-16} = \frac{1}{2}\sqrt[3]{4\pi . x_{P}{}^{2} x_{N}}$$