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Mass to Inductance Transformation

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Introduction

In this paper I introduce a mass to inductance transformation $L_0=2/(\alpha^2 m_0^2)$. L is the inductance (Henry) of a rest mass m_0. And α is a constant. The main propose of this paper was to find an analog electrical circuit in order to simplify the solution of Relativistic Problems. Fortunately, the analog circuit that I had found, change our knowledge about waves and particles, help to explain why Special Relativity and Quantum Mechanics are both correct and why Space-Time is equivalent to another well known theory.

In this paper

1) I almost eliminate mass from Newtonian Mechanics and Relativistic Problems including interactions between photons and elementary particles.

The proof of the suggested transformation relies entirely on Einstein's Special theory of relativity.

The most important conclusion from this paper is that Special Relativity is a wave and not a mechanical theory.

Mass to Inductance Transformation

The mass to inductance transformation is given by the following equation

1] $$L_0(\text{Henry})=\frac{2}{\alpha^2 m_0^2}$$

in the above equation m_0 is the rest mass of an elementary particle.

The elementary particle is described as an electronic "coil" L whose inductance is measured in Henry

And since mass is in kg, α is a constant that transfer kg to Henry

For example m_0 can be the rest mass of an electron

Pay attention to the fact that big mass have low inductance. The inductance of the Higgs particle is much smaller then the inductance of electron because the mass of the

Higgs is much bigger then the mass of the electron. And the inductance of the photon is infinitely big.

Millikan experiment under mass to inductance transformation

The oil drop experiment was performed by Robert A. Millikan and Harvey Fletcher in 1909 to measure the elementary electric charge (the charge of the electron).
In this experiment Millikan had found that

2] $$K_{millikan} = \frac{Q_0}{m_0}$$

where

$K_{millikan}$ is a constant

and

$$m_0 = 9.11 \cdot 10^{-31} \text{ [kg]}$$
$$Q_0 = -1.6 \cdot 10^{-19} \text{ [C]}$$

Now let combine eq 1 and 2

3] $$\frac{K^2_{millikan}}{\alpha^2} = \frac{Q_0^2}{\alpha^2 m_0^2} = \frac{L_0 Q_0^2}{2}$$

If an electron is moving around a proton in a circle with a constant radius and therefore a constant velocity and constant energy,
Then the current of this one electron is

4] $$I = \frac{Q_0}{T}$$

where T is the time period of one rotation given in seconds
and the electric current I is given in Amperes
{ I and T are also quantified (see Bohr's Atom) }
from equation 3 and eq 4
5]

$$\frac{K^2_{millikan}}{\alpha^2} = \left[\frac{LI^2}{2}\right] T^2 = \text{Coil stored energy} \cdot T^2 = \text{Constant}$$

The last equation is entirely electrical and is correct only for non relativistic velocity.

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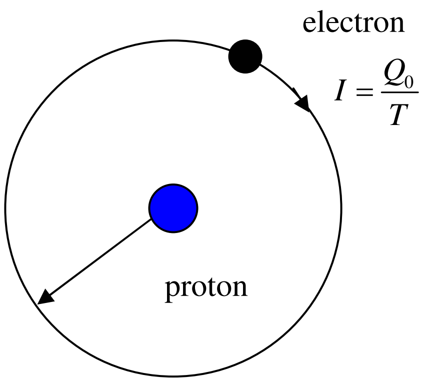

Later I will explain what happens to the rotating electron with a relativistic speed

Relativistic mass under m to L transformation

According to Special Relativity

6] $$m = \frac{m_0}{\sqrt{1-\beta^2}}$$
$$\beta = \frac{V}{c}$$

Where

V is the electron velocity and c the speed of light and $m \geq m_0$ is the moving mass

Most of the scientist believes that mass exist. I am going now to describe mass in an entirely different way

Squaring eq 6 and multiplying both side by α^2

7] $$\alpha^2 m^2 = \frac{\alpha^2 m_0^2}{2}\left[\frac{1}{1-\beta} + \frac{1}{1-\beta}\right]$$

I defined L_0 as

8] $$L_0 = \frac{2}{\alpha^2 m_0^2}$$

Let define L as

9] $$L = \frac{1}{\alpha^2 m_0^2}$$

(Pay attention to 1 instead of 2)

Equation 7 becomes

10] $$\frac{1}{L} = \frac{1}{(1-\beta)L_0} + \frac{1}{(1+\beta)L_0}$$

The question now is what this equation means electrically

To understand the physical meaning , I multiply both sides by

$$\omega = 2\pi\upsilon$$
$$j = \sqrt{-1}$$

Now Einstein's equation 6 converts into an electric equation

11] $$\frac{1}{j\omega L}=\frac{1}{j\omega(1-\beta)L_0}+\frac{1}{j\omega(1+\beta)L_0}$$

We know from electricity that for an alternating current circuit [AC],
The impedance of a coil (Inductor) is

12] $$Z = j\omega L$$
$$Z_0 = j\omega L_0$$

So we can write eq 11 as follows

13] $$\frac{1}{Z}=\frac{1}{(1-\beta)Z_0}+\frac{1}{(1+\beta)Z_0}$$

It is worth to notice that $j\omega$ is not known, and the above equation is correct for any value of $j\omega$

Let define

14] $$Z_- = j\omega(1-\beta)L_0 = (1-\beta)Z_0$$
$$Z_+ = j\omega(1+\beta)L_0 = (1+\beta)Z_0$$
$$Z_\beta = j\omega\beta L_0 = \beta Z_0$$

From eq 13 and eq 14 Einstiens Mechanical description of mass (eq 6) is converted into symmetrical easy to remember Electrical Circuit

15] $$\frac{1}{Z}=\frac{1}{Z_-}+\frac{1}{Z_+}$$

Conclusion

It was found that $m=\frac{m_0}{\sqrt{1-\beta^2}}$ and $\frac{1}{Z}=\frac{1}{(1-\beta)Z_0}+\frac{1}{(1+\beta)Z_0}$ are equivalent

The electrical circuit equivalent of relativistic momentum

According to Einstein's equation

16] $$p^2c^2 = E^2 - E_0^{\;2}$$

where

17] $$E = \frac{m_0 c^2}{\sqrt{1-\beta^2}}$$

18] $$E_0 = m_0 c^2$$

and

19] $$p = mV = m\beta c$$

it is easily shown from the right side of eq 16 that

20] $$p^2 = \frac{m_0{}^2 c^2 \beta}{2}\left(\left(\frac{1}{1-\beta}\right) - \left(\frac{1}{1+\beta}\right)\right) = \frac{m_0{}^2 c^2 \beta}{2}\left(\frac{2\beta}{1-\beta^2}\right)$$

so

21] $$p = \frac{m_0 c\beta}{\sqrt{1-\beta^2}}$$

In Newtonian Mechanics β is low and

22] $$p\,|_{\beta\to 0} = \frac{m_0 c\beta}{\sqrt{1-\beta^2}} = m_0 c\beta$$

If eq 20 is multiplied and divided by $Z_0 = j\omega L_0$

23] $$p^2 = \frac{m_0{}^2 c^2 \beta}{2}\left(\left(\frac{1}{1-\beta}\right) - \left(\frac{1}{1+\beta}\right)\right)\frac{Z_0}{Z_0} = \frac{m_0{}^2 c^2 \beta Z_0}{2}\left(\left(\frac{1}{Z_-}\right) - \left(\frac{1}{Z_+}\right)\right)$$

Now the right side of 23 will be multiplied by α^2 and the mass to induction transformation given in eq 1 will be used , and the definition of $Z_\beta = \beta Z_0$ will be used

24] $$\alpha^2 p^2 = \frac{\alpha^2 m_0{}^2 c^2 \beta Z_0}{2}\left(\left(\frac{1}{Z_-}\right) - \left(\frac{1}{Z_+}\right)\right) = \frac{c^2 Z_\beta}{L_0}\left(\left(\frac{1}{Z_-}\right) - \left(\frac{1}{Z_+}\right)\right)$$

and using eq 12

25] $$p^2 = m^2 \beta^2 c^2 = \frac{c^2 Z_\beta}{\alpha^2 L_0}\left(\left(\frac{1}{Z_-}\right) - \left(\frac{1}{Z_+}\right)\right)$$

again Eq 26 that describe the momentum of a moving relativistic mass is described using an Electrical Circuit

Matter and wave–particle duality
and
De Broglie hypothesis

Louis- de Broglie suggested that all matter has wave properties. This concept is known as the De Broglie hypothesis

According to de Broglie

26] $$p = m\beta c = \frac{h}{\lambda}$$

so

27] $$p^2 = \frac{h^2}{\lambda^2} = \frac{m_0^2 c^2 \beta^2}{1-\beta^2}$$

from eq 27

28] $$\frac{1}{\lambda^2} = \left(\frac{m_0 c}{h}\right)^2 \frac{\beta^2}{1-\beta^2} = \frac{\beta}{2\lambda_C^2}\left(\left(\frac{1}{1-\beta}\right)-\left(\frac{1}{1+\beta}\right)\right)\frac{Z_0}{Z_0}$$

using eq 14

29] $$\frac{1}{\lambda^2} = \frac{Z_\beta}{2\lambda_C^2}\left(\left(\frac{1}{Z_-}\right)-\left(\frac{1}{Z_+}\right)\right)$$

It will be shown later that the Compton Wavelength and frequency are

30] $$\lambda_C = \frac{h}{m_0 c}$$
$$f_C = \frac{c}{\lambda_C}$$

using eq 30 with 29

31] $$f^2 = f_-^2 + f_+^2 = f_C^2 \frac{Z_\beta}{2}\left(\left(\frac{1}{Z_-}\right)-\left(\frac{1}{Z_+}\right)\right)$$

according to the Electrical Circuit in the above equation when the electron is moving we can measure two frequencies f_- and f_+

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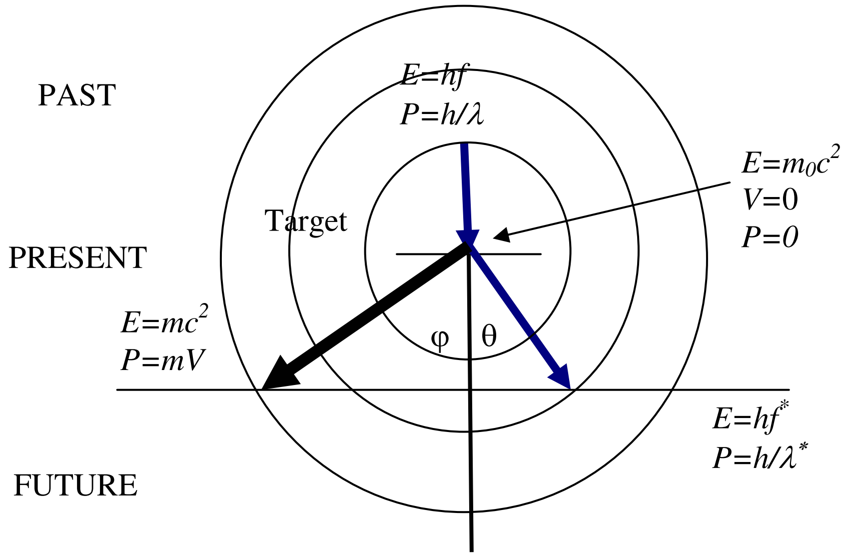
Electron photon collision

Compton's Experiment (1923)

Compton's experiment layout is described below.

In Compton Experiment, photon with wavelength λ collides with an electron at rest. The scattered photon has a longer wavelength λ^* and therefore have lower energy. The photon is deflected, and continues to move with a new angel *θ*. The electron that was at rest, after collision, is deflected from its course in the opposite direction at an angle *φ*



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Derivation of Compton Equation

	Before collision	After collision
The energy of incident photon	$h \cdot f$	$h \cdot f^*$
The energy of electron	$m_o \cdot c^2$	$m \cdot c^2$
The wavelength of the photon	λ	λ^*
The momentum of electron	0	$m \cdot \vec{V}$

The energy of the system before collision,

$$E_{PAST} = hf + m_o c^2$$

The energy of the system after collision,

$$E_{FUTURE} = hf^* + mc^2$$

From the principle of conservation of energy

1] $$hf - hf^* + m_o c^2 = mc^2$$

Remembering that for the photon, the linear momentum is given by

2] $$p = \frac{hf}{c} = \frac{h}{\lambda}$$

The linear momentum of photons before and after the collision is given by

3] $$p = \frac{hf}{c} = \frac{h}{\lambda} \quad \text{and} \quad p^* = \frac{hf^*}{c} = \frac{h}{\lambda^*}$$

The linear momentum of an electron with velocity V is

4] $$p_M = mV = \frac{h}{\lambda_M}$$

From the principle of conservation of linear momentum along x and y axis, we have

in y axis

5] $$p_y = p_y^* + p_{M,y}$$

$$h\frac{f}{c} = h\frac{f^*}{c}\cos(\theta) + mV\cos(\phi)$$

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In x axis

6]
$$0 = p_{M,x} + p_x$$

$$0 = mV\sin(\phi) - h\frac{f^*}{c}\sin(\theta)$$

Squaring (5) and (6) and then adding them together,

7]
$$m^2V^2c^2 = (hf)^2 + (hf^*)^2 - 2(hf)(hf^*)\cos(\theta)$$

Squaring equation (1);

8]
$$(hf - hf^* + m_oc^2)^2 = (mc^2)^2$$
$$m^2c^4 = m_o{}^2c^4 + (hf)^2 + (hf^*)^2 - 2(hf)(hf^*) + 2m_oc^2(hf - hf^*)$$

Subtracting (7) from (8);

9]
$$m^2c^4 - m^2V^2c^2 = m_o{}^2c^4 + 2(hf)(hf^*)[\cos(\theta) - 1] + 2m_oc^2[hf - hf^*]$$

According to Einstein's equations, Relativistic mass depend on velocity according to

10]
$$m = \frac{m_o}{\sqrt{1-\beta^2}}$$
$$\beta = \frac{V}{c}$$

from eq 10

11]
$$m^2c^2 - m^2V^2 = m_o{}^2c^2$$

Multiplying both sides by c^2;

12]
$$m^2c^4 - m^2V^2c^2 = m_o{}^2c^4$$

This is known as Einstein's equation

13]
$$E^2 - p^2c^2 = E_0{}^2$$

Using equation (12) , equation (9) becomes

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14]

$$0=2(hf)(hf^*)[\cos(\theta)-1]+2m_oc^2[hf-hf^*]$$

$$\frac{h}{m_oc^2}[1-\cos(\theta)]=\frac{f-f^*}{f\cdot f^*}=\frac{1}{f^*}-\frac{1}{f}$$

$$\frac{c}{f^*}-\frac{c}{f}=\lambda^*-\lambda=\frac{h}{m_oc}[1-\cos(\theta)]$$

The last line in Eq 14 is Compton equation

11]

$$\lambda^*-\lambda=\lambda_c\cdot(1-\cos(\theta))$$

$$\lambda_c=\frac{h}{m_oc}$$

Where λc is called the Compton wavelength of the electron.

Let see the wave properties derived from Compton Effect

From eq 6, in x axis

12]

$$h\frac{f^*}{c}\sin(\theta)=mV\sin(\phi)$$

$$\frac{f^*}{c}\sin(\theta)=\frac{mV}{h}\sin(\phi)$$

$$\frac{1}{\lambda^*}\sin(\theta)=\frac{1}{\lambda_M}\sin(\phi)$$

$$\frac{c}{\lambda^*}\sin(\theta)=\frac{c}{\lambda_M}\sin(\phi)$$

$$f^*\sin(\theta)=f_M\sin(\phi)$$

From the last line above momentum conservation becomes frequency conservation

in y axis

13]

$$h\frac{f}{c}=h\frac{f^*}{c}\cos(\theta)+mV\cos(\phi)$$

$$\frac{f-f^*\cos(\theta)}{c}=\frac{mV}{h}\cos(\phi)$$

$$f-f^*\cos(\theta)=f_M\cos(\phi)$$

Again, from the last line above momentum conservation becomes frequency conservation

We have to remember that

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$$\frac{1}{\lambda_M{}^2} = \frac{1}{\lambda_C{}^2}\frac{\beta^2}{1-\beta^2} = \frac{\beta}{2\lambda_C{}^2}\left[\frac{1}{1-\beta} - \frac{1}{1+\beta}\right]$$

$$\frac{c^2}{\lambda_M{}^2} = \frac{c^2\beta}{2\lambda_C{}^2}\left[\frac{1}{1-\beta} - \frac{1}{1+\beta}\right]$$

$$f_M{}^2 = f_C{}^2\frac{\beta}{2}\left[\frac{1}{1-\beta} - \frac{1}{1+\beta}\right]$$

From the last line when the electron moves the Compton frequency splits into two frequencies

Conclusions

The main conclusion from the Electrical Circuits describe above is: that Relativistic and Non relativistic mechanical process can be solved using an Electric Analog Circuit or Maxwell Equations .

The most important conclusion from this paper is that Special Relativity and Newtonian Mechanics is a wave theory and not a mechanical theory. No particles really exist only waves as Quantum Theory predict

This is only the first part of the theory

In the following papers I explain the physics behind the Electrical Circuit and solve some problems in order to compare Special Relativity to this model

Special Relativity Entirely New Explanation **Authors:** Mourici Shachter

In this paper I correct a minor error in Einstein's theory of Special Relativity, and suggest a new approach to tackle problems in this area of physics. Propose of this paper is to understand what is mass. I suggest, to read this paper carefully because the minor error is in the foundation of physics. And a little part of the big structure that was built on those foundations is going to crash.

http://vixra.org/abs/1604.0035

Lorentz Velocity Transformation and Energy Mass and Momentum Transformation **Authors:** Mourici Shachter

Velocity transformation is used to change system coordinates in order to simplify the solution of problems that involve relativistic collisions of particles. In this paper I check how the energy of a particle A that moves with some velocity VA toward an observer S* is seen by an observer S , under the condition that both observers sees the same energy. I found that although observer in S* sees particle A with a real rest mass momentum and energy. Observer S sees two particles. If they move in opposite direction, One of those particles have an imaginary rest mass momentum and energy. I could not decide if the case is only a numerical problem or it is also physical. I expect that those who will read this paper are more experienced then me and will find if the imaginary rest mass is physically true or false. And will suggest how to use it in practical situations.

http://vixra.org/abs/1603.0317

Special Relativity Solved Examples Using an Electrical Analog Circuit
Authors: Mourici Shachter

In this paper, I develop a simple analog electrical circuit. And I use this circuit to solve some classical problems in special relativity.

http://vixra.org/abs/1603.0209

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