A new Approach to Particles Interactions With Bosons Through Thermodynamics and Mechanics Arguments

Explanation of the Law of Lenz

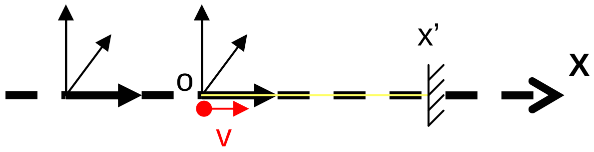
Laboratoire de Physique Théorique Fondamentale de Paris
Emmanuel Chauvet

Introduction

1905 : The electrodynamics of the moving bodies, Albert Einstein

Two inertial systems **K (x, y, z, t)** and **k (ξ, η, ζ, τ)**

Uniform translation v of **k** in comparison with **K**



Emission from **O** – **reflection** at **x' = x - vt** – **reception** in **O** of a **light ray**

At the scale of an electron – photon interaction, what kind of reflection ?

The probability for a photon emitted by a particle in O to be reflected by another particle of matter towards the previous particle is very close to zero.

Statistically the reasoning of Albert Einstein can be right at the scale of time we are able to calculate but how to found the Special Relativity at the lowest scale ?

"For x' infinitely small" :

$$\frac{\partial \tau}{\partial x'} + \frac{v}{c^2 - v^2}\frac{\partial \tau}{\partial t} = 0$$

After the simplification of this equation (which implicitly uses a speeds composition law for the speed of light), we obtain what is called further, the equation of continuity of time.

The Equation of Continuity of Time (ECT)

(2) $$\frac{\partial \tau}{\partial t} + div\left(\tau \frac{1}{n}\vec{c}\right) = 0$$

n = v/c is the special refractive index of the (particle of) matter,

v is the apparent velocity of emission of the photon by the matter in the vacuum,

c is the (phase) velocity of the photon in the vacuum ;

τ is the density of time and $\tau \frac{1}{n}\vec{c}$ is a vector density of time,

$\frac{1}{n}\vec{c}$ is the velocity of the time density carrier : lower is v, higher this velocity is.

Consequences :

• slow particles exchange time “information” far faster than c

• time coherence is so established globally in matter and perception by light, which is not as fast, gives a sight of a global time coherence

ECT : A path towards the Lorentz Transformation

Considering a photon moving along the X axis at the velocity c, (2) becomes :

$\frac{\partial \tau}{\partial x} + \frac{v}{c^2}\frac{\partial \tau}{\partial t} = 0$ which gives $\tau = a\left(t - \frac{v}{c^2}x\right)$ where a = f(v) and t = 0 if τ = 0 on O.

With v the velocity of a « ξ density », we obtain $\xi = b(x - vt)$ after integrating a coordinate density continuity equation on the photon path.

The correction of the space-time distortion due to the emission of the photon is:

$\sqrt{\frac{P_{final}}{P_{initial}}} = \sqrt{\frac{c^2}{c^2 - v^2}} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} = \beta$ where P is the differential radiation pressure of the photon.

So we can write the law of transformation of time and of one space dimension from **K** to **k**:

$$\begin{cases} \tau = a\beta\left(t - \frac{v}{c^2}x\right) \\ \xi = a\beta(x - vt) \end{cases}$$

Lacking information on the other coordinates our aim is then to exploit the equation of continuity of time locally and at the smallest quantum scale.

Reciprocity principle ; spherical coordinates ; state equation

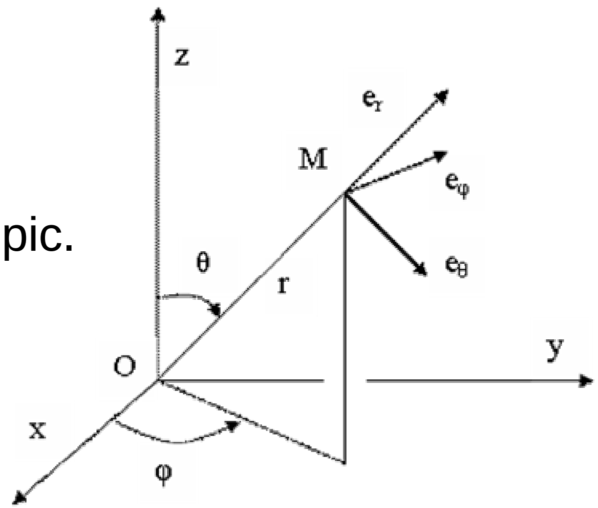
The reciprocity principle involves:

"The space-time distortion in reception = the one in emission" and so $\beta^2 = \pm i$

Calculation of the ECT in spherical coordinates:

M(O, x, y, z) → M(O, r, θ, φ)

Conditions: $r \cong r_0$, $\frac{\partial r_0}{\partial r} = 0$ but $\frac{\partial r}{\partial t} \neq 0$; $\theta \approx \frac{\pi}{2}$; τ is isotropic.



The ECT becomes: $\left(\frac{\partial r}{\partial t}\right)_\tau A = \frac{c^2}{v}$ with $A = 1 + \frac{c^2}{v r_0 \dot{\theta}} + \frac{c^2}{v r_0 \dot{\varphi}}$

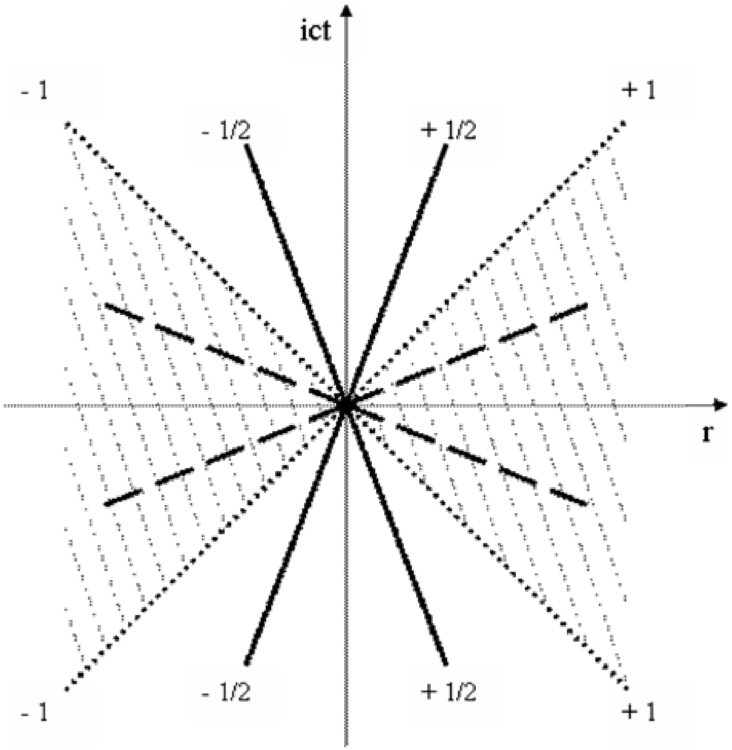
The state equation of an interacting particle is then:

$$\beta^2 = \pm i = \frac{1}{1 - \frac{v}{A}\left(\frac{\partial t}{\partial r}\right)_\tau}$$

Perturbation theory

The main solution of the state equation: $v = \pm\sqrt{2}\, e^{\pm i\frac{\pi}{4}}\, c$

The perturbation: $\Pi = \frac{1}{\sqrt{\sqrt{2}}}\, e^{\pm i\frac{\pi}{8}}$



Eight "possible" states

A new interpretation of the spin number

The second order of the theory:

Limitations

Main solution: $\alpha = \mp\sqrt{2}\, e^{\pm i\frac{\pi}{4}} \left(\frac{\partial c}{\partial t}\right)_{\tau}$

Same perturbation as the first order

Five rules of coherence between the first and the second orders of the theory

The equivalence between gravitation and acceleration

A shift of π between the solutions of the first and the second order (4 x π/4) which is equivalent to interactions with bosons which sum of spins is 4

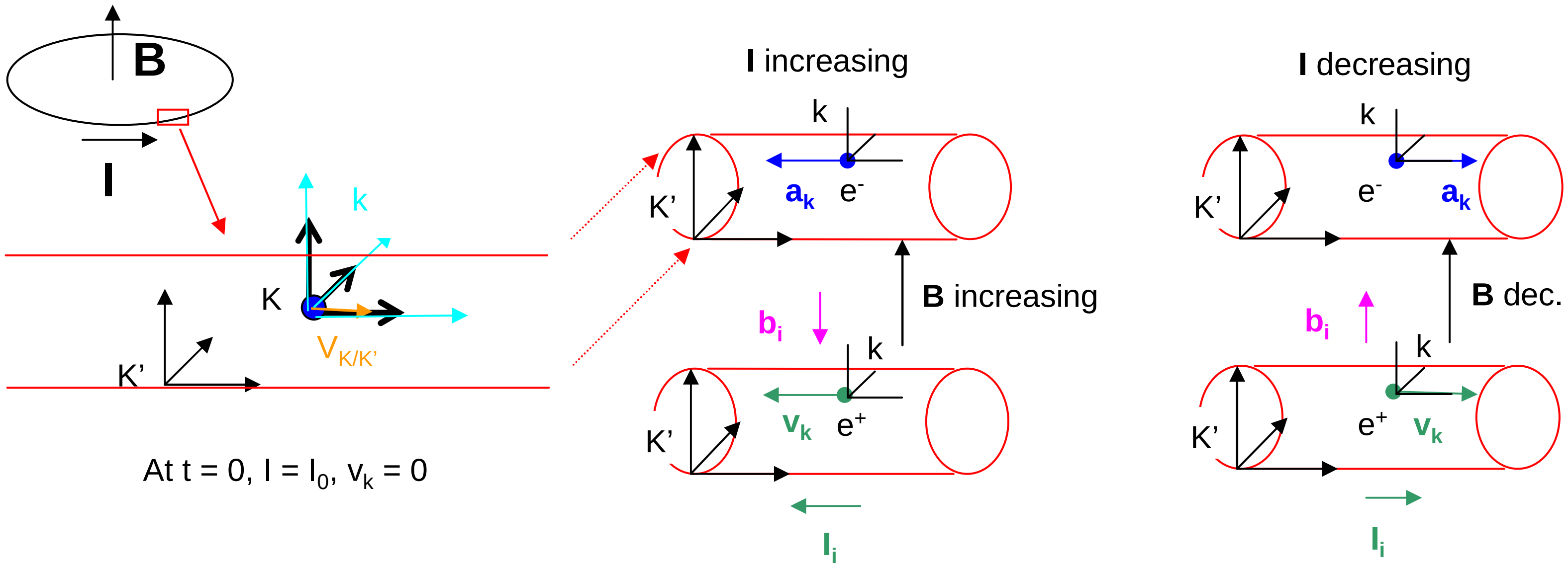
Two examples:

1. The two orders states coincide after two interactions with two photons and one interaction with a graviton,
2. The two orders states coincide after two interactions with two gravitons.

This last example particularly means that at the smallest scale, the acceleration of a particle changes its charge sign so the particle becomes its anti-particle and needs two gravitons to get back its initial charge. In other terms, the gravitation is responsible for the stability of the negative charge of the electron.

An explanation of the law of Lenz

The effects induced by a variation in magnetic field go against the causes which give birth to them.



B, b : magnetic field	a_k : acceleration in k	b_i : b induced
I : current strength	v_k : speed in k	I_i : I induced