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ABSOLUTE DYNAMICS

26TH FEBRUARY 2009

ORDIS EDITIONS

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26TH February 2009

ABSOLUTE DYNAMICS

1. **INTRODUCTION.** The title chosen for this essay, "Absolute Dynamics", does not stand in opposition to Relativistic Dynamics, the solidity of which remains undoubted. By using the term "absolute" we affirm the existence of an *absolute cosmological substrate* or, if preferred, of a *privileged frame of reference* in respect of which *all other mechanical inertial bases* moved without acceleration. The Special Theory of Relativity (SRT) itself postulated the existence of a "LORENTZ ether," even though many declared it redundant in the wake of the theory's development. Such a substrate is unnecessary for a *physico-mathematical* theory, but absolutely indispensable for plumbing the depths of Physics (metaphysical Cosmology if you wish). Fashionably speaking all the sciences, in trying to understand their foundations, use meta-lenguage: there are such things as meta-logic, meta-mathematics, and even meta-meta-mathematics. Following WERNER HEISENBERG I think Physics has a right to its own *meta-physics.*

Such an absolute substrate is fundamental, as H. BONDI says, to place in it *fundamental observers* to with *fundamental clocks* that measure *fundamental time,* together with a *fundamental ruler* to which to refer all other measurements.

We shall follow the same criterion, for otherwise it would be impossible to avoid paradoxes. We would forever remain in the realm of the "as if it were" without ever getting near to that of "what is", the physical reality of the world around us. The attempt is not a mere scientific position, but has always served as the prime motor for our investigations. To remain satisfied by the "as if it were" is no more than positivistic comfort. It has the undoubted advantages of being extremely practical and most elegant for its been liable to be tackled with a equally elegant mathematical instrument; but what we really accomplish is to reduce *metaphysical-physics* to *mathematical-physics.* However attractive this position may be, physical reality tends to set itself free from the shackles of mathematical algorithm, but not from metaphysical comprehension, perennially present even if tacitly so.

To postulate an absolute substrate is not metaphysical quibbling. It is backed by observation such the so-called *background radiation,* as well as

by the *isotropy of the Universe,* in astronomy observations. The latter demand an upper limit for the *absolute velocity* of our solar system of 250–300 km/s, taking into account the orbital velocity of our planet. Formerly this substrate was called "ether" (LORENTZ); more recently it received the name of "a body", "thermostat caché" (DE BROGLIE), "continuum", etc.

The STR bases itself on the experiments of electrodynamics as well as on those of MICHAELSON-MORLEY, FIZEAU, etc.; here we shall give a different interpretation of the same phenomena.

Formally, and strictly speaking, the STR expressed in the pseudo-Euclidean minkowskian space is an elegant mathematical solution of the "as if it were" type. It demands a never proved reciprocity of the same phenomena in all inertial frames, and it is loaded with paradox. In MINKOWSKY' solution, constrains *space* and *time*, two *hetero-geneous* realities, into one. The price of such elegance is that it cannot get rid of many paradoxes. *Space* and *time* are different realities: it is enough to think of an absolutely *static* Cosmos, with *space* determined by its lumps of matter, but without *time* for lacking of change, the real foundation of time.

This way of thinking goes back to ARISTOTLE for whom *space is prior to time* in that the latter demands the presence of the former but not *vice versa*.
The two are therefore heterogeneous, as so PALACIOS, one of the best Spanish physicists, thought.

On the other hand, in Minkowsky's *space-time,* the speed *c* is an universal constant playing the same role as *infinite* speed in Galilean-Euclidean space. The latter has the advantage of not forcing the space co-ordinates together with time duration. Time remain heterogeneous, and is always positive as demanded by the Second Principle of Thermodynamics, EDDINGTON's "time-arrow."

The POINCARÉ–MISRA theorem clearly brings out the heterogeneity between space and time: it is not possible to reconcile Dynamics with Thermodynamics, because the former, as formulated, is *symmetrical* with respect to time and the latter is not.

Euclidean space allows for an independent absolute time, and is therefore better for getting to the "as is" of physics. Our exposition loses

elegance in that our "as if it were" will not improve in positivistic terms. Our express intention, however, is to get at the bottom of physics "as is".

Since the time of BECQUEREL, CURIE and POINCARÉ it has been well known that mass and energy are complementary aspects of the same reality.. Later experience confirmed the presence of energy at rest E_o, and that mass-energy increases with velocity, tending to infinity when it is near the velocity of light. W. BERTOZZI fully proved this proposition in 1964. This essay is an attempt at integrating all these facts starting from the famous FITZGERALD-LORENTZ contraction, which will re-acquire the *real*, *non reciprocal* character, meant by the eminent physicists who formulated it.

We will say nothing about the incompatibility of Electrodynamics with Classical Dynamics (CD), for it would require remodelling the latter into a New Dynamics (ND) able to unify and transcend at the same time the incompatibility between Thermodynamics and Quantum Mechanics[1]..

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Barcelona, 14th February 1982
(revised and registered, 1998)
(revised, Februsry 26th, 2009)

2. INITIAL HYPOTHESES. Concisely exposed are as follows:

a) We suppose that the kinetic energy K of particle m is null when its *absolute speed* v is also null in respect to an *absolute frame* of reference:

$$K = K_o = 0 \qquad \text{when} \qquad v = v_o = 0 \tag{1}$$

b) when $v << c$, the *kinetic energy* is given by the classical expression:

$$\boxed{K = \tfrac{1}{2} m v^2} \tag{2}$$

[1] *Vid.* J. RIUS-CAMPS *The Dynamics of Irreversible Mechanical Systems,* Barcelona, 1996.

c) If the particle *reaches* speed c, the whole of its *mass-energy at rest* E_o has become kinetic energy:

$$K_c = E_o \qquad (3)$$

In this sense E_o is the *upper limit* of kinetic energy.

d) The *total energy* E of the particle tends to infinite when its speed approximates that of light. Now we can write

$$E_c = \textit{tends to infinite}$$

e) Since both *kinetic* and *rest energy* are *finite,* and *total energy* grows monotonically towards *infinite* with the particle speed, it is necessary to postulate the existence of another energy in the moving particle, different from both its kinetic and its rest energy. Let us call it *internal energy* U. It must comply with the conditions

$$\begin{aligned} &U_o = 0 && \text{when} && \square = 0 \\ &U_c = \textit{infinite} && \text{when} && \square = c \\ &\textit{total energy} = \textit{rest energy} + \textit{internal energy} \end{aligned} \qquad (4)$$

f) Besides kinetic energy K and internal U, the particle possesses rest energy E_o, as already said; but this energy *does not keep constant* because it decreases with absolute speed $\square$. Let us call it E_e. As we shall see in the *second fundamental hypothesis* this energy is the only one capable of being emitted as a photon without atomic desintegration; its rest value is E_o and becomes zero at c speed, being then impossible any photon emission.

3. FUNDAMENTAL HYPOTHESIS. The two *fundamental hypothesis* that complement the precedent ones are:

1) ***First fundamental Hypothesis.*** If a system in absolute rest emits a photon, an equal part of its rest mass-energy E_o becomes radiant energy. In principle *the whole of its rest mass* could become radiation, nevertheless our hypothesis is that only the fraction E_o/Φ, *is liable to be emitted,* if the absolute speed $v \neq 0$. The Φ function enjoys the following properties:

$$\Phi = 1 \qquad \text{if} \qquad v = 0$$

$$\Phi = \text{infinite} \qquad \text{if} \qquad v = c$$

When a particle reaches, if it should be conceivable, the speed $v = c$, then the photon emission should be impossible.

The last affirmation implies that if a photon of ν_o frequency, emitted at absolute rest[2], has the energy

$$E_o = h\nu_o$$

If emitted from an emitter at speed v_e, its energy will be lesser, since only a *fraction* is liable to be emitted:

$$\boxed{E_e = E_o/\Phi = h\nu_o//\Phi = h\nu_e} \qquad \nu_o/\Phi \quad (5)$$

since we postulate the invariance of h (PLANCK constant). From (5) it is immediate

$$\boxed{\nu_e = \nu_o/\Phi} \qquad (6)$$

[2] Either at absolute rest or near it, such as the Earth absolute orbital speed.

The above result is fundamental to the theory here proposed.

In summary, the *total energy* E (4) of the particle is expressed as

$$\boxed{E = E_e + K + U} \qquad (7)$$

evidently satisfying the conditions

$$\begin{aligned} E &= E_o && \text{when} && \beta = 0 \\ E &= \textit{infinite} && \text{when} && \beta = c \end{aligned} \qquad (8)$$

2) The ***Second fundamental Hypothesis*** is to affirm that the fraction $1/\gamma$ of the E_o energy, susceptible of to be emitted, is given by

$$\boxed{E_e = E_o - K}$$

where K is the kinetic energy of the mass particle before emitting the photon. From the equation (5) plus the above, it follows that

$$E_o - K = E_o/\gamma$$

and from the latter

$$\boxed{K = E_o \frac{\gamma - 1}{\gamma}} \qquad (9)$$

This equation must satisfy the conditions (1), (2) , (3), and (4). It is fulfilled for the (1), (3) and (4) but also it is necessary the fulfilment of expression (2). For this aim we ought to know the expressions for E_o and g . In this way *two experimental facts* will serve us:

1st The *mass–energy equivalence* at rest, given by

$$E_o = m_o c^2$$

2nd The *"failure"* of the 1881 MICHELSON–MORLEY experiment suggest the FITZGERALD–LORENTZ "contraction" given by

$$l = l_o/\gamma$$

Associating this *contraction* to the *fraction* $1/\gamma$ of *rest energy* E_o liable to be emitted, given by (5)

$$E_e = E_o/\gamma$$

(we will further justify this association), it follows that

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

attained by LORENTZ.

4. FIRST CONCLUSIONS. From the prior exposition we can conclude, by the way of summary, that

$$K = m_o c^2 \frac{\gamma - 1}{\gamma}$$

which is none other than (9) and also satisfies condition (2), because in this particular case results

$$K = m_o c^2 (1 - 1/\gamma) \approx m_o c^2 (1 - 1 + \tfrac{1}{2}\frac{v^2}{c^2})$$

when $\beta << c$, and then

$$K = \tfrac{1}{2} m_o \beta^2$$

which is the expected correct result[3].

In another side, we also knows by experience that the particle total energy E , according to equation (7), satisfies

$$E = E_o \beta \qquad (10)$$

with the values for E_o and β , given by the experience as noted before, fulfilling the conditions (8).

Now, from (5), (7) and (10), we can write

$$\begin{aligned} E &= E_e + K + U = E_o \beta \\ U &= E_o \beta - E_e - K \end{aligned} \qquad (11)$$

Noting that $E \approx E_o + K$ when $\beta << c$. Introducing (5) and (9) into (11) we can determine the expression for U :

$$U = E_o \beta - E_o/\beta - E_o \frac{\beta - 1}{\beta} = E_o(\beta - 1/\beta - 1 + 1/\beta) =$$

$$\boxed{U = E_o(\beta - 1)}$$

that satisfies the conditions (4). It is worth noting that this expression appears as "kinetic energy" in the SRT; here has the meaning of *internal energy* . May be liberated on the receptor at rest "braking" the particle, as shown by W. BERTOZZI in 1964 who, however, takes it as kinetic energy. The same energy can become radiation if the particle disintegrates, as it is shown by the disintegration of π^0 mesons (CERN, 1964).

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[3] This happens at speeds near to absolute rest at Earth, compared with light speed c ; since its upper limit is of the order of *300 km/s* .

5. MASS PARTICLE EMISSION AND ABSORPTION. Now we will see the general case in which a *photon particle* , with rest mass m_o , emitted from an *emitter* at speed v_e and absorbed by a *receptor* at speed v_r . In such a situation the *energy at rest* of the particle will not be E_o but the *fraction* E_e *;* and its *total energy* E_r , on being absorbed by the receptor, will be $E_e\gamma_r$ instead of $E_o\gamma_r$; verifying

$$E_r = E_e/\gamma_r + K_r + U_r = E_e\gamma_r \qquad (12)$$

where E_e is given by (5); K_r and U_r are, respectively, the *kinetic energy* and the *internal energy* of the absorbed particle, whose *rest energy* is the *fraction* E_e , instead of E_o . Factors γ_e , γ_r , correspond to the speeds of emission and reception of the particle.

The (12) expression is identical to

$$E_r = m_oc^2/\gamma_e\gamma_r + (m_oc^2/\gamma_e)(\gamma_r - 1)/\gamma_r + U_r = (m_oc^2/\gamma_e)\gamma_r \qquad (13)$$

and from the last one it is immediate that

$$U_r = (m_oc^2/\gamma_e)(\gamma_r - 1/\gamma_r - 1 + 1/\gamma_r) =$$

$$\boxed{= U_r = (m_oc^2/\gamma_e)(\gamma_r - 1)}$$

If the mass particle is emitted at rest, in this case $\gamma_e = 1$ and we have

$$U_r = m_oc^2(\gamma_r - 1)$$

and if the receptor is also at rest, then $U_r = 0$ as predicted by the theory.

6. WAVE–PARTICLE. On interpreting the particle as a wave, (13) becomes

$$h\nu_r = h\nu_o/\nu_e\nu_r + (h\nu_o/\nu_e)(\nu_r - 1)/\nu_r + (h\nu_o/\nu_e)(\nu_r - 1) = (h\nu_o/\nu_e)\nu_r$$

from which follows at once that

$$\boxed{\nu_r = \nu_o\nu_r/\nu} \qquad (14)$$

The above is fundamental, as we shall see, to correct the *classical DOPPLER effect* so as to arrive at the result of relativity.

Now, continuing with our exposition, since by (5) we have

$$\nu_e = \nu_o/\nu \qquad (15)$$

then from (14) we get

$$\nu_r = \nu_e\nu_r \qquad (16)$$

The frequency received is greater than that emitted, and the emitted one is less than that liable to be emitted at rest. Corrections (15) and (16) are *superimposed* to the classical DOPPLER effect; besides they will account for the *transversal DOPPLER effect, FIZEAU's coefficient, star aberration,* etc.

7. THE DOPPLER EFFECT. The theory proposed considers light as moving in vacuum at speed c in respect of the absolute frame. If the *source* moves at speed ν_e and the *observer is at rest;* the classical DOPPLER effect –being ν_e in the same observation line and *moving away from the observer*– is given by

$$\boxed{\nu = \frac{\nu_o}{1 + \frac{\nu_e}{c}}}$$

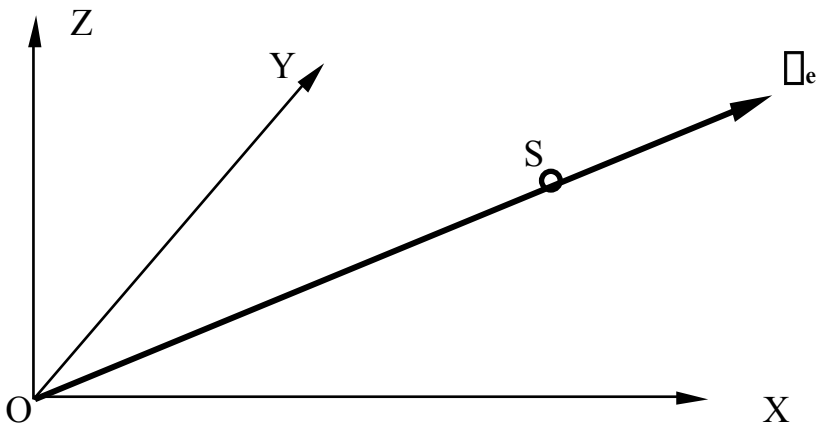

Fig. 1

the observer is supposed in the co-ordinates origin *0* (see Fig. 1). If movement is *towards the observer at rest,* then

$$\nu = \frac{\nu_o}{1 - \frac{v_e}{c}} \tag{17}$$

according with observation; however according to precedent deductions, it is necessary to *superimpose* correction (15) to the frequency (17), and so finally we get

$$\boxed{\nu_e = \nu \frac{1}{\nu_e} = \frac{1}{\nu_e} \frac{\nu_o}{1 - \frac{v_e}{c}}} \tag{18}$$

identical to relativistic result. And similarly in the precedent case with the source *moving away from the observer at rest*.

Let us now consider the problem *symmetric* to (17), that is to say, the *source at rest* and the *observer moving with speed* $v_r = -v_e$, *towards the source,* the classical result is

$$\nu = \nu_o \left(1 - \frac{v_r}{c}\right) = \nu_o \left(1 + \frac{v_e}{c}\right)$$

Correcting this with (14) and taking into account that since the source is at rest $\gamma_e = 1$, it becomes

$$\nu_r = \gamma \nu_r = \nu_o \left(1 + \frac{v_e}{c}\right)\gamma \qquad (19)$$

being $\gamma = \dfrac{1}{\sqrt{1 - \dfrac{v_e^2}{c^2}}}$ (because $v_r = -v_e$)

Result (19) is identical to the relativistic one and it is immediate that the frequency ν_e in (18), is exactly the same as ν in (19); it is enough to write the last one as

$$\nu_r = \nu_o \left(1 + \frac{v_e}{c}\right)\frac{\sqrt{1 - \dfrac{v_e^2}{c^2}}}{1 - \dfrac{v_e^2}{c^2}} = \nu_o \frac{\left(1 + \dfrac{v_e}{c}\right)\sqrt{1 - \dfrac{v_e^2}{c^2}}}{\left(1 + \dfrac{v_e}{c}\right)\left(1 - \dfrac{v_e}{c}\right)} =$$

$$\nu_o \frac{\sqrt{1 - \dfrac{v_e^2}{c^2}}}{1 - \dfrac{v_e}{c}} = \frac{1}{\nu_e}\frac{\nu_o}{1 - \dfrac{v_e}{c}} = \nu_e$$

thus, evidencing the *relativistic symmetry* which classical physics lacks[4].. We will find a like *symmetry* when the *source is moving away from the observer*.

8. TRANSVERSAL DOPPLER EFFECT. The classical DOPPLER effect occurs when the emitter's velocity v forms an angle θ with the direction of observation and the observer is at rest. Its expression is

$$\nu = \frac{\nu_o}{1 + \left(v/c\right)\cos\theta} \tag{20}$$

that must be corrected according with (14), as just we have seen. And being $\theta = 1$, in that case we get

$$\lambda_r = \lambda \frac{1}{\lambda_e} = \left[\frac{\nu_o}{1 + \left(v/c\right)\cos\theta}\right]\frac{1}{\nu_e} \tag{21}$$

and then in (20) results $\nu = \nu_o$ when $\theta = \pi/2$, but it is not the same in the (21) that becomes

$$\lambda_r = \lambda \frac{1}{\lambda_e} = \nu_o \frac{1}{\nu_e}$$

that is the same result expected in SRT, known as *transversal DOPPLER effect;* evidenced for the first time by IVES and STILLWELL in 1938 and 1941, and more recently (1960) by experiments using of the *MOSSBAUER effect*.

[4] *Vid.* FEYNMANN, p. 34 - 11

If both, observer and source, move in respect of the *cosmological substratum,* then result (20) needs to be modified according to (14); and we get

$$\nu_r = \frac{\nu_o}{1 + \left(v/c\right)\cos\theta}\,\frac{1}{\nu_e}\,\nu_r$$

It is not usually possible to know whether our inertial frame coincides with the *absolute* one, but recent studies on the "background radiation" allows us to affirm that our speed in respect of this *cosmological substratum* has an upper limit about *300 km/s ,* as already noted. We can also take COPERNICUS's frame of reference as the absolute one, knowing that the approximate correction factor is given by

$$\nu_r \approx \sqrt{1 - \frac{c^2\,10^{-6}}{c^2}} = 0,99999950 \approx 1$$

but as the correction is negligible, we can apply the foregoing reasoning without problems.

9. MASS LIABLE TO BE EMITTED AND TOTAL MASS. In section **3**. we equated the *F. L. contraction* to the reduction of mass-energy m_e. l*iable to be emitted.* Now let us assume that the mass m_o *at rest* is a cylinder of length l_o with its axis oriented along the direction of the velocity v. A physical form of understanding the loss of *mass liable to be emitted* is to admit a real contraction of l_o in the direction of motion; and then we get

$$m_e = m_o/\nu_e \qquad (22)$$

Thus we have a better understanding of the F. L. contraction, whose experimental justification was the failure of the M.M. experiment (1891), confirmed by further proofs.

On the other hand from (10) it is immediate that

$$E = E_o\gamma = m_o c^2\gamma$$

by which we can define the *total mass* m of the moving particle:

$$\boxed{m = m_o\gamma} \qquad (23)$$

$$\boxed{E = mc^2} \qquad (24)$$

Expression (23) is the relativistic increase of mass and (24) give us the total energy, except that in the present exposition the increase is *real* in respect to the absolute substratum, and *neither relative nor reciprocal* as according to the SRT.

According to (22) the mass m_e *liable to be emitted* tends to zero when the particle's speed approaches c. Photons cannot be emitted at this speed except by disintegration as we have affirmed. We can consider m_e as the *physical, dimesionable mass* of the system; meanwhile by using (5) we can write the parallel expression

$$m = m_e + m_K + m_U$$

with $m_e = m_o/\gamma$, $m_K = m_o(\gamma - 1)/\gamma$, $m_U = m_o(\gamma - 1)$. We shall consider m_K as *kinetic mass,* varying between *zero* and m_o, meanwhile we designate m_U as *internal mass* that changes between *zero* and *infinite;* the latter two are not dimensionable like m_e.

When a moving particle is slowed down to absolute rest, its energy is either absorbed by the receptor or radiated, so that only m_o remains.

The *photon* is a *very peculiar* particle: it possesses kinetic energy K_c only, but neither internal energy U nor energy or mass liable to be emitted. Therefore

$$K_c = m_o c^2 = h\nu_o \qquad (25)$$

supposed it is emitted from absolute rest. If not, equation (25) should have m_o/γ_e instead of just m_o, thus becoming

$$K_c = m_o c^2/\lambda_e = h\nu_e$$

as already seen.

In the present theory the photon *mass at rest* is m_o, becoming m_K at emission but has not internal energy U, for no work is done upon m_o. Thus we elude the thorny question whether to attribute to it a *null rest mass*. This is an open contradiction if the photon origin is a "defect of mass" of the emitting body. If its rest mass is null, how to explain this "defect" in the emitter? Since $m_e = 0$, we cannot assign dimensions to the photon; nevertheless it possesses mass m_K, so that forces may act on it modifying its trajectory, etc., as occurs with gravitation forces (famous SOBRAL experience); also inertial mass is present since it possesses energy, and it behaves as a *wave–particle.*

It is worth noting, as it is well known, that the M. M. experiment does not constitute a proof or a consequence of SRT. Nevertheless it is in accordance with what has been expounded here. The experimental facts are also in accord with the *physico–mathematic* explanation of SRT, and no objection is there if no extrapolation is made beyond the limits of the positivistic "as if it were". The foregoing treatment, as noted at the

beginning, is along the *physico–metaphysical* lines, so as to avoid basic paradoxes and contradictions; that is to say, go away from the "as if it were" for a closer approach to the "as is".

10. THE FIZEAU's EXPERIMENT AND STELLAR ABERRATION.

This section, and following the actual exposition, will account the *FIZEAU's experiment* on moving fluids and for the phenomenon of *stellar aberration* from a moving frame of reference like our planet.

a) FIZEAU's experiment. When light travels trough the system in the same direction and sense as $\boldsymbol{u}$, as per Fig. 2, then

$$\lambda_{c/n} = c/n + u$$

since c/n is the light speed in the medium, and it is so according to our problem understanding. However when we observe at F' the interference of two light beams, travelling through the fluid in the opposite sense, everything happens *as if* speed u were corrected by the factor $(1–1/n^2)$; that is to say

$$u_{c/n} = u\left(1 - \frac{1}{n^2}\right) \qquad (26)$$

it immediately follows that

$$\square_{c/n} = c/n + u_{c/n} = c/n + u\left(1 - \frac{1}{n^2}\right)$$

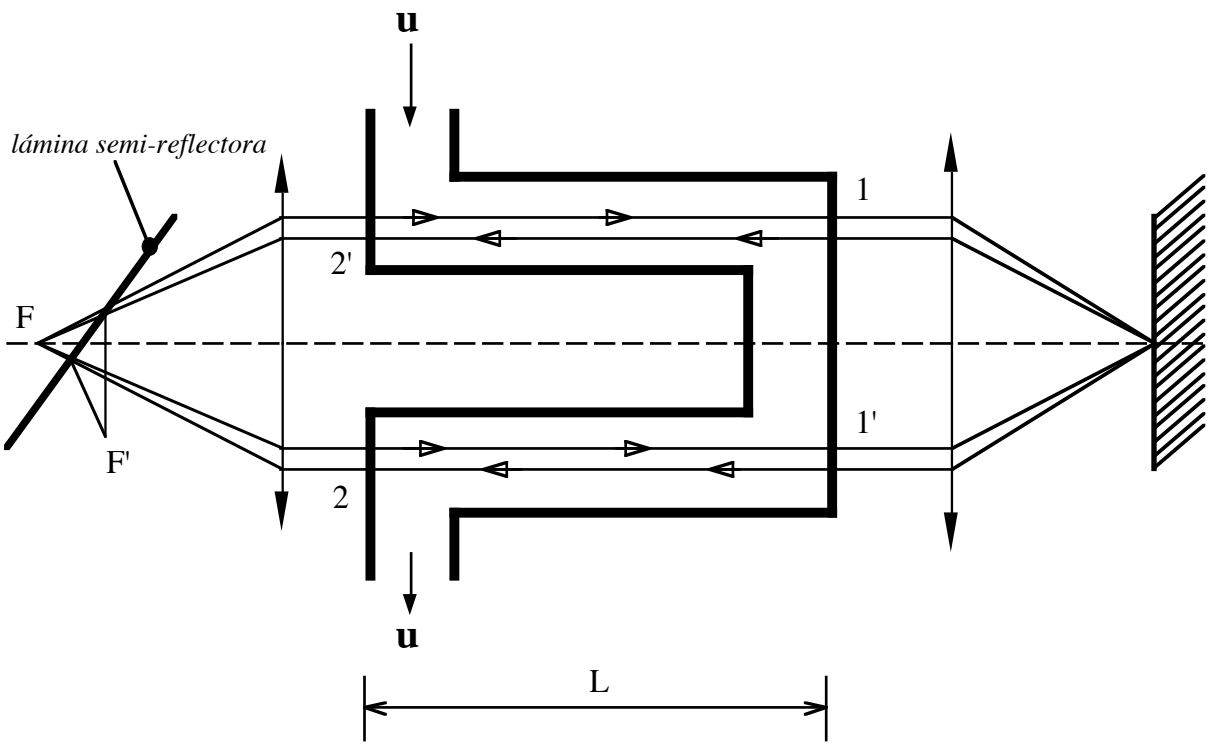

Fig. 2

in agreement to FRESNEL prediction and the results of FIZEAU, M. M., etc. that confirms it. To explain this fact according with our theory, it is necessary to consider that the photons *emitted* at F, are *re-emitted* (at speed $c/n + u$), first at the point *1* and then at point *2* (*1'* and *2'* for those travelling in opposite sense) before interfering at *F'*. Since $c/n >> u$, we can consider that such a re-emission occurs at speed c/n.

According to the result (6) the frequency re-emitted light will be

$$\nu' = \nu/\nu_{c/n}$$

where ν is *the frequency* on leaving F. But as there occur *two re-emissions* before reaching *F'*, the frequency at interference will be

$$\nu'' = \nu/(\nu_{c/n})^2$$

and the corresponding wavelength

$$\lambda'' = \lambda\lambda^2_{c/n} \qquad (\text{con } \lambda = c/\nu) \qquad (27)$$

and the expected *shift* (related to the emitted wave length) is

$$\Delta\lambda/\lambda = \nu_u$$

This is proportional to the fluid speed u, just like $\Delta\lambda$. Nevertheless, on the wavelength varying with (27), but $\Delta\lambda$ remaining the same due to its dependence to the *real speed* u, it will be

$$\nu_u'' = \Delta\lambda/\lambda'' = \Delta\lambda/\lambda\lambda^2 = \nu_u/\lambda^2_{c/n}$$

Since the observed relative shift is proportional to the fluid speed, we can write

$$\Delta_t/u \;=\; \Delta_t''/u_{c/n} \;=\; \textit{observed value}$$

and from the two precedent expressions it is immediate that

$$u_{c/n} \;=\; u\Delta_t''/\Delta_t \;=\; u/\beta_{c/n} \;=\; u\left(1 \;-\; \frac{c^2/n^2}{c^2}\right) \;=\; u\left(1 \;-\; \frac{1}{n^2}\right)$$

that is none other than the speed calculated by FRESNEL from his experimental results (26); and definitively we get

$$\boxed{\beta_{c/n} \;=\; \frac{c}{n} \;+\; u\left(1 \;-\; \frac{1}{n^2}\right)}$$

as we have intended to prove [5].

b) Stellar aberration. If α is the angle formed by the light beam emitted from a star with the orbital plane of Earth (see Fig. 3), classical mechanics (supposed a COPERNICAN referential frame *(R)*) give us the components of velocity $\boldsymbol{c}$:

$$\boldsymbol{c} \;=\; [\beta_x = -c\cos\alpha\ ,\ \beta_y = -c\,\mathrm{sen}\,\alpha\ ,\ \beta_z = 0]$$

and the sum of vectorial velocities is

$$\boldsymbol{c'} \;=\; \boldsymbol{c} \;-\; \boldsymbol{\beta}$$

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[5] *Vid.* M. BERTIN, J. P. FAROUX, J. RENAULT. *Electromagnétisme 3,* p. 127. Ed. Dunod. París, 1979.

Being c' the velocity at (R') fixed to the Earth's centre of gravity. For simplicity let us assume this to happen at the moment when β is parallel to the COPERNICAN axis OX at points of its orbit T_1 and T_2 lying on OZ. The components of the velocity of light in (R') will then be

$$\alpha_x' = -c\cos\alpha - \beta \quad , \quad \alpha_y' = -c\,\mathrm{sen}\,\alpha \quad , \quad \alpha_z' = 0$$

with the direction of observation from Earth of

$$\boxed{\mathrm{tg}\,\alpha' = \alpha_y'/\alpha_x' = \mathrm{sen}\,\alpha/(\cos\alpha + \beta/c)}$$

Six months later the Earth, initially at T_1, will reach T_2, and β will now be $-\beta$, modifying the direction of observation (see Fig. 3). Calculations correspond rather well with experimental observation, which speaks in favour of the existence of an *absolute substratum* in respect of which light propagates with constant speed c. Relativistic calculations give

$$\mathrm{tg}\,\alpha_R' = \mathrm{tg}\,\alpha'/\gamma \qquad \text{with} \qquad \gamma = \frac{1}{\sqrt{1 - \frac{\beta^2}{c^2}}}$$

but, since $\beta/c \approx 10^{-4}$, it is impossible to detect the difference. From the point of view of our theory, we can maintain the classic expression since the fact is rightly interpreted. Relativistic interpretation means that:

$$\alpha_x^2 + \alpha_y^2 = \alpha_x'^2 + v_y'^2 = c^2$$

incompatible with all the above[6].

[6] *Ibid.* p. 127

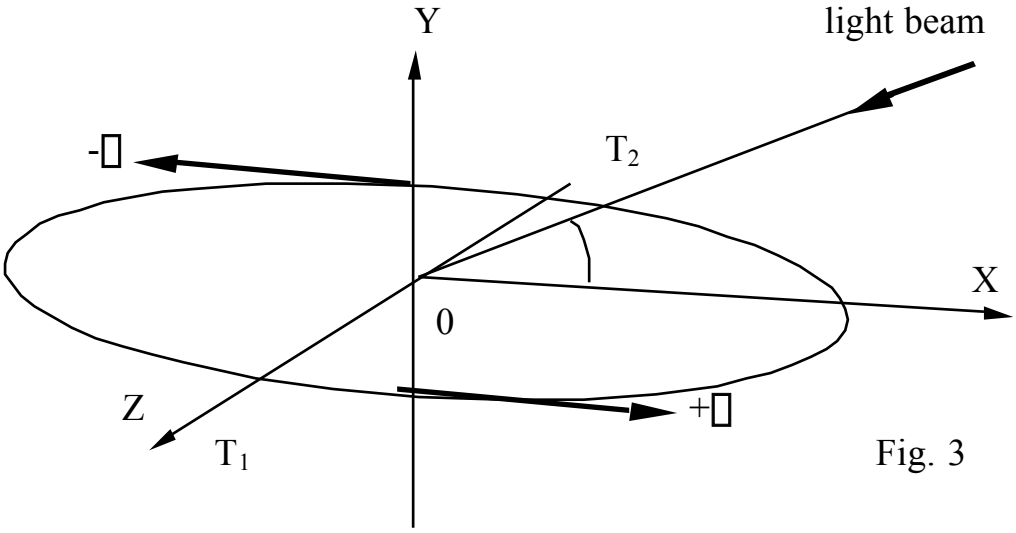

Fig. 3

11. FINAL CONCLUSION. After pointing out the difficulties of Relativity at the beginning, we have applied our *Absolute Dynamics* to the best known classical problems with the intention of showing that there is no need to recur to Relativity in order to solve them. The expounded Dynamics is by no means complete, for it does not tackle the totality of mechanical problems, but only those affected by the presence of an *absolute cosmological substratum.*

BARCELONA, 14th February 1982
(Revised, February 26th 2009)

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(Revised, Barcelona, 26TH February 2009)