

*For a better understanding, please read first : "A coherent dual vector field theory for gravitation".*

## **Discussion: the Dual Gravitation Field versus the Relativity Theory**

### ***What is the extend of the Dual Gravitation Field Theory (Gravitomagnetism)?***

The gyrotation theory is a theory at Newton's and Kepler's "level". By this is meant that when Newton and Kepler observed the sky, they could not discover more than the radial effect of gravitation. Now, we can observe supernova and binaries. With the gyrotation theory, the transversal part of gravitation is confirmed in the Maxwell analogue equations. The theory corresponds fairly well with observation, solving the "missing mass" problem and many other questions.

The gyrotation theory is not pretending to solve the calculation method for time, length, the gravitation factor G, etc. in other systems. It has to be seen as the extension of the basic Newton's law, nothing more. But the theory is necessary to fully understand gravitation motions.

When we now reach this level of understanding, we can indeed wonder if time, length, the gravitation factor G, etc. vary in place and in time, and by which parameters.

For example, the problem "time" is more a problem of measurement than a problem of fundamentals only. Earlier, scientists took the earth's day or the earth's year as a time unit. When you see a rotary star with a black spot on it, somewhere in space, you could take the frequency of the black spot as a time unit too.

Nowadays we have taken a light signal from an atomic vibration as unit, especially to measure very short events. This choice has a consequence, as it has been searched after since Einstein : this time unit is only valid for light (and "trapped light") at a certain place (and even only at a certain moment). The challenge is to find a way to compare systems at different places and times and to predict (calculate) what light does, what atoms do in those systems, and how the basic parameters might change.

But again, gyrotation theory does not pretend having much more than the "Newton and Kepler level" of Gravitation understanding, such as relativistic properties, nor prediction possibilities in terms of fundamental units. It does calculate what happens locally in a system with local time, distance, mass, speed of light and G. And it can maybe help us getting a better view on the relationship between systems at different places and time. By comparing calculations and observation, we should be able to clarify the fundamental links between the dimensional units.

### ***The centenary of the relativity theory.***

No one puts Einstein's geniality in doubt. The introduction of the relativity principle dominated the twentieth century completely. In a period where the cosmic observations were quite limited, the theory of the relativity had predicted events that appeared to be correct, like the bending of light by gravity, and the advance of Mercury's perihelion.

The big number of cosmic observations made so far has been giving so much substance to eventual theories enabling to prove their validity, that it appears quite contradictory that so few solutions have being brought when it comes to the general relativity theory, while thermodynamics and quantum mechanics are getting many successes in the description of physics.

Let's debate on the relativity theory according to the rediscovery of the gyrotation  $\Omega$  (the field of Heaviside), which explains the influence of an object's velocity in its field of gravitation in an analogous way as the magnetism in the electromagnetism.

The possibility of mathematical deduction of this field, its clear and unambiguous physical meaning, and its analogy with the induced magnetic field, makes it a real addition to gravitation theory, since it is directly derived from the gravitation field's movement.

This field complies with 
$$\oint \mathbf{W} \cdot d\mathbf{l} = 4 \pi G c^{-2} \cdot dm/dt \quad (1)$$

where  $dm/dt$  is the mass flux surrounded by the loop integral in the left side of the equation.

The Heaviside gyrotation field enables a precise description of many cosmic events, such as the formation of a plane galaxy, the shape of the supernova explosions, strengths keeping the fast rotating stars together, the torus shape of rotating black holes, etc.

In the paper, "*A coherent dual vector field theory for gravitation*", we examined two parallel mass fluxes with equal velocity in the same direction. One could conclude that the work of a moving system seen by an observer at rest equals  $W \cdot (1+v^2/c^2)$ , and the work of the moving system seen by a moving observer equals  $W$ .

When we claimed the application of the equivalence principle we got the equation

$$\frac{2G(\underline{m}_{st})_{st}}{r} + \frac{2G(\underline{m}_v)_{st} v^2}{r c^2} = \frac{2G(\underline{m}_{st})_v}{r} + 0 \quad (2)$$

The last term is zero because the velocity is zero in that case.

Taking into account the relativity equivalence one could say that a mass at rest seen by a moving observer equals a moving mass seen by an observer at rest,  $(\underline{m}_{st})_v = (\underline{m}_v)_{st}$ .

This gives finally the requested equation  $(\underline{m}_{st})_{st} = (\underline{m}_v)_{st} \sqrt{(1-v^2/c^2)}$ . (3)

When de gyrotation is taken into account, the factor  $\sqrt{(1-v^2/c^2)}$  is thus the difference between the gravitation of the moving system seen by a moving observer, and the gyrotation of the moving system seen by an observer at rest. To reduce the formula to one observer, one has only to apply the relativity principle  $(\underline{m}_{st})_v = (\underline{m}_v)_{st}$ .

But can one do such manoeuvres in physics with impunity?

### ***Lorentz's transformation, Michelson-Morley's experience, and Einstein's relativity theory.***

Lorentz noticed an invariance on the Maxwell equations, by using the factor  $\sqrt{(1-v^2/c^2)}$ .

On the other hand, the experience of Michelson-Morley had to determine the speed of the ether, and theoretically foresaw the use of this same factor  $\sqrt{(1-v^2/c^2)}$  to this effect.

It is therefore normal that this factor seemed essential to Einstein, which allowed him to prove the equation  $E = mc^2$  and on the other hand to postulate that the speed of light is constant in all directions (for the observer).

The major advantage of the theory of relativity was that it did not necessitate to take into account the absolute speed of the ether. The experience of Michelson-Morley didn't succeed, which made of the invariance of Lorentz the ideal basis for a solution.

This is what happened after the experience of Michelson-Morley : since it didn't result into anything, an inverse correction had to be made, resulting in the interference of the two light beams becoming zero after their separation and their re-grouping, as was required by the experience. It was in line with the assumption that the speed of light would be constant and identical in all directions. It legitimated the equation  $E = mc^2$ , which also necessitated the correction of the relativistic mass for all relative speeds (below  $c$ ).

The general relativity, which has as main actor the mass, forced Einstein to make a choice. Either to abandon the principle of relativity, because the masses fix the free movements in an absolute way (instead of a relative one), either to give to the invariance of Lorentz a "totalitarian" character: to consider the universe as deformed as gravitation "distorts" it, and to distort in precisely the same way the coordinates that describe this universe.

### ***Discussion of the experience of Michelson-Morley***

When at the test of Michelson-Morley the light is partially reflected and partially passed by the mirror, it is sent away by 90°. By the rotation of the earth a gyrotation force will work on the light, and bend it (depending from

the case, i.e. downwards). When the second mirror again reflects the light, the gyrotation works exactly in inverse direction (e.g. upwards). However, Michelson and Morley assumed that the light is sent in a certain direction, because of the moving ether, in order to get an interference (which corresponds to the contraction of Lorentz).

If the ether of the earth has a speed zero, interference becomes indeed zero.

### ***Galaxies with a spinning centre.***

Earlier, we have studied disc galaxies.

We have seen that the stars of galaxies balance either widely around the axis of rotation of the central black hole, either around its equator. It depends on the fact whether the star has an orbit or not.

The orbit of the stars accelerates or slows down according to its change of slope, like a harmonic oscillator. A field that transmits the kinetic energy therefore exists: the gyrotation field.

The speed must then be defined according to the strongest gravitation fields nearby, and in principle one gets for each object simultaneously a set of speeds, relative to each gravitomagnetism-field of the universe.

If the strongest gravitomagnetism-fields nearby are taken away, the equation (2) seems to be correct, and to lead to Lorentz' formula.

### ***Worlds***

In the special relativity theory, Einstein gave the example of two trains which move with a relative speed. Apart from those two trains nothing has been taken into account. Einstein created a "world". This means that the special relativity theory is only applicable for two trains with a relative movement, without any other object.

When Einstein describes situations with a room falling freely in a gravitation field and with an accelerating room, Einstein again creates worlds. Nothing exists except this room and forces on that room. When one makes the equation (2), one has again created a world, because nothing existed outside the experience.

But universe is not a lab. In reality we should always state that, i.e. for the left side or the right side of the equation (2) there exists a sufficiently large mass at finite distance, whose gravitation field reaches the test laboratory. Otherwise no "local absolute speed" can be defined. And only when no speed can be defined, we could make use of the relativity theory, and therefore get the equation (2) as a valid option.

### ***Experiment on 'local absolute speed'***

Consider the experience of parallel mass streams, but with opposite velocities (+v en -v). Depending on the immobile observer -compared to the mass streams-, or an observer moving with one of the streams, the results become totally different when using the gyrotation theory. But when one sees the observer as a large mass, the logic with the gyrotation theory comes back.

But if we would do the experiment of chapter 12 in "[A coherent dual vector field theory for gravitation](#)" with mass streams at respective velocities -v and +v (placed at infinity from other masses), we may not replace those velocities by respectively 0 and 2v, because of the symmetry principle in nature. Theoretically, the results would be totally different when applying the theory blindly.

Concerning the ether (the hypothetical carrier of light and gravitomagnetism waves), one has to acknowledge that it does not move in relation to the observer. Let's leave unexplained if the ether is a separate entity, or if it is formed by a teamwork of the gravitomagnetism and the electromagnetism themselves.

If one applies the gyrotation theory, one should state: the velocity of the ether (whatever it might be) is related to the sum of all the gravitomagnetism waves on the considered point. And its velocity is zero in relation to the object which measures its velocity. Only this way of seeing the ether is compatible with a constant speed of light.

Thus, the velocity of an object must be seen in relation to all the existing gravitation and gyrotation fields on that object. Only then, a valid reference frame can be chosen, namely the strongest gravitation field(s) of the system.

### ***Is the relativity theory wrong?***

When we limit its applications strictly to what it was meant originally, it is not wrong. The principles which are deduced from the retardation of light are of course valid. And when calculations are made for events that are related to light, this can lead to the Lorentz transformation as well. The relativity theory is applicable for light (electromagnetic waves) and gravitomagnetism waves. Perhaps even not for electromagnetic and gravitomagnetism fields. It describes accurately what a wave does according to the observer. It was seen earlier that the relativity theory applies the gyrotation, but that it is calculated backwards to the point of view of the observer. However there are many scientists who found imperfections to the theory of special relativity, or found improvements for three-dimensional applications. These researches will help astronomers interpreting observations.

Indeed, the theory causes problems. When Einstein demonstrates the way how he calculates the relativity equation  $x^2 - c^2t^2 = x'^2 - c^2t'^2$ , he calculates the light motion in the +x direction and combines it with the light motion in the -x direction. He combines  $x - ct$  and  $x + ct$  into one equation,  $x^2 - c^2t^2$ . How in physics can we combine two opposite motions at the same time? One plausible way is the following: a light beam which is subject to a transversal Doppler effect of its wave, whose wave-cycle goes first in the +x directions and then in the -x direction, resulting in  $x - ct$  and  $x + ct$ . But fundamental physics' knowledge stops here.

At the other hand, the relativity theory is not valid to explain how masses really behave. This explains the limited successes in this domain. All the successes of the relativity theory are exclusively related to how the observer sees the light, coming from an event somewhere in space.

### ***Is the relativity theory compatible with the gravitomagnetism theory?***

Yes, to a certain extent. Or better: they are both useful, but they describe different things. The relativity theory is only applicable in a restricted world, where the carrier of light is bounded with the observer, and without any fixed reference frame (such as it is valid for light). Moreover it only expresses how the data of light sources of a moving event can be mathematically transformed back for a stationary observer, but not what really happens with the objects.

Indeed, if one assume that there is only gravitation (and not gyrotation) of a stationary observer towards the stationary frame, one must say (to apply the relativity theory):

if one wants to have a moving frame examined by a stationary observer, one should do the following: look at the moving frame with a moving observer (thus simply the gravitation law) and adjust the point of view of the moving observer to the point of view of the stationary observer (deduction of the gyrotation law).

Calculated the other way around (opposite to the gravitation + gyrotation laws) one can therefore express the moving frame (examined by a stationary observer) into a stationary frame which is corrected for its velocity. The application of the relativity theory did indeed arise the term of the gyrotation, but caught in an expression, just as if an observer would examine an egg and only see the shell, whereas in fact the yolk and the blank in the egg are present but hidden. And this happens really with light, because light adapts itself to each carrier of light, in other words, the ether of the masses where the light is coming through until the ether of the observer.

This means that we have two valid approaches: one is the gravitomagnetism, valid for the description of dynamics, for any velocity, even faster than light, and another which is the relativity theory, only fully valid for the "perception" of electromagnetic and gravitomagnetism waves.

### ***Inertial mass and gravitational mass***

At the study of rapidly rotating stars we came at the conclusion that the gyrotation is responsible for the non-exploding of compact stars. The gyrotation on a moving mass gives as a result a force, which the relativity theory interprets wrongly as a mass.

We should define gravitational mass and gyrotational "pseudo-mass" as totally different entities. Inertial mass should be defined as the mass which responds to forces such as gravitation, gyrotation and other forces acting on the mass. Gravitational mass is the mass which induces centrifugal forces on satellite masses in such way that it allows the formation of closed elliptic orbits.

When the relativity theory is applied on moving masses, the mass and the gyrotation forces are mixed into a whole. This allows only with difficulty to conclude something about the laws of our universe.

### ***Conclusions.***

Since several decades, one has tried to use the relativity theory as well for the mass dynamics as for the description of light and fields. Gravitomagnetism however is doing the job consistently and fully for the description of mass dynamics. It is not in contradiction with the general relativity theory for what it was meant for, but it completes the Newton gravitation theory and is utmost effective for the description of the dynamics of masses.

### ***References.***

Einstein, A., 1916, Über die spezielle und die allgemeine Relativitätstheorie.

Feynman, Leighton, Sands, 1963, Feynman Lectures on Physics Vol 1, Vol 2.

De Mees, T., 2003, A coherent dual field theory for gravitation.

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