

# Did Einstein cheat ?

or

## How Einstein solved the Maxwell Analogy problem.

*Described by :*  
*The advance of Mercury's perihelion, and the gyrotational bending of light.*

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### Abstract

Since one century, Gravitation has been in the spell of Einstein's Relativity Theory. Although during decades, dozens of scientists have provided evidences for the incorrectness of this theory. And often successfully, but without finding a sympathetic ear. Here we will discover what is wrong with the theory, and what brings a lot of scientists -in spite of that- to not dump it. We will not only discover that the Relativity Theory of Einstein is a tricked variant of the authentic Gravitation Theory, but we will also be able to form an idea about how and why Einstein did this. *Did Einstein cheat?* is no attack on the person of Einstein, or on its working method. For that the reasons are too few. But it is a beautiful example, in these times, of a too long idolatry of a theory, just like it was the time before Galileo in astronomy and the time before Vesalius in medicine. Most remarkable is that the correct Gravitation Theory is an older theory than the Relativity Theory itself. In *Did Einstein cheat?* both theories are examined and compared, put in their historical and scientific context, and applied on some essential physical phenomena: the progress of the perihelion of Mercury and the bending of the light close to the sun.

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## 1. Introduction: two competitive models.

### *1905: the birth of a new vision*

Almost hundred years ago, a milestone was put in the history of science: the special Relativity Theory arose from Einstein's brain around 1905, as a result of a number of perceptions which could simply not be explained.

The first basic idea which has put the scientific world on its head was the concept "*relativity of the speed*". This basic idea was able to explain the Lorentz contraction that appeared to follow from the Michelson-Morley experience. Out of that the Special Relativity Theory arose. A number of scientists was soon won for the idea. The next logical step was of course *acceleration*. Immediately the next problem arose: are gravitation mass and gravitation acceleration different from inertial mass and inertial acceleration? If both could be equated, the way lay open for the development of the "*relativity of the acceleration*". But by applying the concept "*relativity of the acceleration*" on gravitation, Einstein reached the finding that an object falling to a planet, remarkably enough seems weightless. How could this be united with the fact that masses have a weight?

The philosophical solution came shortly with the "thought experiments" of Einstein: if one cannot discover the difference between on the one hand someone who stands on the ground in the gravitation field and in this way experiences a weight, and on the other hand someone in the space in a lift going upwards, both situations must be identical. The equivalence of acceleration and weight was shown that way. An elementary mass which is falling under the influence of gravitation (and in fact seems weightless) moves according to "*weightlessness lines*", usually called "*world lines*". Those "*weightlessness lines*" can describe curved coordinates, and perhaps one can state that the universe is curved as well. With the aid of a maths expert, Einstein has developed a mathematical model in which a gravitation universe was created, and in which coordinates became not fixed and straight like in a traditional coordinate system, but could be chosen freely, according the curved "*weightlessness lines*". The logic of this mathematical model lies in the extension of the concept relativity of coordinate systems.

What is considered as brilliant to the theory is moreover that the starting point is generalised but very concise, in the form of Einstein's field equations. These equations are appropriate on matter, provided that solutions of the field equations are chosen with care, including the choice of the integration constants. It also seemed to concord well with the earlier knowledge of the universe, which was rather limited compared to today.

However, we suspect Einstein to have developed a mathematical model that describes only a small part of the known universe, particularly a part of our solar system that is extrapolated to the complete universe. And not only that, but moreover, the fragment which in appearance is correct for our solar system is tricked. Soon we see why.

In the viewpoint of mathematicians there is no problem developing a magnificent mathematical theory, which is concise, very general and beautiful, even if it is verified to be complex solving it in detail. If it can then be applied on a physical concept, their satisfaction is infinitely large. One mathematical equation can then become the fundament of a universe of which only one fraction was physically observed. Though, that theory offers then the possibility of setting up the most fabulous speculations, based on each possible solution of that single mathematical equation.

### *1893: the consolidation of an old concept*

Twelve years before the Special Relativity Theory saw the daylight, more than a century ago, knowledge of electromagnetism had reached a summit when Oliver Heaviside<sup>[5],[4]</sup>, an autodidact, transformed the laws of electromagnetism in a few compact equations, the (wrongly) so-called laws of Maxwell.

But as well as this less remarked contribution of Heaviside, also the work concerning the analogous Maxwell Equations for Gravitation became almost forgotten. Heaviside settled in 1893 that the Newton law of gravitation looked remarkably much like the force law for electric charges. Would it be possible that the gravitation acts the same way as electromagnetism does? Does there exist something like *magnetic gravitation*? Heaviside could not prove it, because around 1900 the knowledge of our universe was strongly limited. But he suggested that mass worked similarly as charges do, and that two constants exist for Gravitation, analogously to electromagnetism, in such way that the universal gravitation constant and the speed of light remain linked. The result was a set of identical equations -in shape- to these of Maxwell, such as we will discover in next chapter. The challenge which Einstein had faced, namely to calculate the unexplained part of the Mercury's perihelion advance of 43 arc

seconds per century, did fade the proponents of the Heaviside theory. One could not get this deviation calculated by means of the Maxwell Analogy, because with the knowledge of that time, only  $1/12^{\text{th}}$  of it could be found<sup>[5]</sup>! Einstein himself made an attempt using the Maxwell Analogy for gravitation by means of an unnoticed publication<sup>[5]</sup>, but discovered the problem probably later on. The Relativity Theory seemed to be the only expedient to a solution.

### *Has the last word been said?*

In the dispute which arose between the traditional scientists who consider Maxwell's Equations as the ultimate theory to explain gravitational phenomena, and the proponents of the universal Relativity Theory for Gravitation there are two elements to look at. First, the perception of cosmic phenomena is achieved by means of collected electromagnetic waves such as light and X-rays. These are nicely described by the Relativity Theory, which generalises the bending of these rays to the bending of the space. This tends at the first sight to the benefit of the Relativity Theory. The second element is that the difference between both theories is in that degree small, that the Maxwell equations are considered by the "Relativists" as a good approach of the "correct" Relativity Theory. More accurately, the terms with factors  $c^0$  (called "Newtonian solution") and  $c^2$  (called "Post-Newtonian solution of the second order") are seen as a 2<sup>nd</sup> order approach of the relativistic series development.

For the engineer however, the Relativity Theory of Einstein is not practical this way: the theory tries explaining how we *see* things after distortion by gravitation rather than *what happens* in reality. It is to a great extent also philosophical and very general. In the limit, we could state that the Relativity Theory is an *Optics Theory* which takes into account gravitation. And even if the Relativity Theory would come further that the description of light behaviour, it is at the cost of an enormous effort of calculations.

As last item we state that the Relativity Theory has proved remarkably little, and what is proved, remains the only basis which makes the theory stands or falls: the advance of Mercury's perihelion which is not completely explained by the traditional laws of Newton. When applying the Relativity Theory, the observed deviation of 43 arc seconds accords perfectly with the calculated value. And also the bending of the light of stars near the sun is perfectly explained by the Relativity Theory. What could then possibly be wrong with the Relativity Theory?

Oleg Jefimenko has another look on the problem. This scientist and professor at the University of West-Virginia has developed the suggestion of Heaviside<sup>[4]</sup> in a coherent Gravitation Theory. Oliver Heaviside wrote down analogous Maxwell Equations for Gravitation as those for electromagnetism, and tried to examine these further. Indeed, the Maxwell Equations form a correct description of electromagnetic waves. Why wouldn't we test this concept as a model for gravitation?

Oleg Jefimenko's<sup>[5]</sup> many years of specialisation in the field of electromagnetism did revive the old suggestion of Heaviside, and in this way his vision was analysed in detail. He demonstrated that not only the Relativity Theory was able to describe the consequences of the finite speed of light, and therefore the delay which appears. The phenomena can be described likewise, if not better, by means of the Maxwell Equations. Jefimenko proves that the analogous laws of Maxwell, as an extension of Newton's laws, provide a complete coherent theory of gravitational dynamics. But his description of the theory is for the rest mainly restricted to a number of theoretical laboratory applications.

However, very interesting is the study concerning pretended relativistic clocks. Jefimenko shows here that the relativistic property of clocks depends on the composition and the mechanism of the clock, and that relativistic clocks such as (perhaps) the atom is rather incidental than a rule. This means therefore that clocks can be relativistic or not, by concept. In the third chapter we will have a word concerning these clocks.

In my work "[A coherent double vector field theory for Gravitation](#)"<sup>[6]</sup> of 2003, I have demonstrated a long range of applications on the cosmos, based on the Maxwell Equations for Gravitation. We come back to it soon.

In the second chapter we will discover the Maxwell equations for Gravitation. This theory is then described in the third chapter within the framework of Jefimenko's findings. He was able to describe gravitation as a theory which incorporates the laws of dynamics into a whole, what nobody had accomplished so far.

The fourth chapter describes what by James A. Green has discovered. The unexpected observation which we will make, discredits the exactness of the Relativity Theory significantly, and opens a number of question marks. Finally we will make an amazing observation by applying the Maxwell equations correctly on the progress of Mercurius' perihelion and on the bending of the stars light grazing the sun.

## 2. The Maxwell analogy for gravitation: a short overview.

Electromagnetism is very well known, and the many studies about it have excluded each misleading, especially thanks to the large energies that accompany these fields. Oliver Heaviside suggested the Maxwell analogy for gravitation. Several scientists have examined this theory in depth, of whom the most important is Oleg Jefimenko, which has obtained breathtaking conclusions with regard to the gravitation theory.

The deduction follows from the gravitation law of Newton, taking into account the transversal forces which result from the relative speed of masses. The laws can be expressed in equations (2.1) up to (2.6) below.

Equations (2.1) till (2.6) below form a coherent range of equations, similar to the Maxwell equations. The electric charge is then substituted by mass, the magnetic field by *gyrotation*, and the respective constants are also substituted (the gravitation acceleration is written as  $\mathbf{g}$ , the so-called *gyrotation field* as  $\mathbf{W}$ , and the universal gravitation constant out of  $G^{-1} = 4\pi \mathbf{z}$ , where  $G$  is the "universal" gravitation constant. We use sign  $\Leftarrow$  instead of  $=$  because the right-hand side of the equations causes the left-hand side. This sign  $\Leftarrow$  will be used when we want insist on the induction property in the equation.  $\mathbf{F}$  is the resulting force,  $\mathbf{v}$  the speed of mass  $m$  with density  $\mathbf{r}$ .

$$\mathbf{F} \Leftarrow m (\mathbf{g} + \mathbf{v} \wedge \mathbf{W}) \quad (2.1)$$

$$\tilde{\mathbf{N}} \cdot \mathbf{g} \Leftarrow \mathbf{r} / \mathbf{z} \quad (2.2)$$

$$c^2 \tilde{\mathbf{N}} \wedge \mathbf{W} \Leftarrow \mathbf{j} / \mathbf{z} + \mathfrak{J} \mathbf{g} / \mathfrak{J} t \quad (2.3)$$

where  $\mathbf{j}$  is the mass flow through a fictitious surface. The term  $\mathfrak{J} \mathbf{g} / \mathfrak{J} t$  is added for same the reasons such as Maxwell did: the compliance of formula (2.3) with the equation

$$\text{div } \mathbf{j} \Leftarrow - \mathfrak{J} \mathbf{r} / \mathfrak{J} t \quad (2.4)$$

It is also expected that:

$$\text{div } \mathbf{W} \circ \tilde{\mathbf{N}} \cdot \mathbf{W} = 0 \quad (2.5)$$

and

$$\tilde{\mathbf{N}} \wedge \mathbf{g} \Leftarrow - \mathfrak{J} \mathbf{W} / \mathfrak{J} t \quad (2.6)$$

All applications of electromagnetism can then be applied with prudence on *gravitomagnetism*. Also it is possible to speak of gravitomagnetism waves with transmission speed  $c$ .

$$c^2 = 1 / (\mathbf{z} \mathbf{t}) \quad (2.7)$$

wherein  $\mathbf{t} = 4\pi G/c^2$ .

The laws of Maxwell are not always interpreted correctly and entirely. In the following chapter we examine the laws of Maxwell, developed by Oleg Jefimenko, with some surprising results.

## 3. The Maxwell analogy for gravitation examined by Oleg Jefimenko.

### *The generalisation of the Maxwell analogy*

The equations (2.1) up to (2.7) suggest that it is possible obtaining an induction between an electric field and a magnetic field and the other way round. Oleg Jefimenko correctly points out that always must be kept in mind that only a moving charged particle, such as the electron, can eventually be the cause of such an induction and not a field by itself. This allows to stay with our both feet on the ground, and not to formulate wild speculations without reflection, by manipulating the Maxwell equations: only charges can arouse these fields. Depending of the fact if

the speed or rather the acceleration is constant, several magnetic or electric fields can be generated. The same happens with masses. Gravitation fields act analogously to electric fields and gyrotation fields act analogously to magnetic fields. Both fields are aroused by stationary, steadily moving, or accelerating masses .

*The Maxwell analogy forms a coherent gravitation theory*

Just as with the Maxwell equations, the energies, forces, pulse moments and angular moments are entirely coherent and consistent with each other, and mutually derivable by pure mathematical manipulation. This was not possible with the Newton laws.

*Relativistic and non-relativistic clocks*

Jefimenko describes a number of relativistic clocks which will run more slowly when they are in motion. For example the negatively charged ring, moving on with speed  $v$  in the  $x$  direction, in which a positive charge oscillates, as represented in fig. 3.1.a. Also fig. 3.1.b. and c. are relativistic.

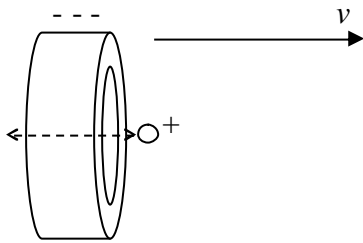


fig. 3.1.a

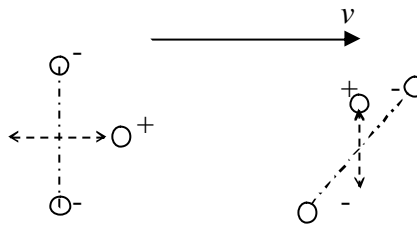


fig. 3.1.b

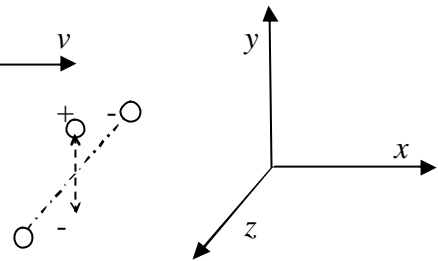


fig. 3.1.c

These three clocks have a period  $T = T_0 (1 - v^2/c^2)^{-1/2}$  and are therefore relativistic. But the clocks of fig. 3.2.a. and fig. 3.2.b. are not. The positive charge in fig. 3.2.a. oscillates near negative charges which are placed parallel with the  $x$ -axis. In fig. 3.2.b. there are two negative charge flows between which the positive charge oscillates.

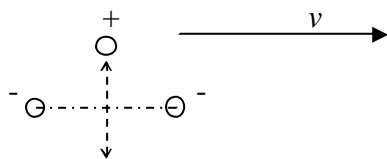


fig. 3.2.a

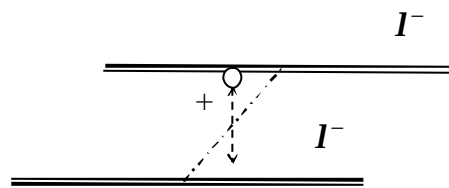
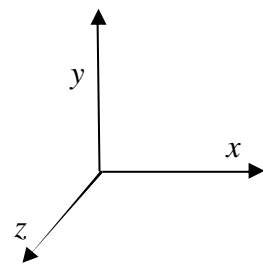


fig. 3.2.b



The clock in fig. 3.2.a has a period  $T = T_0 (1 - v^2/c^2)^{-5/4}$  what is not the correct relativistic delay, and the clock in fig. 3.2.b has the non-relativistic period  $T = T_0 (1 - v^2/c^2)^{-3/4}$ .

The clock type is determinative for its time delay. Consequently, if an atomic clock behaves (perhaps) such as the Relativity Theory wants it, this has to do with the structure of that atom, but this is not universally valid for all clocks.

In the next chapter we must put a still more extraordinary question mark concerning the General Relativity Theory: a coefficient problem.

#### 4. The Maxwell analogy for gravitation examined by James A. Green.

*The Relativity Theory for Gravitation and the Maxwell analogy are almost identical*

Not only specialists in universities or docents are able fulfilling new contributions. This is illustrated in this chapter. James A. Green has made, with self study, a number of analyses concerning the Relativity Theory. As an engineer he has been interested in the viability of theories too, not only in the theoretical considerations of it. What he discovered is very astonishing. He started with the general mathematical expression of the Relativity Theory, and cut it off after the second order (Post-Newtonian approximation of 2<sup>nd</sup> order; the usual abbreviation is: PN2). Higher orders are not significant. By working out these expressions and fill in Einstein's equations, he obtains:

$$c^2 = 4 / ( \mathbf{z} \mathbf{t} ) \quad (4.1)$$

or, written in usual symbols from electromagnetism:  $c^2 = 4 / ( \mathbf{e} \mathbf{m} )$

Green further shows that the 2<sup>nd</sup> order Post-Newtonian solution of the Relativity Theory (this is a time - and place-dependent differential equation) has in fact a well-known solution: the extended time-dependent Maxwell equations, expressed in potential fields:

$$\square^2 \mathbf{f} = \mathbf{r} / \mathbf{z} \quad (4.2)$$

$$\square^2 \mathbf{A} = \mathbf{t} \mathbf{j} \quad (4.3)$$

$$W = \tilde{\mathbf{N}} \cdot \mathbf{A} \quad (4.4)$$

$$\mathbf{g} = - \tilde{\mathbf{N}} \mathbf{f} - \mathcal{J} \mathbf{A} / \mathcal{J} t \quad (4.5)$$

The coordinates of these potential fields are to be taken locally in time and place. The operator  $\square$  is a four-coordinate vector made from the three-coordinate operator  $\tilde{\mathbf{N}}$  in a place  $x, y, z$ , and gets as fourth coordinate the negative partial time derivative  $-\mathcal{J} / \mathcal{J} t$ . For masses with low speeds and in the case of stationary situations the above equations are valid, because the time delay of the field does not have to be taken into account.

Green actually found these equations out of the Einstein's field equations, but in which  $c^2$  apparently should be replaced by  $4 (\mathbf{z} \mathbf{t})^{-1}$  at a certain step, in order to get an equivalence of both theories (written in usual symbols from electromagnetism:  $c^2 = 4 (\mathbf{e} \mathbf{m})^{-1}$ ).

*The speed of light does not originate from  $c^2 = 4 (\mathbf{e} \mathbf{m})^{-1}$*

At further development of the equations (4.2) till (4.5) and when infilling in (4.1), Green finds an impossibility. The next expression is, as a matter of fact, found:

$$4 \operatorname{div} \mathbf{j} = - \mathcal{J} \mathbf{r} / \mathcal{J} t \quad (4.6)$$

what is contradictory with the continuity equation (2.4).

Because of this, we can perfectly say that the General Relativity Theory is not consistent with itself. And the inconsistency is not just an insignificant approximation error, neither finds its cause in cutting-off higher orders of a serial expansion. The difference is much more significant!

A second proof is also introduced by Green. The Lorentz gauge (that is believed to be at the basis of solutions, in accordance with the cosmos) for the Relativity Theory is given by equation:

$$c^2 \operatorname{div} \mathbf{A} = - \mathcal{J} \mathbf{f} / \mathcal{J} t \quad (4.7)$$

This equation also brings Green right to (4.6).

Normally of course, we expect the expression (2.7) to define the speed of light in the Maxwell equations. The Relativity Theory can possibly give a very general and interesting general picture of how light goes in its work in the universe, but it is definitely not exact.

## 5. General Relativity Theory: a dubious calibration?

Earlier, we have forgotten to explain a step. The general Relativity Theory needs control points. A first control area is that at non-relativistic speeds, the theory reduces itself to the Newton theory, as far as we talk about our planetary system. A second control area would have been the Lorentz gauge. But above, we saw that the Lorentz gauge is no correct basis to build a theory upon that is entirely correct. However the correctness of the theory is examined at two measurable phenomena in our solar system: the Mercury's perihelion advance and the bending of star light grazing the sun. First, we describe these control points, and try in the next chapter to find an explanation and a solution to the problem.

### *The Mercury's perihelion advance.*

It is perhaps not occasional that Mercury's perihelion advance is for Einstein *the* reference to justify the General Relativity Theory. Indeed, the issue remains whether Einstein simply has compared the result of the theory to the measured values, or inversely has harmonized the theory with these figures. In the last case we can speak of a calibration. The Newtonian control calculation of the astronomic values of the perihelion advance was performed by Leverrier in 1859, and was reassessed and improved by Newcomb in 1895. The interpretable advances of Mercury's perihelion are due to:

1. the progress of the equinox, which explains 5025'' per century;
2. the perturbation by the planets for total of 526',7 per century.

Unexplainably compared with the overall astronomic observation is a surplus of 43'' per century.

Einstein<sup>[1]</sup> finds, using the Relativity Theory, a advance excess  $\mathbf{d}$  in the form:

$$\mathbf{d} = \frac{24 \mathbf{p}^2 a^2}{T^2 c^2 (1-e^2)} \quad (5.1)$$

with  $a$  the half large axis of the elliptic orbit of the planet,  $T$  the period, and  $e$  the eccentricity of the elliptic orbit. These values can be found by astronomic observation, and Einstein obtains theoretically  $\mathbf{d} = 43''$ . And with this result a first proof is provided (bad tongs claim: the first calibration realised) for the general Relativity Theory.

But in order to define a curve accurately, one still needs at least a third calibration point. We find the third calibration point in the bending of the star light grazing the sun.

### *The bending of star light grazing the sun.*

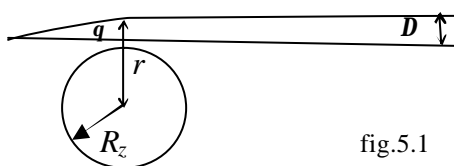


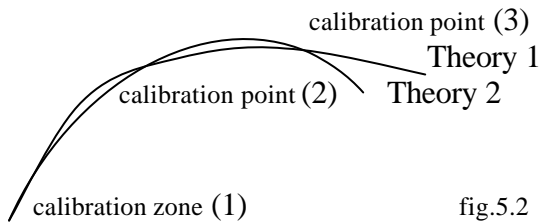
fig.5.1

When a light ray grazes the sun it is supposed to be bent because of the attraction between both masses. The deviation angle was given by Einstein in 1911 being  $\mathbf{q}_N = 0,875'' R_z/r$  what was exactly the same value as with the Newton calculation, and which was wrong. After a number of failed attempts between 1911 and 1914 for measuring the bending (one pretends that there were no results known) Einstein brought out the general Relativity Theory in 1915, which gave as a result for the angle the double value of the Newton one:  $\mathbf{q}_E = 1,75'' R_z/r$ . Observation is difficult because of the strong sunrays, but at a total

sun eclipse one finds a value close to the relativistic value  $q_E$ . With radio waves, measuring can be done during all the year, and the value is confirmed near the sun's poles<sup>[7]</sup>. However, it is observed that there is a slight deviation the more the rays are closer to the equator, whereas the Relativity Theory does not explain this, and furthermore no consistent values are known.

*Discussion*

We see therefore that the wrong Lorentz gauge nevertheless finds a correct solution for Mercury's perihelion and



for the bending by the sun. It is as if two curves, with the same calibration asymptote (the theory of Newton) and the same two calibration points (Mercury's perihelion advance and the bending of light) have arisen. Although several theories can be quite similar, only one theory will deserve more credit than the others. The question is only: which one? Therefore we preferably must try to find what is most logical one: the Maxwell Analogy or the General Relativity Theory. But we can only reject a theory if indeed the other theory

explains everything. How far do the explanations via the Maxwell Analogy bring us? Will we be able to check this theory with more reference areas and reference points?

**6. Comparison with the Maxwell Analogy.**

*The advance of Mercury's perihelion and the Milky Way.*

In order to make a simple comparison concerning the advance of Mercury's perihelion we can write (5.1) differently. In equation (5.1) the solution (or the calibration) of Einstein was written down. Now, to elliptic orbits always applies

$$T^2 = \frac{4 \mathbf{p}^2 a^3}{G M} \quad (\text{Kepler}), \tag{6.1}$$

so that 
$$\mathbf{d} = \frac{6 G M}{a c^2 (1-e^2)} \tag{6.2}$$

The local revolution speed for elliptic orbits is found out of

$$v^2 = G M \{(2/a) - (1/r)\} \tag{6.3}$$

where  $r$  is the distance from the focus (in which the sun lies) to the considered place on the ellipse.

Now, in order to simplify, let us assume that  $e^2$  is negligible. Then the revolution speed is almost constant and is found from (6.3) by putting  $a = r$ .

Hence 
$$\mathbf{d} = 6 v^2 / c^2 \tag{6.4}$$

This entity  $\mathbf{d}$  is an extra deviation on Newton's gravitation. The total amount is therefore  $(1 + \mathbf{d})$ . When we apply this on the gravitation force  $F$  we get :

$$-F = G \frac{M M'}{r^2} + 6 G \frac{M M' v^2}{c^2 r^2} \tag{6.5}$$

This is therefore the result of the Relativity Theory in which  $v$  is the orbit revolution speed of Mercury.

Let us now examine which outcome is obtained with the Maxwell analogy. Based on the theory of Heaviside, Jefimenko found that a mass which moves in relation to an observer, experiences an extra force. (James A. Green tries to explain the phenomenon by a time delay of gravity waves, which is a wrong approach for stationary systems.) A moving mass induces a field, analogously to the magnetic field in electromagnetism. Heaviside however incorrectly considers this induced field in function of the observer.

The vision of Heaviside and of Jefimenko must be corrected indeed. In my work [6] I have explained how important it is to define the local absolute speed. When we want to apply the Maxwell analogy equations on moving objects, the gravitation field which is the reference has to be known, and then becomes *the* appropriate reference for that speed. It is not a matter of *definition of the observer* like in the Relativity Theory or in the Heaviside/Jefimenko approach, but a matter of *definition of the local stationary gravitation field*. Only gravitation fields can be regarded as “locally immobile” references.

For Mercury we must take into account the local stationary gravitation in which Mercury is immersed. The “immobile” gravitation of the sun can be a reference field with which the gravitation field of Mercury is in “interference”, creating this way a field, similar to a magnetic field, called *gyrotation field*.

This is only possibly if the sun itself moves in a straight line, rotates, or is caught in an orbit. We can verify<sup>[5]</sup> that the spin of the sun is virtually insignificant for this phenomenon. A rotation speed of 26 days on its axis is not sufficient to be perceptible in secondary effects. The sun has however got another motion. In my work [6] I have calculated, starting from the Maxwell Analogy, that all stars of our Milky Way revolute with a speed of roughly speaking 240 km/s. This was based on a galactic system of which the central bulge was valued on 10% of the total mass of the galaxy, and with a bulge diameter estimate of 10000 light years. In literature we find strongly divergent values for this bulge mass, what makes an exact calculation difficult. At present one values the speed  $v_I$  of the sun between 220 and 250 km/s, what closely join our quick calculation.

Although the Milky Way’s gravitation field might seem weak, nevertheless the weak field can play a sufficiently large role to oblige the sun making a revolution around the centre of our galaxy in 220 millions year time .

From the work of Jefimenko follows the property, for uniform moving spherical masses in a local gravitation field, that an extra force is exerted on any mass, perpendicularly on the movement direction. If we isolate a random thin ring of the sphere in a plane, perpendicularly on the rotation vector  $\mathbf{W}$ , the uniform motion  $v$  in a gravitation field will be associated with an extra force  $F$  on mass  $m'$  that is perpendicular on  $\mathbf{W}$  and  $v$ , and is equal to

$$-F = G \frac{m m'}{2 r^2 c^2} v^2 \quad (6.6)$$

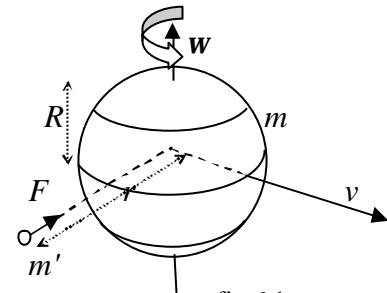


fig.6.1

Moreover the mass  $m$  will work as a dipole due to the rotation vector  $\mathbf{W}$  and will exercise a supplementary force on mass  $m'$  equal to

$$-F = G \frac{m m' \mathbf{W} R^2}{5 r^3 c^2} v \quad (6.7)$$

(see equation (4.2) in [6] for the basics of the calculation)

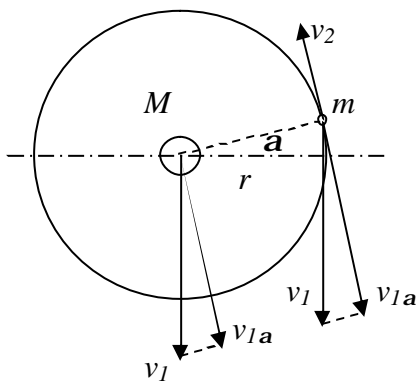


fig.6.2

In fig. 6.2 , the sun with mass  $M$  and radius  $R$  is considered at an average distance  $r$  of Mercury, which has mass  $m$  , and resides at a certain instant under angle  $\alpha$  in relation to an axis going through the centre of the galaxy. We approach again the elliptic orbit by a circular one.

All these forces are attractions: the law of Newton, the force originating from the uniform movement  $v_I$  , and the one of the spin

$\mathbf{W}$  of the sun. Under the angle  $\mathbf{a}$ , Mercury experiences therefore the following forces by the sun :

$$-F_a = G \frac{m M}{r^2} + G \frac{m M}{2 r^2 c^2} v_1^2 \cos^2 \mathbf{a} + G \frac{m M \mathbf{w} R^2}{5 r^3 c^2} v_1 \cos \mathbf{a} \quad (6.8)$$

The first term corresponds to the law of Newton. As noticed earlier, the last term can be neglected (gyrotation), because of the slow spin of the sun. The second term however interests us particularly.

When we know that Mercury revolves with an average speed  $v_2$  equal to 47,9 km/s, and the sun with a estimated speed  $v_1$  equal to 235 km/s in the galaxy, what means that, expressed in  $v_2$ , we can write that  $v_1^2 = 24 v_2^2$ . The second term of (6.8) can therefore be written as:

$$-F_{a2} = 12 G \frac{m M}{r^2 c^2} v_2^2 \cos^2 \mathbf{a} \quad (6.9)$$

When we integrate this over  $\mathbf{a}$  from  $-\mathbf{p}/2$  to  $+\mathbf{p}/2$  we get half of the total impact. Doubling this result gives the total effect over the whole circumference (it does not annihilate with the first half circumference because the speed vector changes sign). Dividing the result by  $2\mathbf{p}$  gives us the average over the whole circumference :

$$-F_2 = 6 G \frac{m M}{r^2 c^2} v_2^2 \quad (6.10)$$

this brings us to:

$$\mathbf{d} = 6 v_2^2 / c^2$$

This result, obtained by using the Maxwell Analogy, is exactly the value which was obtained using the Relativity Theory.

Of course we have chosen  $v_1$  exactly equal to 235 km/s, in order to obtain the aimed result. In fact we probably should choose the real speed  $v_1$  somewhat lower, consider the eccentricity of Mercury's orbit, and also correct the result for  $\mathbf{d}$  with some arc seconds because of the perturbation by the other planets. They indeed also exert the three described forces on Mercury, of whose the force related to the orbit speed is the most important one after the Newton force. Of course, Leverrier originally could only take into account the Newton forces. We do not go into details, but now the first step has been set.

*The bending of star grazing the sun.*

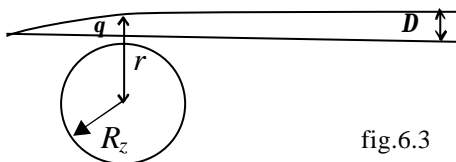


fig.6.3

When light grazes the sun we find again several forces with the Maxwell analogy, but partly other forces than these of (6.8). Since the rest mass of light rays is zero we may *not consider the gravitation force of Newton!*

Only a mass at speed  $c$  must be taken into account, and this will arouse a gyrotation force. Jefimenko calculates the gyrotation of a mass flow with radius  $a$  and density  $\mathbf{r}$  at a distance  $r$ , measured perpendicularly to the mass flow:

$$\mathbf{W} = - G \frac{2 \mathbf{p} \mathbf{r} a^2}{r^2 c^2} v \quad (6.11)$$

For light we set  $c=v$ , and the mass per length unit  $\underline{m} = \mathbf{p} \mathbf{r} a^2$ .

$$\mathbf{W} = - G \frac{2 \underline{m}}{r^2 c} \quad (6.12)$$

Using (2.1) in which we set  $g=0$ , we find the force per length unit :

$$\underline{F}_W = -G \frac{2mM}{r^2} \quad (6.13)$$

Of course its validity remains for each length of the light ray.

The force caused by speed  $v_I$ , actually the orbit revolution speed of the sun in our galaxy, is given by the second term in (6.8).

As last force we get the one of (6.7), whereof the size depends on the spin of the sun, and of course of the latitude  $\mathbf{j}$  along which the light ray passes. The sun has actually a *differential* spin which varies according to the latitude: the poles rotate 30% more slowly than the equator. If we assume that, with respect to the sun, the speed of the passing star light is the constant  $c$ , one may not take into account the speed  $v_I \cos \mathbf{a}$  of fig.6.2. in this term.

The last term in (6.14) was obtained from the acceleration  $a_{r \text{ tot}}$  described in equation (9.2) of [6]. It is the second term of that equation, which describes the radial attraction to the surface of the sun. The formula is of course adapted to the symbols used here.

The total force becomes this way:

$$-F_{\mathbf{j}, \mathbf{a}} = G \frac{2mM}{r^2} + G \frac{mM}{2r^2 c^2} v_I^2 \cos^2 \mathbf{a} + G \frac{mM}{5c^2} \frac{\mathbf{w}_j^2}{c^2} \cos^2 \mathbf{j} \quad (6.14)$$

The bending of light over the poles is therefore exactly the double of the calculation according to Newton, but moreover there is an extra bending according to the position of the earth relative to the sun and to the Milky Way, and an extra bending which varies according to the latitude on the sun along which the light ray passes. The last term is positive (attraction bending) at the left side of the sun and negative (repulsion bending) at its right side, because of the spin direction of the sun.

## 7. Has the Relativity Theory era been fertile so far?

Nearly a century ago, one of two competitive theories has been put aside: the exact theory had to run off for the profit of the wrong one! How could this come up to that point?

Three elements to which the theory had to satisfy were known: the Newton limit, the bending of light and the progress of Mercury's perihelion. And moreover the theory had to offer a solution for the paradox of the Lorentz invariance. To this invariance was even given a physical dimension (Lorentz contraction) subsequently to the test of Michelson-Morley.

The Relativity Theory was able to bring together all those elements to an apparently correct theory. Very certainly also Einstein must have known that with the Maxwell Analogy, the progress of Mercury's perihelion could not be explained. This for the simple reason that almost nothing was yet revealed of our galaxy. And on the other hand, the step to the Relativity Principle became still more easy because of the (wrong) principle of Heaviside that the observer, and not the gravitation field, had to be seen as *the* reference for all calculations.

Thus, Einstein's Relativity Theory arose, where all parameters were united, and which was moreover poured in a form that virtually deleted all tracks of the Maxwell Analogy: a curved space with an adapted kind of maths.

But something was nevertheless overlooked: the speed of light that is obtained by confronting in a certain way the Analogue Maxwell Theory and the Relativity Theory is wrong. That ultimate discovery makes fail the Relativity Theory.

However, it is astonishing that that discovery of James A. Green, as well as the many publications of other non-conventional scientists, seemingly are ignored by the proponents of the Relativity Theory, who constitute the establishment. Why would this be this way? First, the theory has been expressed in a very concise way as a

differential equation. It is also very general, and after the appropriate calibration it allows each mathematically correct solution as a possible real situation, even if it has not yet been discovered with our observation instruments. This frees the path in a fabulous way for predictions, what is of capital importance for science. The main reason for ignoring the Maxwell Analogy is probably also that on world scale, a complete army of scientists has been proliferated out of the "Relativistic schools", almost such as new religions ever arose and developed. Once extended they are replaceable with difficulty.

Shortly after the First World War yet important solutions have been calculated with the theory.

For instance, non-rotating black holes and wormholes were predicted long before there was any indication of their existence. Now one admits their existence, although non-rotating black holes have never been found yet, nor wormholes. However, rotating black holes were observed meanwhile, which are not described by the theory, unless by introducing an extension of it.

In that sense the Relativity Theory has enormously contributed by being its time far ahead. It also showed the universe in an original and new manner: a curved universe, where nor the time, nor the distance, nor the mass have absolute values, but are different for each observer, and moreover it would be no illusion but be also like that in reality. Also cosmology progressed, by thoughts concerning the shape and the (in)finity of the universe.

But over the course of time this conduct is becoming a handicap for the Relativity Theory: calculations become the longer the more complex. And it is uncertain that space is really curved, that mass and time really increase that way with the speed, and that lengths really reduce that way. Oleg Jefimenko, James A. Green, and many others demonstrate adequately that also by means of the traditional physics all phenomena, and much more, can be explained. How could it possible be else after what we discovered here!

We saw already some facts which Jefimenko and Green have demonstrated. Jefimenko also illustrated the affinity between both theories, and extended the Maxwell Analogy for not-static and non-linear cases. Green showed by means of the traditional working method, with the Maxwell equations, several phenomena at atomic scale. I demonstrated in [6] that the speed of stars in disc galaxies satisfies the laws of Kepler, and that *dark mass* is a myth. Furthermore, why some rapidly rotating stars cannot burst entirely, why the mass expels of supernova and must adopt stipulated profiles. The torus-like shape of rotating black holes was uncovered and was further discussed, and the reason for the many tiny Saturn rings proved in "[Cassini-Huygens Mission](#)"<sup>[7]</sup>.

## 8. Conclusion: Did Einstein cheat?

We proved the validity of both the progress of the perihelion of Mercury and of the bending of light close the sun with the Maxwell Analogy. Now the question remains open: did Einstein know that he made an error by defining its theory? Did Einstein cheat? *A posteriori* it seems indeed strange that Einstein succeeded, seemingly without much magic, to write down some simple looking equations, though by means of a strange and complicated type of maths for that time, and moreover little common.

On the other hand Einstein must have known that the Mercury problem was not soluble by means of the Maxwell Analogy with the observations and the measuring known at that time. An appropriate calibration of the Relativity Theory therefore has been done (The Einstein's field equations are indeed deduced from the equation -named Einstein-Hilbert action- for a "space", extended with the equation -named Lagrangian- for the definition of mass in that space. Also Einstein defined a required factor  $k$  as  $k^{-1} = 16 \pi G c^{-4}$ . Finally, Cartan extended the theory for rotating objects.) It is at last between 1911 and 1914 that Einstein must have known that the bending of light grazing the sun rather had the double value of the one according to Newton. Did Einstein intuitively fall on the good looking equations at that period? Was the new type of maths necessary to increase the detachment to the Maxwell Analogy and to conceal the calibrations?

Probably we should not judge Einstein too quickly. Although it might be possible that, thanks to some calculations, Einstein got on that "good" track in a converging manner, consciously cheating is still another thing. The main reasons for the new track which Einstein made was the need to incorporate the contraction of length (and thus of time) as a part of the theory, and the impossibility of building further on the Maxwell Analogy because of the Mercury problem. The glory that the theory of Einstein obtained was, among others, thanks to the sudden revelation, after more than ten years of inventively and intuitively work, of a theory in a mathematically new appearance, original and general, and one which made extrapolations to cosmology possible.

And we can expect that both competitive theories will still continue existing in parallel, possibly for decades.

## 9. References and interesting literature.

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