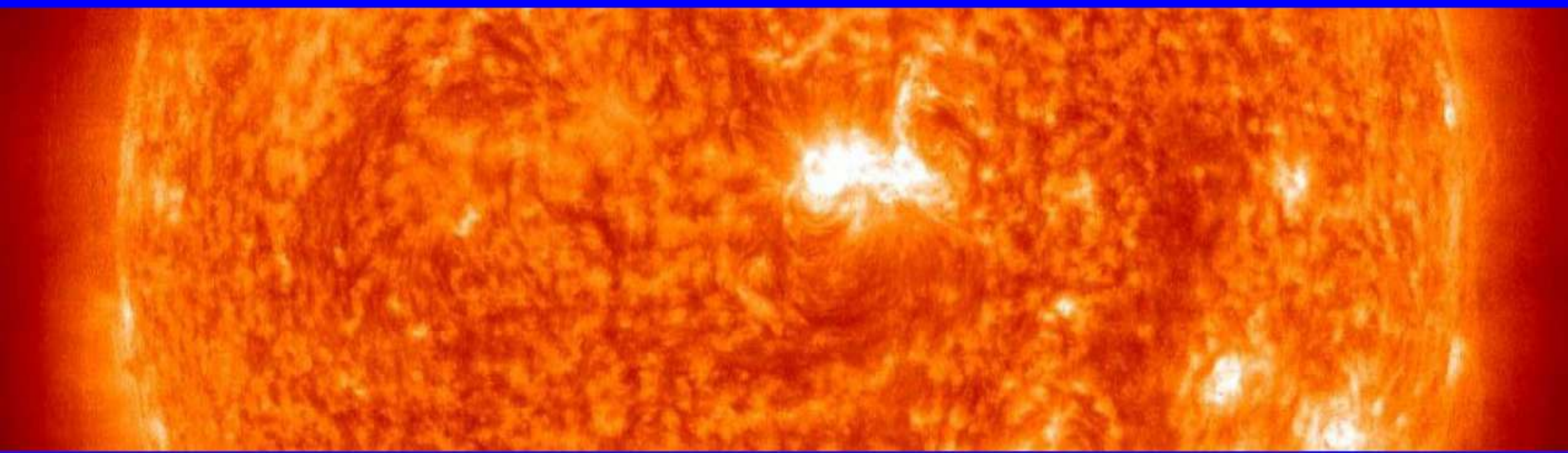
Thierry De Mees

Gravitational Constants, the Earth's Expansion and Coriolis Gravity



Gravity Beyond Einstein

INDEX

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Gravitational Constants, the Earth's Expansion and Coriolis Gravity

INTRODUCTION

Is not everything settled with Gravitomagnetism, the analogy of electromagnetism for gravity, with which I explained the formation of disk galaxies without dark matter, the shape of supernova and hourglass stars, and many other phenomena? Is there more to be told?

In this little booklet, I show that one of the parameters that are used to define the Sun's dynamics can be expressed by the other parameters. In other words, the Sun's gravity is defined by its angular velocity and its radius.

This amazing property finds its origin in the way how particles interact, and the way how I expect that all kinds of forces work: by a Coriolis effect between particles.

Henceforth the calculus of the Gravitational Constant is possible.

Linked to this phenomenon is the expansion of spinning objects, like the Earth, the Sun and the stars. This occurs by gravity as well, and this can be explained by both the Gravitomagnetic as the Coriolis approach.

Discover in the next few pages how these new gravitational realities take form.

Gravity Beyond Einstein

1

Coriolis Gravity : a Novel Underlying Interpretation of Gravity

The sun's differential rotation is one of the most amazing dynamic solar facts, and it has not been explained properly yet. It seems that it driven by the solar fusion, but maybe it is simply caused by expelling light, or by what is commonly called “gravitons”, though it isn't yet clear if one has to speak of “trapped” or “closed” waves such as particles, or “open” waves.

The two next papers were written in different periods, but I rearranged that for an easier lecture.

In the first paper, I explain that the sun's dynamics correspond, very amazingly, to the its standard gravitational parameter $G\,m$. Moreover, when we apply the Coriolis effect to an interaction between expelling light and particles of the Sun, this appears to exactly correspond to Newtonian gravity!
And if the Coriolis effect is applied upon accelerated particles themselves, by self-induction, one comes to an excellent explanation of the inertial counter-force. I also make an attempt to explain the sun's differential rotation theoretically.

In the second paper, which I wrote a year later, I explain these deduced Coriolis mechanisms of 'inertial velocity' and 'inertial acceleration' some more in detail. I shortly remind the principles of my first book, “Gravitomagnetism”, founded by Oliver Heaviside, thoroughly investigated by Oleg Jefimenko, I applied upon the cosmos by myself. Since “Gravitomagnetism” is the name that I found the most on the Internet, I continue to use this name, instead of the many other names I have used in my early papers that have been reprinted in my first book.

If the reader is interested to enter more in dept about Gravitomagnetism, one should avoid reading mainstream interpretations such as the so-called “Linearized General Relativity Theory” because they have nothing common with “true” Heavisidian Gravitomagnetism. My first book and my very first paper on the subject are the easiest approach to the subject, full of real examples from the cosmos.
Enjoy the reading!

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Is the Differential Rotation of the Sun Caused by a Coriolis Graviton Engine?

Thierry De Mees

Abstract

Essential fundamentals of gravitomagnetism are found by applying the process of the reciprocal graviton-losses by particles that are defined here as trapped photons. The gravity field is found to be generated by a Coriolis effect, exerted by gravitons upon particles. Inertial resistance is generated by a Coriolis effect as well. In order to demonstrate the former case, we apply the graviton mechanics to the Sun. The amplitude of this effect is found to match the Sun's rotation frequency.

1. Introduction

Mindful of the previous successes of gravitomagnetism in cosmic phenomena [1], this paper is the subject of a more fundamental research on the mechanism of gravitation.

It is well-known that trapped light is the most convenient solution for the description of matter, even if the great number of very different particles obscure the details of it. The so-called energy-matter exchanges allow for the transition of a large set of particles into others.

From my earlier paper, [1] I found the equations for gyrotation, the 'magnetic'-analogue equivalence in gravitomagnetism. In this paper, I will interpret the gravitation field and inertia as Coriolis effects, applied upon trapped photons.

2. Gravity as a Coriolis effect

Let C_j be an circular orbit of a trapped photon δ_j , within a finite set of orbits of photons $(C_1,C_2,...,C_n)$ that forms multiple elementary particles. The orbit C_j represents a particle with mass m_j, rotating at an orbit radius R_j with an angular velocity ω_j.

Let L_j be the path of a graviton γ that leaves that circular orbit C_j (I use the word 'graviton' in order to not interfere with the word 'photon', although both might be of the same kind). Let C_i be another photon orbit at a distance R_{ij} from C_j , with an angular velocity ω_i and an orbit radius R_i. Let τ_{ij} be the intersection of L_j with C_i.

The vector expression for the Coriolis acceleration $\vec{a}_{ij}$ at the intersection τ_{ij} is then given by: $$2\vec{\omega}_i\times\vec{c}=-\vec{a}_{ij} \qquad (1)$$
wherein $\vec{c}$ is the translation velocity of the graviton.

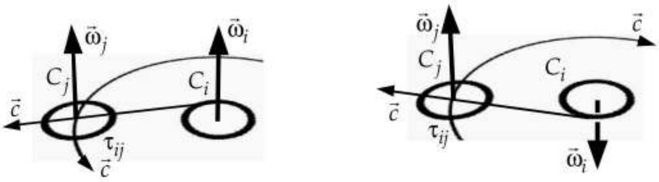

Figure 1.a. and b. Two *cases of trapped light, hit by a graviton, radial or tangential, and undergoing a Coriolis effect.*

<u>Hypothesis</u>: this Coriolis acceleration $\vec{a}_{ij}$ engenders the gravitation acceleration of the particle C_i at a distance R_{ij} from C_j.

The right hand of Eq. (1) is equal to the corresponding gravity acceleration, produced by the diluted fraction Gm_i of gravitons that leave the circular photon orbit, in tangential or perpendicular directions. The gravitational acceleration flux in a point τ_{ij} at a distance R_{ij} will be :

$$-Gm_i / R_{ij}^2 \quad (2)$$

The total possible number of intersections τ_{ij} is then given by $(2\pi R_i)/R_i$. Hence, from Eq. (1) and (2) follows, in totality :

$$\omega_i = \frac{2\pi G m_i}{2c R_{ij}^2} \quad \text{or} \quad \upsilon_i = \frac{G m_i}{2c R_{ij}^2} \quad (3)$$

wherein υ_i is the according rotation frequency.

It was showed [1] that the mutual gyrotation orientations of nested particles in a rotating object, similar as $\vec{\omega}_j$ and $\vec{\omega}_i$ in figure 1.a., have like rotation orientations, due to the like-oriented gyrotation fields. However, particles that are apart from the object always get opposite spin orientations, like $\vec{\omega}_j$ and $\vec{\omega}_i$ in figure 1.b.

3. Inertia as a Coriolis effect

A direct consequence of regarding matter as trapped light is the interpretation of the mechanism of inertia. Also this mechanism is ruled by the Coriolis effect.

Let the trapped photon δ_j be accelerated by a force in a certain direction, as shown in figure 2 and the photon paths will cross in τ_{jj1} and τ_{jj2} .

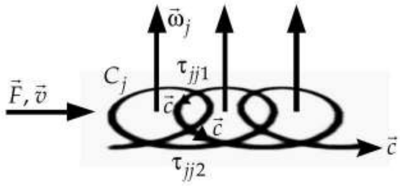

Figure 2. *Trapped light under a force $\vec{F}$ undergoes a Coriolis effect that is oriented in opposite direction.*

There are six possible orientations of $\vec{\omega}_j$ (like the sides of a dice) whereof four result in the same orientation of the Coriolis acceleration $-a_{jj} = 2\omega_j c$, and two of them that have a screwing shape (right of left screwing) don't undergo any Coriolis effect at all.

4. Derivation of the Sun's Rotation Equation

It will be shown below that Eq. (3), when applied to the Sun as a whole, gets a special meaning, due to the like orientation of particles by the Sun's rotation.

Since the gravitons are leaving the Sun in radial or tangential way, or any situation between-in, there is a net gravitational and rotational effect.

Hence, when applying Eq. (3) for gravitons that leave the Sun along the equator, we find:

$$\upsilon_{eq} = \frac{G m_{Sun}}{2c R_{eq}^2} \quad (4)$$

Herein : $G = 6.67 \times 10^{-11}$ m^3 kg^{-1} s^{-2},
c = *3.00x108* m s^{-1}
and for the Sun, $m_{Sun} = 1.98 \times 10^{30}$ kg
$R_{eq} = 6.96 \times 10^8$ m.

What I suggest here, is that the Sun's angular velocity might be defined, due to a law of nature, by its gravitational properties. By applying the figures above, this can immediately be checked.

However, when it comes to the entrainment of matter by gravitons, a minimum of viscosity is required. The Dalsgaard model for the solar density [3] shows a hyperbolic-like function, whereof the asymptotes intersect at about 0.98 R_{eq} : at first, there occurs a very quick density increase from 10^{-6} g/cm³ at R_{eq} until 10^{-2} g/cm³ at nearly 0.95 R_{eq} and next a slow, almost linear density increase until $1.5x10^2$ g/cm³ at the Sun's center. On the other hand, S. Korzennik et al. [2] found that the highest value of the Sun's rotation is located at about 0.94 R_{eq} , where the corresponding density is 10^{-2} g/cm³.

When applying Eq. (4) by using a corrected radius, somewhere between 0.98 and 0.94 R_{eq} , and when assuming that the total mass may be kept alike, the result for the Sun's rotation frequency υ_{eq} is somewhere between 474 and 515 nHz, or a corresponding sidereal period between 24.44 and 22.49 days, which is very close to the measured Sun's sidereal period of 24.47 days at the equatorial photosphere [2]. This result suggests that the equatorial disc of the Sun maintains and controls the rotation frequency of the Sun ever since the Sun started to rotate in some initial direction.

5. Derivation of the Sun's Differential Rotation Equation

When a graviton quits the Sun at any latitude α , it will cause an acceleration as well, based on Eq. (4) , but whereby the spin ω will be inclined at an angle α (the equator is 0 rad) and whereby the radius R_{eq} remains to same for all latitudes.

In a first approach, I reason as follows. The average direction between the Sun's equatorial, graviton-induced spin, name it ω_{eq} , and the inclined spin, name it ω_α , is $\alpha/2$. The value of ω_α should, in addition, be reduced by the cosine of $\alpha/2$ towards the rotation axis because we only observe the component at the angle $\pi/2$.

Hence $$\omega_\alpha = \omega_{eq} \cos(\alpha/2) \quad (5)$$

This result is a raw equation for the differential rotation under the effect of gravitons but it doesn't indeed take into account the centrifugal flow inside the Sun's Convection Zone. This flow engenders a Coriolis effect up to the surface which attenuates the angular velocity, especially in a range around the angle of $\pi/4$. It could be possible to extract a semi-empiric equation from Eq. (5) that takes in account this motion, but this is not the prime purpose of this paper.

6. Discussion

The parity of the Coriolis acceleration with the Sun's gravity acceleration, under the action of escaping gravitons, is remarkable. Gravitons at any latitude produce the same rotation value, which, combined with the global spin of the Sun, result in a differential rotation. The equator is the place where gravitons propel the Sun at the largest resulting velocity.

According to S. Korzennik et al. [2] , the measured differential rotation at the solar surface shows a wide range of rotation frequencies between nearly 337 nHz (rotation period of 34.3 days at the poles) and 473 nHz (rotation period of 24.47 days at the equator). With Eq. (5) we got a raw equation, without solar convection corrections, of the expected differential rotations at places, other than at the equator. For example, the calculated result –by using 0.98 R_{eq} and without further corrections– for the poles is 34.56 days, which comply very well with the measured rotation period of 34.3 days.

The expression "Graviton Engine" follows from the mechanical Coriolis-process that is at the origin of Eq. (4).

7. Conclusion

Our Sun seems to behave like a giant particle whereof any place on the surface is propelled by gravitons that quit the Sun at a speed c . Its motion may confirm our gravitomagnetic interaction-model between particles, shaped as circular trapped light, wherein the Coriolis effect by gravitons generates gravitation. Other latitudes on the Sun's surface, where the same process occur, directly contribute to the measured differential rotation.

8. References

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Motion is Relative to the Universe but Inertia is not

Based upon GravitoMagnetism and the Coriolis Gravity Theory

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Based upon the Gravito-Magnetic Theory it is clear that motion can be defined very precisely: the presence and the amplitude of the (gravito)-magnetic component at some place is the very proof of relative motion of an object. Hence, each motion cannot but being relative to the rest of our Universe. On the other hand, inertia can be proven to be not relative to the rest of our Universe, by deduction from the elementary process of force generation, which is found in the Coriolis Gravity Theory, which theory is a fundamental theory of forces and which is entirely compatible with the Gravito-Magnetic Theory. This proves that Mach's Principle (Mach's conjecture) is absurd.

1. The Heaviside Equations for Gravity (= GravitoMagnetism)

At the end of the nineteenth century, the engineer Oliver Heaviside proposed the gravitational equations as a copy-paste of the electromagnetic laws. This is called the Gravito-Magnetic Theory (or the Maxwell Analogy for Gravitation, or the Heaviside Gravitation Theory, etc…).

The equations (1) to (5) form a coherent set, similar to the Maxwell equations. Electrical charge q is substituted by mass m, magnetic field $\boldsymbol{B}$ by *Gyrotation* $\boldsymbol{\Omega}$ (the magnetic-like field of gravity), and the respective constants as well are substituted (the gravitation acceleration is written as g and the universal gravitation constant as $G = (4\pi\,\zeta)^{-1}$. We use sign $\Leftarrow$ instead of = because the right hand of the equation induces the left hand. This sign $\Leftarrow$ will be used when we want to insist on the induction property in the equation. $\boldsymbol{F}$ is the induced force, v the velocity of mass m with density ρ. Operator $\times$ is used as a cross product of vectors. Vectors are written in bold.

$$\boldsymbol{F} \Leftarrow m\,(\boldsymbol{g} + \boldsymbol{v} \times \boldsymbol{\Omega}) \qquad (1)$$

$$\nabla\, \boldsymbol{g} \Leftarrow \rho / \zeta \qquad (2)$$

$$c^2\, \nabla\times \boldsymbol{\Omega} \Leftarrow \boldsymbol{j} / \zeta + \partial \boldsymbol{g} / \partial\, t \qquad (3)$$

where $\mathbf{j}$ is the flow of mass through a surface. The term $\partial \mathbf{g}/\partial t$ is added for the same reasons as Maxwell did: the compliance of the formula (1.3) with the equation : $\operatorname{div} \boldsymbol{j} \Leftarrow -\,\partial\rho / \partial\, t$

It is also expected $\qquad \operatorname{div} \boldsymbol{\Omega} \equiv \nabla\, \boldsymbol{\Omega} = 0 \qquad (4)$

and $\qquad \nabla\times \boldsymbol{g} \Leftarrow -\,\partial\, \boldsymbol{\Omega} / \partial\, t \qquad (5)$

All applications of the electromagnetism can from then on be applied on gravitomagnetism with caution. Also it is possible to speak of gravitomagnetic waves.

In many of my former papers, I have demonstrated *ad nauseam* that the Heaviside equations solve all the known gravitational cosmic issues, as far as the observation allows to identify and verify them. Moreover, they are to be considered as being very close to the Einstein's Relativity Theory, but way more easy to work with because the Heaviside equations form a linear theory.

2. Motion is relative to the Universe

From electromagnetism, we know that every motion of charged particles or objects causes a magnetic field. The same occurs with the Heaviside equations [1]. Every time that a particle moves in an external Newtonian gravity field (originated by any other object), that magnetic field is generated. In electromagnetism and in gravitomagnetism we represent it as a circular field about the direction of motion of the object. With rotating objects, it is also clear that magnetic fields are created. Indeed, all particles at a certain radius from the axis of rotation have a unique velocity and are moving against all the other particles of that object.

How to calculate the gyrotation vector of a particle? Since gyrotation only occurs when there is a relative motion between a Newtonian gravity field and a particle, it follows that the vector sum of the Newtonian gravity fields of the Universe, except the enquired particle itself, fully determines the gyrotation vector of the enquired particle.

The consequence is that a particle is in absolute rest if that gyrotation vector sum is zero. Practically however, one can define a local absolute rest if the considered particle, object or system, has a low gyrotation field. This allows us to study subsystems within a certain order of precision, determined by the system where it is a part of. This approach allowed me to find a link between the solar motion within the Milky Way and Mercury's perihelion advance [2]. Indeed, the solar system's motion in the Milky Way causes a Lorentz force for gravitation upon the solar system, caused by the Milky Way's Newtonian gravity field.

3. Deduction of the Coriolis Gravitation Theory from Gravitomagnetism

Forces are caused by a Coriolis effect between particles. I proved this by applying the law of Newtonian gravity and the law of gyrotation (together they form gravitomagnetism) to the Sun in the following manner [4].

Let a particle be represented by trapped, circular light. Let 'gravitons' (made of light) orbit about that particle and let the orbit be widening with time. The 'graviton' can approach another particle and interact with it. That results in a Coriolis effect $2c\times\omega$ between the 'graviton' and the spinning particle, and the obtained acceleration perfectly corresponds to the Newtonian acceleration. This is the first action occurring from a graviton.

The second action that occurs is an interaction of a radial 'graviton' that is leaving a particle, with another spinning particle. The resulting interaction, which we call 'force' is one that is perpendicular to both the graviton's radial velocity vector and the particle's spin vector that was hit. That results in a Coriolis effect $2c\times\omega$ between the 'graviton' and the spinning particle, and the obtained acceleration corresponds to an induction of rotation. When gravitons are leaving a particle in radial way over the whole circumference, we find the following relationship [4]: $(2\pi R/R)(2c\times\omega)\Leftarrow Gm/R^2$.

This is the second possible action occurring from a graviton.

When applying these two effects to the global Sun, I found a physical relationship between the Gravitational Constant and the Sun's dynamics. It appears that for the Sun, the following relationship between the solar parameters exists [4], [6]:

$$\upsilon_{eq} \Leftarrow \frac{G m_{Sun}}{2c\, R_{eq}^{\ 2}} \tag{6}$$

Herein : $G = 6.67\text{x}10^{-11}\ \text{m}^3\ \text{kg}^{-1}\ \text{s}^{-2}$,
$c = 3.00\text{x}10^{8}\ \text{m s}^{-1}$
and for the Sun, $m_{Sun} = 1.98\text{x}10^{30}\ \text{kg}$
$R_{eq} = 6.96\text{x}10^{8}\ \text{m}$.

and υ_{eq} is the according solar rotation frequency. The arrow expresses an unilateral validity.

Based upon the stellar lifecycle, I found an extrapolation of the apparent unilateral direction of the validity of eq.(6). I stated that, based upon the fundamental gravitomagnetic laws that are fully compatible with eq.(6), this equation should be valid for any active star [5].

The high profit of the Coriolis Gravity Theory is that any force can be expressed as a Coriolis effect, unveiling the forces' mechanism, because a Coriolis effect gives a pure common mechanical trajectory of the 'graviton' with the spinning particle, which results in an acceleration of both the 'graviton' and the particle. The entity 'force' is no mystery any more.

4. Inertia is independent from the remaining Universe, hence Mach's principle is false

If we want to express inertia in terms of the Coriolis Gravity Theory, which would be the ultimate concept to unveil the mystery of accelerations and forces, and which very probably is the fundament of all accelerations and forces what-so-ever, we have to consider the following.

A forced displacement at relativistic velocities of a particle gets the following effect: the orbiting 'gravitons' about the particle undergo a Doppler effect, so that orbital 'graviton' paths are becoming closer. Some of them, depending from the particle's velocity, are overruling each-other, causing an interaction between several orbits, which can be seen as a Coriolis effect.

A forced, accelerating displacement of a particle means that the orbiting 'gravitons' about the particle undergo a continuously increasing Doppler effect, so that 'graviton' orbits are overruling each-other more and more, and much of the particle's spin even gets overruled by its own 'gravitons' [4]. The interaction between the orbiting light (gravitons) and the spinning particle itself causes a Coriolis effect, which reflects the concept of inertia as a counter-acting 'force'.

Mach's Principle, which links the whole Universe to the inertia of a particle, is a philosophy that has no physical grounds. It would have been forgotten since long if Einstein wouldn't have been interested by it. Contrarily to Einstein's conviction, inertia must be measured with respect to itself, and not with respect to something else.

5. Conclusion

The theory of Gravitomagnetism forms a strong evidence of the relativity of motion with regard to the whole Universe. This means, for a certain object, that the velocities and the accelerations of the rest of the Universe rule the gyrotation of the observed object.

On the other hand, when one goes more into detail by using the Coriolis Gravity Theory, which rules the fundaments of all the existing elementary forces, it appears that inertia is fully determined by the particle itself, and not by the rest of the Universe. Hence, Mach's Principle is false.

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2

Gravity is Causing the Inflating of the Earth, the Sun and the Stars

In the recent years, it has been steadily more confirmed that the PANGEA theory is wrong and that the displacement of the continents is ruled by solely an Earth expansion.

What is ruling that expansion? Could gravity cause that in any ways? I found that, yes, it does.

Since the underlying cause for gravity can be found by a Coriolis interaction between light (or gravitons) and particles, the next two papers will treat both Gravitation and the Coriolis interaction, analyze the possibility of gravitational repel and find out the origin of the Earth's expansion.

The first paper shows that according to Gravitomagnetism, spinning objects can repel or attract, due to second field, called “co-gravitational field” by Jefimenko, and which I preferred to call “Gyrotation(al field)” because rotation is the primary cause for that second field.
But also the Coriolis interaction occasions such a behavior. The tight connection between both theories is therewith shown again.

Also the sun and the stars evolve through an expansion phase, which is know since much longer time. I explored that further in the second paper.

Enter now in the amazing world of inflating spinning objects.

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The Expanding Earth :

Is the Inflation of Heavenly Bodies Caused by Reo-riented Particles under Gyrotation Fields?

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Abstract

Gravitomagnetism [1] consists of Newtonian gravity and *gyrotation*, which is totally analogous to magnetism. In an earlier paper [2], based on findings with regard to the Sun, I suggested that the attraction between elementary particles is generated by a Coriolis effect between gravitons and particles. Here, I deduce that the amplitude of gravity between particles (the process of reciprocal graviton-losses) is ruled by the spin-orientation of particles. Like-oriented particles engender their mutual repel, and consequently the inflation of heavenly bodies that was suggested by the Expanding Earth Theory.

1. The expanding earth theory

The discovery that the continental drift theory is wrong and that the Earth is instead expanding, from a small object to the Earth of today, is about to be accepted as a standard. Also Mars is expanding and the Sun as well. This motivated me to progress on my theory on the Coriolis effect of gravitons, interacting with elementary particles.

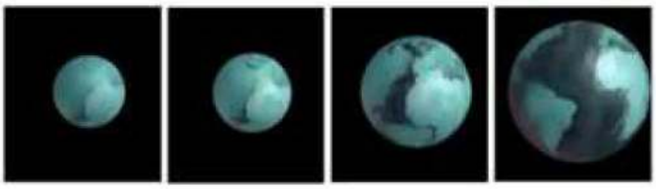

Image: Michael Netzer

Figure 1. Expanding Earth Theory. Some billion years ago, the earth was a small sphere (shown in the middle). It grew and the surface got broken into parts. Newer parts appeared below the sea level.

What made the Earth grow? Is it still expanding? How about other heavenly bodies? It is the purpose of this paper to unveil the reasons of it.

2. The internal gyrotation field of a rotating body [1]

Rotation, and the motion of bodies create fields and forces in addition to gravity. I call this second field *gyrotation*, which is the 'magnetic'-analog equivalence in gravitomagnetism and which is responsible for the flatness of our solar system and of our Milky Way.

As explained in my paper, the gyrotation of a rotating body provides a magnetic-like field that acts internally as well as externally to the body upon moving masses.

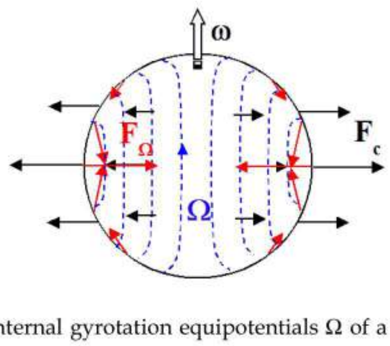

Figure 2. Internal gyrotation equipotentials Ω of a spinning body at a spinning rate ω. Surface gyrotation forces are indicated as F_Ω and centrifugal pseudoforces as F_c.

In figure 2 , the internal gyrotation equipotentials Ω of a spinning body at a spinning rate ω are shown. The gyrotation fields are parallel and oriented like the rotation vector. The surface gyrotation forces are indicated as F_Ω and the centrifugal pseudoforces as F_c.

3. The preferential orientation of particles under a gyrotation field

Trapped light is the most convenient way to describe matter [2]. (I prefer the terminology 'trapped light' over 'trapped photon', since photons are often regarded wrongly as particles instead of waves). When elementary particles are not preferentially but randomly oriented, six orientations are possible, like the six sides of a dice or any linear combination of them. But when a gyrotation field acts upon the body, a reorientation will occur over time in the sense that the gyrotation direction is preferred. Initially, a precession upon the particle's spin will occur, but because the particles are trapped light, they are not to be considered as 'hard' objects, and their light path will be able to swivel. There will be an increasing number of particles that will swivel.

In figure 3, several relevant cases of elementary particles are shown that are in a gyrotation field and undergo an analogue Lorentz-acceleration $\vec{a}_\Omega = \vec{c} \times \vec{\Omega}$ (1)

wherein $\vec{c}$ is the velocity of the trapped light and $\vec{\Omega} = \vec{\Omega}_{\text{int}}$ the interior gyrotation field of the spinning object. For a sphere, like the Sun, the Earth or Mars, its value, simplified for an uniform density, is given by [1]:

$$\vec{\Omega}_{\text{int}} = \frac{3Gm}{c^2 R^3}\left(\vec{\omega}\left(\frac{2}{5}r^2 - \frac{1}{3}R^2\right) - \frac{\vec{r}\,(\vec{r}\bullet\vec{\omega})}{5}\right) \quad (2)$$

wherein $\vec{\omega}$ is the spin velocity of the object, r the first polar coordinate, $\vec{r}\bullet\vec{\omega}$ a scalar vector product, equal to $r\,\omega\cos\alpha$ with α the second polar coordinate, R the radius of the object and m its mass. The swiveling acceleration is then given by Eq. (1) but the inertial moment of the elementary particles will slow down that swivel, and on top of it, a Coriolis effect upon that swiveling motion will make the particles' orbit precess.

In the figure 3.b. and c., the particles swivel their spin vector towards the gyrotation field's direction; the particle in the figure 3.a. will not swivel, since its acceleration is oriented inwards the particle.

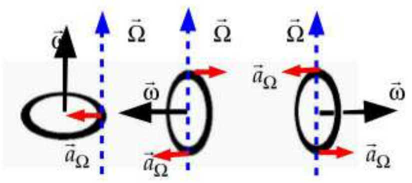

Figure 3.a.b.c. Three situations of spinning particles at a spinning rate $\vec{\omega}$, under a gyrotation field $\vec{\Omega}$. In the cases 3.b. and 3.c. there occurs a swiveling of the particle towards a like orientation as the gyrotation's direction, due to an acceleration $\vec{a}_\Omega$.

It follows that after time, the random distribution of particles will not be maintained, but instead an excess in a preferential direction.

4. Gravity between particles as a Coriolis effect

The gravitation field can be seen as a Coriolis effect [2], applied upon trapped photons. For two elementary particles with their respective trapped light orbits C_i and C_j, at a reciprocal distance of R_{ij}, the interaction with a graviton that orbits about the light orbit C_i is given by the Coriolis acceleration $\vec{a}_C$ which equals to $2\vec{\omega}_j \times \vec{c} = -\vec{a}_C$ (3)

wherein ω_j is the angular velocity, c the speed of light, and

$a_C = Gm_i / R_{ij}{}^2$. (4)

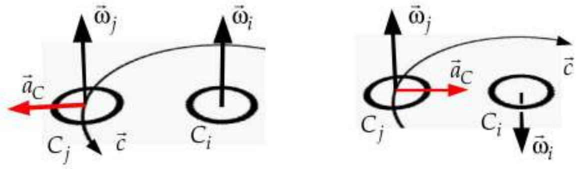

Figure 4.a. Like-oriented elementary particles of trapped light, hit by a graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles repel. Figure 4.b. Unlike-oriented trapped light, hit by a graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles attract.

Like-oriented particles of trapped light that are hit by a graviton and that are undergoing a Coriolis acceleration $\vec{a}_C$ will repel (figure 4.a). Unlike-oriented trapped light however that are hit by a graviton and that undergo a Coriolis acceleration $\vec{a}_C$ will attract (figure 4.b). The amplitude $|\vec{a}_C|$ is identical in both cases.

What are the consequences of the preferential orientation of particles?

5. Gravitational consequences of the preferentially like-oriented particles

Under a gyrotation field, caused by the spinning of the object, more elementary particles will get like-oriented, and these like oriented particles repel. The inflating of heavenly bodies is occasioned by the repel of the excess of like oriented particles in one direction.

Let's go over the main features of like and unlike spinning elementary particles:

1° Gravity between elementary particles can be an attraction as well as a repel.

2° Consequently, the 'universal' gravitation constant isn't universal at all but 'local' and its value depends from the degree of like or unlike orientations of particles in the bodies.

3° Rotating (spinning) bodies get steadily more like-oriented particles and consequently, steadily higher values of the 'local' gravitation constant.

4° The gravity of an object, containing ideally random-oriented particles doesn't have any global gravitational effect! In other words, if there is no preferential orientation of the particles, no global gravitational attraction (or repel) will occur!

5° The parameters of the gravitational attraction and repel of bodies are their masses (as far as they can be regarded as absolute values), their distance and their excess quantity of like oriented particles (also expressible by the 'local' gravitation constant of each of the bodies, as vectors).

6° Rotating (spinning) bodies inflate.

6. Discussion

The Sun, the earth, Mars and all the planets that spin or that are influenced by the spinning Sun, undergo a transformation inside. The rotation of the bodies generate a gyrotation of the same orientation inside the bodies. Due to the Coriolis affect, like spinning elementary particles get repelled and unlike attracted.

But, let us analyze the external gyrotation of spinning bodies, as a bonus.

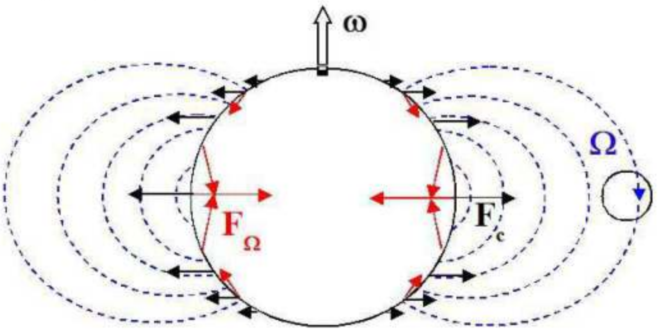

Figure 5. A rotating body also provides an external gyrotation Ω that has an inverse orientation of the body's rotation. Every orbiting body gets that gyrotation field working on it, which orient the elementary particles to it, with time. Attraction of the body occur. Surface gyrotation forces are indicated as F_Ω and centrifugal pseudoforces as F_c .

Spinning bodies indeed procure a gyrotation field that is the inverse of the body's rotation, and every orbiting object will undergo that gyrotation field by orientating the particles preferentially in the inverse direction (see figure 5). Let the large body be the Sun and the small one the Earth. Since the excess of orientation of the Sun's particles is opposite to the one of the Earth, the gravitons will cause attraction. On the long term, the Earth's rotation will slow down, the more that the earth expands, but the number of like-oriented particles with the Sun will increase at a slower rate as well, and cause a slower widening of the Earth's orbit with time.

One could wonder if the objects on Earth wouldn't be changing their weight, depending from the orientation of the object. Would an upside-down object be repelled by the Earth? No, because the elementary particles conserve their orientation, whatever the bodies orientation is. And the Earth's gyrotation field at its surface is more or less oriented likewise over the Earth, opposite to the Earth's rotation, which results in a comparably attraction force all over the world.

7. Conclusion

The expanding Earth has an explanation that is consistent with gravitomagnetism and with (what I would call) the Coriolis Gravity Theory [2]. The like spin of elementary particles cause gravitational repel and the unlike spin, attraction. Gyrotation fields, induced from rotation, orient these spins preferentially likewise with the body's rotation, which results in the repel inside the body, and so, its expansion. The consequence of it is that gravity doesn't always mean attraction, because it depends from the excess of orientation of particles in specific directions. Gravity can be repulsive and attractive. The gravitation constant is not a constant at all but should rather be seen as a fraction of a mass one (when masses are regarded as absolute entities) that interferes with the fraction of a mass two. It is then probable that the supposed 'absolute' mass of some planets is different of what has been supposed until now.

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[1] De Mees, T., "Analytic Description of Cosmic Phenomena Using the Heaviside Field", Physics Essays, Vol. 18, No. 3 (2005).

[2] De Mees, T., "Is the Differential Rotation of the Sun Caused by a Graviton Engine", Proceedings of the NPA, (2010).

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On the Gravitational Constant of Our Inflating Sun and On the Origin of the Stars' Lifecycle

explained by Gravitomagnetism [1] [4] and the Coriolis Gravitation Theory [2] [3]

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Abstract

Gravitomagnetism [1] consists of Newtonian gravity and *gyrotation*, which is totally analogous to magnetism. In an earlier paper [2], I suggested that the attraction between elementary particles (trapped light) is generated by a Coriolis effect between gravitons and particles (Coriolis Gravitation Theory). In the subsequent paper [3], I deduced that the amplitude of gravity between particles is ruled by the spin-orientation of particles and I explained the origin of the Expanding Earth. Here, I consider the consequence that the value of the gravitational constant of the Sun is ruled only by the number of like-oriented particles in the Sun and in the planets. I find that the lifecycle of stars is ruled by a gravitomagnetic cycle.

1. Introduction: the expanding Sun and Earth

1.1 The gyrotation field of a rotating body is defined by the spin of the object

Rotation, and the motion of bodies create a magnetic-like field in addition to gravity. I call this second field the *gyrotation* Ω. As explained in my paper [1], this field acts internally to the body and externally upon moving masses (see fig. 1.a and fig.1.b).

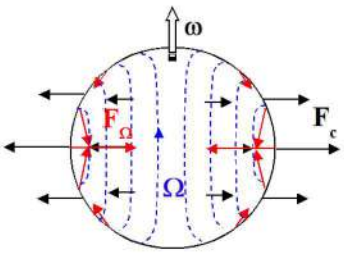


Figure 1.a. Internal gyrotation equipotentials Ω of a spinning body at a spinning rate ω. Surface gyrotation forces are indicated as F_Ω and centrifugal pseudo forces as F_c.

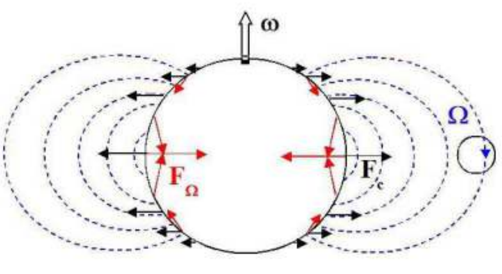


Figure 1.b. A rotating body also provides an external gyrotation Ω that has an inverse orientation of the body's rotation. Every orbiting body gets that gyrotation field working on it, which orient the elementary particles to it, with time. Attraction of the orbiting body occur. Surface gyrotation forces are indicated as F_Ω and centrifugal pseudo forces as F_c.

1.2 The preferential orientation of particles under a gyrotation field tends, with time, to change to that of the gyrotation field

As stated in my papers [2] [3], 'trapped light' is the most convenient way to describe matter. When elementary particles are not preferentially but randomly oriented, six main orientations are possible, like the six sides of a dice or any linear combination of them. But when some gyrotation field acts upon the body, a reorientation will occur over time: the preferred orientation will eventually correspond to the local gyrotation direction.

1.3 Gravity between particles (trapped light) seen as a Coriolis effect

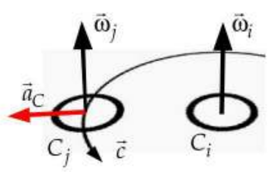
In my earlier papers [2] [3], it was explained that the gravitation field can be seen as a Coriolis effect, applied upon trapped photons, wherein the gravitational attraction or repel is given by :

$$-\vec{a}_C = 2\vec{\omega}_i \times \vec{c} \tag{1}$$

whereby

$$-a_C = G m_i / R_{ij}^{\;2} \tag{2}$$

wherein R_{ij} is the reciprocal distance (see fig.2 and fig.3).



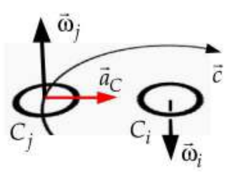


Figure 2.a. Like-oriented elementary particles of trapped light, hit by a graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles repel.

Figure 2.b. Unlike-oriented trapped light, hit by a graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles attract.

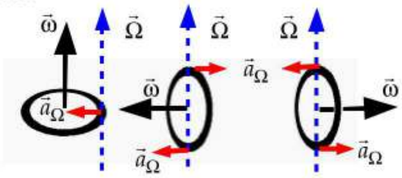


Figure 3.a.b.c. Three situations of spinning particles at a spinning rate $\vec{\omega}$, under a gyrotation field $\vec{\Omega}$. In the cases 3.b. and 3.c. there occurs a swiveling of the particle towards a like orientation as the gyrotation's direction, due to an acceleration $\vec{a}_\Omega$.

It follows that after time, the random distribution of particles will not be maintained, but instead an excess in a preferential direction.

1.4 Gravitomagnetic consequences due to preferentially like-oriented particles

Under a gyrotation field, caused by the spinning of the object, more elementary particles will get like-oriented, and these like oriented particles repel [3]. The inflating of heavenly bodies is occasioned by the repel of the excess of like oriented particles in one direction.

Let's go over the main features of like and unlike spinning elementary particles:

1° Gravity between elementary particles can be an attraction as well as a repel.

2° Consequently, the 'universal' gravitation constant isn't universal at all but 'local' and its value depends from the degree of like or unlike orientations of particles in the bodies.

3° Rotating (spinning) bodies get steadily more like-oriented particles and consequently, steadily higher values of the 'local' gravitation constant.

4° An object, containing ideally random-oriented particles doesn't have any global gravitational effect! In other words, if there is no preferential orientation of the particles, no global gravitational attraction (or repel) will occur!

5° The parameters of the gravitational attraction and repel of bodies are: their masses (as far as they can be regarded as absolute values), their distance and their excess-quantity of like oriented particles (also expressible by the 'local' gravitation constant of each of the bodies, as vectors).

6° Rotating (spinning) bodies inflate.

On top of these six consequences of my paper [3], two more consequences follow.

7° The steady state of spinning objects' gravity is rather an internal repel than an internal attraction [3].

8° The steady state of the spinning objects' gyrotation results rather in a compression than an internal repel [1].

The consequence 7° follows from the fact that spinning objects get an internal gyrotation that tends to orient the particles like-wise, which causes repel. The consequence 8° follows long since the basic gyrotation calculations in [1].

2 The value of the gravitational constant is defined by the quantity of like spin orientations of particles

Since the orientation of spinning trapped light (elementary particles) defines the quantity of attraction or repel, and since Newton's gravitation equation doesn't content variables, under fixed masses and distances, the quantity of like-oriented particles should be expressed by some variable, that cannot be included elsewhere than in the gravitational 'constant'.

2.1 When is the global gravitational constant of an object minimal?

From the paragraph 1.4 , especially the consequences 4° and 5° follows that when an object consists of particles that are perfectly randomly oriented, there is no global attraction or repel of particles inside that object. There are as much repelling as attracting particles and the resultant is zero.

$$\sum \vec{\omega} = 0 \quad \text{. It follows that} \quad \sum \vec{\Omega} = 0$$

for the gyrotation of the object.

If the object is not spinning and if there is no external gyrotation acting upon the object, the situation will remain constant in time. The global gravitational constant is then zero

2.2 When is the global gravitational constant of an object maximal?

The individual gravitational constant between two like-oriented particles is a well defined value : the "elementary gravitational constant". This constant indicates the flow of how many gravitons escape from an elementary particle that are implicated in a Coriolis effect with another elementary particle.

When all the particles are like-oriented, due to a long-lasting rotation of the object, or due to an external gyrotation field that works upon the object, the global gravitational constant will be the same as the "elementary gravitational constant" itself. This is the maximal possible value for the global gravitational constant of the object.

3 The star's lifecycle: a typical gravitomagnetic cycle

Consider a recently born star in its early condition: a cloud of almost randomly spin-oriented particles, though with some global spin. The global spin will be consequently responsible for a gyrotation field, internally and responsible externally (fig.1.a and fig.1.b), and for a steady increase of the number of particles with a spin orientation in the preferred direction, that of the global star's spin.

3.1 Towards a red giant

When an increase of like-oriented particles occurs as explained in [3], the star inflates, due to the repel of these particles. At the same time, the star's spin velocity decreases, due to the radius increase and to the conservation of global momentum. Because the star's density decreases, the nuclear activity decreases at the same time. The star finally becomes a red giant.

Now, the star's rotation is very low and its size is maximal. The star's global gravitational constant became maximal as well, because its value is directly linked to the number of like-oriented particles [3]. But it doesn't mean that *all* the particles are like-oriented.

3.2 The spin inversion of the red giant

In my paper [2] I explained that trapped light works in two different ways upon other trapped light: the first way is by an orbital graviton, as explained in fig.2, the second way is the one with a direct radial impact of 'light' upon other particles, as shown in fig.4 below.

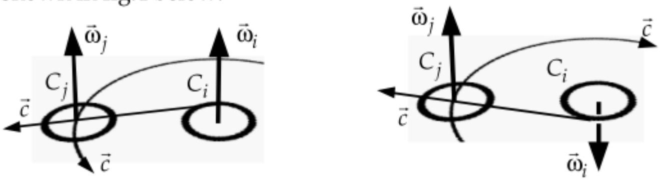


Figure 4.a. and b. Two cases of trapped light, hit by a graviton, radial or tangential, and undergoing a Coriolis effect.

From eq.(1) follows that in fig.4.a, the Coriolis effect by the direct and radial impact of light gives an induced rotation (by a Coriolis effect), opposite of the global object's spin. This is particularly clear when one consider the spin $\vec{\omega}_i$ as one of a more inner particle, and $\vec{\omega}_j$ as one of a particle that is more situated near the star's surface.

The impact of this phenomenon, subsequently to the expansion of the star towards a red giant is that, the more the particles are like-oriented, the more the spin will tend to increase in the opposite direction of the star's global spin. Indeed, in fig.4.a, the global spin is oriented like the spins $\vec{\omega}_i$ and $\vec{\omega}_j$.

The red giant's spin will reach zero, then will start to increase in the opposite direction! Since the global gravitational constant was maximal at the end of the expansion period, this spin increase is fast, and causes the next phenomena.

3.3 Towards a white dwarf

The new spin will generate a gyrotation that is defined by the spin of the star (fig.1.a), and that is differential, depending from its latitude. The strongest differential spin at first will generate a swiveling of the particles' orientation in its neighborhood, which results in an attraction with the rest of the star's particles, which are still oriented as before. The inner part of the star will keep the ancient orientation the longest time and the outer shells of the star will get inversed orientations more quickly. This means that, still at a high value of the gravitational constant, two zones are built up, which attract each-other.

Also the global gyrotation, originated by the global spin of the star, builds-up a compression zone between the equator and about 35° of latitude, which compresses the star [1].

Both phenomena are responsible for a decreasing distance between both zones, an increasing pressure and an increasing spin of the star, strongly augmented by the law of conservation of angular momentum when the star's radius decreases, and resulting all together in the collapse of the star into a white dwarf, wherein the nuclear activity rises again strongly.

3.3 The star's lifecycle: an harmonic?

It is quite complicated to analytically predict how the following stage of the white star would be, since the mixture of 'up' and 'down' oriented particles can become turbulent, and therefore hard to evaluate. However, it is probable that due to the global angular momentum, the dust of the dying star could partly stay together and try another cycle, depending from how much matter got lost into space.

4 Discussion and conclusion

A new positive test for the Coriolis Gravitation Theory: the lifecycle of a star

The expanding Sun and the lifecycles of stars have an explanation that is consistent with gravitomagnetism and with the 'Coriolis Gravity Theory' [2]. Rotation (spin) engenders gyrotation, and gyrotation engenders internally more and more like-oriented spins of elementary particles.

This results in the following lifecycle of a star: inflation of the star occurs until it becomes a red giant at a low spin. At that stage, its global gravitational constant is maximal. The high number of like-oriented elementary particles also slows down the star's spin and inverses it, due to the Coriolis effect between like-oriented elementary particles and incoming radial gravitons (fig.4.b).

The global gyrotation of the red giant increases together with its inversed spin, and the places where the local gyrotation is the largest will again inverse the spin of the elementary particles. This outer shell of the star will attract the inner part and result in a collapse to a white dwarf.

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3

The Nature of the Gravitational Constant, Mass and Matter

But if the Earth and the Sun expand, why don't we find evidence of repelling gravity in everyday life? What is the real nature of the Gravitational Constant and how is its value formed on Earth? The Gravitational Constant on the Earth is different from place to place. How will the Gravitational Constant evolve on the different places on Earth?

A qualitative explanation is given in the first of two papers: Gravitomagnetism helps us to precisely detect the faster and slower expanding parts on Earth, and the preferential orientations of spinning particles.

When I follow this track, I cannot but conclude that matter must be vector-like microscopically, but a scalar as we discover it macroscopically. That is explained in detail in the second paper. The original assumption that particles are made of “trapped light” or “closed waves” is once again reinforced by the findings of the Coriolis Gravity Theory.

Enjoy reading about the mysteries of matter and mass.

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Fundamental Causes of an Attractive Gravitational Constant, Varying in Place and Time

Explained by Gravitomagnetism and the Coriolis Gravitation Theory

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Abstract

The gravitational constant *G* has been measured since more than 200 years [4]. It seems impossible to find a precise value for *G*. In this paper, I will analyze the reasons for that issue, according Gravitomagnetism and the Coriolis Gravitation Theory. In my paper "On the Gravitational Constant of Our Inflating Sun and On the Origin of the Stars' Lifecycle", I explained that the Sun and the Earth is expanding due to Gravitomagnetism [1] , which consist of the Newtonian gravity and *gyrotation* that is totally analogous to magnetism. The Coriolis Gravitation Theory completes the picture which governs the gravitation laws. Here, the topological values of *G* are found qualitatively, based on the local *gyrotation* field inside the Earth. I find that the difficulties for the measuring of the Gravitational Constant are caused by the location where the measurement is done and from which location the test materials are originated. Furthermore, I come to the proof why, although the Coriolis Gravity Theory allows gravitational attraction as well as repel, the heavenly bodies' particles preferentially form distributions that are mainly attractive.

Keywords: gravitomagnetism, expanding Earth, gravitational constant, Coriolis Gravity Theory, gyrotation.

1. The Coriolis Gravitation Theory [2] [3]

1.1. Gravity between particles (trapped light) seen as a Coriolis effect

In my earlier papers [2] [3], it was explained that the gravitation field can be seen as a Coriolis effect, applied upon trapped 'light', where particles are made of. The relevant interactions are shown here :

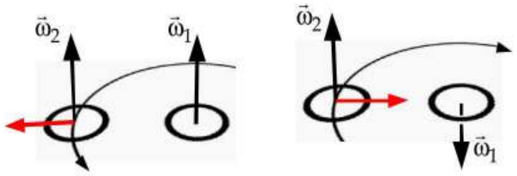

Figure 1.a. Like-oriented elementary particles of trapped 'light', hit by an orbiting graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles repel.

Figure 1.b. Opposite-oriented trapped 'light', hit by an orbiting graviton and undergoing a Coriolis acceleration $\vec{a}_C$. The particles attract.

Attraction or repulsion are the processes that rule gravity, caused by escaping 'gravitons' from opposite- or like-oriented spins of particles. The interaction occurs, due to a Coriolis effect of the escaped graviton, interacting with the second particle's spin. (If in the figure 1, the spin of particle '2' is oriented to the left or to the right, the acceleration will be up or down.)

1.2. The expanding Earth

The repulsion variant of the Coriolis Gravitation Theory explains the expanding of the Earth qualitatively [2]. However, I didn't yet treat the aspect of how the attraction and the repulsion can cohabit. A qualitative explanation will be given in this paper.

2. Integration of Gravitomagnetism with the Coriolis Gravitation Theory

2.1. The early Earth and its particles' orientation

From the general point of view, one could say that the particles in the early Earth probably were oriented randomly. But the Earth was formed from a certain physical process. Although I am won for the idea of a solar protuberance that formed the Earth, any other process could result in some global orientation distribution of the particles.

It will be shown below that there always occurs attraction between particles, according to the figure 1.b.

2.2. Why the preferential orientation of the Earth's particles is attractive

Why is the preferential orientation of the Earth's particles attractive? Imagine several particles side by side that are oriented upwards or downwards: ↑↓↓↑. The particles that are oriented differently, → or ← , do not affect this reasoning because they don't interact much with ↑ and ↓ (thus, the reasoning for ↑↓↓↑ is similar to that of ↑←↓←↓→↑). As we saw earlier [2], opposite oriented particles attract and like oriented particles repel. The final situation of the example is given by ↑↓ ↓↑.

Between the two downwards oriented particles of this example, the space between them increased and some room is created for another particle to fill it. We have a probability of at least 1/6 that this will be a ↑ , because ↑ is attracted by ↓ , resulting in a double attraction (left side and right side). In this example, we obtain a higher probability for ↑↓↑↓↑, which globally is a group that is oriented upwards ▲. The same reasoning is possible for groups : ▼▲▲▼ will result in ▼▲ ▲▼ , and then in a higher distribution probability of ▼▲↓▲▼ or ▼▲▼▲▼, which here gives a downwards super-group. These super-groups on their turn form hyper-groups the same way. However you look at it, one always gets a majority of attraction-oriented compositions.

Now we know why the heavenly bodies are attractive, despite the fact that the Coriolis Gravity Theory allows both attraction and repulsion of particles. We also found the first reason why the Gravitational Constant isn't identical everywhere, because the super-groups' orientations are random after all and don't allow new settings if they became solid or crystallized.

Hereafter, we will see how the Earth's rotation can also affect the Gravitational Constant value.

3. The internal gyrotation field of a rotating body [1]

3.1. Global Gyrotation fields of the Earth

Rotation creates a field in addition to gravity. I called this second field: *gyrotation*, which is the 'magnetic'-analog equivalence in gravitomagnetism. The gyrotation of a rotating body provides a magnetic-like field that acts internally on the individual particles of the spinning body.

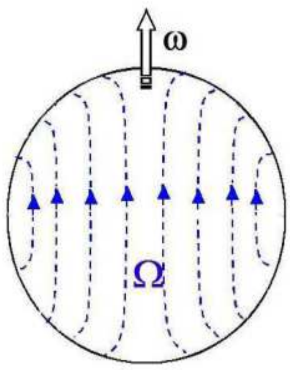

Figure 2. Internal gyrotation equipotentials Ω of a spinning body at a spinning rate ω.

In the figure 4 , the internal gyrotation-equipotentials Ω of a spinning body at a spinning rate ω are shown. The gyrotation fields are parallel and oriented like the rotation vector [1].

3.2. Detailed Gyrotation fields of the Earth

The actual Earth rotates at a certain rate, which creates a gyrotation field. (This rotation probably comes from the expulsion process out of the Sun, as I explained in my Solar Protuberance Theory in earlier papers.)

Hereafter, I will analyze the possible outcome of the Gravitational Constant issue.

We found in [1] that the internal gyrotation $\vec{\Omega}$ of a sphere is given by:

$$\vec{\Omega}_{\text{int}} = -\frac{3Gm}{c^2 R^3}\left(\vec{\omega}\left(\frac{2}{5}r^2 - \frac{R^2}{3}\right) - \frac{\vec{r}\,(\vec{r}\cdot\vec{\omega})}{5}\right) \quad (1)$$

wherein R is the radius of the sphere, r the local radius of a point inside the sphere and $\vec{\omega}$ its angular velocity.

The 'vertical' (y-) and 'horizontal' (x-) components are given by the following expressions, derived from (1).

$$\Omega_y = -\frac{3Gm\omega}{5c^2 R^3}\left(2x^2 + y^2 - R^2\right) \quad (2)$$

and

$$\Omega_x = \frac{3Gm\omega}{5c^2 R^3}\,x\,y \quad (3)$$

These equations are visualized in the figure 3.

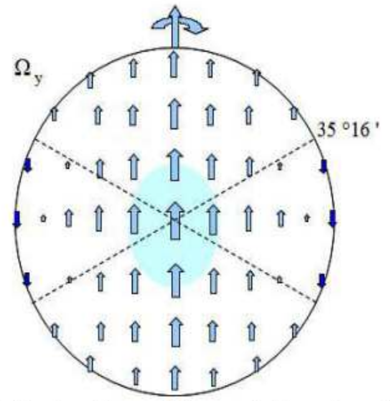

Figure 3.a. Vector topology of the gyrotation along the spin axis of a spinning sphere. The spin axis contains the highest amplitude of gyrotation. At the latitude of 35°16', the gyrotation becomes zero. At the equator, gyrotation is inversed, and one gets a local increase of the global attraction!

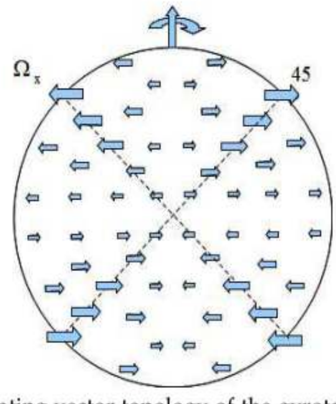

Figure 3.b. Rotating vector topology of the gyrotation along the equatorial axis of a spinning sphere. At the longitude of 45°, the gyrotation is maximal. Near the center, the gyrotation is zero. Since particles continuously rotate with the Earth's spin, their original spin orientation will not be affected that easily.

The gyrotational vector topology along the spin axis shows a maximal gyrotation near the spin-axis and the center of the globe (figure 3.a). Near the latitude of 35°16′, the gyrotation becomes zero. In the equatorial direction, gyrotation is maximal at a latitude of 45° and zero near the center of the sphere (figure 3.b). However, since particles continuously rotate with the Earth's spin, the gyrotational orientation is spinning as well in a plane that is parallel to the equator and their original spin orientation will not be affected that easily.

3.3. The preferential orientation of particles under a gyrotation field

The Earth's spin is responsible of the formation of gyrotation equipotential lines as shown in the figure 2. In analogy with electromagnetism, particles will have the tendency to orientate along the equipotentials of gyrotation. After time, the particles will have the tendency to re-orientate along the spin axis, parallel to it, at the amplitudes represented in figure 3.a. The gyrotation field shown in figure 3.b will almost not affect the particles, but a more detailed study should be done to confirm this.

Inversely, opposite spinning particles will be repulsive. These proprieties are valid for large bodies as well as for smaller particles, as shown in [2]. In order to meet this latter condition, we need to consider particles as being spinning, which is met if we accept the concept of matter that consists of trapped light.

4. Conclusions

In my former papers, I found that the gravitation fundaments are relational. That was expressed in the Coriolis Gravity Theory.

The first important discovery in this paper is the fact that, spites the alike occurrence of attracting and repelling particles at the origin of the Earth, attraction became the main pattern due to the creation of new space between the repelling particles, which is preferentially filled up by particles with an opposite spin. Groups of particles are randomly distributed, which causes local changes of the Gravitational Constant. Crystallized and solid matter will stop reorganize its attracting particles' distribution. Only liquids and gasses can still continue adapting its structure.

It follows that the values of the Gravitational Constant are also determined by the location where the materials have been mined from, and whereof the measuring equipment is built.

A second important discovery is that the Earth's spin changes bit by bit the particles' orientation distribution in the fluid parts of the Earth. About the Earth's axis, the strongest repel gyrotation field is generated, which has effects upon the value of the internal Gravitational Constant, where the Gravitational Constant increases or decreases with depth, especially in the deeper liquid and gas zones near the poles. The increase or decrease don't only depend from the value of the local particles' spin orientation, but also from the interacting orientations between large hyper-groups of different layers in the Earth. Near the Earth's surface, this latter interaction is preponderant.

The consequence is that the Earth expands with time in the whole central region and along the whole spin axis. The poles are an excellent probe region to evaluate the progress of the value decrease of the Gravitational Constant.

At the equator, the global attraction effect between the surface and the inner layers is slightly augmented, with can create an slightly increased Gravitational Constant value between hyper-groups over time.

Finally, I can state that it must be possible to find a way to 'distillate' particle spin-orientation groups that are oriented in a particular way, in order to form an artificial attraction reduction, possibly a repel and consequently, weightlessness.

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The Gravito-Magnetic Inflation of Rotating Bodies and the Nature of Mass and Matter

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Gravito-magnetism consists of the Newtonian gravity and *gyrotation*, which is totally analogous to magnetism. This model has successfully explained an important number of physical and cosmic phenomena [1]. One of the most striking predictions is the possibility of gravitational repel by objects with like-oriented spins. I found that the sign and the amplitude of the effective gravity between particles is ruled by the spin-orientation of particles [2]. In [3], I emphasized the topological values of the gravitational 'constant' G inside the spinning Earth, based on its internal *gravito-magnetic* field. Also, I proved that the spin-orientations inside spinning bodies consequently provoke the inflation of these bodies, as suggested by the supporters of the Growing Earth Theory. I also showed why the gravitational constant is varying locally and I prove that, although the *gravito-magnetism* allows gravitational attraction as well as repel, the particles in rotating bodies will preferentially form distributions that are globally attractive. This explains why masses have never been found to be repulsive [3]. I deduce here a new definition for "mass" as a vector, and conclude that the gravitational constant's value is the sum of the orientations of the elementary vector-masses while taking their spacing into account. Moreover I find why the gravity force is so weak and why cohesion forces are so large.

1. Introduction

Considerable publicity was made by Neal Adams in 2008, who showed that the plate tectonics theory (PANGEA) is wrong and that the Earth is instead growing, from a small proto-Earth to the Earth of today [5]. Also Mars is growing and the Sun as well. His very convincing explanation, well documented by video, brought me to progress on my theory regarding *gravito-magnetism* [1].

What made the Earth grow? Is it still growing? How about other heavenly bodies? It is the purpose of this paper to unveil these questions through *gravito-magnetism*.

Hereafter, we will see how the Earth's rotation can also affect the Gravitational Constant value.

1.1. Gravito-magnetism

Mindful of the previous successes of gravito-magnetism in explaining cosmic phenomena, which I described in a former paper [1], this paper again just applies a property of *gravito-magnetism*.

Rotation and the motion of bodies create fields and forces in addition to the Newtonian gravity. I call this second field *gyrotation*, which is the 'magnetic'-analogue equivalence in gravito-magnetism and which is responsible for the flatness of our solar system and of our Milky Way. It also engenders the prograde orbit of the planets and the stars in their system and the constancy of the star's velocity in disc galaxies. It explains the hourglass shape of some supernovae as well.

From my earlier paper [1] , I found the equations for *gyrotation* $\vec{\Omega}$, the 'magnetic'-analogue equivalence in gravito-magnetism. Similarly to magnetism, which is the field that occurs when a electrical charge moves (or rotates), gyrotation is the field that occurs when a mass moves (or rotates). The properties of this field suffice to explain the inflation of rotating bodies.

The external gyrotation field is given by Eq. (1) and is represented in Fig. 1, wherein $\vec{\omega}$ is the spin velocity of the object, $\vec{r}$ the first polar coordinate, $\vec{\omega}\bullet\vec{r}$ a scalar vector product, equal to $r\omega\cos\alpha$ with α the second polar coordinate ($\alpha = 0$ at the equator), R the radius of the object and m its mass.

$$\vec{\Omega}_{\text{ext}} \Leftarrow -\frac{G m R^2}{5c^2 r^3}\left(\vec{\omega} - \frac{3\vec{r}\left(\vec{\omega}\bullet\vec{r}\right)}{r^2}\right) \qquad (r \geq R) \qquad (1)$$

The Eq.1 can be found analogically to the calculation of the magnetic field of an electric dipole (a closed current loop), where the magnetic field is replaced by the gyrotation field and the electric charge by mass [8].

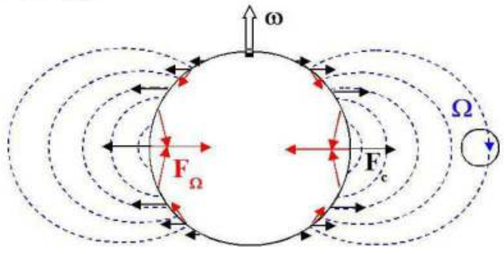

Figure 1. A rotating body provides an external gyrotation $\vec{\Omega}$ that has an inverse flow of the body's rotation. Attraction of the orbiting body occur, due to the equivalent Lorentz force [8]. Surface gyrotation forces are indicated as F_Ω and centrifugal pseudo forces as F_c .

It is amazing how the gyrotation fields act. The analogy with electromagnetism is fully allowed, and the Lorentz force for gravity $\vec{F}_\Omega$ is applicable for a body with mass m_2 that travels or rotates in the gyrotation field $\vec{\Omega}$ of the spinning mass m.

$$\vec{F}_\Omega = m_2\left(\vec{v}_2 \times \vec{\Omega}\right) \qquad (2)$$

Prograde orbiting objects get attracted and retrograde orbiting objects get repelled by the Lorentz force. But also at the surface of the spinning body, gyrotation forces occur by the interaction of the surface gyrotation field and the object's surface velocity. In previous papers [1], I deduced that the faster the body spins, the stronger the Lorentz gyrotation forces act inwards the body nearby the equator, up to the latitude of 35°16′, allowing fast spinning stars to not totally fall apart.

1.2. Opposite Spins Attract, Like Spins Repel

I also deduced [1] that due to the Lorentz force for gravitation acting upon the external gyrotation fields of spinning bodies, the following occurs, due to the mutual external gyrotation fields that both interact with the other body's surface (and internal) velocity. Bodies with opposite oriented spins will attract and bodies with like-oriented spins will mutually repel (Fig.2). This is valid for bodies, molecules, atoms and for any particle with a spin. In this paper we will generally speak of "particles".

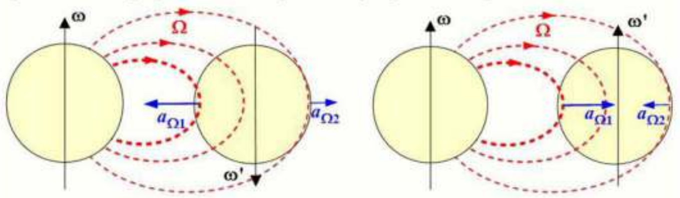

Figure 2. Due to the Lorentz-force for gravity, bodies with opposite-oriented spins will attract and bodies with like-oriented spins will mutually repel.

The conclusion above is of utmost importance to fully understand the working of gravity at all levels and the definition of mass and matter.

2. Internal Gyrotation Field of a Rotating Body

As explained in my paper [1], the gyrotation $\vec{\Omega}$ of a rotating body provides a magnetic-like field that acts internally as well as externally to the body upon moving masses.

For a sphere, like the Sun, the Earth or Mars, its value inside the body, simplified for an uniform density, is given by [1]:

$$\vec{\Omega}_{\text{int}} \Leftarrow \frac{3Gm}{c^2 R^3}\left(\vec{\omega}\left(\frac{2}{5}r^2 - \frac{1}{3}R^2\right) - \frac{\vec{r}\,(\vec{r}\bullet\vec{\omega})}{5}\right) \qquad (r \le R) \qquad (3)$$

wherein the same symbols as in Eq. (1) are used.

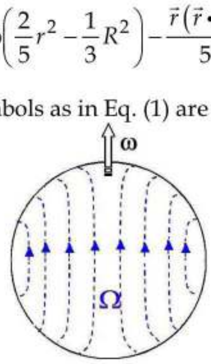

Figure 3. Internal gyrotation equipotentials $\vec{\Omega}_{\text{int}}$ of a spinning body at a rate $\vec{\omega}$.

The internal gyrotation $\vec{\Omega}_{\text{int}}$ of a spinning sphere is represented in Fig. 4 for the component Ω_y that is parallel to the spin vector [3]. By comparing both Fig. 3. and 4. it appears that the component Ω_x is rather small compared with Ω_y (except at the sphere's surface) and will not affect the further reasoning of this paper. The reason will become clear during my explanations. The arrows in Fig. 4 are represented larger for higher amplitudes of the internal gyrotation.

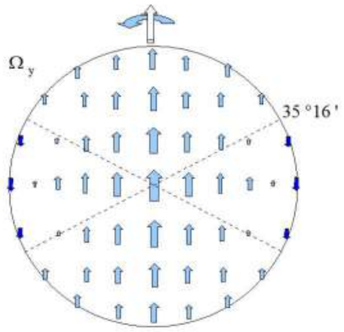

Figure 4. Vector topology of the gyrotation along the spin axis of a spinning sphere. The spin axis contains the highest amplitude of gyrotation. At the latitude of 35°16′, the gyrotation becomes zero. At the equator, the gyrotation is inversed, and one gets a local increase of the attraction!

It appears from Eq. (3) that near the Earth's spin axis, the gyrotation will be strongly oriented like the spin. At the latitude of 35°16′, the gyrotation becomes zero, and around the equator, the gyrotation becomes even inversed near the surface.

3. The Preferential Orientation of Particles under a Gyrotation Field

The most important elementary particles have a spin. When these particles are not preferentially but randomly oriented, six main orientations are possible, like the six sides of a dice, or any linear combination of them. But I will show below that when a gyrotation field acts upon the body, an internal spin reorientation will occur over time, parallel to the ambient gyrotation orientation. Although initially, a precession upon the particle's spin will occur, but because the particles are not to be considered as 'hard' objects, their internal dynamical structure will be able to swivel. Under the external gyrotation field, there will be an increasing number of particles whereof the spin vector will swivel.

In Fig. 5, several relevant cases of elementary particles are shown (as rings) that are in an internal gyrotation field and undergo a Lorentz-acceleration $\vec{a}_\Omega = \vec{v}_i \times \vec{\Omega}_{\text{int}}$ (2)
wherein $\vec{v}_i$ is the rotation velocity of the elementary particle and $\vec{\Omega}_{\text{int}}$ the interior gyrotation field of the spinning object.

The swiveling acceleration is then given by Eq. (2) and the inertial angular moment of the elementary particles will in the first place cause a precession of the particles' spin vector.

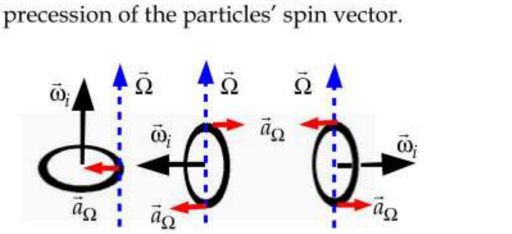

Figure 5.a.b.c. Three situations of spinning particles at a spinning rate $\vec{\omega}_i$, under a gyrotation field $\vec{\Omega}$. In the cases 5b. and 5c. there occurs a swiveling of the particle towards a like orientation as the ambient gyrotation's direction, due to an acceleration $\vec{a}_\Omega$.

In the Fig. 5b and c, the particles will swivel their spin vector until the gyrotation field's orientation; the particle in the Fig. 5a will not swivel, since its acceleration is oriented inwards the particle.

It follows that after time, the distribution of particles will not maintain random, but instead, one direction will be preferential, in the same way as the gyrotation distribution Ω_y of Fig. 4. Thus, this figure also shows the distribution of the density decrease (due by repel and so, expansion) inside the Earth. Remark that the distribution Ω_x is not relevant because of the continuous rotation of the Earth whereby the gyrotation orientations rotate as well, parallel to the equatorial plane.

In the light of Fig. 4 and Eq. (3) it is clear that nearby the Earth's spin axis, the particles' spin will be strongly oriented like the Earth's spin, more than elsewhere in the sphere. At the latitude of 35°16', the particles' spin is not altered, which means that the spins' orientations have remained random. At the equator, the particles' spin can even become inversed, and one gets a local increase of the global attraction (large zones with opposite spins)!

4. Why Gravity Generally Appears to Attract

4.1. The Early Earth and Its Particles' Orientation

From the general point of view, one could say that the particles in the early Earth probably were oriented randomly, because the spinning did not modify the particles' orientations yet. But the Earth was formed from a certain physical process. Although I am won for the idea of a solar protuberance that formed the Earth [4], any other process could result in a certain orientation distribution of the particles.

It will be shown below that there always occurs attraction between particles.

4.2. Why the Preferential Orientation of the Earth's Particles is Attractive

Why is the preferential orientation of the Earth's particles attractive? Imagine several particles side by side that are randomly oriented upwards or downwards, say, ↑↓↓↑. As we saw earlier [1] [2], opposite oriented particles attract and like oriented particles repel. According to gravito-magnetism [1], the first particle at the left attracts the second and the third particle, the second particle repels the third one, but attracts the first and the fourth ones, and so forth. The particles that are oriented differently, → or ← , do not affect this reasoning because they don't interact much with ↑ and ↓ (thus, the reasoning for ↑↓↓↑ is similar to that of, say, ↑←↓←↓→↑). The final situation of the example is given by a void between the second and the third particle, like ↑↓ ↓↑. Between the two downwards oriented particles of this example, the space between them increase and some room is created for another particle to fill it. We have a probability of more than 1/6 that this will be a ↑ , because ↑ is attracted by ↓ , resulting in a double attraction (left side and right side). In this example, we obtain a higher probability for ↑↓↑↓↑, which globally is an attracting group, noted as ▲ , that is oriented upwards. Remark however that the global orientation is only of an amplitude ↑ , for the five particles. The same reasoning is possible for groups : ▼▲▲▼ will result in ▼▲ ▲▼ , and then in a higher distribution probability of ▼▲↓▲▼ or ▼▲▼▲▼, which here gives a downwards super-group. These super-groups on their turn form hyper-groups the same way. However you look at it, one always gets a majority of attraction-oriented compositions, in case of mobile particles like in the Sun or like most of the actual Earth. But even hyper-groups will get an amplitude of only ↑ , which suggest the reason why the external gravitation force is so small, while the cohesion forces in matter are so large.

Now we know why the heavenly bodies are attractive, despite the fact that gravito-magnetism allows both attraction and repulsion of particles. We also found the first reason why the Gravitational Constant isn't identical everywhere.

5. Gravitational Consequences of the Preferentially Like-oriented Particles

Let's recall the main features of like and unlike spinning elementary particles:

1. Gravity between elementary particles can be attractive as well as repulsive.
2. Consequently, the 'universal' gravitation constant isn't universal at all but 'local' and its value depends from the degree of like or unlike orientations of hyper-groups of particles in the bodies.
3. Rotating (spinning) bodies get steadily more like-oriented particles and consequently, steadily lower attracting and higher repelling values of the 'local' gravitation constant.
4. Rotating (spinning) bodies inflate and their density decrease.
5. The gravity of an object, containing ideally random-oriented particles doesn't get any global external gravitational effect! In other words, if there is no preferential orientation of the particles, no global gravitational attraction (or repel) will occur!
6. Microscopic and elementary masses have now gotten a vector propriety because the attraction or repel between bodies only depends from the mutual (global and individual) spin orientation of these bodies and of their particles.
7. The parameters of the gravitational attraction and repel of bodies are their masses (as far as they can be regarded as absolute values), their distance and their mutual orientation (also expressible by the 'local' gravitation constant of each of the bodies, as vectors).
8. The grouping of the particles' orientation of spinning bodies make them preferentially attractive, but with a small attraction amplitude, which explains the high cohesion forces of matter and, at the same time, their low gravitation forces.

6. Matter, Mass, and the Gravitational Constant

Matter can globally be non-spinning and the internal particles can remain "frozen" in their original arbitrary spin-orientations, so that they are (theoretically) neutral and insensible to gravity. In other words, it appears that the rate of attraction or repel depends on the elementary masses' spin-orientations and of the gravitational constant G, but it also appears that there possibly doesn't exist any scalar mass. This point of view directly follows from the definition of matter as "trapped light".

Since mass however is regarded as a matter-related quantity, not as a quantity of attraction, the rate of attraction or repel should ideally be treated by the gravitation constant. One should find a description that's keeps the original value of the word "matter" as "mass", and keep the gravity constant as the relationship between the vector-masses.

Since mass really behaves as a vector with respect to gravity, the more correct description is the following.

I can consider Newton's law as a Coulomb-like law, but where the masses become vectors, defined by the sum of their elementary spins, and where the constant G only defines the 'normalized elementary gravitational constant', this is, the value that is obtained when two like-oriented or opposite-oriented elementary particles are considered. The resulting equation then avoids to regard the 'gravitational constant' as the variable.

$$\vec{F} = G_{\text{norm}} \sum \frac{\vec{m}_i \bullet \vec{m}_j}{R_{ij}^3} \vec{R}_{ij} = G_{\text{norm}} \sum \frac{m_i\, m_j \cos(\alpha_{ij})}{R_{ij}^3} \vec{R}_{ij}$$
$$= G_{\text{norm}} \sum \frac{\text{proj}(M_i)\cdot \text{proj}(M_j)\cdot \cos(\alpha_{ij})}{R_{ij}^3} \vec{R}_{ij} \quad (4)$$

wherein the used symbols speak for themselves according Fig.5: $\vec{R}_{ij}$ is oriented in the direction of the y_{ij}-axis and $\vec{m}_i$ and $\vec{m}_j$ are two-dimensional projections of the corresponding masses $\vec{M}_i$ and $\vec{M}_j$ in the x_{ij}-z_{ij}-plane.

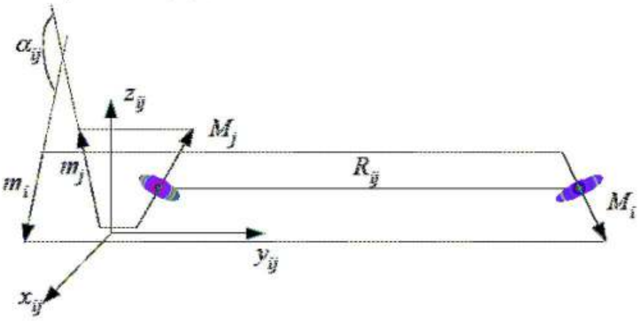

Figure 6. Definition of the attraction or repel between two elementary masses $\vec{M}_i$ and $\vec{M}_j$ as the two-dimensional scalar vector product of the projections $\vec{m}_i$ and $\vec{m}_j$ in the x_{ij}-z_{ij} –plane, according to the equation (4).

The value of G_{norm} is then defined by the structure of a set of two particles. For larger objects, G_{norm} is defined by the average hyper-group structure.

7. The Nature of the Gravitational Interaction

In a former paper [2], I found strong evidence that the Sun's rotation is caused by a Coriolis effect between escaping light and the Sun's body. Moreover, I could distinguish tangential (orbiting) and radial escaping "light" (E-M-waves). Although the orbiting "light" (are they gravitons?) doesn't totally seem plausible, they appear in the mathematical description of the physical properties of the Sun. Strikingly the Sun's frequency is tightly bound with its mass, radius and gravitational constant! [2]:

$$\upsilon_{\text{eq}} = \frac{G m_{\text{Sun}}}{2c\, {R_{\text{eq}}}^2} \quad (5)$$

whereby I found evidence that Eq. (5) is caused by a Coriolis effect.

As I have put it in [2], for two particles δ_i and δ_j of "trapped light", the total possible number of intersections between the escaping light of one particle (radius R_i) with the global second particle (radius R_j) is given by $(2\pi R_j)/R_j$. (6)

Indeed, the Coriolis equation $2\vec{\omega}_j \times \vec{v}_i = -\vec{a}_j$ is compatible with Eqs.(4), (5) and (6).

8. Discussion and Conclusion

The modification of the scalar mass-model into a vector mass-model is mandatory for understanding the gravitational attraction and repulsion between elementary particles, especially under an external influence of a gyrotation field, as caused in the Expanding Earth phenomenon. However, it doesn't reduce the validity of Newton's gravitation law for massive bodies at low velocities.

The angular momentum of the elementary particles must have an important role in our definition of the gravitational constant, groups of opposite oriented particles are cluttered and form global objects that attract from all sides, pseudo-randomly.

The Earth's surface's gyrotation field has a low component along the Earth's axis and a high component that rotates with the Earth (Fig.3), which results in a pseudo-random spin orientation of particles at the surface, and which forms a comparable attraction force all over the world.

In the section 5 above, many conclusions have been made already. The Growing Earth Theory can be explained by gravitomagnetism. The like spins of elementary particles cause gravitational repel and the unlike spin, attraction. Gyrotation fields, induced from the rotation of masses, orient these spins preferentially the same as the body's rotation, which results in the repel inside the body, and so, in its expansion. The consequence is that gravity doesn't always mean attraction, because it depends from the excess of orientation of particles in specific directions. The gravitational constant is not a constant at all but should rather be seen as a combination of spin orientations of the considered elementary masses, globalized over the Earth.

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4

Simplifying the Stellar Dynamics, thanks to the Coriolis Gravity

Concerning the Gravitomagnetic Theory, I wrote: Replacing an old-fashion theory by a new one sometimes is like David fighting against Goliath.
Although the actual theory is based upon the data of the sun only, I am confident that soon will be found the dynamic and the gravitational data of other stars, showing their link and allowing the elimination of one of the star's dynamical and gravitational parameters.

The two following papers treat this possibility further on stars and black holes, by eliminating one of the parameters. For example, the Gravitational Constant can be found out of the star's mass and dynamics.

From the first paper, where I insist on the amazing solar properties, likely extensible to other stars, I find grounds to suppose that the sun's standard gravitational parameter $G\,m$ can be interpreted as a vector, fully defined by the sun's angular velocity and radius.

Also for fast spinning stars and black holes, which are treated in the second paper, an interesting simplification can be found, whereby I redefine the light horizons (similar to event horizons) and mass horizons (places where all orbiting matter is gravitationally disintegrated).

Discover now the integration of Gravitomagnetism with the Coriolis Gravity for spinning stars!

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The Discovery of the Gravitational Constant as a Specific Stellar Property Simplifies the Description of Gravity

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The most striking about the Sun is the link between the Sun's dynamical data and the Gravity Constant. In a former paper [2], that link has been shown, and the consequences were 1° that elementary forces can be expressed as Coriolis interactions between orbiting gravitons and spinning particles; 2° that the solar spin is caused by the escaping radial light. Here, I suggest the inverse property that the Gravity Constant is defined by the solar dynamics. The consequence of the elimination of one parameter permits one to find more useful information on stars and their planets.

1. The Gravitational Constant

In a former paper [2], I proved, for the Sun, the following relationship between the solar parameters:

$$\upsilon_{eq} \Leftarrow \frac{G m_{Sun}}{2c {R_{eq}}^2} \tag{1}$$

Herein : $G = 6.67 \text{x} 10^{-11}$ m³ kg⁻¹ s⁻²,

$c = 3.00\text{x}10^{8}$ m s⁻¹

and for the Sun, $m_{Sun} = 1.98\text{x}10^{30}$ kg

$R_{eq} = 6.96\text{x}10^{8}$ m.

and υ_{eq} is the according solar rotation frequency. The arrow expresses an unilateral validity.

The importance of this equation (1) should not be underestimated. It rules the Sun's rotation, based upon the Sun's dimensional properties, but including the Gravitational Constant as well. As we have seen, eq.(1) is a few percentages wrong, probably because the entrainment of the solar particles by light cannot be achieved at the very edge of the Sun's radius, but slightly before that edge, where the matter's density isn't too small.

2. Fundamental interactions between elementary particles [2]

The fundamental property of matter is that it is made of spinning, trapped light.

The basis for the relationship of eq.(1) was found in my interaction hypothesis between elementary particles, which would then, consequently, also rule inertia.

On the one hand, this elementary interaction occurs between light, orbiting about the elementary particles (say, gravitons), which leave that particle, and on the other hand spinning particles ("trapped light"). The interaction itself creates a mechanical common path of both entities, called a Coriolis effect, which effectuates a displacement of the hit particle and that we call commonly "a gravitational attraction force". Inertia as well is ruled by the interaction of the spinning light: when the spinning light is accelerated, it will run across its own spinning light, and the interaction between these gravitons and the spinning particle will engender again, by a Coriolis effect, a mechanical common path, which is commonly called the inertial reaction force.

3. Expanding and imploding stars [3]

However, is it really the equation (1) that is the fundamental scientific equation, or is it merely the following one?

$$G_{Sun} m_{Sun} \Leftarrow 2c R_{eq}^2 \upsilon_{eq} = \frac{c\,\omega_{eq} R_{eq}^2}{\pi} \tag{2.a}$$

Is the product of the Gravitational Constant with the mass not just a combination of dynamical properties of the Sun, which was not discovered before, because we used and measured this constant on the Earth only, or perhaps because nobody was foolish enough to propose it?

I found the confirmation for this idea in the expansion of stars to red giants [3]. Evidently, gravity has not much impact upon red giants anymore. At the same time, their rotation speed is very slow and their radius very large. When the red giant stops spinning, its equator remains however an attracting zone and causes its collapse into a white dwarf [3]. At each transformation, the star's gravitational constant changes.

It is very surprising and almost impossible to accept with our actual scientific education, that the Gravitational Constant could differ that much from one star to the other and from one star phase to another. For any active star, we would come to:

$$G_{\text{star}}\, m_{\text{star}} = 2c\, R_{\text{eq}}^2 \upsilon_{\text{eq}} = \frac{c\, \omega_{\text{eq}} R_{\text{eq}}^2}{\pi} \tag{2.b}$$

The extrapolation I propose is indeed solely verified for the Sun's dynamics, and it will take lots of time before one will be able to check its validity to another star. However, based upon the fundamental deductions out of eq.(1) concerning the interaction between elementary particles, I found more evidence than by mere stellar observatory results [2]. This evidence accounts for the fundamental extended Newtonian laws, i.e. the two fields of gravitomagnetism itself, and moreover, a simple explanation for inertia, which is a local effect, not a global one (as Ernst Mach wrongly suggested and which Einstein wrongly embraced).

4. Variability of the gravitational constant and of mass [5]

The gravitational constant is not the only entity that is variable. As I showed earlier, the fundamental property that we call "mass" is not a scalar but a vector [5]. With time, the orientation of mass particles can change as well. I showed also that oriented particles have a unique property: like-oriented mass-vectors are repulsive and opposite mass-vectors are attractive [4]. However, I also showed why globally, only attracting bodies are found [4]. The variability of both the gravitational constant and mass is very confusing, because the microscopic and the macroscopic descriptions of gravity differ from the orthodox point of view.

Concerning stars, let us consider the macroscopic (which is the more conventional) description only. The left hand of eq.(2b) is generally present in gravitomagnetic equations and they can be replaced by the right hand.

The gravitational constant of a stellar system, possibly containing planets, can be replaced by the right hand of eq.(3)

$$G_{\text{star}} = \frac{2c\, R_{\text{eq}}^2 \upsilon_{\text{eq}}}{m_{\text{star}}} = \frac{c\, \omega_{\text{eq}} R_{\text{eq}}^2}{\pi\, m_{\text{star}}} \tag{2.c}$$

5. Conclusion

The equation (1) represents an intrinsic property of the Sun. I suggested that the equation is valid in all directions, and especially valid to define the gravitational constant in terms of other parameters. I also suggest that this equation is valid for all active stars, because I found eq.(1) out of the fundamental gravitomagnetic equations, which cannot but being general physical laws. The elimination of both the gravitational constant and the mass from these fundamental gravitomagnetic equations reduces the number of parameters in the study of stars and exo-planets significantly and corrects the idea about the constancy of the gravitational constant when comparing different stars. It also clarifies that the star's mass cannot be seen as a scalar but as a vector. The consequence is that mass, as a Newtonian property of a parameter of attraction should be revised, because the vector mass can attract as well repel. Moreover, a star's vector mass is much less a constant over the star's lifetime than solely due to its mass loss by radiation.

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The Gravitational Stellar Constant Allows for an Improved Description of Stellar and Black Hole Dynamics

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The Sun's dynamics defines our Gravity Constant. In a former paper [2], that strict relationship has been shown, based upon the most fundamental equations of gravity and gyrotation (the magnetic equivalent for gravity), applied upon elementary particles. The consequence is that one parameter can be eliminated, as explained before [6] and this allows me to unveil some issues on the shape and the moments of inertia of stars, supernovae and black holes.

1. The Gravitational Stellar Constant

Several papers concerning the gravitational Coriolis interaction between particles and inertia opened the path to new insights on the gravitational constant. It appears that for the Sun, the following relationship between the solar parameters exists [2], [6]:

$$\upsilon_{eq} \Leftarrow \frac{G\, m_{Sun}}{2c\, R_{eq}^{\ 2}} \tag{1}$$

Herein : $G = 6.67\text{x}10^{-11}\ \text{m}^3\ \text{kg}^{-1}\ \text{s}^{-2}$,
$c = 3.00\text{x}10^8\ \text{m s}^{-1}$

and for the Sun, $m_{Sun} = 1.98\text{x}10^{30}$ kg
$R_{eq} = 6.96\text{x}10^8$ m.

and υ_{eq} is the according solar rotation frequency. The arrow expresses an unilateral validity.

Based upon the stellar lifecycle, I found an extrapolation of the apparent unilateral direction of the validity of eq.(1). I stated that, based upon the fundamental gravitomagnetic laws that are fully compatible with eq.(1), this equation should be valid for any active star. The importance of this finding and its consequences for the description of gravity for distant stars and exo-planets are evident.

Indeed, eq.(1) can also be written as:

$$G_{star}\, m_{star} = 2c\, R_{eq}^2 \upsilon_{eq} = \frac{c\ \omega_{eq} R_{eq}^2}{\pi} \tag{2}$$

This means that the product of the Gravitational Constant with its mass can be replaced by the product of a pure "specific angular moment", completed by the proper constants.

2. Derivation of the fast spinning star's shape

In a former paper [4], I discussed the shape of fast spinning and exploding stars and I found their exploding-free zones, which are compressed by 'gyrotation'-forces (the magnetic equivalent for gravity) and which are stronger than the centrifugal effect.

3.1 The dynamics of a non-exploding fast spinning star

The spherical star (a white dwarf) that rotates fast will partially explode [1] [4] and become a supernova. Near the equator, and up to the latitude of nearly 35°16', the star will be kept together by the gyrotational-compression [1].

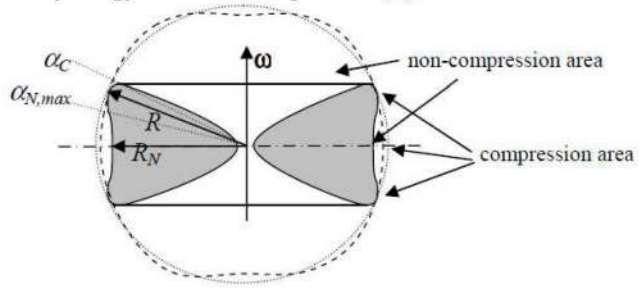

Figure 1: What remains just after the explosion of a fast spinning star is the area between a latitude of 0 to about 35°16'. Of the equator itself, about 10% of the star's radius will explode as well.

As long as the star's equatorial radius R_{eq} is larger than a critical radius R_C found in [4] , eq.(3.5) , with:

$$R_{eq} > R_C = G\, m / 5c^2 \tag{3}$$

the star will continue to lose matter. When the actual radius is smaller than R_C , the loss of mass stops. The condition for non-explosion is:

$$R_{eq} < R_C = G\, m / 5c^2 \tag{4}$$

This is the result at the equator.
At a certain latitude α , we found that the equation becomes:

$$R_\alpha < R_{C\alpha} = \left(G\,m/5c^2\right)\left(1-3\sin^2\alpha\right) \quad (5)$$

which limits the compression zone between the latitudes of 0° and 35°16'. Above that value, compression is strictly speaking not possible.

Eq. (4) can be combined with (2) as follows:

$$R_{\rm eq} < \frac{Gm}{5c^2} = \frac{\omega R_{\rm eq}^2}{5\pi c} = R_C \quad (6)$$

which reduces the criterion to the single parameter of the angular velocity of the star. The higher that velocity, the smaller the maximal stellar radius has to be.

Remark that (6) is valid for a sphere (with a moment of inertia $I = 2\,m R_{\rm eq}^2/5$ and that the general equation of (3) is:

$$R_C = \lambda G\,m/2c^2 \quad (7)$$

wherein λ is a dimensionless shape-factor that equals 2/5 for a sphere and 1 for a thin ring.

Then, the eq.(6) of the non-explosion condition can be generalized, by using eq.(2) to:

$$R_{\rm eq} < \frac{\lambda Gm}{2c^2} = \frac{\lambda\omega R_{\rm eq}^2}{2\pi c} = R_C \text{ for an axis-symmetric shape,} \quad (8)$$

Since eq.(8) can be written as :

$$v_{\rm eq} = \omega R_{\rm eq} < \frac{2\pi c}{\lambda} \quad (9)$$

it is clear that the left hand of eq.(9) is the equatorial velocity, normally speaking restricted to velocity c , and the right hand is far above the speed of light because the shape parameter λ will always have a value below or around the figure one. Since eq.(9) tells us nothing new, I need to make a more detailed analysis.

I assume that eq.(8) is valid even after the explosion as a supernova. Indeed, although the value of the star's mass after the explosion has been reduced by nearly 39% (= 35°16'/90°) of its original mass, I didn't attribute the drop of mass to any of the dynamical constants, because the star in that stage is 'dead' and not more active. Hence, I don't expect any intrinsic change of these parameters and I rather expect a change in shape only.

3.2 The light horizon of a fast spinning star

In equation (2.4.b) of the same paper [5], I deduced the light horizon $r_{\rm LH}$, i.e. the extreme radius where light can escape from a fast spinning star, at the equator level.

It was found that $r_{\rm LH} = 2\,r_{\rm MH}$, where $r_{\rm MH}$ is the mass horizon, i.e. the orbital radius of any satellite around a fast spinning star whereby the orbital velocity would reach the speed of light due to gravitomagnetism, and whereby the satellite would consequently disintegrate.

This is why we will not see the disintegration of orbiting objects about fast spinning stars and black holes: first, they are hidden from view before they are destroyed.

3.3 The matter horizon of a fast spinning star

In a former paper [5], I deduced the matter horizon $r_{\rm MH}$ in equation (1.18) , which I adapt here for any shape.

$$r_{\rm MH} = \frac{Gm\lambda}{2c^2}\left(1+\sqrt{1+\frac{2Ic\omega}{Gm^2}}\right) = \frac{Gm\lambda}{2c^2}\left(1+\sqrt{1+\frac{2\lambda R_{\rm eq}^2 c\omega}{Gm}}\right)$$

Here, we kept the star's mass of before its explosion, using eq(2) :

$$r_{\rm MH} = \frac{\lambda\omega R_{\rm eq}^2}{2\pi c}\left(1+\sqrt{1+2\pi\lambda}\right) \quad (8)$$

It appears that the matter horizon $r_{\rm MH}$ depends from the star's radius and the angular velocity, which fully defines it.

As noticed in , there is also a negative solution, which here, results in:

$$r_{\rm MH}^- = \frac{\lambda\omega R_{\rm eq}^2}{2\pi c}\left(1-\sqrt{1+2\pi\lambda}\right) \quad (9)$$

Since (9) is negative, I assume that the rotation direction is inversed inside the torus' hole.

It is then assumed that the fast spinning star is a torus whereof the inner radius is larger than the negative matter horizon $r_{\rm MH}^-$ and the outer radius is smaller than the positive matter horizon $r_{\rm MH}$.

For the Sun, we find very small values for $r_{\rm MH}$ and $r_{\rm MH}^-$ and this means that its radius must be laying between: $\left|r_{\rm MH}^-\right| < r_{\rm MH}^+ < R_{\rm eq}$.

Thus, in general, we start from the situation:

$$\left|\frac{\lambda\omega R_{\rm eq}^2}{2\pi c}\left(1-\sqrt{1+2\pi\lambda}\right)\right| < \frac{\lambda\omega R_{\rm eq}^2}{2\pi c}\left(1+\sqrt{1+2\pi\lambda}\right) < R_{\rm eq} \quad (10)$$

or, in order to fix the ideas for a value of $\omega R_{\rm eq}$, the velocity $v_{\rm eq}$ at the equator is:

$$v_{\rm eq} = \omega R_{\rm eq} < \frac{2\pi c}{\lambda\left(1+\sqrt{1+2\pi\lambda}\right)} < \left|\frac{2\pi c}{\lambda\left(1-\sqrt{1+2\pi\lambda}\right)}\right| \quad (11)$$

which gives the lower limit for $v_{\rm eq}$ in 'normal' cases being a constant.

3.4 From an inner light and matter horizon towards the external light and matter horizon of a black hole

Remark that under the condition of a sphere, the following is true:

$$\left|r_{\rm MH}^-\right| < r_{\rm MH} < \left|r_{\rm LH}^-\right| < r_{\rm LH} < R_{\rm eq} \quad (12)$$

In general and preliminary, we can assume that eq.(12) is valid for any active star.

The eq.(10) , (11) and (12) are also valid for the torus-like shape of fig.1. Also here, it is found that the shape of the torus will only be ruled by the star's radius and angular velocity. Moreover, I found an upper boundary of the fast spinning torus star.

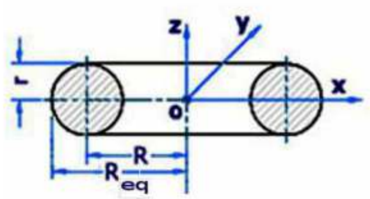

Figure 2: Torus-approximation of a stabilized fast spinning star after its explosion.

Due to gravity and gyrotation, the section of the torus of fig.1 will be contracted to a quasi elliptic section which can be approximated by a circular section, as in fig.2.

It is then possible to estimate the upper boundary of the spinning star and the transition moment with eq.(10).

Since $I_{\text{torus}} = m\left(R^2 + \frac{3}{4}r^2\right)$ and since we had defined, in general: $I = \lambda m\, R_{\text{eq}}^2$, I combine this to $\lambda_{\text{torus}} = 1 + \frac{3}{4}\frac{r^2}{R^2}$. (13)

Indeed, in the case of eq.(10) we cannot speak of black holes, but of 'normal' non-exploding stars (white dwarfs).

But in order to reach the black hole status, there must have been a transition period after which we get $R_{\text{eq}} < \left|r^-_{\text{LH}}\right| < r_{\text{LH}}$ and so $R_{\text{eq}} < 2\left|r^-_{\text{MH}}\right| < 2r_{\text{MH}}$.

In general and preliminary, we can assume that the following is true for Black Holes: $R_{\text{eq}} < \left|r^-_{\text{MH}}\right| < r_{\text{MH}} < \left|r^-_{\text{LH}}\right| < r_{\text{LH}}$

During the transition period T_1, we get a situation where first the place $\left(R_{\text{eq}} - 2r\right)_{T1} = r_{\text{LH}}$ at the inner side of the torus is reached which is transiting first, then the middle of the torus' section $\left(R_{\text{eq}} - r\right)_{T1} = r_{\text{LH}}$ r_{LH}, next the outer side of the torus at $\left(R_{\text{eq}}\right)_{T1} = r_{\text{LH}}$, and which results in the equatorial velocity:

$$\left(v_{\text{eq}}\right)_{T1} = \omega\left(R_{\text{eq}}\right)_{T1} = \frac{\pi c}{\lambda\left(1 + \sqrt{1 + 2\pi\lambda}\right)} \tag{14}$$

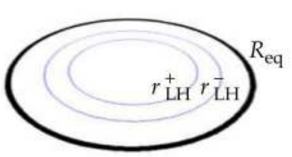

Figure 3: A normal star has internal light and matter horizons.

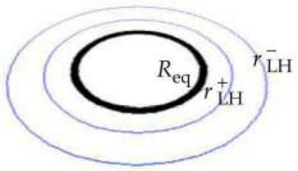

Figure 4: When the star collapses the radius decreases and the light and matter horizons become external. It became a Black Hole.

It is clear, out of eq.(13) that $v_{\text{eq}}/c < 1$, if $\lambda \geq 0.88$. (15)

Later, at moments T_2 , T_3 and T_4 the negative light horizon, the positive matter horizon and the negative matter horizon could pass from the inner side to the outer side as well.

Based upon eq.(13) , and analogical to eq.(15), this means that the respective torus shape constants and r/R are

$$\begin{aligned} &T_1: \lambda \geq 0.88 \text{ and } r/R \text{ is undefined,} \\ &T_2: \lambda \geq 1.45 \text{ and } r/R \geq 0.77, \\ &T_3: \lambda \geq 1.49 \text{ and } r/R \geq 0.81, \\ &T_4: \lambda \geq 2.20 \text{ and } r/R \text{ is undefined.} \end{aligned} \tag{16}$$

Remark that for a Black Hole under the condition of eq.(15) the following is true:

$$\left|r^-_{\text{MH}}\right| < r_{\text{MH}} < \left|r^-_{\text{LH}}\right| < r_{\text{LH}} \tag{17}$$

3.5 Transition bursts when black holes are formed

When the matter horizon switches from the inside to the outside of the torus, there really is a moment of a possible double successive burst by an exaggerated equatorial speed. Such an acceleration of speed, possibly caused by a matter collapse, can cause the (partial) death of the star, if $\lambda < 1.49$ by a reduction of R_{eq} and an increase of ω.

Remark that the transition to a Black Hole depends upon the equatorial velocity ωR_{eq}, not only upon ωR_{eq}^2 , which defines the angular moment of inertia.

3. Conclusion

Since the gravitational constant can be deduced from the Sun's dynamics, I assumed that any active star function the same way [6]. When this feature is strictly extrapolated to active stars in general, it is possible to predict quite precisely the required shape of the stars in different cases: non-exploding stars, supernovae, and Black Holes, as showed in the equations (16), where I started from the hypothetical shape of a torus.

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Thierry De Mees

One day in 2002, I discovered in a newspaper that "dark matter" is supposed to be responsible for the constancy of the orbital velocity of the stars, and that velocity is supposed to be in contradiction with the Kepler laws. I was upset. We can travel to the moon and invent great medicines, we have the supposed miracle-theory of general relativity and nobody can explain it?
Next hour, I was rumbling in a slide of my old desk, where I stored old papers from my university period, and I found back the analogy I made between electro-magnetism and gravitation. I never trusted Einstein's relativity theory, because it only calculates what is observed by using light, but not what is really happening. Also the great Richard Feynman once confessed that he didn't understand why gravitation would be so different from other physical theories. A few days later, I found the gravitational consequences of the motion of masses.
Month after month, I steadily discovered that all the cosmic issues that are not understood by mainstream, make sense through gravitomagnetism. The shape of supernovae, the disc and the spiral galaxies, the motion of asteroids, the flatness of planetary systems, the tiny rings of Saturn, black holes, the expanding Earth and Sun, etc. I can't find any cosmic issue that is in contradiction with gravitomagnetism. This was the subject of my first book: "Gravitomagnetism".

In 2010, I discovered the underlying mechanism of inertial and gravitational forces, the more underlying level of how the 'Universal' Gravitational Constant is linked to our Sun, and what the consequence is for the Gravitational Constant of other stars in the universe. That is unveiled in this book. And an astonishing consequence is the Earth's expansion.

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