Gravitomagnetism a Fatal Problem for the General Relativity Theory and the Accompanied Analysis of the Gravity Probe B Experiment

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Abstract

Grand deceptions in "science" need to be revealed and openly discussed. How is it possible that such phenomena develop and continue to exist today in the 21st century? Did the science regressed back into dark ages? Has it been hijacked by politicians and spinsters, or is the scientific method still self correcting? Please judge by yourselves.

- This presentation shows that there cannot be any Gravito-Electro-Magnetic (GEM) field contrary to a popular belief of its existence and contrary to many claims of its existence found in the reputable publications. This is shown using a simple thought experiment of two massive parallel plates that are moving in a direction parallel to the plates' surfaces and in a direction perpendicular to the plates' surfaces. It is found that the field energy is not conserved for these two directions if the GEM field existence is postulated as derived from the Einstein's field equations for the weak gravitational field and as claimed that it has been detected by the Gravity Probe B.

- In the second portion of the presentation the Gravity Probe B results are analyzed in a greater detail and it is found that this experiment does not prove the correctness of Einstein General Relativity Theory (GRT) as is enthusiastically claimed. It is clearly shown that an error exists in the GRT geodetic precession formula derivation and that the experiment actually proves the correctness of a different metric rather than the Schwarzschild metric of the celebrated GRT theory.

Outline of the presentation

- What is gravitoelectromagnetism (GEM)
- GEM equations compared to Maxwell EM field equations
- Description of the thought experiment
- Derivations and final results of calculations
- Solution of the problem
- Conclusions
- References
- Analysis of the Gravity Probe B experiment using two different metrics
- Conclusions
- References

What is Gravitoelectromagnetism

NASA File: Gravity Probe B Confirms the Existence of Gravitomagnetism
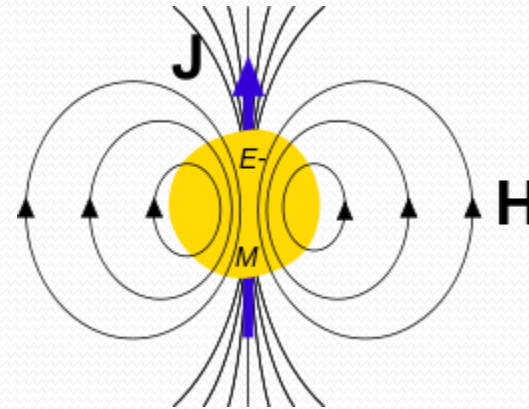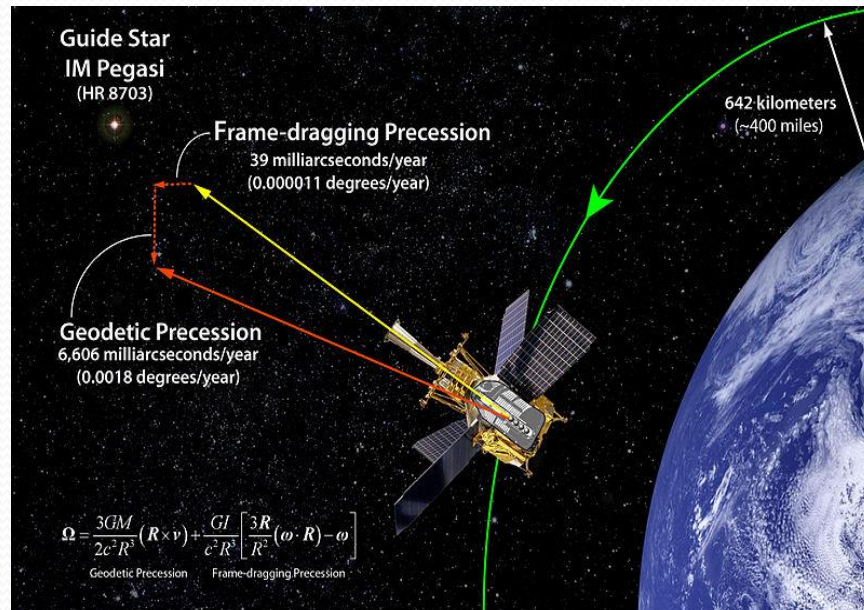
- **From Wikipedia:**
- **Gravitoelectromagnetism**, abbreviated **GEM**, refers to a set of formal analogies between the equations for electromagnetism and relativistic gravitation; specifically: between Maxwell's field equations and an approximation, valid under certain conditions, to the Einstein field equations for general relativity.

This part of presentation will show that the gravitomagnetism cannot exist.

What is Gravitoelectromagnetism
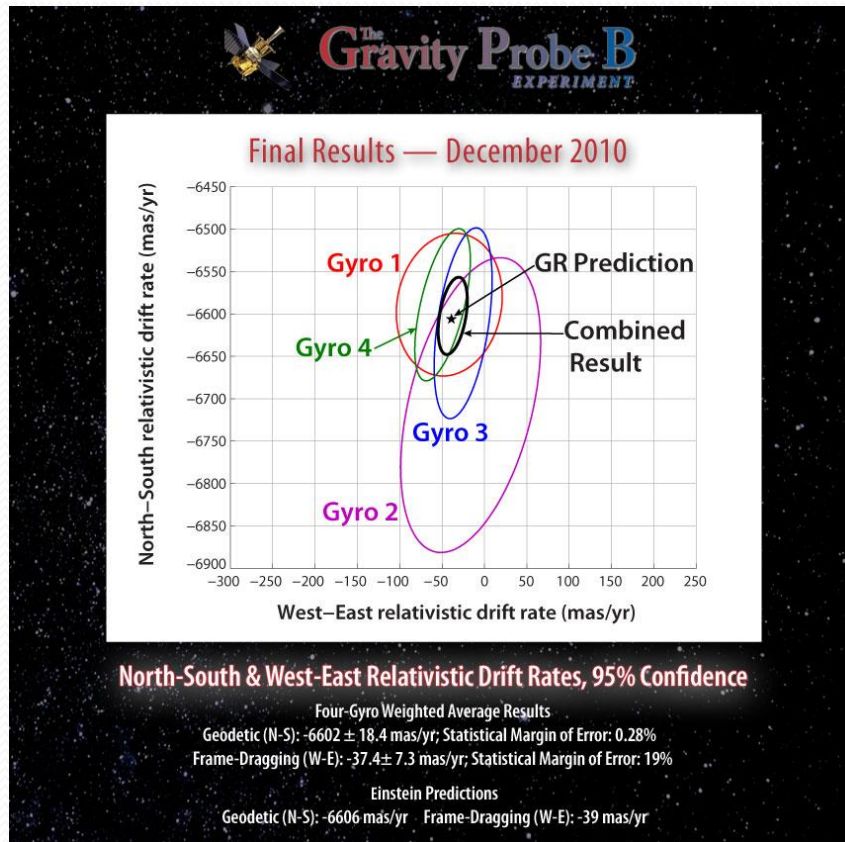
- There are two components of the Gyro's Precession that is placed in the Earth's polar orbiting satellite.
- The larger component is the Geodetic Precession that is caused by the curvature of space-time induced by the gravity of Earth.
- This presentation does not dispute the existence of this component, although its calculation has a subtle error in it to make it agree with the experiment (not sure at this time if this has been done on purpose).
- The smaller component, the West-East drift, is due to the so called frame dragging effect caused by the Earth's rotation.
- This theoretical effect follows only from the Einstein's GRT and not from the more general Metric Theory of Gravity. The effect is some times called the Lense-Thirring Precession.
- There could easily be other causes for this effect that are buried in the measurement inaccuracies.
- **This presentation disputes the existence of the second smaller component of the precession, more or less in line with the data of Gyro 2 or perhaps even the Gyro 3.**

What is Gravitoelectromagnetism

- Some more interesting details about the measurement problems and analysis in GP-B experiment can be found here:
- http://spectrum.ieee.org/aerospace/space-flight/the-gravity-probe-b-bailout

- Below are some of the excerpts from the above web posting:

- GP-B's measurements have been riddled with wobbles that have made the ongoing data analysis for this "frame dragging" effect tremendously challenging. GP-B's final results were expected this year, but the GP-B team, based at Stanford University, appealed to NASA to continue funding through March 2010 to extract the precision measurements that team managers say still lie buried beneath a layer of noise.

- However, a subtle effect, involving the tug of Earth's rotation on space itself, has not yet been seen unequivocally detected, because of an error in the gyroscopes' manufacture.

- This presentation, therefore, is not directed towards the analysis of the GP-B experimental data and its criticism, but to the fundamental aspect of the theory that underlines this experiment and which this experiment was supposed to address.

- It will be clearly shown next that one of the effects that this experiment has purportedly detected cannot and does not exist.
- This is a bad science of the main stream, which tarnishes the scientific approach to the understanding of nature, and which all the dedicated scientists should vigorously fight.

GEM and the Maxwell field equations

Einstein field equations

$$G_{jk} = R_{jk} - \frac{1}{2} R_{(c)} g_{jk} = -\frac{8\pi\kappa}{c^4} T_{jk}, \quad T^j_{k|j} = 0$$

GEM equations

$$\nabla \cdot \vec{E}_g = -4\pi\kappa\rho_g$$

$$\nabla \cdot \vec{B}_g = 0$$

$$\nabla \times \vec{E}_g = -\frac{1}{2} \frac{\partial \vec{B}_g}{\partial t}$$

$$\nabla \times \frac{1}{2} \vec{B}_g = \frac{1}{c^2} \frac{\partial \vec{E}_g}{\partial t} - \frac{4\pi\kappa}{c^2} \vec{j}_g$$

Maxwell equations

$$\nabla \cdot \vec{E} = \frac{\rho}{\varepsilon_0}$$

$$\nabla \cdot \vec{B} = 0$$

$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$

$$\nabla \times \vec{B} = \frac{1}{c^2} \frac{\partial \vec{E}}{\partial t} + \mu_0 \vec{j}$$

Lorentz force equations

$$\vec{F}_g = M\left(\vec{E}_g + \vec{v} \times \vec{B}_g\right)$$

$$\vec{F} = Q\left(\vec{E} + \vec{v} \times \vec{B}\right)$$

- In many publications one can find the derivation of the GEM equations from the Einstein field equations of General Relativity Theory (GRT). These derivations are valid for the weak gravitational fields.
- GEM equations resemble the Maxwell field equations with some small differences.
- Einstein field equations are nonlinear tensor equations while the GEM equations are linear vector equations that are easier to handle. This is the main reason for their popularity.
- Based on this analogy various claims are being made about the existence of gravitomagnetic force that results from the "mass current".
- In the description of simple thought experiments that follow it will be shown that such a force cannot exist and that the analogy between the gravitational field and the Maxwell EM field is fundamentally flawed.
- The derivations will use the SRT Lorentz length contraction and the inertial mass increase with velocity.

Description of the Thought Experiment

The EM case of charged parallel plates moving in the direction parallel to their surfaces :
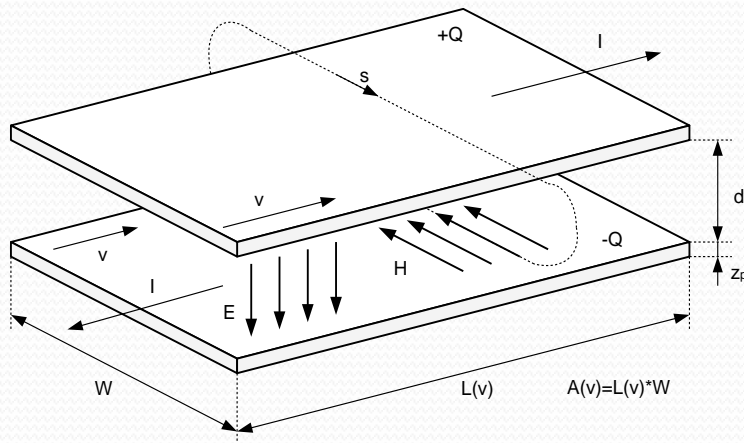
- The moving charged plates represent a current.
- The E and H fields the plates generate will be calculated and from that the energy stored in the field will be found.
- The energy of the field should not depend on the direction in which the plates are moving, either parallel to their surfaces, or perpendicular to their surfaces.
- The field energy is a scalar quantity.

- The electric field intensity is calculated from the Gauss law as follows:

$$\oiint \vec{D} \cdot d\vec{S} = Q \qquad E = \frac{Q}{\varepsilon_0 A}$$

- The magnetic field intensity is:

$$\oint \vec{H} \cdot d\vec{s} = I \qquad H = \frac{Q}{A} v$$

- The force between the plates is:

$$\vec{F} = Q\left(\vec{E} + \vec{v} \times \vec{B}\right) \qquad F_q = \frac{Q^2}{2\varepsilon_0 A}\left(1 - \frac{v^2}{c^2}\right)$$

- Lorentz length contraction effect is used:

$$A = A_0 \sqrt{1 - v^2/c^2}$$

- The zero index parameters are the values at rest.
- The field energy is calculated by integrating the force over the distance between the plates:

$$W_e = \frac{Q^2 d_0}{2\varepsilon_0 A_0}\sqrt{1 - \frac{v^2}{c^2}} = m_0 c^2 \sqrt{1 - \frac{v^2}{c^2}} \qquad \frac{Q^2 d_0}{2\varepsilon_0 A_0} = m_0 c^2$$

- However this is only the potential field energy, it is necessary to also add the kinetic field energy that results from the magnetic field.

Description of the Thought Experiment

- The kinetic energy of the magnetic field is:

$$W_m = \frac{1}{2}\mu_0 H^2 d_0 A = \frac{Q^2 d_0}{2\varepsilon_0 A_0}\frac{v^2/c^2}{\sqrt{1-v^2/c^2}} = \frac{m_0 v^2}{\sqrt{1-v^2/c^2}}$$

- The total energy stored in the field is then:

$$W_{em\parallel} = V_\parallel + T_\parallel = m_0 c^2\sqrt{1-v^2/c^2} + \frac{m_0 v^2}{\sqrt{1-v^2/c^2}} = \frac{m_0 c^2}{\sqrt{1-v^2/c^2}}$$

- The potential and kinetic energies therefore are:

$$V_\parallel = m_0 c^2\sqrt{1-v^2/c^2} \qquad T_\parallel = \frac{m_0 v^2}{\sqrt{1-v^2/c^2}}$$

The EM case of charged parallel plates moving in the direction perpendicular to their surfaces:

- The field potential energy is:

$$V_\perp = \frac{Q^2 d_0 \sqrt{1-v^2/c^2}}{2\varepsilon_0 A_0} = m_0 c^2\sqrt{1-v^2/c^2} = V_\parallel$$

- The field kinetic energy has somewhat more complicated derivation, since there is no magnetic field for this motion direction. Using the retarded potential concept it follows that:

$$T_\perp = \frac{1}{2}\frac{Q^2}{2\varepsilon_0 A_0}\frac{v\,d}{c-v} - \frac{1}{2}\frac{Q^2}{2\varepsilon_0 A_0}\frac{v\,d}{c+v} = \frac{Q^2 d}{2\varepsilon_0 A_0}\frac{v^2}{c^2-v^2} = \frac{m_0 v^2}{\sqrt{1-v^2/c^2}} = T_\parallel$$

- The conclusion for the EM case is that:

$$W_{em\parallel} = W_{em\perp} = \frac{m_0 c^2}{\sqrt{1-v^2/c^2}}$$

- This is a reasonable and expected classical result. The energy stored in the field does not depend on the direction of plates' motion. It is the same for the case when the plates are moving in a parallel direction to their surfaces or in a perpendicular direction to their surfaces, or in any other direction.

- The result also agrees with the Einstein energy-mass equivalence formula.

- Using the EM field analogy for the massive plates, it is, therefore, expected that for the GEM case the result will be the same.

- The field energy should not depend on the direction of the massive plates' motion.

Description of the Thought Experiment

The GEM case of massive parallel plates moving in the direction parallel to their surfaces:
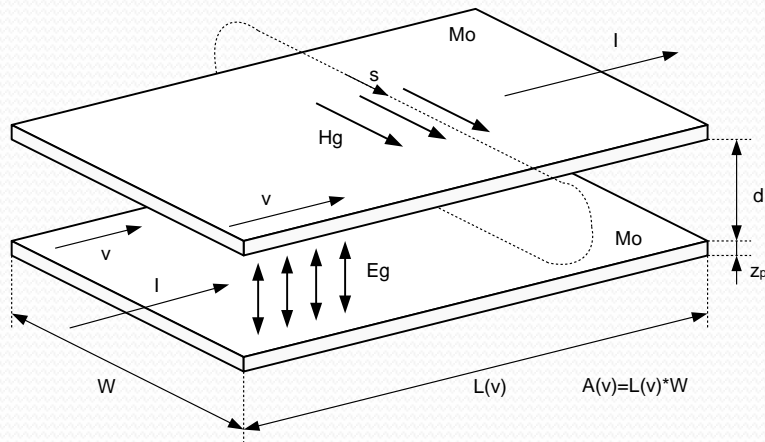
- The moving massive plates represent a mass current.
- The *Eg* and *Hg* fields the plates generate will be calculated using the GEM field theory and from that the energy stored in the field.
- Again, the energy of the field should not depend on the direction in which the plates are moving, either parallel to their surfaces, or perpendicular to their surfaces.
- The field energy must be a scalar quantity.

- The gravitoelectric force between the plates that are moving in this direction is found from the GEM equations and the Lorentz force equation. The mass dependence on velocity is included:

$$F_g = \frac{2\pi\kappa\, M_0^2}{A_0\sqrt{1-v^2/c^2}}\frac{(1-2v^2/c^2)}{(1-v^2/c^2)} \qquad M = M_0 / \sqrt{1-v^2/c^2}$$

- The gravitoelectric field potential energy is found again by integration over the plates' spacing:

$$V_{g\parallel} = \frac{m_{g0}c^2(1-2v^2/c^2)}{(1-v^2/c^2)^{3/2}} \qquad m_{g0}c^2 = \frac{2\pi\kappa\, M_0^2 d_0}{A_0}$$

- The gravitomagnetic induction is equal to:

$$\frac{1}{2}B_g = \frac{4\pi\kappa\, M}{A}\frac{v}{c^2}$$

- The gravitomagnetic field kinetic energy is:

$$T_{g\parallel} = \frac{1}{2}\frac{c^2}{4\pi\kappa}\left(\frac{1}{2}B_g\right)^2 d_0 A = \frac{2\pi\kappa\, M^2 d_0 v^2}{c^2 A} = \frac{m_{g0}v^2}{(1-v^2/c^2)^{3/2}}$$

- The total field energy for the motion in this direction thus seems reasonable:

$$W_{gem\parallel} = V_{g\parallel} + T_{g\parallel} = \frac{m_{g0}c^2(1-2v^2/c^2)}{(1-v^2/c^2)^{3/2}} + \frac{m_{g0}v^2}{(1-v^2/c^2)^{3/2}} = \boxed{\frac{m_{g0}c^2}{\sqrt{1-v^2/c^2}}}$$

Final Result of Calculations

The GEM case of massive parallel plates moving in the direction perpendicular to their surfaces:

- For the field potential energy it is:

$$V_{g\perp} = \frac{2\pi\kappa\, M_0^2 d_0 \sqrt{1-v^2/c^2}}{A_0(1-v^2/c^2)} = \frac{m_{g0}c^2}{\sqrt{1-v^2/c^2}}$$

- However, we also have the field kinetic energy as in the EM case, which is calculated using the same approach of retarded potentials:

$$T_{g\perp} = \frac{2\pi\kappa\, M_0^2 d_0 \sqrt{1-v^2/c^2}}{A_0(1-v^2/c^2)}\frac{v^2}{c^2-v^2} = \frac{m_{g0}v^2}{(1-v^2/c^2)^{3/2}} = T_{g\parallel}$$

- The total field energy for the plates moving in this direction is thus:

$$W_{gem\perp} = V_{g\perp} + T_{g\perp} = \frac{m_{g0}c^2}{\sqrt{1-v^2/c^2}} + \frac{m_{g0}v^2}{(1-v^2/c^2)^{3/2}} = \frac{m_{g0}c^2}{(1-v^2/c^2)^{3/2}}$$

- This result is now compared to the field energy for the plates moving in the parallel direction:

$$W_{gem\parallel} = V_{g\parallel} + T_{g\parallel} = \frac{m_{g0}c^2(1-2v^2/c^2)}{(1-v^2/c^2)^{3/2}} + \frac{m_{g0}v^2}{(1-v^2/c^2)^{3/2}} = \frac{m_{g0}c^2}{\sqrt{1-v^2/c^2}}$$

- It is therefore clear that the field energies for the motion in the parallel direction and for the motion in the perpendicular direction to the plates' surfaces are not the same!

- This is not acceptable and it is a fatal problem for the theory. The field energies of the GEM theory must be the same for any direction of motion as they were for the EM field theory since the GEM is supposed to be the analogy of the Maxwell field equations.

- There are basically only two possibilities for the origin of this problem.

  - The linearization procedure of the Einstein field equations is incorrect.
  - The Einstein field equations themselves are not correct.

- After the detail study of assumptions used for the derivation of Einstein field equations, this author is convinced that the problem resides in the GRT.

- It thus seems that the SRT is correct and that the GRT is not the correct theory of gravity.

Solution of the Problem

There is no gravitomagnetic force and the gravitational mass has a different dependency on velocity:

- The inertial mass dependency on velocity:

$$M_i = M_0 / \sqrt{1 - v^2/c^2}$$

- The gravitational mass dependency on velocity:

$$M_g = M_0 \sqrt{1 - v^2/c^2}$$

- The gravitational field potential energy for the motion in the parallel direction is thus:

$$V_{g\parallel} = \frac{2\pi\kappa\, M_0^2 d_0 (1 - v^2/c^2)}{A_0 \sqrt{1 - v^2/c^2}} = m_{g0}c^2 \sqrt{1 - v^2/c^2}$$

- There is no gravitomagnetic field, therefore, there is no gravitational field kinetic energy:

$$T_{g\parallel} = 0$$

- This indicates that in this direction the gravitational field does not move with the plates.

- The space deformation due to gravity is in the direction perpendicular to the plates, but it is not occurring between the plates, it occurs only in the space outside of the plates, therefore, this deformation does not have to be considered for the calculation of the field energy.

- The total field energy for the plates' motion in the direction parallel to the plates is thus:

$$W_{g\parallel} = V_{g\parallel} + T_{g\parallel} = \boxed{m_{g0}c^2 \sqrt{1 - v^2/c^2}}$$

- For the direction perpendicular to the plates' surfaces the field potential energy is:

$$V_{g\perp} = \frac{2\pi\kappa\, M_0^2 d_0 (1 - v^2/c^2)^{3/2}}{A_0} = m_{g0}c^2 (1 - v^2/c^2)^{3/2}$$

- The field kinetic energy for this direction is:

$$T_{g\perp} = \frac{2\pi\kappa\, M_0^2 d_0 (1 - v^2/c^2)\sqrt{1 - v^2/c^2}}{A_0} \frac{v^2}{c^2 - v^2} = m_{g0}v^2 \sqrt{1 - v^2/c^2}$$

- The total field energy for the motion in this direction is thus:

$$W_{g\perp} = m_{g0}c^2 (1 - v^2/c^2)^{3/2} + m_{g0}v^2 \sqrt{1 - v^2/c^2} = \boxed{m_{g0}c^2 \sqrt{1 - v^2/c^2}}$$

- The field energy again does not depend on the plates' motion direction:

$$W_{g\perp} = W_{g\parallel} = m_{g0}c^2 \sqrt{1 - v^2/c^2}$$

- The gravitational mass and the inertial mass thus must depend on the velocity differently. This is consistent with the fact that photons that move at the speed of light are not attracted by the gravitating bodies.

Conclusion of the first part of the presentation

- Using a simple model of moving massive parallel plates it was clearly shown that the gravitomagnetism cannot exist.

- For the Maxwell's EM field theory the field energy stored in the field of two moving charged parallel plates does not depend on their motion direction. This is expected, since the field energy is a scalar quantity.

- For the gravitoelectromagnetism, however, this is not the case. The analogy for the gravitational field that is based on the Maxwell's field theory is thus flawed.

- There are many reasons for this problem. The one could be related to the fact that the gravitational field is unipolar with only the attractive forces between the masses, while the EM field is bipolar generated by positively and negatively charged particles.

- Another problem, which is most likely, is related to the identical dependence of the gravitational and inertial masses on velocity in the GRT. In the EM field theory charge is an absolute invariant.

- It is therefore misleading to draw the analogy for the gravitational field from the EM field theory and naively expect that there is also a gravitomagnetic force similar to the magnetic force of the EM field theory.

- The results of the gravity probe B experiment are thus questionable and not convincing. The cost of the experiment was: **$750 Million.** However, all the involved scientists claim a big success. Hmm?

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Did the Gravity Probe B actually prove the Einstein's General Relativity Theory when the previous presentation proved the nonexistence of the GEM field?

Outline of the presentation

- Repeated description of the Gravity Probe B experiment
- What is the Geodetic Precession
- Derivation of formulas for the precession in the Schwarzschild metric and in the new MTG metric
- Discovery of error in the GRT formula derivation
- Comparison with observations
- Conclusions
- References

Description of the Gravity Probe B Experiment

NASA File: Gravity Probe B Confirms the Existence of Gravitomagnetism and the Geodetic Precession
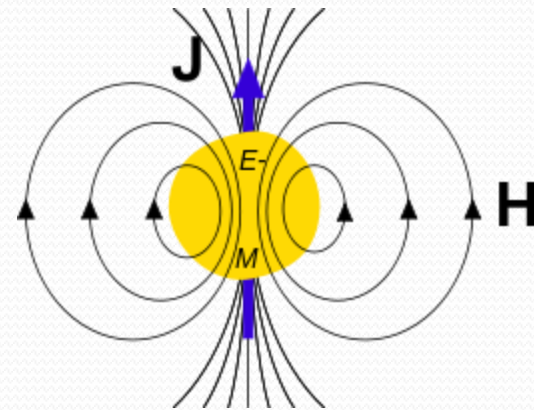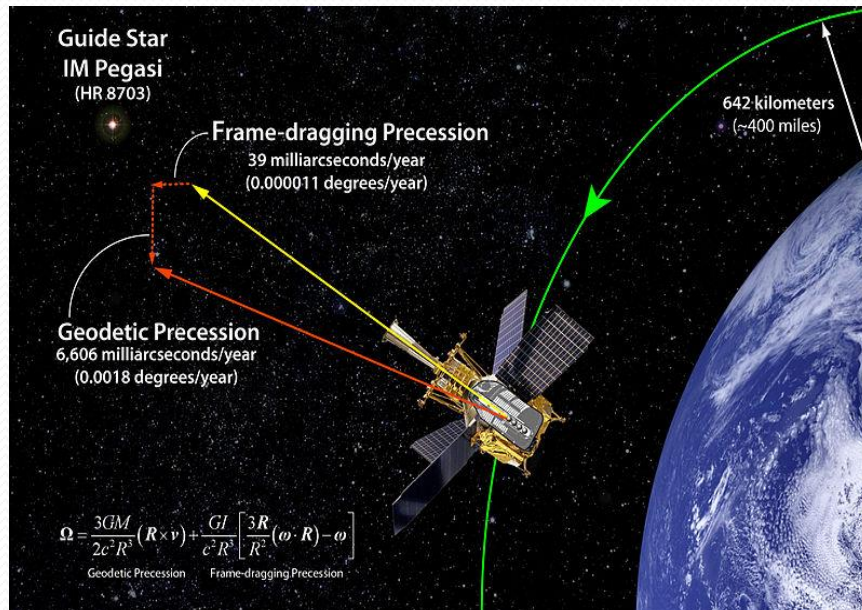
- **The Geodetic Precession, also called the de Sitter effect:** refers to the deviation of the Gyroscope spin axis after the gyroscope completes an orbit around a gravitating body.

- This effect is commonly explained by the curvature of space-time and thus can be considered the direct proof of the curvature.

This part of presentation will clearly show that the precession formula as is typically derived in the GRT is derived incorrectly. The key question therefore arises whether this is done on purpose by the main stream science or it is just an innocent error.

What is the Geodetic Precession?

- The simple visualization can be obtained by considering motion of a spinning top, for example a gyroscope, in a flat Newtonian space-time.

- The spin axis vector always points in the same direction irrespective of the motion of the gyroscope (without any additional torque on the gyroscope such as in gimbal or similar arrangements). This effect is used today for the inertial navigation and seems to work very well.

- This means that by differentiating the spin vector along the gyroscope's orbit trajectory the result must be zero.

- This idea is generalized to curved spaces by setting the covariant derivative of the spin vector along the satellite's trajectory to zero.

- The covariant derivative along a trajectory can be thought of as the standard total derivative with the effects of the space curvature added to it.

- The spin axis deviation will thus indicate the amount of the space curvature.

Derivation of Geodetic Precession Formulas

- Covariant derivative of the spin vector S along the satellite trajectory: $\dfrac{dS^i}{d\tau} + \Gamma^i_{jk} S^j u^k = 0$

  The parameter u is the relativistic velocity 4-vector of that trajectory:

  $$u^0 = \frac{cdt}{d\tau} \qquad u^\phi = \frac{d\phi}{d\tau}$$

- Schwarzschild metric

  $$ds^2 = g_{00}(cdt)^2 - g_{00}^{-1}dr^2 - r^2 d\Omega^2 \qquad g_{00} = (1 - R_s/r)$$

- New MTG metric

  $$ds^2 = g_{00}(cdt)^2 - g_{00}^{-1}dr^2 - \rho^2 g_{00} d\Omega^2 \qquad g_{00} = e^{\frac{-R_s}{\rho(r)}}$$

  $$d\rho = g_{00}^{-1/2}dr$$

- Christoffel coefficients:

  $$\Gamma^r_{00} = \frac{R_s}{2}\frac{r - R_s}{r^3}$$

  $$\Gamma^0_{0r} = -\Gamma^r_{rr} = \frac{R_s}{2}\frac{1}{r(r - R_s)}$$

  $$\Gamma^r_{\vartheta\vartheta} = \Gamma^r_{\phi\phi} = -(r - R_s)$$

  $$\Gamma^\phi_{r\phi} = \Gamma^\vartheta_{r\vartheta} = 1/r$$

- Christoffel coefficients:

  $$\Gamma^r_{00} = \frac{\phi_c}{\rho} e^{-3\phi_c} \qquad \phi_c = \frac{R_s}{2\rho(r)}$$

  $$\Gamma^0_{0r} = -\Gamma^r_{rr} = \frac{\phi_c}{\rho} e^{\phi_c}$$

  $$\Gamma^r_{\vartheta\vartheta} = \Gamma^r_{\phi\phi} = -\rho(1 + \phi_c)e^{-3\phi_c}$$

  $$\Gamma^\phi_{r\phi} = \Gamma^\vartheta_{r\vartheta} = \frac{1 + \phi_c}{\rho} e^{\phi_c}$$

- Equation of harmonic oscillator:

  $$\frac{d^2 S^r}{d\tau^2} + \left(\left(1 - \frac{R_s}{r}\right)(u^\phi)^2 - \frac{R_s^2}{4r^4}(u^0)^2\right)S^r = 0$$

  $$\omega_{s\tau}^2 = \left(\left(1 - \frac{R_s}{r}\right)(u^\phi)^2 - \frac{R_s^2}{4r^4}(u^0)^2\right)$$

- Equation of harmonic oscillator:

  $$\frac{d^2 S^r}{d\tau^2} + e^{-2\phi_c}\left((1 + \phi_c)^2(u^\phi)^2 - \frac{\phi_c^2}{\rho^2}(u^0)^2\right)S^r = 0$$

  $$\omega_{s\tau}^2 = e^{-2\phi_c}\left((1 + \phi_c)^2(u^\phi)^2 - \frac{\phi_c^2}{\rho^2}(u^0)^2\right)$$

Derivation of Geodetic Precession Formulas

- From the covariant derivative along the trajectory: $\dfrac{du^r}{d\tau} = -\Gamma_{00}^r (u^0)^2 - \Gamma_{\phi\phi}^r (u^\phi)^2 = 0$
- And from the two different metrics:

$$c^2 = (1 - R_s/r)(u^0)^2 - r^2(u^\phi)^2 \qquad\qquad c^2 = e^{-2\phi_c}(u^0)^2 - \rho^2 e^{-2\phi_c}(u^\phi)^2$$

- Follow the values for the velocity 4-vector components (only two components are needed):

$$(u^0)^2 = \frac{c^2}{1 - 3R_s/2r}$$

$$\boxed{u^0 = \frac{cdt}{d\tau} \qquad u^\phi = \frac{d\phi}{d\tau}}$$

$$(u^0)^2 = (1 + \phi_c)c^2 e^{2\phi_c}$$

$$(u^\phi)^2 = \frac{R_s}{2r^3}\frac{c^2}{1 - 3R_s/2r}$$

$$(u^\phi)^2 = \frac{\phi_c c^2}{\rho^2} e^{2\phi_c}$$

- And from that the proper and the distant observer spin vector orbital frequencies:

$$\omega_{s\tau}^2 = \left(\left(1 - \frac{R_s}{r}\right)(u^\phi)^2 - \frac{R_s^2}{4r^4}(u^0)^2\right) = \frac{c^2 R_s}{2r^3}$$

$$\omega_{s\tau}^2 = e^{-2\phi_c}\left((1 + \phi_c)^2 (u^\phi)^2 - \frac{\phi_c^2}{\rho^2}(u^0)^2\right) = \frac{c^2}{\rho^2}\phi_c(1 + \phi_c)$$

$$\omega_{st}^2 = \frac{c^2 R_s}{2r^3}\left(1 - 3R_s/2r\right) \qquad \text{Eq.1.}$$

$$\omega_{st}^2 = \omega_{s\tau}^2 (1 + \phi_c)^{-1} e^{-2\phi_c} = \frac{c^2}{\rho^2}\phi_c e^{-2\phi_c} \qquad \text{Eq.1.}$$

- The satellite orbital frequency is needed for a reference and is obtained from the Kepler's third law:

$$\omega_{t0}^2 = \omega_{kt}^2 \frac{\omega_\tau^2}{\omega_t^2} = \frac{c^2 R_s}{2r^3}\frac{1}{(1 - R_s/r)} \qquad \text{Eq.2.}$$

$$\boxed{\omega_{kt} = c(u^\phi)/(u^0)}$$

$$\omega_{t0}^2 = \omega_{kt}^2 \frac{\omega_\tau^2}{\omega_t^2} = \frac{c^2}{\rho^2}\frac{\phi_c}{1 + \phi_c} e^{2\phi_c} \qquad \text{Eq.2.}$$

$$\omega_{st}^2 = \omega_{t0}^2 (1 - 3R_s/2r)$$

- Missing factor $(1 - R_s/r)$ represents the gravitational red shift. This is a hidden error.

$$\omega_{st}^2 = \omega_{t0}^2 (1 + \phi_c) e^{-4\phi_c} \qquad \text{dividing Eq.1. by Eq.2. results in:}$$

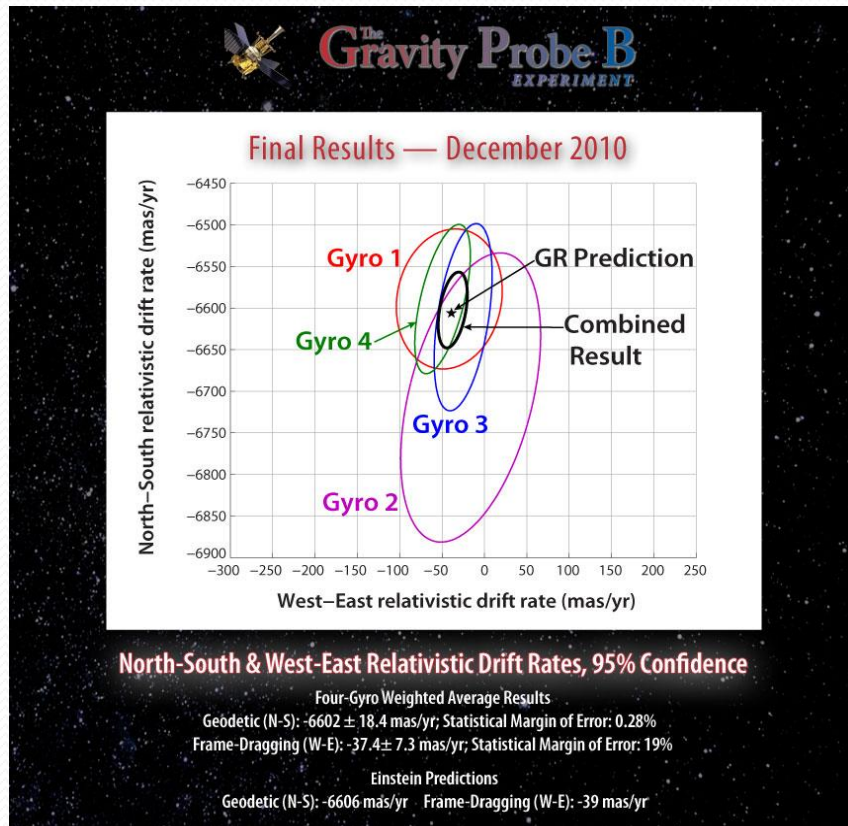$$\omega_{st} = \omega_{t0}\left(1 - 3R_s/4r\right)$$

$$\omega_{st} = \omega_{t0}\sqrt{1 + \phi_c}\, e^{-2\phi_c} \cong \omega_{t0}\left(1 - 3R_s/4\rho(r)\right)$$

Comparison with observations

$$\Delta\alpha = 2\pi N \frac{\omega_{st}-\omega_{t0}}{\omega_{t0}} = -\frac{3\pi}{2}\frac{R_s}{r}N$$

$$\Delta\alpha = 2\pi N \frac{\omega_{st}-\omega_{t0}}{\omega_{t0}} = 2\pi N(\sqrt{1+\phi_c}\,e^{-2\phi_c}-1) \cong -\frac{3\pi}{2}\frac{R_s}{\rho(r)}N$$

$$\Delta\alpha = -\frac{3\pi}{2}\frac{R_s}{R_0+R_e}\frac{365.25\cdot24\cdot60^2\cdot60^2}{t_0}\frac{180}{\pi} = -6.623\,arc\cdot\sec/\,year$$

$$\rho(r)\approx r$$

- The missing factor in the GRT formula for the North-South gyroscope spin axis drift forces the theory to agree with the experiment. This is the proverbial fudge factor to save the GRT and the Schwarzschild metric.

- If the correct factor were included the predicted drift angle would be much higher:

$$\Delta\alpha = 2\pi N \frac{\omega_{st}-\omega_{t0}}{\omega_{t0}} = -\frac{5\pi}{2}\frac{R_s}{r}N$$

- This would make the experiment not to agree with the GRT and thus disprove the validity of Schwarzschild metric.

- The only reasonable conclusion that can be made is that the GP-B experiment confirms the correctness of the new MTG metric and disproves the validity of the Schwarzschild metric.

Conclusions

- It is clear that the GP-B did not prove the correctness of Einstein's GRT. Instead, the experiment has proven the correctness of the new MTG metric.
- Why wasn't this problem discovered earlier?
  - There was no other metric that could be used for a comparison and testing of the derivation method. The spacetime (dark matter) is curved after all but not according to the Einstein's GRT.
  - The Black Holes and Event Horizons point to a problem with the Schwarzschild metric. This is a hint that should have been followed instead of postulating the existence of such absurdities.
- Is there any other evidence of incorrect formula derivations?
  - Yes, the similar error has also been discovered in the derivation of the light deflection formula.
  - There is a proof of nonexistence of GEM derived by linearization from GRT as shown previously.
  - There is a proof that: $M_g \neq M_i$ for bodies in motion.
  - There is an MTG model of the Universe based on the Repulsive Dark Matter that is not expanding, which calculates the Hubble constant from the CMBR, and which agrees well with observations.
- Will the main stream ever acknowledge the errors?
  - No, this is not possible because a tremendous amount of time, thousands of publications, Nobel prizes, professorship positions at universities, various main stream journal editors with gate keeping reviewers, and funding of various organizations such as NASA are all vested in and believing in the correctness of GRT. This is a religion now, not a science, so it cannot correct itself.
- What can be done about this?
  - Not much, scientists should fight more vigorously for the truth. If more dissidents learn the theory, check the calculations, and join their forces behind it, perhaps one day they might win. But I believe that this will not happen during my lifetime.

Final thoughts

- The science should be based on a rational thinking.
  - The assumptions of theories should always be questioned and when the theory predicts absurdities such as the existence of Black Holes, Worm Holes, Event Horizons, and expanding "vacuum", the assumptions should be scrutinized again and again and modified to avoid such insane conclusions.
- Why such irrational thinking phenomena occur in a society?
  - This should warrant a wider investigation. It is generally believed that the science is not subject to problems of being irrational, that it is self correcting, objective, without emotions, and without politics. Apparently this is not so.
  - I do not feel competent to analyze this problem, but it is probably due to the following:
    - A cult of personality: As Marx, Lenin, Stalin, or Mao Zedong were elevated to a level of almost gods, it is the same with Einstein. One cannot publish a paper in a prestigious journal without mentioning how a great genius Einstein was and how unprecedented and advanced his theories were. The evidence of this worshiping is everywhere; on the internet, on the TV etc.. No mention of Riemann, Gauss, Euler, Ricci, and many others.
    - Political issues related to liberalism and progressivism. The science must be helping people and be compassionate. An example of a true science as the science should be is the "science" of socialism, which is being taught as a great success of a millennium, ignoring plenty of proofs that it does not work. The facts do not matter here and are ignored. The ideology and arrogance rule. A recent example of such progressivism is the "science" of Global Warming. This was a great political tool while it lasted, now it is the Climate Change. There seems to be a very little of rational and unbiased analysis in politically correct sciences. The general relativity is now "settled", it is a proven theory, the people who question it are crackpots and must be ridiculed or in a best case ignored.
    - Elitism related to the status of university professors who are always right and cannot be wrong. They are "intelligent" and compassionate, mostly with liberal aberrations. But they should work more in engineering, which is closely coupled to reality. The engineering gadgets must work otherwise nobody will buy them.
    - Funding of research by government grants. The grants are given to universities according to corrupt politics and according to the old boy network. I was there, I know.
- Hopefully, one day the science will return to its normal status of rational theories and thinking.

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Thank You for the Attention