the general science journal

No, the Gravity Field is Weak, Dr Einstein!

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Like Maxwell has shown, the idea of an intrinsic gravitational energy surrounding masses is not viable to explain gravity, because that would lead to incredibly large energies. This falsifies the need for a non-linear general gravity theory such as the general relativity theory, and confirms the validity of Heaviside's linear gravity theory, gravitomagnetism, known as the "weak-field approximation".

Keywords: general gravity theory, Heaviside gravity, general relativity theory, gravitomagnetism

1. Maxwell's "Note on the Attraction of Gravitation"

In his paper "A Dynamical Theory of the Electromagnetic Field"of 1864, Maxwell wrote a note on the intrinsic energy of gravity fields, by comparing it to the magnetic field of two like-named poles.

In his "Note on the Attraction of Gravitation"[1], Maxwell starts from the idea that there would be a gravitational energy in space, capable to exert forces of gravity upon masses, the same way as like-named magnetic poles exert forces mutually, according to their (well-known) field lines, but with an opposite effect. Instead of attraction, we get repel.

If the gravitational energy is intrinsic in space, every point in space should content the potential to exert the necessary force.

To illustrate this, Maxwell compares the situation of two masses M_1 and M_2 with two repelling magnetic poles m_1 and m_2.

He reasons from the point of view that there exists an intrinsic energy E that is surrounding the two masses, and similarly an intrinsic energy E' that is surrounding the two magnetic poles. The elementary work when the masses move over a distance ∂x due to a force X is ∂E , and for the magnetic poles, the elementary work when the poles move over a distance ∂x due to a force X' is $\partial E'$.

Hence, $X\,\partial x = \partial E$ and $X'\partial x = \partial E'$. Maxwell wants to compare both situations, but since the poles are repelling, Maxwell finds $\partial E = -\partial E'$, which gives after integration: $E = C - E'$, where C is an integration constant.

If the resulting gravity force is R, and the resulting magnetic force is R', we get R = - R'.

Maxwell's result is then: $E = C - \Sigma \dfrac{1}{8\pi} R^2 \,\mathrm{d}V$.

His reasoning is now as follows. Since the energy E must be positive, the right hand is positive as well. Hence, at the places of equilibrium between masses and inside the masses, the intrinsic energy density $R^2/8\pi$ must be greater than at all other places, and herein, R is the largest possible gravitational force in the universe.

Maxwell concludes as follows: "*The assumption, therefore, that gravitation arises from the action of the surrounding medium in the way pointed out, leads to the conclusion that every part of this medium possesses, when undisturbed, an enormous intrinsic energy, and that the presence of dense bodies influences the medium so as to diminish this energy wherever there is a resultant attraction.*

As I am unable to understand in what way a medium can possess such properties, I cannot go any further in this direction in searching for the cause of gravitation."

2. Analysis of the Note

It is clear that as Maxwell pointed out, the assumption of an intrinsic gravitational energy would lead to nonsense when we consider the existence of very dense bodies and black holes. Even Maxwell rejected that idea as a possible generator of gravitational action.

However, the mainstream of nowadays apparently didn't got rid of this idea, because it still requires the assumption of a bending space-time and a non-linear gravity theory, due to a supposed strong gravity field, and it still maintains the supposed need of dark matter in order to explain the constant velocity of the stars in a disc galaxy.

In the Note, there are a few strange situations, due to the very idea of an intrinsic gravitational energy in space, which I want to point out. In the first place, the comparison between like-named magnetic poles and gravity is purely artificial. There is not a beginning of evidence for a real physical similitude between both, although the theoretical field lines can be drawn similarly.

Also, the equation of the amplitudes of X and X' is based upon nothing. We know that there is only a limited number of electrons needed in a solenoid to elevate a mass from the gravity force of the whole Earth. In the case that masses generate directly the forces of gravitation, that means that the local density of gravity must be many times smaller than that of magnetic force. And this is totally opposite to the idea of an intrinsic gravitational energy.

Moreover, when we want to compare magnetism with gravity, we should zoom out gravity with a huge factor and increase the masses, in order to get comparable forces. Based on this reasoning, it follows that the intrinsic magnetic energy should be many times stronger than the intrinsic gravitational energy.

Finally, the conventional minus sign for attraction doesn't mean that there is a physical negativity. The integration constant is only a temporary convention to avoid defining the boundaries of a definite integral. So, the presence of a constant C doesn't mean that there really is a quantity of energy C present in space.

A more modern approach that explains gravitational energies is the use of potential energy. In that case, when a mass recede from another mass, it gains potential energy but looses speed (kinetic energy), and when it approaches it, it loses it and transforms it in kinetic energy. Only variations of quantities of energy are intelligible, whereby the minus sign stands for a decrease. One could approach a mass from infinity to a position, and pretend that its potential energy increased strongly, but in real physics, no masses come from infinity to that position. Anyway, the level of "absolute" gravitational energy obtained in this case is never as much as in Maxwell's case study.

In reality, the creation of gravity forces by the very masses themselves is a more likely process, as I pointed out in my former papers [4]. As well, the supposed presence of high quantities of dark matter in disc galaxies is absolutely fanciful as well and is not needed at all to explain the constant speed of the stars [5].

3. Discussion and Conclusion

For some obscure reasons and against all logic, the actual mainstream still maintained the idea of a strong gravitational field in the Universe, while there is no reason whatsoever to claim that. Knowing that electromagnetism perfectly describes the reality of charged elements, there is no reason to use another theory than a linear one for gravity. Even the mass densities of black holes will not affect the linearity of gravity, since the local forces generated by it aren't much stronger than the electromagnetic devices that can be produced on Earth.

Since light doesn't constitute a building block of space-time itself, the approach of an universe directed by the variation of the frequency and the path of light beams due to gravity is fanciful.

Moreover, didn't Einstein made his homework well before developing his theory by neglecting Maxwell's Note?

One can perfectly define a Cartesian universe and describe gravity by the Heaviside analogy from electromagnetism [3] (gravitomagnetism [2]). In most of the cases, mainstream anyway uses gravitomagnetism if something tangible needs to be found, although they artificially deduced gravitomagnetism from the Minkowski space and the perturbation theory. This approach falsely supposes the need of flattened celestial bodies in order to reach gravitomagnetism. However, true gravitomagnetism also works well with spherical celestial bodies.

As pointed out by Maxwell, the idea of strong gravity fields in space is wrong, which invalidates the need of a non-linear gravity theory, such as the general relativity theory, in favor of gravitomagnetism. However, gravitomagnetism cannot be seen as a decoction of GRT, but must be considered a full analogy of electromagnetism.

References

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