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Does Gravitation *Really* Depend on the Curvature of Space-Time and its Energy-Momentum?

Thomas Nordström, PhD

In this paper I will investigate the postulates of Gμυ = Tμυ[1], i.e. the fundamental concepts of Einstein´s General Relativity. On the left side of the equation is the *space-time curvature* and on the right side is the *energy- momentum.* I will investigate if there really is equivalence between these two and also propose an alternative explanation for gravitation.

To illuminate these concepts I stipulate four new postulates[2]:

1) Nothing exists in isolation, i.e. everything exists in relations.
2) Every concept must represent the physical reality directly.
3) Everything that exists is physically concrete.
4) Time does not exist in Nature and the Universe.

The General Theory of Relativity consists of two parts:

1) The energy-momentum which is based on $E = mc^2$, i.e. the mass has energy.
2) The space-time curvature is the geometry, e.g. volume, architecture, form and distance.

Then, based on the postulates 2 and 4, and Einstein´s criterion that "*every element of the physical reality must have a counterpart in the physical theory*"[3], it is only the concepts of mass and form/geometry that are valid, since energy, c^2 and time don´t fulfil the criteria.

Since it is only mass and form that are valid concepts, we can now ask whether these two concepts are equal, i.e. if there is equivalence between these two.

The answer must be "no", there is no equivalence between mass and form. These two qualities, mass and form, however, consociate, unite and always co-exist, in each specific situation, i.e. they cannot be separated from each other, they are singular and their motion is one and the same.

It is not equivalence, it is sameness, i.e. they describe the same phenomenon and not two separatephenomena.

Gottlob Fregehas written his reflections concerning *the concept of sameness*[4], which is related to the concept of equivalence, where he notes theconcept's use, and I quote: "I use this word in the sense of identity and understand "a = b" in the sense of "a is the same as b" or "a and b coincides".[5]

Frege argues: "Is Sameness a relation? A relation between objects? Or between names or signs of objects? I assumed the latter alternative in my *Begriffsschrift*. The reasons that speak in its favour are the following: "a = a" and "a = b" are sentences of obviously different cognitive significance: "a=a" is valid a priori and according to Kant is to be called analytic, whereas sentences of the form "a=b" often contain very valuable extensions of our knowledge and cannot always be justified in an a priori manner."[6]

The conclusion is that Frege´s interpretation of the concept Sameness issupportive of this papersinterpretation of equivalence. Equivalence cannot be used the way Einstein uses the concept, since he confuses the analytic meaning of the concept with its meaning of an extension of knowledge.

Then the concepts form and mass are not equivalent.

Hence Gμυ ≠ Tμυ, i.e. m ≠ f, where f is form and m is mass. The expression should be GμυTμυ, i.e. m and f co-exist.

What, then, does the singular co-existence of mass and formmean for the behaviour of these two concepts? And what is the implication for gravitation?

Before we solve the problem by using concepts that directly represent the physical reality, we need a different theoretical approach.

Based on the first postulate; *nothing exists in isolation, i.e. everything exists in relations*, we conclude that all parts and entities in the Universe hang together.

The concept relation relates to reality by demonstrating that there are relations between all parts and systems in the Universe, formalized as X = aRb, where:

1) a, b, c … are any system, subsystem, unit or part in any field of the Universe, e.g. suns, planets, moons, galaxies, leptons, hadrons, mesons, baryons, nuclei, atoms and molecules.
2) The relation R is a flow of packages, $p_{1\text{-}n}$, between a, b, c … in any field and system of Universe.

The relation can be illustrated by this simple model:

Based on the postulate - *Nothing exists in isolation, i.e. everything exists in relations* - in combination with 1 and 2 above,The Principle of Relations is X = aRb, where X stands for E (Energy), G (Gravitation) and F (Force).

Between all systems and between all parts of any system, S, there is a continuous flow of packages, and the formula is: $S = ap_{1\text{-}n}b$.

Then 1-6 below deals with the same reality, i.e. how masses behave; where r stands for radiation = flow of packages, G stands for Gravitation, S stands for system and Ψ(x,t) stands for wave:

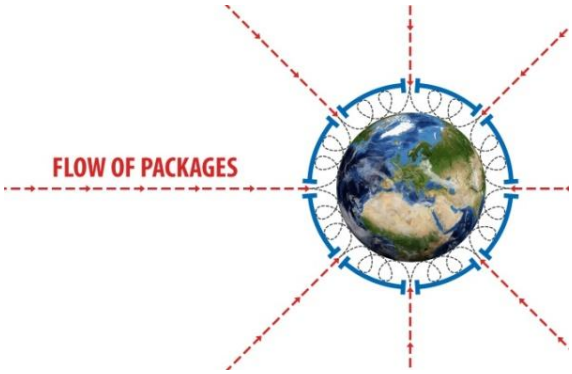
1) $G\mu\upsilon \neq T\mu\upsilon$, i.e. $G\mu\upsilon T\mu\upsilon$
2) $G = arb = aRb$
3) $arb = ap_{1\text{-}n}b$
4) $G = a(\Psi(x,t) = p_{1\text{-}n})b$
5) $G = G\mu\upsilon T\mu\upsilon = mfr = aRb = arb = a(\Psi(x,t) = p_{1\text{-}n})b$
6) $S = a(\Psi(x,t) = p_{1\text{-}n})b$

A wave consists of masses which stand in relation with systems. From system *a*a wave of masses moves to system *b*. This is valid for all masses in the Universe, e.g. galaxies, planets, suns, moons, atoms, molecules and cells.

We need to find out how the masses of the systems and bodies *a* and *b* operate and function.
Now, since the concepts of *space-time curvature* and *energy- momentum* cannot be used, we will use the concepts *mass*, *m*, and *package*, *p*, which directly represents the physical reality, where $p_{1\text{-}n}$ denotes the flows of packages and *m* denotes mass in the sense of body, system and entity. These two, *m* and *p*, also fulfil Einstein´s criterion "every element of the physical reality must have a counterpart in the physical theory".

So, the conclusion is that we now need to find the flows of packages in the Universe, and I will argue that:
1) Gravitation occurs when the flows of packages have an impact on the Earth and for planets, suns and galaxies, i.e. throughout the entire Universe.
2) The concept *flows of packages* will replace the concepts of dark matter and dark energy, i.e. the flows of packages are 95% of all matter in the Universe, while5% is "solid" matter, e.g. planets and suns.

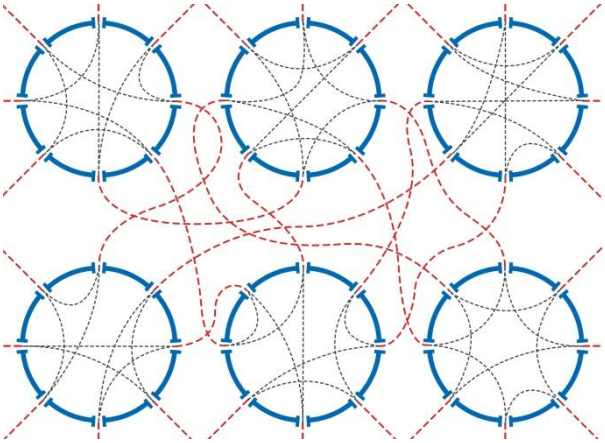
Then, based on X = aRb, gravitation will show up like this:



When gates open the Earth for R, then packages come into the Earth. The absorption of the flow of packages is guided by a *Transformer*, which is *the mechanism that directs and leads packages.* One consequence is that masses (peoples, cars etc.) on Earth will be held on the surface of Earth, i.e. by what now is called gravitation.

Throughout reality the same principle applies to the mechanisms of a Transformer´s functions, e.g. the Earth, the Sun, the Moon, the human body, galaxies, atoms, organs and cells.

In the Universe there are many R, i.e. flows of packages, $p_{1\text{-}n}$, e.g. between suns, planets and galaxies, related to each other. *We need to identify and map all of* $R_{1\text{-}n}$. There is infinite R in the cosmos, illustrated by arrows, flows of packages, in the figure below:



Notes

[1] By using Occam´s razor we can reduce the number of concepts in physics, which is necessary for finding the theoretical foundation of the physical reality.
[2] The article is based on the book *The Theoretical Foundation of Physical Reality. Thomas Nordström. Published by AuthorHOUSE 2020.*
[3] Physical Review, May 15, 1935, Volume 47, page 777; Can Quantum-Mechanical Description of Physical Reality be Considered Complete? A. EINSTEIN, B. PODOLSKY and N. ROSEN, *Institute for Advanced Study, Princeton, New Jersey.*
[4] Gottlob Frege: On Sense and Nominatum in The Philosophy of Language, by A. P. Martinich, pages 217 – 229.
[5] Ibid. page 228.
[6] Ibid. page 217.