

Redefining Fundamental Physics: Uniting Equations and Concepts through the Principle of Relations

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Abstract: *This article presents a groundbreaking approach to understanding the fundamental equations of physics by introducing the Principle of Relations. This principle posits that everything in the Universe exists in intimate relations and flows of packages, replacing traditional concepts of energy and mass. By redefining classical equations such as $E=mc^2$, gravitation, and wave function in terms of relations and flows, a new perspective emerges, offering insights into the interconnectedness of various physical phenomena. This article explores how this principle transforms our understanding of mass, energy, gravity and more, ultimately leading to a comprehensive view of the Universes underlying structure.*

Keywords: Fundamental Physics, Principle of Relations, Equations of Physics, mass, Energy, Gravitation, Flow of Packages, wave Functions and black holes

In this paper an attempt is made to find out how five equations can be transformed to one basic deterministic equation of physics.

Albert Einstein argued at the year 1940 that “At the present, we are quite without any deterministic theory directly describing the events themselves and in consonance with the facts. For the time being, we have to admit that we do not possess any general basis for physics, which can be regarded as its logical foundation.”¹

As it seems, Einstein’s view is still valid. At the present time, there exists no theory accepted by the entire scientific society.

Science just needs a new theory, a shift in Paradigm. I have followed the wisdom of Albert Einstein:

“In my opinion, *nothing can be said concerning the manner in which the concepts to be made and connected, and how we are to coordinate them to the experiences. In guiding us in the creation of such an order of sense experiences, success in the result is alone the determining factor.*”² (Mycursive)

Finding *The Fundaments of Theoretical Physics* we have to question all established concepts and critically investigate all theories, we cannot use any concepts and theories, since they have failed to formulate a general theoretical basis of reality. However some concepts might do.

Let the starting point finding a deterministic theory of reality be these theories, dealt with in chronological order:

- 1) Aristotle’s idea of four causes of physics.
- 2) Newton’s theory of gravitation: $F = Gm_1m_2/r^2$
- 3) Planck - Einstein relation: $E = hv$
- 4) Einstein’s theory of energy: $E = mc^2$
- 5) Einstein’s theory of gravitation, simplified: $G_{\mu\nu} = 8\pi T_{\mu\nu}$
- 6) De Broglie’s hypothesis, simplified: $\Psi = (x, t)$

Then an alternative theory, i. e., *The Principle of Relations*³, can be formulated, based on determinism, using quite new concepts.

Aristotle

Aristotle’s theory consists of four causes, i. e., material, formal, efficient and final; where material is the matter/masses of what something is built of; formal means the design of masses; efficient means how change is made of the material, e. g., building a house; final means the final cause, i. e., designed for a purpose, the teleological cause. These four causes are all needed for producing a result.

Sometimes the teleological idea is and the four causes are showed as the image below:



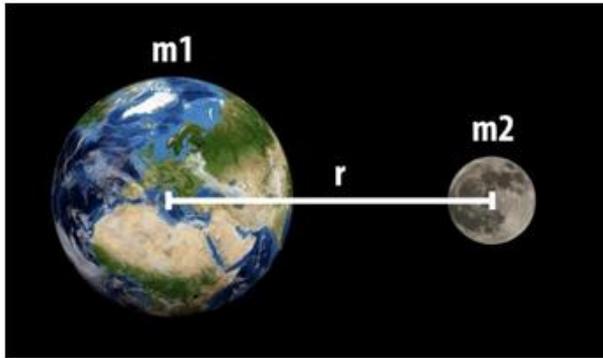
Why do we have to mention the idea of Aristotle?

Because there might be something we have missed, maybe the causes might give some new aspect, which in combination with the entire knowledge created out of hundreds of years can give us a new perspective. But also for respect of Aristotle.

The concepts to be investigated are material, formal, efficient and final.

Isaac Newton

Newton’s gravitation can be shown as below:



Gravity or gravitation is when two bodies attract each other, by a force directly proportional to the product of their masses and inversely proportional to the square of the distance between them. Newton didn't say anything about the essence of the force, which is strange, it is only formulated as an equation: $F = Gm_1m_2/r^2$.

Newton formulated three laws of motion. In short, they describe the relationship between an object's motion and the force needed. There must be a force in order to make an object to move, otherwise it will remain in rest or continue its motion in a constant speed in a straight line.

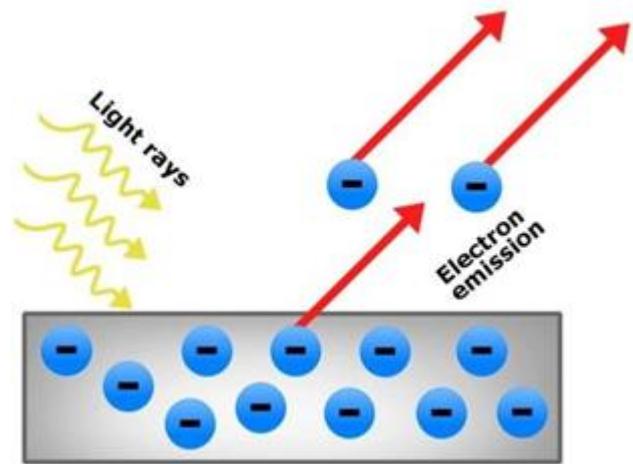
The concepts to be investigated are F , G , m_1 , m_2 , and r^2 .

The photoelectric effect

When light hits a metal surface electrons are emitted. This is supposed to be true, since it has been observed in experiments and has been explained by the theories of Planck and Einstein.

According to Planck $E = h\nu$, which is the energy of each photon. Einstein developed the theory by adding the work function, i. e., $E = W + KE$, where W is the work function and KE is the Kinetic Energy of the electron. One photon is needed to release one electron, and the electron leaves the metal surface or vanishes.

Based on Planck's and Einstein's investigations of the photoelectric effect, light quanta, photons, make electrons emission from a metal plate, often illustrated as below:



The two concepts *intensity* and *frequency* are used to find out when an electron is released or not; i. e., if there is enough frequency then the electron will be removed and this is called W , the work function. Energy is defined as the frequency of the photon, i. e., the density of the mass of photons; intensity is defined as the number of photons.

If we now add different surfaces of different materials, e. g., leaves, grass, trees and human skin, can we expect different answers to the question, when applying different intensities and frequencies?

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

The concepts to be investigated are E , $h\nu$, W and KE .

Einstein's theory of relativity, energy and gravitation.

The well-known equation of Einstein explaining energy to be $E = mc^2$. The equation is based on two postulates, i. e., laws of physics are invariant meaning that all inertial frames of reference with no acceleration and the speed of light is the same from any position, denoted c . The concept equivalence is introduced, i. e., energy and mass are qualities that are equivalence.

The concepts to be investigated are energy, c^2 , inertial frame of reference and equivalence, since they constitute the equation $E = mc^2$.

Einstein's gravitation is often shown as this:



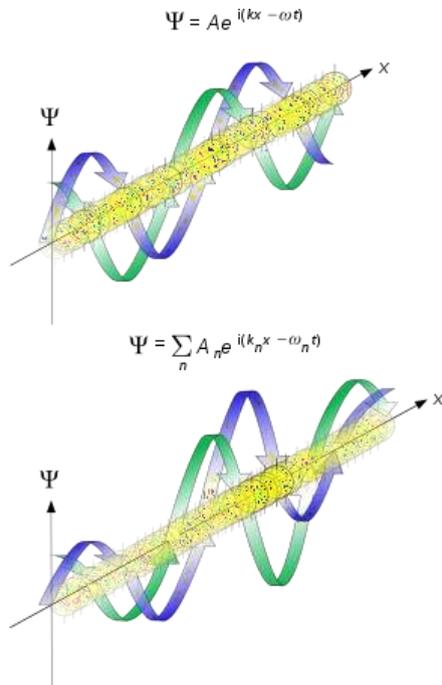
What happens with a person or a car on the down side of the Earth and what happens with a person or a car on the top of the Earth? I guess the reaction will be different: on the down side a person or a car will be crushed and on the right and left side a person or a car will fall off the Earth.

$G_{\mu\nu} = T_{\mu\nu}$, 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.

The concepts to be investigated are $G_{\mu\nu}$, i. e., space - time curvature; $T_{\mu\nu}$, i. e., energy - momentum and equivalence.

De Broglie’s hypothesis

In his PhD thesis de Broglie started with the hypothesis “that to each portion of energy with a proper mass m_0 one may associate a periodic phenomenon of the frequency ν_0 , such that finds: $h\nu_0 = m_0c^2$. The frequency ν_0 is to be measured, of course, in the rest frame of the energy packet. This hypothesis is the basis of our theory.”⁴



The concepts to be investigated are h , ν_0 , m_0 , and c^2 .

Physics and Reality

Every qualified development of science requires new concepts, then manifests in a new theory and at its best in a new paradigm.

We have now noticed the established concepts for different theories, namely:

By *Aristotle* material, formal, efficient and final; by *Newton* F , G , m_1 , m_2 , and r^2 ; by *Planck and Einstein* E , $h\nu$, W and KE ; by *Einstein* energy, c^2 , inertial frame of reference and equivalence, $G_{\mu\nu}$, i. e., space - time curvature; $T_{\mu\nu}$, i. e., energy - momentum and equivalence; by *de Broglie* h , ν_0 , m_0 , and c^2 .

So far, we know that there exists no deterministic theory of reality and these concepts and theories have then failed.

Is it possible to use these concepts finding out *The Fundamentals of Theoretical Physics*, or are we just swirling and spinning around and around by these existing concepts?

I will say yes, that’s a fact. We just spin around in a bag. Please be prepared for a different and anomalistic view of reality based on new concepts.

The Principle of Relations

Now we have to look at the alternative theory, i. e., *The Principle of Relations*, and how it affects existing concepts and theories. The starting point is based on three fundamental postulates:

- 1) Nothing exists in isolation; everything exists in relations.
- 2) Movement is a property of reality.
- 3) Every concept has to represent reality directly and concretely.

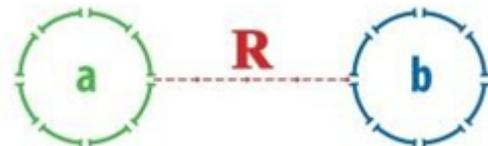
The concept relation relates to reality by showing that there are relations between all parts in reality, where:

- 1) **a, b, c ...** are any system, subsystem, unit or part in any field of relation in Universe, e. g., suns, planets, moons, galaxies, atoms, molecules, cells, organs and species.
- 2) The relation, **R**, is a flow (wave) of packages, $p_1 - n$, e. g., quarks, protons, neutrons, electrons, photons, proteins, fats, polysaccharides, between **a, b, c ...** in any field of reality.

Based on the postulate - *nothing exists in isolation; everything exists in relations* – in combination with 1 and 2 above, the principle is

$$X = aRb$$

The six equations and their concepts will now be replaced by this formula: $X = aRb$. The relation can be illustrated by this simple model:



The principle of relations claims that between all systems and between all parts of any system, S , there is a continuous flow of packages $p_1 - n$, i. e., in aRb , $R = p_1 - n$, and thus the formula is

$$S = ap_1 - nb$$

Besides this formula, the concepts *transformer* and *shape* are needed. Now we have these five concepts understanding reality:

- 1) Mass
- 2) Flow
- 3) Relation
- 4) Transformer
- 5) Shape

These five basic concepts, i. e., Mass, Flow, Relation, Transformer and Shape, understand the entire reality, such as the Universe, the Earth, the Sun, the human body, DNA, organs and cells in the Human Body and its diseases, black holes and galaxies.

- 1) The dominant part is the formula $X = aRb$, where **X** can be gravitation, force, energy, surface of the Earth, new **a, b, c ...** are any system, subsystem, unit or part in any field of relation in Universe, e. g., suns, planets, moons, galaxies, atoms, molecules, cells, organs and species.
- 2) The relation, **R**, is a flow (wave) of packages, $p_1 - n$, e. g., quarks, protons, neutrons, electrons, photons,

proteins, fats, polysaccharides, between a, b, c ... in any field of reality.

Based on the postulate - *nothing exists in isolation; everything exists in relations* – in combination with 1 and 2 above, the principle, reiterated, is

$$X = aRb$$

The six equations and their concepts will now be replaced by this formula: $X = aRb$. The relation can be illustrated by this simple model:



The principle of relations claims that between all systems and between all parts of any system, S, there is a continuous flow of packages $p_1 - n$, i. e., in aRb , $R = p_1 - n$, and thus the formula is

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The dominant part is the formula $X = aRb$, where X can be gravitation, force, energy, surface of the Earth, newspecies, inflammation and disease⁵, conflicts and wars⁶; **a** and **b** are systems and **R** is the relation between them:

- 1) **R** in the formula stands for flows, i. e., flows dominate reality. There is a continuous flow of packages all over reality.
- 2) $S = (aRb) - \infty$, i. e., The system S constitutes of finite relations between a, b, c...
- 3) $R = \sum p_1 - n = p_1 + p_2 + p_3 \dots p_n$, i. e., R is the flow of packages, with different content in different systems.
- 4) $RS = (\sum p_1 - n = p_1 + p_2 + p_3 \dots p_n)^\infty$, i. e., RS is a

system of relations.

- 5) $S = (a_1 - nR_1 - n b_1 - n) R^\infty (c_1 - nR_1 - n d_1 - n) \dots$ identifying all relations is a complex work.

Transformer is interaction between the pathway, its infrastructure and the packages, i. e., they are woven and interconnected together.

Once we have identified the Transformer and the flows in all parts of reality, we know how the Universe, the Earth, the Nature, the Society and the Human Body behave.

There are transformers all over reality. DNA is one transformer transforming masses to new cells; Black Holes are transformers transforming masses to new galaxies and stars; Transformers transforms masses to new inorganic shapes, e. g., changes of the Earth.

Shape is the result of the transformation by the transformer, e. g., new cells, new species, new galaxies, new suns and new planets. The transformers are, to make it very clear, once again, DNA, Black Holes and Transformer of the surface of the Earth.

The Principle of Relations vs Aristotle

The concepts material, formal, efficient and final are used by Aristotle. Based on the Principle of Relations there are some similarities, i. e., mass, transformer and shape. The absorption of the flow of packages is guided by a *Transformer*, which is *the mechanism that directs and leads packages*.

Masses are transformed to shapes, which can be seen as final.

The principle of relations vs Newton

Gravity or gravitation is when two bodies attract each other, by a force directly proportional to the product of their masses and inversely proportional to the square of the distance between them. Newton didn't say anything about the essence of the force, which is strange, it is only formulated as an equation: $F = Gm_1m_2/r^2$. The concepts used are F, G, m_1 , m_2 , and r^2 .

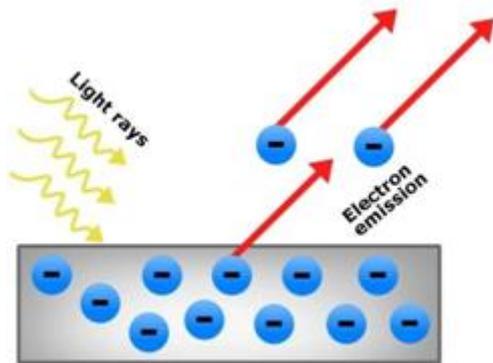
If m_1 is **a** and m_2 is **b**, then **R** is to find and to be identified, i. e., the flow of packages between **a** and **b** or between m_1 and m_2 .

R replaces F.

The Principle of Relations vs The photoelectric effect

According to Planck $E = hv$, which is the energy of each photon. Einstein developed the theory by adding the work function, i. e., $E = W + KE$, where W is the work function and KE is the Kinetic Energy of the electron. One photon is needed to release one electron, and the electron leaves the metal surface or vanishes.

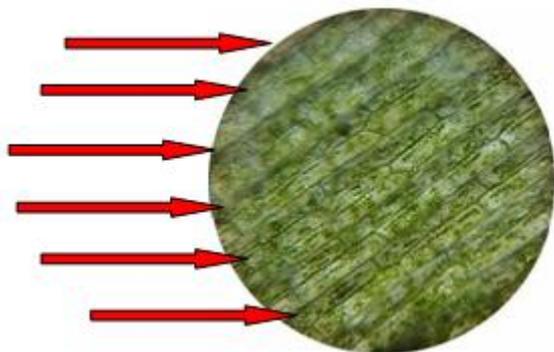
Based on Planck's and Einstein's investigations of the photoelectric effect, light quanta, photons, make electrons emission from a metal plate, often illustrated as below:



The two concepts *intensity* and *frequency* are used to find out when an electron is released or not; i. e., if there is enough frequency then the electron will be removed and this is called W , the work function. Energy is defined as the frequency of the photon, i. e., the density of the mass of photons; intensity is defined as the number of photons.

If we now add different surfaces of different materials, e. g., leaves, grass, trees and human skin, can we expect different answers to the question, when applying different intensities and frequencies?

By using the formula $X = aRb$, we will get another interpretation. Photon has packages, which is not energy, it is just a flow of packages needed by the leaf.



Photosynthesis shows the process of R in Nature, how proteins, which are embedded in the membrane, gather light.

When making experiment in the laboratory, we can manipulate photons approaching a metal plate with different frequency and intensity, but when we study nature itself and how it behaves, we will find another view, which result in the formula $X = aRb$.

The Principle of Relations vs the Principle of Relativity

The last sentence in Einstein's paper *Does the Inertia of a Body Depend Upon its Energy Content*, is: "If the theory corresponds to the facts, radiation conveys inertia between the emitting and absorbing bodies."

Let's call the emitting and absorbing bodies a and b ; then *radiation conveys inertia* between them. Now, if we call radiation r (not to be confused with R , Relation), then we get arb , i. e., a special variant of aRb . We can now translate $E=mc^2$ to $X=aRb$, via arb . (Please read this slowly more

than once.)

Inertia has then in Einstein's paper two meanings, i. e., *Trägheit/Density* and mass, as it seems. If inertia means mass, which can be reasonable, then we can equate *radiation conveys inertia* with *radiation conveys mass*. If we then have the interpretation of radiation as transmitting, then we can call it *flow of packages* as in a beam of light. If L denotes Light, then $L = p1 - n$, where $p1 - n = \Upsilon1 - n$, where Υ stands for photons.

The sentence ... *radiation conveys inertia* ... will have several possible meanings:

- 1) Radiation conveys mass.
- 2) Flow conveys mass.
- 3) A flow of packages transmits mass.
- 4) A flow of packages transports mass.

Based on $X = aRb$ and $S = ap1 - nb$ any system is and can be described as complex flows. We might call them wave functions, since a wave function is a flow of masses, i. e., $\Psi(x, t) = p1 - n$.

Then 1 - 7 below deals with the same reality, i. e., how masses behave:

- 1) $E = mc^2$ rewritten from $m = L/c^2$
- 2) $mc^2 = ap1 - nb$
- 3) $E = arb = aRb$
- 4) $arb = ap1 - nb$
- 5) $mc^2 = arb$
- 6) $E = mc^2 = arb$
- 7) $E = mc^2 = a(\Psi(x, t) = p1 - n) b$

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

We need to find out how the emitted and the absorbed masses of the systems a and b operate and function. Now, since E cannot be used, we will use the concept *package*, p , which directly represents the physical reality,

where $p1 - n$ denotes the flows of packages. It also fulfils Einstein's criterion "every element of the physical reality must have a counterpart in the physical theory"

The conclusion in Einstein's paper is that "*If the theory corresponds to the facts, radiation conveys inertia between the emitting and absorbing bodies*".⁷

This conclusion might be correct regardless of the theory of Einstein. It might as well be aRb that is tested, i. e., aRb states that between two bodies there are flows of packages affecting the content of mass, size and structure of both bodies.

So, the conclusion can be the same, but based on different theories.

Then, based on The Principle of Relations, i. e., $X = aRb$, we can also investigate energy.

The last sentence in Einstein's paper *Does the Inertia of a*

Body Depend Upon its Energy Content, is: "If the theory corresponds to the facts, radiation conveys inertia between the emitting and absorbing bodies." (Inertia has now the meaning of mass.)

Since we now are using new concepts, reiteration is a source for understanding. So a review will follow.

Let's call the emitting and absorbing bodies a and b ; then radiation conveys inertia between them. Now, if we call radiation r (not to be confused with R , Relation), then we get arb , i. e., a special variant of aRb .

We can now translate $E=mc^2$ to $X=aRb$, via arb .

- 1) $mc^2 = arb$
- 2) $E = mc^2 = arb$
- 3) $E = mc^2 = a (\Psi(x, t) = p1 - n) b$

Based on $E = mc^2$ Einstein continued to create the General Theory of Relativity. 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.

Now based on Einstein's criterion that "every element of the physical reality must have a counterpart in the physical theory", 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, m , and form, f , that are valid concepts, we can now ask whether these two concepts are equal, i. e., if there is equivalence between these two, i. e., between m and f .

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 separate phenomena. Thus, $m \neq f$, it is mf , i. e., $G_{\mu\nu} \neq T_{\mu\nu}$, it is $G_{\mu\nu}T_{\mu\nu}$.

Then the following 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, m stands for masses, f stands for form and $\Psi(x, t)$ stands for wave of packages:

- 1) $G_{\mu\nu} \neq T_{\mu\nu}$, i. e., $G_{\mu\nu}T_{\mu\nu}$
- 2) $G = arb = aRb$
- 3) $arb = ap1 - nb$
- 4) $G = a (\Psi(x, t) = p1 - n) b$
- 5) $G = G_{\mu\nu}T_{\mu\nu} = mf1Rmf2 = aRb = arb = a (\Psi(x, t) = p1 - n) b$ 6. $S = a (\Psi(x, t) = p1 - n) b$

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.

Then, based on the postulates 1 and 3, and Einstein's

criterion that "every element of the physical reality must have a counterpart in the physical theory"⁸, 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.

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

Gottlob Frege has written his reflections concerning the concept of sameness⁹, which is related to the concept of equivalence, where he notes the concept'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".

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."¹⁰

The conclusion is that Frege's interpretation of the concept Sameness is supportive of this paper's interpretation 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 $G_{\mu\nu} \neq T_{\mu\nu}$, i. e., $m \neq f$, where f is form and m is mass. The expression should be $G_{\mu\nu}T_{\mu\nu}$, i. e., m and f co - exist.

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

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: $S = ap1 - nb$.

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 $\Psi(x, t)$ stands for wave of packages:

- 1) $G_{\mu\nu} \neq T_{\mu\nu}$, i. e., $G_{\mu\nu}T_{\mu\nu}$
- 2) $G = arb = aRb$
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A wave consists of masses which stand in relation with systems. From system *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.

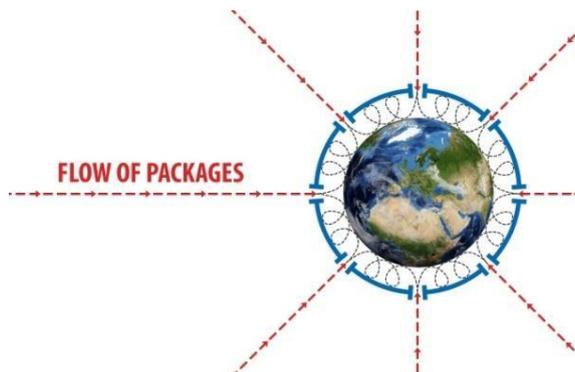
We need to find out how the masses of the systems and bodies *a* and *b* operate and function.

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 *p1 - 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, while 5% is "solid" matter, e. g., planets and suns.

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



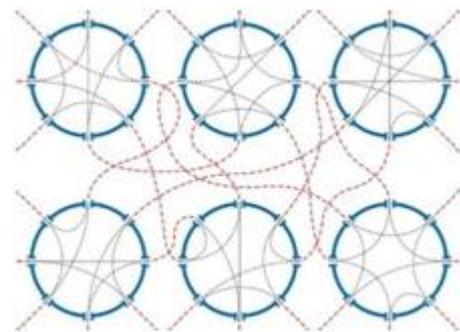
However the image of a black hole has often been shown like the right image¹³:

The questions I want to raise is if do black holes actually exist or is the image based on optical illusions and invalid equations? These two images do not have the same interpretation of black holes. **IF** black holes have singularity and a strong gravitation that nothing, not even light, can

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, *p1 - n*, e. g., between suns, planets and galaxies, related to each other. *We need to identify and map all of R1 - n*. There is infinite R in the cosmos, illustrated by arrows, flows of packages, in the figure below:



Consequences for black holes

Black holes are examples which support The Principle of Relations and the concept Transformer, since it has predicted that black holes create stars, as now has been seen by the Hubble Space Telescope.

"Hubble catches a black hole creating new stars. *The black hole at the heart of this dwarf galaxy is kick - starting star formation instead of cutting it off.*"¹¹

The illustration below is based on Hubble Space Telescope observations of a 200, 000 - light - year - long "contrail" of stars behind an escaping black hole. Credit: NASA, ESA, Leah Hustak (STScI)¹²



come out, **THEN** no stars can be created. These two images have the exact opposite position. How can we deal with this conceptual lack of clarity?

The answer could be The Principle of Relations.

The Principle of Relations vs de Broglie's hypothesis and the Principle of Quantum

As mentioned above, de Broglie’s PhD thesis started with the hypothesis “that to each portion of energy with a proper mass m_0 one may associate a periodic phenomenon of the frequency ν_0 , such that finds: $h\nu_0 = m_0c^2$. The frequency ν_0 is to be measured, of course, in the rest frame of the energy packet. This hypothesis is the basis of our theory.”¹⁴

The formula $X = aRb$, where X can be gravitation, force, and energy, i. e., then energy as concept is not valid, it is instead a flow of packages.

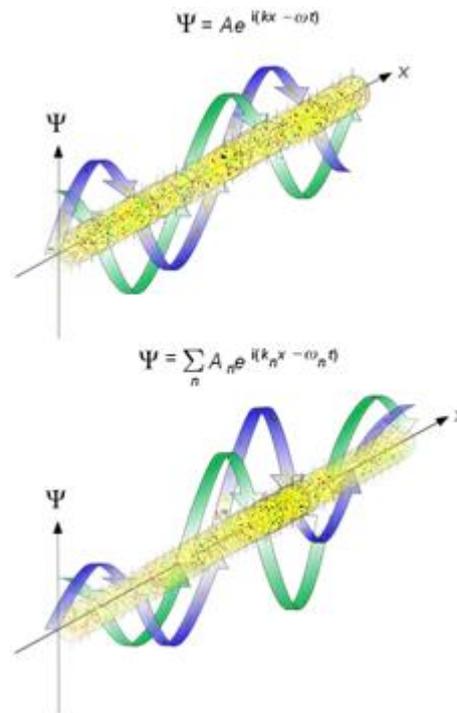
It goes like this:

- 1) $E = h\nu$
- 2) $E = mc^2$
- 3) $mc^2 = h\nu$
- 4) $E = mc^2 = h\nu$
- 5) $R \rightarrow E$, i. e., what manifests as energy is the flow of packages.
- 6) $R \rightarrow \Psi(t, x)$, i. e., what manifests as quanta is the flow of packages.
- 7) $R \rightarrow L$, i. e., what manifests as light is the flow of packages.
- 8) $R = E = aRb = arb = mc^2 = h\nu = a(\Psi(x, t) = p1 - n) b$.

What is energy and what is equivalence?

Since we now have an alternative definition of both energy and equivalence, we cannot use the Planck constant. Energy is now defined as the flow of packages between **a** and **b**, i. e., $a(\Psi(x, t) = p1 - n) b$.

Then we get a new interpretation of this image and the de Broglie’s hypothesis.

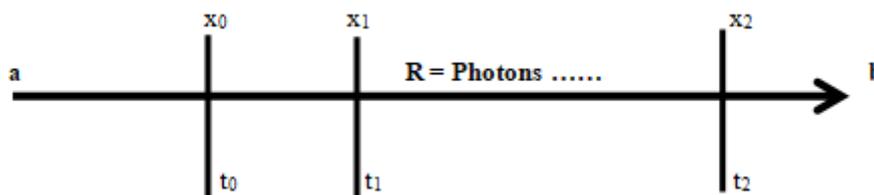


It is obvious that the flow of particles come from a source, i. e., **a** and then it moves to a certain point in nature, i. e., **b**, while de Broglie just want to find out how a particle at a given point x is spread out like a waveform.

De Broglie’s hypothesis can be studied theoretically and within laboratories, but then we miss how it really functions and behaves in nature itself.

As a consequence of $X = aRb$ the principle of uncertainty by Heisenberg is not certain, it is uncertain.

When light manifests as a beam of photons, we can measure a particle at two points x_1 and x_2 at two times, t_1 and t_2 , based on aRb :



Postulates:

- 1) The speed of light is 300.000m/s.
- 2) The distance between x_1 and x_2 is 10.000metres.
- 3) The speed of the particle is 300.000 m/s at x_1 and x_2 .
- 4) The positions of the particle are x_1 and x_2 at t_1 and t_2 .

Conclusion:

- 1) The times at x_1 and x_2 are respectively 10.00 and 10.00003.
- 2) The difference in time is 0, 00003s.
- 3) As the flow of packages between **a** and **b** is continuous, we might experience *Nature as determined*, based on the Principle of Relations, i. e., aRb , which is valid for the entire reality.

When we use the formula $X = aRb$, we get a new angle and perspective which open up an alternative interpretation of the fundamentals of the theoretical physics.

The Principle of Relations is complete and cover the entire reality

The concepts of Mass, Flow, Relation, Transformer and Shape, understand the entire reality. We need to find out how the masses of the systems and bodies **a** and **b** operate and function, i. e., how transformers transform masses to different shapes, within all parts and all fields of reality. In combination with these two new concepts, i. e., transformers and shape, science will be complete, covering the entire reality.

The Overall Equations

- 1) $X = aRb$
- 2) $X = a(\Psi(x, t) = p1 - n) b$
- 3) $G = a(\Psi(x, t) = p1 - n) b$
- 4) $E = a(\Psi(x, t) = p1 - n) b$

In each equation the content is different. This has been shown in the five books mentioned in references below. Each book deals with a different part of the reality, such as the physical reality, medical reality and societal reality; and how different flows of packages in that specific reality consist of masses which stand in relation with systems, then by Transformers, packages enter the pathway in order, and by the infrastructure they are organized and transformed into a new shape; a new entity occurs, e. g., cells, organs, humans, species, suns, planets and galaxies.

We can also notice that most established concepts have got new contents and new relations by $X = aRb$. As *Aristotle* material, formal, efficient and final; by *Newton* F, G, m1, m2, and r^2 ; by *Planck and Einstein* E, hv, W and KE; by *Einstein* energy, c^2 , inertial frame of reference and equivalence; by *de Broglie* h, vo, mo, and mc^2 .

Notes

- 1) Page 118, in the book *Out of my later years*, by Albert Einstein.1950.
- 2) Ibid. page65.
- 3) Thomas Nordström: *The Principle of Relations*, 2018. Cambridge Scholars Publishing. Thomas Nordström: *Reality and the Paradigm of Relations*, Nova Science Publishers, New York, 2021.
- 4) De Broglie L., "Waves and quanta" Nature.1923.
- 5) Thomas Nordström: *The theoretical foundation of medicine*, Nova Science Publishers, New York, 2022.
- 6) Thomas Nordström: *A World Government in Action: A new pragmatic ideology for global politics*. Cambridge Scholars Publishing, 2020.
- 7) Einstein, Annalen der Physik 17, 132, Photoelectric Effect.1905.
- 8) 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*.
- 9) Gottlob Frege: On Sense and Nominatum in The Philosophy of Language, by A. P. Martinich, pages 217 -229.
- 10) Ibid. page228.
- 11) Hubble catches a black hole creating new stars |Astronomy.com
- 12) <https://www.jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/>
- 13) <https://www.jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/>
- 14) De Broglie L., "Waves and quanta" Nature.1923.

References

- [1] Albert Einstein: *Out of My Later Years*.1950.
- [2] Thomas Nordström: *The Principle of Relations*, 2018.

Cambridge Scholars Publishing.

- [3] Thomas Nordström: *Reality and the Paradigm of Relations*, Nova Science Publishers, New York, 2021.
- [4] Thomas Nordström: *The theoretical foundation of medicine*, Nova Science Publishers, New York, 2022.
- [5] Thomas Nordström: *A World Government in Action: A new pragmatic ideology for global politics*. Cambridge Scholars Publishing, 2020.
- [6] Thomas Nordström: *The Theoretical Foundation of Physical Reality*, author HOUSE, 2020.