Beyond the theories

Natural solutions for fundamental physical processes

Abstract

The question is whether the existing theories of physics already provide the best understanding of nature or whether there are still undiscovered foundations to be found. This paper provides evidence that an unknown, deeper level exists in nature. Based on existing knowledge and creative thinking, these previously undiscovered foundations of physics are derived.

Twenty-three indications are presented that point to a medium with extraordinary properties as a natural and plausible solution for fundamental physical phenomena. Subsequently, the properties of this suspected and hitherto undiscovered medium are mathematically derived from hitherto unknown properties of electricity.

Based on a definition of the elementary charge with the basic unit's meter, kilogram and second, natural properties of the field constants result. This surprising finding shows that permittivity is the hidden inverse of pressure, and that permeability manifests itself as density.

By combining the gravitational constant and the new permittivity, an understanding of the acceleration properties of space was gained. This insight could be confirmed by a precise interpretation of Newtonian mechanics as well as an in-depth analysis of the classical gravitational formula.

Subsequently, the solutions and illustrative ways of looking at the above twenty-three indications are provided. Although the explanations do not formally conform to conventional academic standards, the core message is revolutionary. The results do not pose a threat to existing theories but lay a fundamental foundation for understanding mainstream theories.

The locations of dark energy and dark matter become clear, suggesting that the use of dark energy could help solve the world's energy shortage problem in the future.

Particularly noteworthy is the long-awaited unification of the fundamental forces, which is achieved in this work not by a conventional mathematical formula but by a common basis.

This discovery represents a quantum leap and brings with it a paradigm shift that will have a major impact on worldview, understanding of the universe, and physics.

Read on only if you are willing to question centuries-old theories and are interested in new, natural truths.

1 Twenty-three inconsistencies of physics pointing to a medium

There are numerous inconsistencies in the state of the teaching of physics that indicate that there must be a previously undiscovered natural basis in physics. Considered with clear common sense, simple and superficial analyses point logically to the existence of a still unknown partner with strong properties. This should be something remarkably close to the forbidden ether.

1.1 The constancy of the light speed

The speed of light is constant, independent of the state of motion of the light source. The mechanism by which the "delivery speed" in an empty space does not add to the speed of light collides with logic is inexplicable. A logical explanation would be that the light moves in a medium that determines the speed of light by pressure and density.

1.2 Light as a wave

Light is usually described as a wave, but there is a clear inconsistency: each wave is merely a generic term for a resonance process that results from the interaction of pressure and density. The speed of light is determined by the square root of (reciprocal of permeability divided by permittivity). This suggests that the reciprocal of permittivity and permeability could be hidden pressure and density properties of a medium.

$$v\_x := \sqrt{\frac{\text{Druck}}{\text{Dichte}}} \qquad \sqrt{\frac{\frac{1}{\text{Permittivität}}}{\text{Permeabilität}}} = 2.998 \times 10^8 \frac{\text{m}}{\text{s}}$$

1.3 The properties of the mass

Mass is the basis of all our existence. The mass is omnipresent and powerful and has incredibly many properties. However, it is also a fact that mass represents less than a breath within the volume (space occupation approximately 10^{-18}). It is common knowledge that a helium atom the size of a soccer stadium would have a nucleus the size of a grain of rice. It is philosophically and technically impossible how an atom as nothing in space can possess these immense and manifold properties. There must be an invisible but powerful partner in the form of a medium.

1.4 The definition of mass

Mass is defined by the ratio of force and acceleration: Mass = Force/Acceleration. It is interesting that the mass thus has no definition at standstill (acceleration equals zero). Logically would be that the mass has also at zero acceleration an all-sided force due to a medium, this force, however, since all-sided equal, is invisible to us.

1.5 Force due to the acceleration of a mass

An accelerated mass exerts a counterforce on the "accelerator". However, there is a discrepancy with an old physical law, the "action = reaction" principle. The action represents the acting force, but there appears to be a superfluous reaction because the reaction consists of acceleration **and** counterforce. There must be an unknown partner in the form of a medium with properties responsible for the second reaction.

1.6 The kinetic energy of the mass

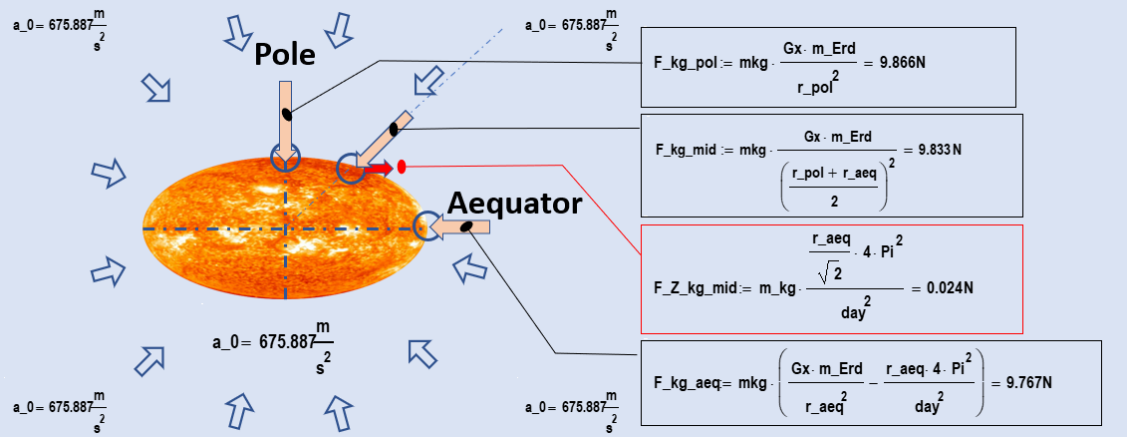
A mass with velocity is assigned a kinetic energy using the familiar formula. Where is this energy stored, and how does the process work? The momentum of the mass is action, and energy is reaction. Action and reaction cannot be identical on the same object. A velocity as such cannot have energy. Energy is the result of force times displacement. The only plausible explanation for this process is the existence of a medium that can absorb and release energy.

1.7 The relativistic mass

According to this theory, the mass of an object increases at extremely high speed. This raises some questions: If mass is considered as matter, an increase in matter is impossible (because this would mean the creation of atoms). Likewise, an increase in property energy ($E=mc^2$) is impossible, as this would break the energy balance. However, it is true that at high speed, the force for acceleration increases. An obvious explanation for this phenomenon is the occurrence of a dynamic pressure in a medium whose transfer speed is limited to the speed of light.

1.8 The spherical shape of the earth

The spherical shape of the earth is explained by the mutual attraction of masses. However, neither philosophically nor technically, this explanation is tenable. It is impossible that the mass in the gaseous and later liquid state can form as an ellipsoid in the present form due to the centrifugal force. The concept of mutual attraction of masses results in a higher force at the pole **F_kg_pol** to the center than at the equator **F_kg_aeq**. Because the centrifugal force **F_Z_kg_mid** at the point **F_kg_mid** additional mass moves to the pole. The mechanism is self-reinforcing, and the masses evaporate as a flat disk due to the centrifugal force.



The only logical explanation for the occurrence of the ellipsoid in the present form is the presence of a medium with pressure and density. The shape has been created by the usual optimization of the surface of two media with different energy densities.

1.9 The forces of attraction in the atomic model

In all models of the structure of the atoms, the "attraction force" is needed to explain the functioning. This well-known and accepted "attraction force" is observable but exactly mystical (mysterious, unfathomable, inexplicable, transcendent, the explanation is hidden). This force is supposed to run toward infinity at the smallest distance? Infinite "attraction" on smallest space is infinitely nonsensical! Everything points to the fact that a medium with pressure and density exists and that the electrons move in this pressure field according to the probability on the paths.

1.10 The infinite forces that hold the atomic nucleus together

In all models of the atomic nucleus, the strong nuclear force, which is responsible for the cohesion of the nucleons (protons and neutrons), is described as infinitely strong. In quantum mechanics, gluons take over this gigantic task and are responsible for the strong "adhesive force" with which the protons and neutrons are supposed to be glued together. Nothing against theories and models, but infinitely large "sticking together forces" on tiny space cannot be real. This must be a pressure force in a medium from the outside (the "repulsion force disappears if no more medium is between the protons).

1.11 The definition of the current

Electricity is ubiquitous and is measured in amperes. However, the question, what exactly the current is and how these attraction and repulsion forces work over distances, nobody knows. Strictly speaking, the current has always been defined abstractly with itself only by two of its effects[1]. The only reasonable and real interpretation of the field pictures of the current around the conductor suggests that this must be a mass flow in a medium invisible to us.

1.12 The Bohr magneton

The Bohr magneton represents an essential key to understanding the processes in the atomic model. The definition with $9.274010 \cdot 10^{-24}$ J/T refers to the abstract ampere and is therefore understandable only in the abstract world of theory. A natural definition of this key to the understanding of the atom results if it is considered in connection with a medium.

1.13 The field constants

The known field constants of the vacuum (permeability and permittivity) represent the properties of space. The two properties determine the speed of light but refer to amperes squared and are therefore hidden and not obvious. Energy transfer in a gas is by pressure and density. There must be a medium with unknown pressure and density, which determines the speed of light.

$$\text{Permittivität} := \text{eps0} = 8.854 \times 10^{-12} \frac{A^2 \cdot s^4}{kg \cdot m^3} \qquad \text{Permeabilität} := \text{mu0} = 1.257 \times 10^{-6} \frac{kg \cdot m}{A^2 \cdot s^2}$$

$$c\_x := \sqrt{\frac{1}{\text{Permittivität}}} = 2.998 \times 10^8 \frac{m}{s} \qquad c\_y := \sqrt{\frac{P0}{rho\_0}} = 2.998 \times 10^8 \frac{m}{s}$$

1.14 Gravity

The masses exert mutual “attractive forces” on each other, and the formula for this is well known. Real philosophically, for every pulling force, an object is needed that can absorb the pulling force. A real local force requires a real local cause. It is incomprehensible that in today's enlightened world, we are satisfied with the abstract curvature of space. This must be a real, local force, which arises as a result of mutual shielding of the masses in a medium with pressure and density.

1.15 The absurd difference between gravity and gravitation

Gravity, according to current theory, is caused by the mass of objects, while gravitation is explained by the curvature of space-time. Why this difference? It is one and the same thing. Both must be the consequence of the acceleration-content change of the surrounding medium. Each existing mass (each atom) exerts an influence on the surrounding medium. At a short distance, the influence is large (gravity); at a large distance, the influence is small (gravitation).

1.16 Dark matter and dark energy

Known and accepted is the existence of “dark matter” and “dark energy”. It is assumed that this energy makes up almost 70 percent (68.3 percent). The question of where this energy is stored and where and I which form the mass should be in the space is unknown. Why is this immense mass nowhere visible? The only possible logical explanation for the energy is a medium with an immense pressure, and for the dark mass, the density of the same medium.

[1] Here lies the hidden key. The definition of the current with the units kg, m, s gives the explicit solution for the forces and surprisingly also defines the space constants.

1.17 Einstein's E = m*c²

The formula for the equivalence of mass and energy is well known. However, the question of where the energy comes from, how it is stored and how the process exactly works has not yet been completely clarified[2]. The only logical explanation goes to the fact that the mass possesses not only energy but also impulse. This impulse is stored in the surrounding medium and appears as energy if the mass is destroyed.

1.18 The magnetic forces

The forces due to magnetic fields both from permanent magnets and due to current are defined by the field equations. However, the exact mechanism of how and why this works is not recognized. Moreover, the same is true here: “attractive forces” without something concrete to absorb the force cannot be plausibly explained. The only reasonable and real interpretation of the field images of the magnetic forces suggests that this must be a flux invisible to us. Thus, all forces would be explained by real forces due to mass flow in a medium.

1.19 The electrostatic forces

The forces between charges are simply defined. Unequal charges attract each other, and equal charges repel each other. Foremost, there is no such thing as long-distance forces ("forces of attraction"); there are only local forces. The observation cannot be doubted; however, a logical conclusion proposes itself with a careful observation of the lightning: In the case of a direct attraction without the presence of properties of the environment, the lightning would necessarily follow a direct path from A to B. However, it is evident that the lightning (the current) seeks the path of least resistance due to environmental properties. The logical explanation is that there must be a medium with properties.

1.20 The temperature in Kelvin

For a long time, the temperature scale in Celsius was defined by the freezing point and the boiling point of water. Since 2019, Kelvin has been defined by the Boltzmann constant, which corresponds to a concrete amount of energy. However, the definition is not yet complete. It is not known to what (to which object) this amount of energy must be assigned. The temperature of the earth comes from the sun. There is a strong hint to a medium. Where is the energy during the eight minutes until the rays from the sun arrive at the earth? It needs a medium that can take up this energy during this time, transport it and deliver it again.

1.21 The temperature of the space

The general knowledge about the background radiation in space says that there is thermal radiation coming from all directions of the space. It originated shortly after the Big Bang and is a remnant of the hot initial phase of the universe. The background radiation has a temperature of approximately 2.7 Kelvin (-270.45 degrees Celsius) and is called the "cosmic microwave background radiation." Nothing can have no temperature! Temperature is energy and where energy is, nothing cannot be. The only possible solution for this contradiction is the existence of a medium with a temperature of approximately 2.7 Kelvin.

[2] Where the energy comes from, there must be other energy that can be harnessed in a less brute way than by mass destruction. It should therefore be a top priority research project to find an explanation of where the energy originally comes from, where it is stored before mass destruction, and how this process works.

1.22 The empty space

The concept of empty space is held remarkably high as a dogma. Interestingly, however, not consistently. At the moment, where properties are assigned to the space, among other things the temperature and impedance of the vacuum, the clean logic is violated because **"nothing"** can have no properties. Recently, the Higgs particle was made responsible for gravity. However, if these Higgs particles are present in the space, then the space is no longer empty. These are confirmed views that are inconsistent. With the existence of a medium, they can be brought into agreement.

1.23 The environmental conditions of the black holes

Black holes are astrophysical objects of enormous density because the mass (atomic structure) is destroyed and the components of the mass are compressed to a tiny space, which leads to an enormous density. The gravitational force around the black hole is said to be infinite, so nothing can escape. According to Hawking, black holes should nevertheless lose energy over time, radiating particles. The whole thing looks like helpless explanations with exceptions that violate the basic principle. Furthermore, there, at a closer look, everything points to an existing medium with pressure properties. Therefore, all speculated and impossible properties would be brought to an understandable and bearable measure.

2 The logical derivation of the space pressure via the definition of the current

The preceding considerations are all nicely logical but are worth nothing without the derivation and justification of a medium. This is primarily important because until today, the proof of a medium has not succeeded, and science assumes an empty space. To this end, there is to say the following: If something cannot be proved, this is never proof that something does not exist. Moreover, it is impossible to prove something if one is part of this something and is subject to this something. The proof of a medium within the same medium is as impossible as the construction of a perpetuum mobile. Interestingly, however, the properties of the medium can be deduced by careful analysis of the current.

2.1 The historical definition of the current

Historically, the current was and is always defined only by two effects with itself. With the definition of 1948**,** with a force of **$2\text{-}10^{-7}$ N** between two one meter long conductors at a distance of one meter, the occurring "current" was defined from it with one ampere = **1A.** *This defines an unknown cause (current) via a measurable effect (force) with a measurement, which in turn is another effect (magnetic field of the measuring device) of the same unknown cause (current).* The new definition of 2019 is not better, also there the current is defined abstractly with itself. This is an unsatisfactory situation that needs to be fixed. The current should also be definable by cause and effect.

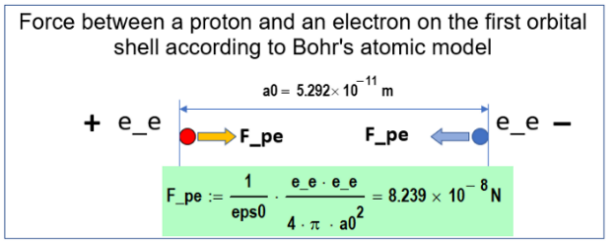
2.2 Mindsets

Thinking approach 1: The approach to the analysis of the current is based on the observation of an unsightliness in connection with the current: The flowing current (ampere) exerts a force on other current-carrying conductors. It follows that current * current = force. The current is amperes [A], and the force is newtons [kg*m/s^2]. It follows that: A^2 = [kg*m/s^2]? This discrepancy makes us think: Logically, the current would also have to be defined from a value with the units kg, m, s. Consequently, a natural definition of the elementary charge with kg, m, s should be derivable, which leads to a natural definition of the current.

Thinking approach 2: The vacuum has the properties of permeability, permittivity, and impedance. Strictly speaking, these values must represent the property of the space. However, the units of these properties are based on the abstract ampere, which makes the values inaccessible for a descriptive understanding. As soon as the definition of the elementary charge with the units kg, m, s is known, the field constants with natural units also become visible. By this transformation of the known properties of the vacuum, logically, the real space properties should appear as a result.

2.3 The approach for deriving the definition of the elementary charge with m, kg, s.

The point is to understand the current as cause and effect. This can only be done if a definition of the elementary charge with the natural basic units meter, kilogram, and second is found. Thus, the field constants without reference to **A²** with natural properties must become visible. This definition can be found with simple mathematical derivation and logic. The derivation is based on the formula for the force **F_pe** on the electron on the first orbit of the Bohr atomic model.



2.3.1 Derivation of the parameters of the static force between two charges

The aim of the following derivation is to define the elementary charge with the units meter, kilogram, and second. Thus, the goal is to derive a definition of the elementary charge independent of Coulomb. With the natural definition of the elementary charge, the new field constants should appear without reference to **A²**

The force on the electron in the first orbit of the Bohr atomic model is **F_pe.**

$$F\_pe := \frac{1}{eps0} \cdot \frac{e\_e \cdot e\_e}{a0^2 \cdot 4 \cdot \pi} = 8.239 \times 10^{-8}\,N$$

In equation **F_pe, eps0** is replaced by the expression **eps0_repl**, which with transformation (prefixing the charges) leads to **F_pe_b.**

$$eps0\_repl := \frac{1}{mu0 \cdot c^2} = 8.854 \times 10^{-12}\,\frac{A^2 \cdot s^4}{kg \cdot m^3} \qquad \frac{eps0\_repl}{eps0} = 1 \qquad F\_pe\_b := e\_e^2 \cdot mu0 \cdot c^2 \cdot \frac{1}{a0^2 \cdot 4 \cdot \pi} = 8.239 \times 10^{-8}\,N$$

The value for the two charges squared can be equivalently replaced by **e_e_quad_repl**, which gives **F_ep_c.**

$$e\_e^2 = 2.567 \times 10^{-38}\,C^2 \qquad e\_e\_quad\_repl := \frac{A^2 \cdot s^2}{N\_C^2} = 2.567 \times 10^{-38}\,C^2 \qquad F\_pe\_c := \frac{A^2 \cdot s^2}{N\_C^2} \cdot mu0 \cdot c^2 \cdot \frac{1}{a0^2 \cdot 4 \cdot \pi} = 8.239 \times 10^{-8}\,N$$

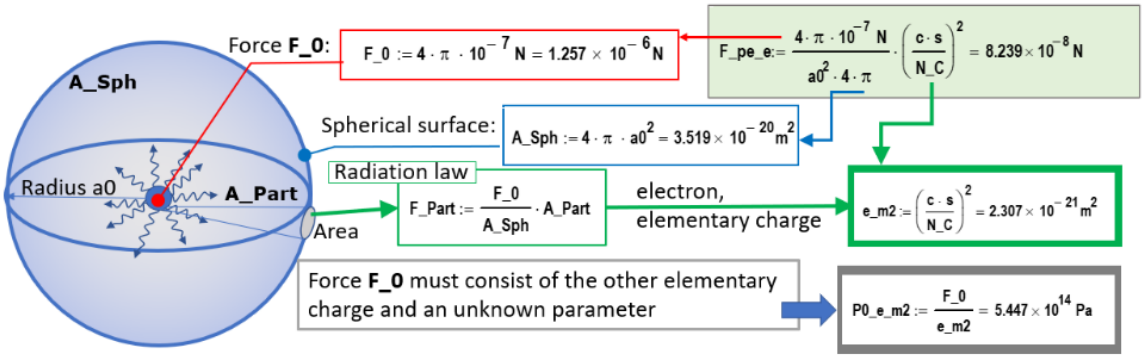
The equivalent substitution of the magnetic field constant **mu0** by the numerical definition value **mu0_repl** gives the unchanged result **F_ep_d**. The equation presented in this way still represents the original situation with the correct result. Thus, a first goal is attainable. The unit for Coulomb (**A∗s**) can be shortened.

$$mu0\_repl := 4 \cdot \pi \cdot 10^{-7} \cdot \frac{m \cdot kg}{A^2 \cdot s^2} \qquad \frac{mu0\_repl}{mu0} = 1 \qquad F\_pe\_d := \left(\frac{A^2 \cdot s^2}{N\_C^2}\right) \cdot \left(4 \cdot \pi \cdot 10^{-7}\,\frac{m \cdot kg}{A^2 \cdot s^2}\right) \cdot c^2 \cdot \frac{1}{a0^2 \cdot 4 \cdot \pi} = 8.239 \times 10^{-8}\,N$$

By deliberate simplification (leaving 4 pi, since this is the natural relation) and transformation of this equation, we obtain the result **F_ep_e.**

$$F\_pe\_e := \frac{4 \cdot \pi \cdot 10^{-7}\,N}{a0^2 \cdot 4 \cdot \pi} \cdot \left(\frac{c \cdot s}{N\_C}\right)^2 = 8.239 \times 10^{-8}\,N$$

From a distance, this equation is recognizable as a point-like emission on a surface. The basic force **F_0** radiates (shields) onto a spherical surface **A_Sph**. A part of the sphere surface **A_Part** experiences the corresponding force **F_Part.** Thus, the real properties of the electron are recognizable.



The real value for the electron with natural units results in **e_m2**. Logically (since the result is the force between two charges), the basic force **F_0** must come from another parameter and the counter charge (same quantity). This must result in exactly the second parameter by dividing the force **F_0** by the newly defined charge **e_m2.** The result shows a pressure **P0_e_m2**.

$$e\_m2 := \left(\frac{c \cdot s}{N\_C}\right)^2 = 2.307 \times 10^{-21}\,m^2 \qquad F\_0 := 2 \cdot \pi \cdot \left(2 \cdot 10^{-7}\,N\right) = 1.257 \times 10^{-6}\,N \qquad P0\_e\_m2 := \frac{F\_0}{e\_m2} = 5.447 \times 10^{14}\,Pa$$

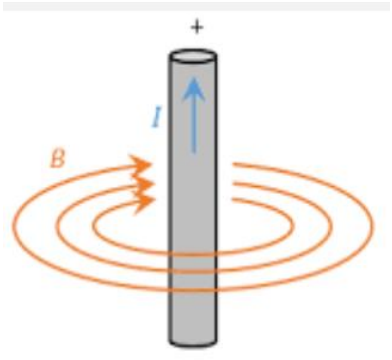
The conventional field constants defined with the elementary charge **e_e** result in **mu0**, **eps0**, and **Z0**. With the new value of the elementary charge **e_m2,** the natural field constants result in the form of a density **mu0_m2** and as reciprocals of a pressure **eps0_m2**. The impedance of the vacuum appears as a momentum density **Z0_m2**.

$$mu0 := \frac{\left(2 \cdot Pi \cdot 2 \cdot 10^{-7}\,N\right)}{\left(e\_e \cdot \frac{N\_C}{s}\right)^2} = 1.257 \times 10^{-6}\,\frac{m \cdot kg}{A^2 \cdot s^2} \qquad eps0 := \frac{1}{mu0 \cdot c^2} = 8.854 \times 10^{-12}\,\frac{A^2 \cdot s^4}{m^3 \cdot kg} \qquad Z0 := \sqrt{\frac{mu0}{eps0}} = 376.73\,\Omega$$

permeability of free space **permittivity of free space** **impedance of free space**

$$mu0\_m2 := \frac{\left(2 \cdot Pi \cdot 2 \cdot 10^{-7}\,N\right)}{\left(e\_m2 \cdot \frac{N\_C}{s}\right)^2} = 6.06 \times 10^{-3}\,\frac{kg}{m^3} \qquad eps0\_m2 := \frac{1}{mu0\_m2 \cdot c^2} = 1.836 \times 10^{-15}\,\frac{1}{Pa} \qquad Z0\_m2 := \sqrt{\frac{mu0\_m2}{eps0\_m2}} = 1.817 \times 10^{6}\,\frac{kg}{m^2 \cdot s}$$

2.4 Viewing the current in detail



This leads to a new explanation of the cause and effect of current and to new and logically explainable values for all quantities of electrical engineering. The mechanism of the current is as follows: In the conductor flows the current **A_m2** as a **cause** (a surface), the conductor is in the momentum environment **Z0_m2** and therefore around it arises the circular mass flow **A_kgs** as an **effect**. The value corresponds to the sum of the invisible mass accelerated around the current-carrying conductor. Current as the cause is therefore **A_m2,** and current as the effect is **A_kgs**. Consequently, current is a real and natural interaction of cause and effect. Therefore, the **effect** of elementary charge can be recognized as **e_kgs**.

$$A\_m2 := N\_C \cdot \frac{e\_m2}{s} = 0.014\,\frac{m^2}{s} \qquad Z0\_m2 = 1.817 \times 10^{6}\,\frac{kg}{m^2 \cdot s} \qquad A\_kgs := A\_m2 \cdot Z0\_m2 = 2.616 \times 10^{4}\,\frac{kg}{s^2} \qquad e\_kg := \frac{A\_kgs}{N\_C \cdot s^{-1}} = 4.192 \times 10^{-15}\,\frac{kg}{s}$$

An unresolved detail: How is it that the effect due to the cause is circularly perpendicular to the direction of motion of the electron?

2.5 The properties of the space

From the new values for permeability, permittivity and impedance, the properties of the space can be read. The pressure **P0** becomes visible via the reciprocal of the permittivity **eps0_m2.** The density **rho_0** corresponds directly to the value of permeability. Via the characteristic impedance **Z0_m2** of the vacuum **rho_I0** shows up as the momentum density. That the speed of light **c_x** appears with the correct value results from the derivation.

$$P0 := \frac{1}{eps0\_m2} = 5.447 \times 10^{14}\ Pa \qquad rho\_0 := mu0\_m2 = 6.06 \times 10^{-3}\ \frac{kg}{m^3} \qquad rho\_I0 := Z0\_m2 = 1.817 \times 10^{6}\ \frac{kg}{m^2 \cdot s} \qquad c\_x := \sqrt{\frac{P0}{rho\_0}} = 2.998 \times 10^{8}\ \frac{m}{s}$$

By equating the formula for gravitation with the formula for a pressure model, the unique value for the factor **K_Gx** (factor for converting mass to area) can be determined with the known pressure **P0,** with which mass can be converted into area in space.

$$Gx4Pi \cdot \frac{m\_So \cdot m\_Erd}{\left(4 \cdot \pi \cdot r\_SoEr^2\right)} = P0 \cdot \left[\frac{m\_So \cdot K\_Gx \cdot m\_Erd \cdot K\_Gx}{\left(4 \cdot \pi \cdot r\_SoEr^2\right)}\right] \Rightarrow Gx4Pi = P0 \cdot K\_Gx^2 \qquad K\_Gx := \sqrt{\frac{Gx4Pi}{P0}} = 1.241 \times 10^{-12}\ \frac{m^2}{kg}$$

By equating the formula for gravitation with the formula for an acceleration model, the unique value for the acceleration property of the space **a_0** can be determined with the known value for **K_Gx.**

$$Gx4Pi \cdot \frac{m\_So \cdot m\_Erd}{\left(4 \cdot \pi \cdot r\_SoEr^2\right)} = \left[\frac{a\_0 \cdot m\_So \cdot m\_Erd \cdot K\_Gx}{\left(4 \cdot \pi \cdot r\_SoEr^2\right)}\right] \Rightarrow Gx4Pi = a\_0 \cdot K\_Gx \qquad a\_0 := \frac{Gx4Pi}{K\_Gx} = 675.887\ \frac{m}{s^2}$$

The gravitational constant **Gx4Pi is** composed of the product of **K_Gx** and **a_0**, which is a great indication of the correctness of the reasoning.

$$\frac{Gx4Pi}{a\_0 \cdot K\_Gx} = 1$$

This looks compelling logical according to natural properties of the space in form of pressure, density, acceleration content and momentum density. Whether this is called vacuum, ether, space medium, space gas or whatever.

The new knowledge about the properties of space provides all the necessary parameters to find natural and descriptive processes for all the fundamentals of physics.

3 The proof of the acceleration content of space

In the following, it is derived in two ways that there is an acceleration content in the space. This indicates that gravitation is a consequence of the small difference in the acceleration content of the space on both sides of the mass. This acceleration reduction (difference) on the inner side arises by shielding from the full space acceleration by the distant mass.

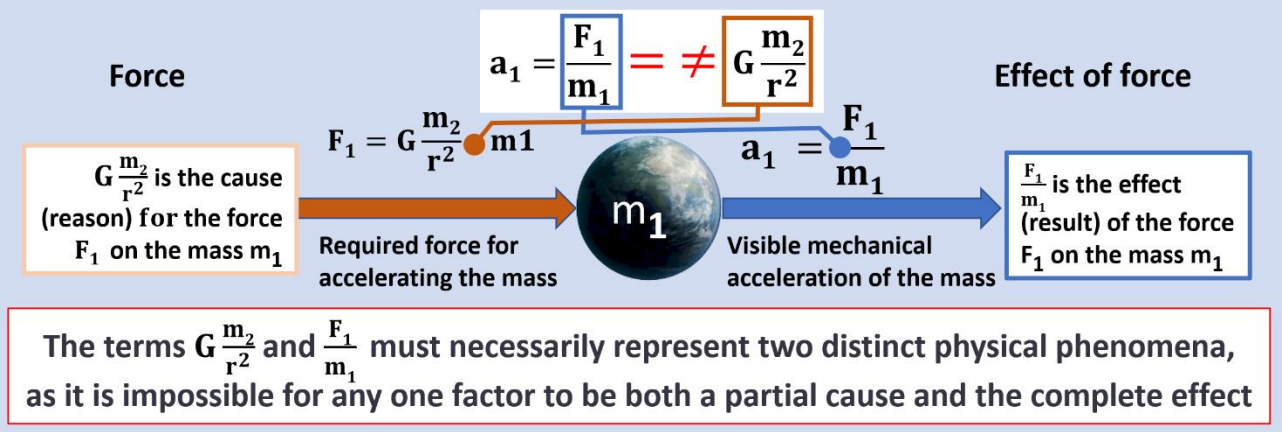
3.1 The centuries-old error in the foundations of Newtonian mechanics

In classical physics, the inertial mass and the heavy mass are equal, which is called the equivalence principle. In the following, an analysis of classical physics is carried out. In Newtonian mechanics on gravitation, the following formulas are found everywhere for the relationship between the accelerations $\mathbf{a_1}$ and $\mathbf{a_2}$ of two masses due to gravitation.

$$a_1 = \frac{F_1}{m_1} = G\frac{m_2}{r^2} \qquad a_2 = \frac{F_2}{m_2} = G\frac{m_1}{r^2}$$

In this case, the same two numerical values are erroneously both assigned to the visible acceleration of the mass. The interpretation of the value, which concerns the not visible acceleration, was missed. (Explanations only with $\mathbf{a_1}$ also apply to $\mathbf{a_2}$)

The two numerically equal accelerations from formulas $\frac{F_1}{m_1}$ and $G\frac{m_2}{r^2}$ are different physical phenomena.



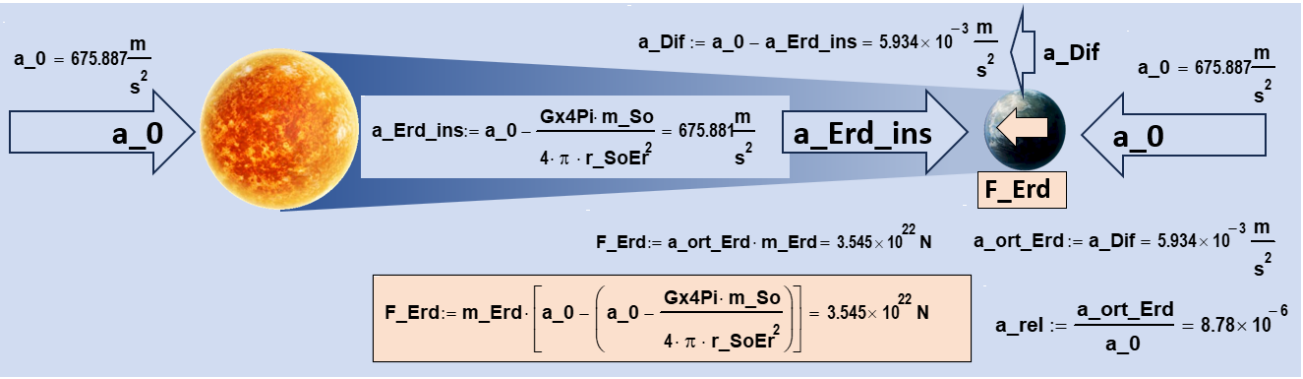
The principle of causality states that a cause must always occur in time before the effect and that there can be no effect in nature without a cause. Furthermore, the principle excludes that something can be cause and effect at the same time because this would be a contradiction. It is therefore logical that a part of the cause and the whole effect must represent two different physical forms and must not be equated. **The reverse conclusion necessarily states that the two terms** represented in the above context as part of the cause and as total effect **must be different physical processes**. This is based on the deepest basic laws of physics and logic and cannot be falsified with real arguments without questioning the basic physical laws.

The results of the two expressions for accelerations $\frac{F_1}{m_1}$ and $G\frac{m_2}{r^2}$ are numerically the same but still describe different physical processes. The expression $\frac{F_1}{m_1}$ is the visible acceleration of the mass, while $G\frac{m_2}{r^2}$ is the cause of the gravitational force (the acting acceleration property of space at the location of the mass).

This is proof that $G\frac{m_2}{r^2}$ is the property of space.

This must be inevitably the local property of the vacuum, a local acceleration difference, which acts on the local mass. This acceleration difference results from shielding by the distant mass.

The following graphic shows the numerical relations for the shielding of the sun on the earth and the resulting gravitational force on the earth. It is visible that the cause of the gravitational force **a_Dif** is a ridiculously small deviation **a_rel** from the general property of the space **a_0**.



3.2 Confirmation of this fact by the gravitational formula for the earth

There is a remarkably simple approach to the same thing. The conventional formula for gravitation, **F_So_Earth**[3], suggests that the force (result) results from Gx (factor) and the product of the masses (cause). However, if one realistically assumes that the force on the Earth must be a real and local force, the equation can be transformed into **F_loc_Earth = m_Earth * U_Var_Earth**. Thus, Local force = Mass *Environment variable. Therefore, according to the basic principles of evaluation of formulas in physics, the result corresponds to a property of space at the location of the Earth, namely, the acceleration **U_Var_Erd.**

$$F\_So\_Erd := Gx4Pi \cdot \frac{m\_So \cdot m\_Erd}{4 \cdot \pi \cdot r\_SoEr^2} = 3.545 \times 10^{22}\,N \qquad F\_loc\_Erd := m\_Erd \cdot \frac{Gx4Pi \cdot m\_So}{4 \cdot \pi \cdot r\_SoEr^2} = 3.545 \times 10^{22}\,N$$

F_So_Earth is the force (cause of acceleration)
U_Var_Earth is the cause of the force
a_Earth is the acceleration (effect)

$$U\_Var\_Erd := \frac{Gx4Pi \cdot m\_So}{4 \cdot \pi \cdot r\_SoEr^2} = 5.934 \times 10^{-3}\,\frac{m}{s^2}$$

$$a\_Erd := \frac{F\_So\_Erd}{m\_Erd} = 5.934 \times 10^{-3}\,\frac{m}{s^2}$$

$$F\_loc\_Erd := m\_Erd \cdot U\_Var\_Erd = 3.545 \times 10^{22}\,N$$

The ambient variable thus found is an invisible acceleration property of space at the location of the Earth, which is 100% consistent with the previous considerations. It is inconceivable in real terms how the Sun alone can directly generate these remote local properties (acceleration/pressure). There must be a third, invisible, everywhere present partner in which this acceleration or pressure difference is produced by the presence of the masses. With an acceleration content or pressure present everywhere (**a_0/P0**), gravity can be explained logically. The local force is generated by mutual shielding and the resulting acceleration difference **Δa_loc_Erd** or by pressure difference **ΔP_loc_Erd** at the location of the Earth. The relative difference to the environment is small. Because the absolute value of **a_0** or **P0** falls out with the calculation of gravity, this connection was so long invisible. This agrees 100% with the derivation of Newtonian mechanics.

$$\Delta a\_loc\_Erd := a\_0 - \left(a\_0 - \frac{Gx4Pi \cdot m\_So}{4 \cdot \pi \cdot r\_SoEr^2}\right) = 5.934 \times 10^{-3}\,\frac{m}{s^2} \qquad F\_Erd\_a\_0 := \Delta a\_loc\_Erd \cdot m\_Erd = 3.545 \times 10^{22}\,N \qquad \frac{a\_0}{\Delta a\_loc\_Erd} = 1.139 \times 10^{5}$$

$$\Delta P\_loc\_Erd := P0 - \left(P0 - \frac{Gx4Pi \cdot m\_So}{K\_Gx \cdot 4 \cdot \pi \cdot r\_SoEr^2}\right) = 4.782 \times 10^{9}\,Pa \qquad F\_Erd\_P0 := \Delta P\_loc\_Erd \cdot m\_Erd \cdot K\_Gx = 3.545 \times 10^{22}\,N \qquad \frac{P0}{\Delta P\_loc\_Erd} = 1.139 \times 10^{5}$$

The natural explanation for this acceleration in space is the presence of a medium with pressure and density that behaves like an ideal gas.

4 The properties of a possible medium

All previous considerations and properties point to a medium in the form of an ideal gas.

4.1 Mass and velocity of the smallest particle

What could be the mass of the "smallest particle" and its velocity? In a new attempt to solve this question, simple clues have been found in the kinetic theory of gases.
https://de.wikipedia.org/wiki/Maxwell-Boltzmann-Verteilung

$$pV = \frac{1}{3}Nm\overline{v^2} \qquad \frac{1}{3}Nm\overline{v^2} = Nk_{\mathrm{B}}T$$

[3] The gravitational constant is extended by 4 pi to the natural value.

4.1.1 Particle velocity

The mean square velocity can be determined from the first equation. The pressure **P0** is known. The volume is assumed to be **Volm3.** The mass **m0x** and the number of particles **Nx** can be replaced by **rho_0**, and the solution for **v_v0** shows a value greater than the speed of light by the square root of three! "Impossible?" No, the value is consistent with the kinetic theory of gases, and in any medium, the particle velocity is always greater than the linear energy transfer velocity.

$$P0 = 5.447 \times 10^{14}\,Pa \qquad Volm3 := 1m^3 \qquad m0x := \frac{u}{10^6} = 1.661 \times 10^{-33}\,kg \qquad rho\_0 = 6.06 \times 10^{-3}\,\frac{kg}{m^3} \qquad Nx := \frac{rho\_0 \cdot Volm3}{m0x} = 3.65 \times 10^{30}$$

$$P0 \cdot Vol = \frac{1}{3} \cdot Nx \cdot m0x \cdot v\_m0^2 \qquad v\_m0 := \sqrt{\frac{3(P0 \cdot Volm3)}{\left(\frac{rho\_0 \cdot Volm3}{m0} \cdot m0\right)}} = 5.193 \times 10^8\,\frac{m}{s} \qquad v\_m0 := \sqrt{\frac{3P0}{rho\_0}} = 5.193 \times 10^8\,\frac{m}{s} \qquad \frac{v\_m0}{c} = 1.732$$

4.1.2 Particle mass

The mass **m0 of** the smallest particle can be determined from the second equation by the temperature of the space **T_space.**

$$\frac{1}{3} \cdot Nx \cdot m0 \cdot v\_m0^2 = Nx \cdot k\_B \cdot T\_space \qquad T\_space := 2.732 \cdot K$$

$$m0 := \frac{3 \cdot k\_B \cdot T\_space}{v\_m0^2} = 4.197 \times 10^{-40}\,kg$$

4.2 Conclusion

Thus, a homogeneous picture of a medium in the form of an ideal gas emerges that can serve as the sought-after partner to the natural solution to the twenty-three questions raised in Chapter 1.

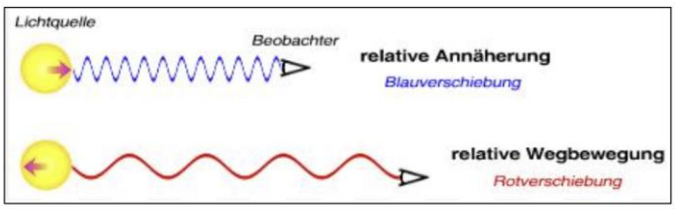
5 The solutions to the twenty-three inconsistencies of physics

5.1 The constancy of the light speed

The constancy of the speed of light independent of the state of motion of the light source is logical and solved with the existence of a medium. The light is transferred to a medium, and from this moment on, only the properties of the medium are decisive for the velocity. As with sound, any additional (or reduced) energy due to moving emitters is absorbed into a change in wavelength. This results in the well-known shift of the wavelength toward red or blue. Looked at in this way, the properties of light can practically be seen as proof that space is not empty but must consist of a medium with pressure and density.

$$c\_konv := \sqrt{\frac{1}{\frac{mu0}{eps0}}} = 2.998 \times 10^8\,\frac{m}{s}$$

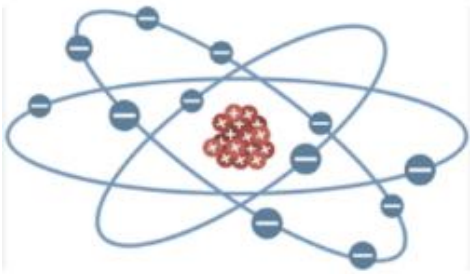
$$c\_P0 := \sqrt{\frac{P0}{rho\_0}} = 2.998 \times 10^8\,\frac{m}{s}$$



5.2 Light as a wave

The medium allows the mutual interaction of kinetic energy and potential energy, which is the basic requirement for any wave. The resonance conditions are the root of pressure and density. With the proposed properties of space in terms of pressure and density, this medium is available for resonance, and the energy transfer speed is the speed of light.

5.3 The properties of the mass



The presence of a strong environment with properties explains why mass (a puff of nothing in space) can have so many visible strong properties. With the factor **K_Gx** derived from the gravitational constant and the pressure, one kilogram of mass in space represents an all-sided area of **A_kg**, which is a very small area. With this small area and the pressure **P0, an all-sided** force **F_all** appears. This force is invisible because it is equal on all sides. The same all-sided force **F_all_b** appears with the acceleration property of the space **a_0** (ambient variable).

$K\_Gx = 1.241 \times 10^{-12} \frac{m^2}{kg}$ $A\_kg := mkg \cdot K\_Gx = 1.241 \times 10^{-12} m^2$ $F\_all := K\_Gx \cdot P0 \cdot mkg = 675.887\,N$ $a\_0 = 675.887 \frac{m}{s^2}$ $F\_all\_b := mkg \cdot a\_0 = 675.887\,N$

A plausibility check for the value of the area: To obtain the coincident projected area of a sphere **A_kg**, the density of the collapsed mass would have to result in **rho_00.** This density agrees approximately with the values for collapsed mass found on the Internet.

$$rho\_00 := \frac{mkg}{\left(\sqrt{\frac{A\_kg}{Pi}}\right)^3} \cdot \frac{3}{4 \cdot \pi} = 9.617 \times 10^{17} \frac{kg}{m^3}$$

5.4 The definition of mass

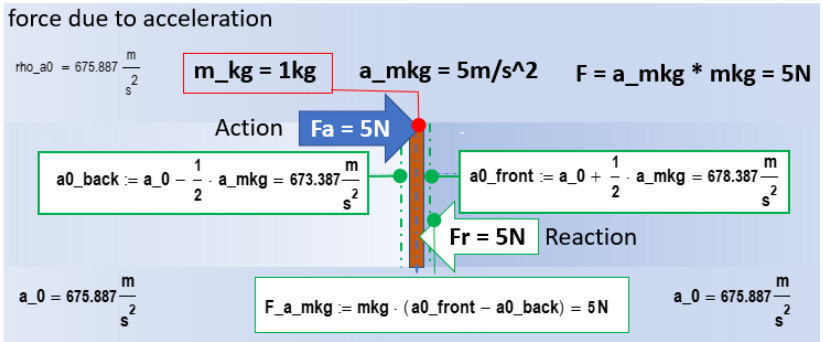
With the presence of a medium, it becomes logically and vividly visible that the mass also has a definition in the standstill (acceleration equals zero). Strictly speaking, the kilogram mass would have to be defined with the all-sided force of **F_all** or by the area **A_kg.** However, both are senseless definitions since they are invisible and not comprehensible. Thus, the definition of the mass by the measurable relation of force and acceleration is the only possible and correct solution.

$F\_all := mkg \cdot a\_0 = 675.887\,N$ $A\_kg := mkg \cdot K\_Gx = 1.241 \times 10^{-12} m^2$

5.5 Force due to the acceleration of a mass

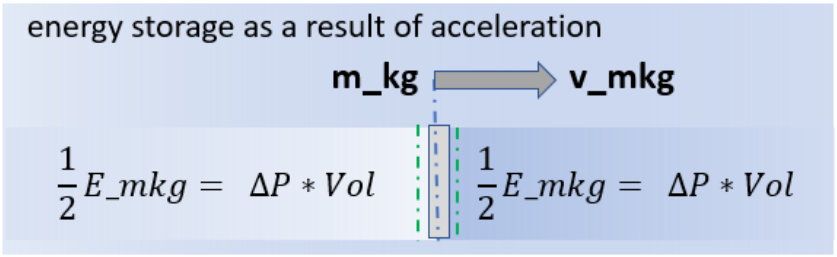
The existence of a strong environment with properties explains logically and vividly why this force arises. This property of the mass must be a passive reaction of the mass due to the properties of the space. The mass accelerated in the space experiences the counterforce from the environment and transmits this passively as a reaction force against the applied force. Here is a visible, natural comparison: Imagine a massless, thin sheet metal plate standing in water at right angles to its surface and being accelerated. For acceleration, force must be applied. Nobody will claim that the counterforce is applied by the sheet metal plate. Analogously, the "acceleration force of the mass" is a pure reaction of the environment. Likewise, it is evident from this model that force must again be applied to stop the moving plate.

The force **Fa** due to acceleration **a_mkg** results because of the difference in the rear **a0_back** and front **a0_front** changed acceleration content of space.



5.6 The kinetic energy of the mass

With the presence of a medium, it becomes logically and vividly visible how energy is created and stored. For this purpose, again the comparison with the massless, thin sheet metal plate. For acceleration, force must be applied. This force, together with the distance, results in energy. The energy is not stored in the sheet metal plate but in the water in the direction of movement before and after the plate. The massless metal plate can have no energy but has only the visible impulse. Once accelerated, the sheet metal plate continues to move without force (consequently has the same force on both sides). To bring the sheet metal plate back to rest, the same amount of force is needed in the opposite direction. The kinetic energy does not follow from the speed! A closer analysis shows that both the velocity and the kinetic energy are two different consequences of the acceleration. The velocity **v_mkg** results from the integral of the acceleration **a_mkg** over time **ta,** and from this, the momentum **I_mkg** results. The energy **E_mkg,** however, results from the force times distance.



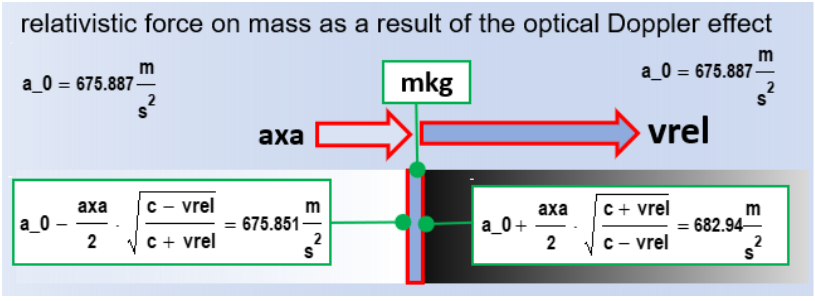
$a\_mkg := 5 \cdot \frac{m}{s^2}$ $ta := 10s$ $v\_mkg := \int_0^{ta} a\_mkg\, dt = 50\frac{m}{s}$ $I\_mkg := \int_0^{ta} a\_mkg \cdot m\_kg\, dt = 50\frac{m \cdot kg}{s}$

$Kraft := mkg \cdot a\_mkg = 5\,N$ $Weg := \frac{1}{2} \cdot a\_mkg \cdot ta^2 = 250\,m$ $E\_mkg := Kraft \cdot Weg = 1.25 \times 10^3\,J$ $E\_mkg := mkg \cdot \left(\frac{1}{2} \cdot a\_mkg^2 \cdot ta^2\right) = 1.25 \times 10^3\,J$

The visible momentum clearly belongs to the mass, while the energy is stored in space as pressure and density change.

5.7 The relativistic mass

The explanation of the relativistic mass with a medium is logical and easy to explain. This is a normal force due to the dynamic pressure in a medium whose energy transfer speed is limited to the speed of light. Using the numerical example, the conventional formula for relativistic mass gives a mass of **m_rel** at 99% speed of light. The force in front and behind at the mass results from collisions of the smallest mass of the medium (ideal gas) at the surface of the mass. As a result of the velocity, the frequency at the back **Fak_bac** and at the front **Fak_fro** changes at the mass according to the known formulas for the optical Doppler effect. The formula **F_delta_a** shows the force resulting at velocity **vrel** during acceleration with **axa**. That the mass also changes, according to **m_rel,** is a false conclusion, which is only due to the definition of mass with force at acceleration. What is certain is that the area represented by the mass does not change.
The presence of a medium provides the perfect explanation for the relativistic mass.



$axa := \frac{1m}{s^2}$ $vrel := 99\% \cdot c$ $m\_rel := \frac{mkg}{\sqrt{1 - \frac{vrel^2}{c^2}}} = 7.089\,kg$ $F\_delta\_a := mkg \cdot \left[a\_0 + \frac{axa}{2} \cdot \sqrt{\frac{c + vrel}{c - vrel}} - \left(a\_0 - \frac{axa}{2} \cdot \sqrt{\frac{c - vrel}{c + vrel}}\right)\right] = 7.089\,N$

Conversely, the confirmed observation of the relativistic force could be considered evidence for the presence of a medium.

5.8 The spherical shape of the earth

The existence of a medium with pressure supplies the perfect explanation for the spherical form (ellipsoid) of the earth. Due to the force applied from the outside because of the acceleration content of the space, an acting all-sided force on the mass of the earth results as a basis, which would lead to a perfect spherical shape without rotation. The momentum density of the mass is smaller than the momentum density of the space. This leads to the optimization of the surface to the ellipsoid like everywhere, where a denser medium encloses a less dense medium, (in absence of other forces). With these considerations, it should be possible for a mathematician to determine the environmental property **a_0,** which led exactly to the ellipsoid of the earth.

5.9 The forces of attraction in the atomic model

The presence of a medium provides the perfect explanation for the "force of attraction", which can now be explained logically, real and naturally with a pressure force. With the concept that the mass represents a surface in space, electrons and protons must also represent a surface in space, which experiences the corresponding collision force in the pressure field. This area can be calculated. The conventional formula for the "attraction force" on the first orbit of the Bohr atomic model is **F_ep_konv**. Analogously, the formula **F_ep_m2** with **e_m2** is used for the charge. From this, the area of the charge can be calculated with **e_m2.** The formula **F_ep_m2** shows the natural mechanism of the pressure force between protons and electrons on the first orbit of the Bohr atom model.

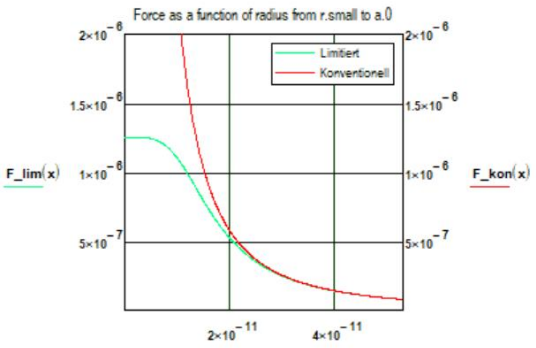
$$F\_ep\_konv := \frac{1}{eps0} \cdot \frac{e\_e \cdot e\_e}{4 \cdot Pi \cdot a0^2} = 8.239 \times 10^{-8}\,N \qquad F\_ep\_m2 := P0 \cdot \frac{e\_m2 \cdot e\_m2}{\left(4 \cdot Pi \cdot a0^2\right)} = 8.239 \times 10^{-8}\,N \qquad e\_m2 := \sqrt{F\_ep\_konv \cdot \frac{\left(4 \cdot Pi \cdot a0^2\right)}{P0}} = 2.307 \times 10^{-21}\,m^2$$

5.10 The finite forces that hold the atomic nucleus together

With the pressure **P0** in space, this question is solved. The components of the nucleus are held together with a pressure force. With the existence of a medium, overcoming the repulsion forces is also solved. The "repulsion forces" exist only as long as the medium exists between the two positively charged protons. As soon as there is no more medium between the protons, the local "repulsive force" of the protons disappears. After "merging" of the protons, only the external force exists because of the pressure. Now, the formula for the force needs an extension for small distances. The force cannot go to infinity according to the conventional formula but is limited to the value given from the space pressure. Below is the extended formula for the force near and at the surface **r_small** of the atomic nucleus. The deviation in the first orbit of the atomic model is very small, but near the nucleus, it deviates far from the conventional ideas. The force on the nucleus shows the expected value of **F_0**.

$$F\_kon(x) := \frac{1}{eps0\_m2} \cdot \left[\frac{(e\_m2 \cdot e\_m2}{\left[(x)^2 \cdot (4 \cdot \pi\right]}\right. \qquad F\_lim(x) := \frac{1}{eps0\_m2} \cdot \left[\frac{(e\_m2 \cdot e\_m2)}{\sqrt{(e\_m2)^2 + \left[(x)^2 \cdot (4 \cdot \pi)\right]}}\right] \qquad r\_small := \frac{1}{2} \cdot 10^{-15} \cdot m = 5 \times 10^{-16}\,m \qquad F\_0 = 1.257 \times 10^{-6}\,N$$

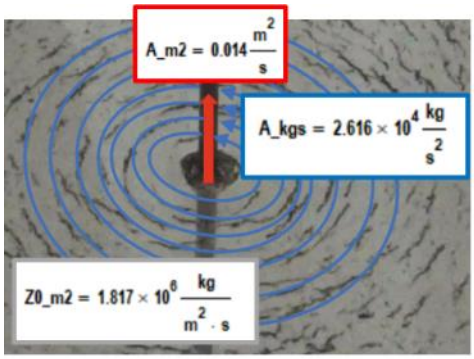
$$Fact(x) := \frac{F\_kon(x)}{F\_lim(x)}$$



force conventional	force limited	deviation
$F\_kon(r\_small) = 922.831\,N$	$F\_lim(r\_small) = 1.257 \times 10^{-6}\,N$	$Fact(r\_small) = 7.344 \times 10^{8}$
$F\_kon(1a0) = 8.239 \times 10^{-8}\,N$	$F\_lim(1a0) = 8.221 \times 10^{-8}\,N$	$Fact(1a0) = 1.002$
$F\_kon(4a0) = 5.149 \times 10^{-9}\,N$	$F\_lim(4a0) = 5.149 \times 10^{-9}\,N$	$Fact(4a0) = 1$
$F\_kon(9a0) = 1.017 \times 10^{-9}\,N$	$F\_lim(9a0) = 1.017 \times 10^{-9}\,N$	$Fact(9a0) = 1$
$F\_kon(16a0) = 3.218 \times 10^{-10}\,N$	$F\_lim(16a0) = 3.218 \times 10^{-10}\,N$	$Fact(16a0) = 1$
$F\_kon(25a0) = 1.318 \times 10^{-10}\,N$	$F\_lim(25a0) = 1.318 \times 10^{-10}\,N$	$Fact(25a0) = 1$

5.11 The definition of the current

The current (the ampere) as a cause can be defined as **A_m2**. The thus defined ampere as the cause produces an effect of **A_kgs** in the medium with an impulse density (impedance) of **Z0_m2**. Thus, the current is defined as a real cause and effect. The current as a cause is a moving and rotating surface in the conductor and produces the current as an effect in the form of a real circular mass flow around the conductor in the invisible medium. This agrees perfectly with all indirect observations.



$$A\_m2 := \frac{N\_C}{s} \cdot e\_m2 = 0.014\,\frac{m^2}{s} \qquad Z0\_m2 := \frac{P0}{c} = 1.817 \times 10^6\,\frac{kg}{m^2 \cdot s} \qquad A\_kgs := A\_m2 \cdot Z0\_m2 = 2.616 \times 10^4\,\frac{kg}{s^2}$$

5.11.1 The new units of electrical engineering

As a consequence of the new definition of the elementary charge (new definition of ampere), new units and new numerical values result for all physical quantities of electrical engineering. Of course, all previous field theories remain valid for electrical engineering and electrostatics. The difference from the definition via ampere results in the fact that a real background can be assigned to the fields. The thus far abstract fields now have real properties consisting of kg, m, and s. In the following, the new properties of some units of the conventionally defined units (*_k) are contrasted. The property of the units is represented either as a cause (*_m2) in the momentum environment or directly as an effect (*_kgs). On closer inspection, it becomes visible that the units obtain an understandable and plausible unity. First, the functional unit of resistance and conductance catches the eye. Likewise, the capacity becomes so nicely logical.

		abstract conventional	Cause in the impulse medium	Effect observed
Elemental charge:	$e\_e = 1.602 \times 10^{-19}\,C$	$C = 1A \cdot s$	$e\_m2 = 2.307 \times 10^{-21}\,m^2$	$e\_kgs = 4.192 \times 10^{-15}\,\frac{kg}{s}$
Charge:	$C\_ek := C = 1C$	$1C = 1A \cdot s$	$C\_em2 := N\_C \cdot e\_m2 = 0.014\,m^2$	$C\_kgs := N\_C \cdot e\_kgs = 2.616 \times 10^4\,\frac{kg}{s}$
Current:	$I\_k := \frac{C\_ek}{s} = 1A$	$1A = 1A$	$I\_m2 := \frac{C\_em2}{s} = 0.014\,\frac{m^2}{s}$	$I\_kgs := \frac{C\_kgs}{s} = 2.616 \times 10^4\,\frac{kg}{s^2}$
Tension:	$U\_k := \frac{W}{I\_k} = 1V$	$1V = 1\,\frac{m^2 \cdot kg}{A \cdot s^3}$	$U\_m2 := \frac{W}{I\_m2} = 69.446\,\frac{kg}{s^2}$	$U\_kgs := \frac{W}{I\_kgs} = 3.822 \times 10^{-5}\,\frac{m^2}{s}$
Resistance:	$R\_k := \frac{U\_k}{I\_k} = 1\Omega$	$1\Omega = 1\,\frac{m^2 \cdot kg}{A^2 \cdot s^3}$	$R\_m2 := \frac{U\_m2}{I\_m2} = 4.82 \times 10^3\,\frac{kg}{m^2 \cdot s}$	$R\_kgs := \frac{U\_kgs}{I\_kgs} = 1.46 \times 10^{-9}\,\frac{m^2 \cdot s}{kg}$
Conductance:	$G\_k := \frac{1}{R\_k} = 1\,\frac{1}{\Omega}$	$\frac{1}{\Omega} = 1\,\frac{A^2 \cdot s^3}{m^2 \cdot kg}$	$G\_m2 := \frac{1}{R\_m2} = 2.07 \times 10^{-4}\,\frac{m^2 \cdot s}{kg}$	$G\_kgs := \frac{1}{R\_kgs} = 6.84 \times 10^8\,\frac{kg}{m^2 \cdot s}$
Capacity:	$C\_k := \frac{C\_ek}{U\_k} = 1F$	$1F = 1\,\frac{A^2 \cdot s^4}{m^2 \cdot kg}$	$C_{m2} := \frac{C\_em2}{U\_m2} = 2.07 \times 10^{-4}\,\frac{m^2 \cdot s^2}{kg}$	$C_{kgs} := \frac{C\_kgs}{U\_kgs} = 6.84 \times 10^8\,\frac{kg}{m^2}$
magnetic flux:	$\Phi\_k := U\_k \cdot s = 1Wb$	$1Wb = 1\,\frac{m^2 \cdot kg}{A \cdot s^2}$	$\Phi\_m2 := U\_m2 \cdot s = 69.446\,\frac{kg}{s}$	$\Phi\_kgs := U\_kgs \cdot s = 3.82 \times 10^{-5}\,m^2$
magnetic flux density / Induction:	$B\_k := \frac{\Phi\_k}{m^2} = 1T$	$1T = 1\,\frac{kg}{A \cdot s^2}$	$B\_m2 := \frac{\Phi\_m2}{m^2} = 69.446\,\frac{kg}{m^2 \cdot s}$	$B_{kgs} := \frac{\Phi\_kgs}{m^2} = 3.822 \times 10^{-5}$

Inductance:	$L\_k := \frac{U\_k \cdot s}{I\_k} = 1\,H$	$1H = 1\frac{m^2 \cdot kg}{A^2 \cdot s^2}$	$L\_m2 := \frac{U\_m2 \cdot s}{I\_m2} = 4.82 \times 10^{3}\frac{kg}{m^2}$	$Lkgs := \frac{U\_kgs \cdot s}{I\_kgs} = 1.46 \times 10^{-9}\frac{m^2 \cdot s^2}{kg}$
magnetic field strength:	$H\_k := \frac{I\_k}{m} = 1\frac{A}{m}$	$\frac{1A}{m} = 1\frac{A}{m}$	$H\_m2 := \frac{I\_m2}{m} = 0.014\frac{m}{s}$	$H\_kgs := \frac{I\_kgs}{m} = 2.616 \times 10^{4}\,Pa$
Electric field strength:	$E\_k := \frac{N}{C} = 1\frac{m \cdot kg}{A \cdot s^3}$	$1\frac{V}{m} = 1\frac{m \cdot kg}{A \cdot s^3}$	$E\_m2 := \frac{N}{C\_em2} = 69.446\,Pa$	$E\_kgs := \frac{N}{C\_kgs} = 3.822 \times 10^{-5}\frac{m}{s}$

Some of these units become so obviously natural and understandable that this is a great indication that reality has been recognized.

5.12 The Bohr magneton

Because of the new definition of the elementary charge, the Bohr magneton conventionally determined by amperes obtains a real explicable value. The Bohr magneton is **muB.** With the elementary charge as effect **e_kgs,** the magneton becomes a pure energy **muB_kgs,** and with **e_m2** as the cause, the magneton becomes **muB_m2,** which is also an energy.

$$muB := \frac{e\_e \cdot h\_0}{2 \cdot m\_e \cdot (2\pi)} = 9.274 \times 10^{-24}\,A \cdot m^2 \qquad muB\_kgs := \frac{e\_kgs \cdot h\_0}{2 \cdot m\_e \cdot (2\pi)} = 2.426 \times 10^{-19}\,J \qquad muB\_m2 := \frac{e\_m2 \cdot h\_0}{2 \cdot m\_e \cdot (2\pi)} = 1.335 \times 10^{-25}\frac{m^4}{s}$$

For **muB_m2**, an explanation is visible: This is an empty volume **Vol_leer,** which moves with the speed of light, which is another form of energy. The empty volume with the space pressure **P0** coincides with the energy **E_Vol_empty.**

$$Vol\_leer := \frac{muB\_m2}{c} = 4.454 \times 10^{-34}\,m^3 \qquad E\_Vol\_leer := Vol\_leer \cdot P0 = 2.426 \times 10^{-19}\,J$$

From this, new insights for the functionality in connection with the spin of the electron can be clarified.

5.13 The field constants

Because of the new definition of the elementary charge **e_m2,** the known field constants of the vacuum (permeability, permittivity and impedance) also obtain a descriptive value based on the units kg, m, s. This now shows the natural values of the space constants.

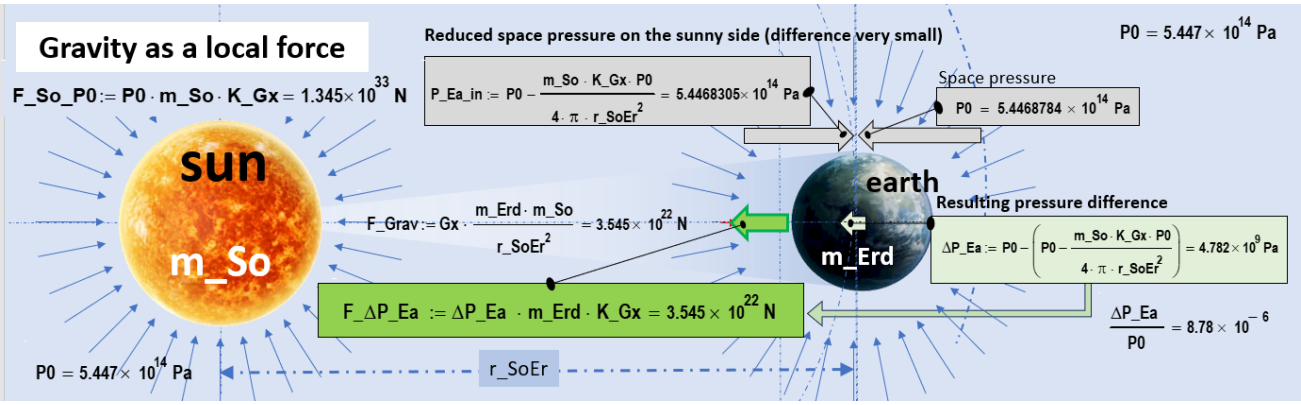
	permittivity:	**permeability:**	**impedance:**
e_e conventional:	$eps0 = 8.854 \times 10^{-12}\frac{s^4 \cdot A^2}{kg \cdot m^3}$	$mu0 = 1.257 \times 10^{-6}\frac{kg \cdot m}{s^2 \cdot A^2}$	$Z0 = 376.73\,\Omega$
e_m2 as cause:	$eps0\_m2 := eps0 \cdot \frac{e\_m2^2}{e\_e^2} = 1.836 \times 10^{-15}\frac{1}{Pa}$	$mu0\_m2 := mu0 \cdot \frac{e\_e^2}{e\_m2^2} = 6.06 \times 10^{-3}\frac{kg}{m^3}$	$Z0\_m2 := \frac{Z0 \cdot e\_e^2}{e\_m2^2} = 1.817 \times 10^{8}\frac{kg}{s \cdot m^2}$
e_kgs as effect:	$eps0\_kgs := eps0 \cdot \frac{e\_kgs^2}{e\_e^2} = 6.06 \times 10^{-3}\frac{kg}{m^3}$	$mu0\_kgs := mu0 \cdot \frac{e\_e^2}{e\_kgs^2} = 1.836 \times 10^{-15}\frac{1}{Pa}$	$Z0\_kgs := \frac{Z0 \cdot e\_e^2}{e\_kgs^2} = 5.504 \times 10^{-7}\frac{s \cdot m^2}{kg}$

Interestingly, the values as a consequence of the definition via the cause **e_m2** or via the effect **e_kgs** are exactly crossed identical, while the impedance from the point of view of the cause **Z0_m2** corresponds exactly to the reciprocal value from the point of view of the effect **Z0_kgs.**

5.14 Gravity

The gravitation can be explained with a normal radiation model. Following the detailed explanation of the gravitational force of the sun on the earth. The sun as a source of the force is in the general pressure field of **P0.** The numerical value **F_So_P0** shows the gigantic all-sided force of the source. This all-sided force holds the sun together and is responsible for the spherical shape.

In the direction of the earth, the pressure field is weakened inversely proportional to the spherical surface depending on the distance.
The Earth has pressure **P0** on the side away from the Sun**,** which together with the reduced pressure **P_ea_in** on the inner side results in a pressure difference of **ΔP_Ea**. It is noteworthy that the relative change is very small (approximately 10^{-7}). The visible force on the Earth results from the pressure difference **ΔP_Ea** (acceleration difference) on the two sides. The local force on the earth is thus **F_ΔP_Ea**. This agrees with the known value **F_Grav.**



5.15 The absurd difference between gravity and gravitation

The gravity on the surface of a mass (earth with **a_Earth_Surf**) is also explained with the above model. The formula is also valid for the value of the acceleration at the surface of every mass, as long as the mass has a "normal" density. With the same formula, the acceleration difference at the place of the sun can be calculated with **a_So**, which leads to the known gravitational force **F_Grav_So_Er.**

$a\_Erd\_Surf := \frac{a\_0 \cdot m\_Erd}{4 \cdot \pi \cdot r\_Erd^2} \cdot (K\_Gx) = 9.807 \frac{m}{s^2}$ $\quad F\_Erd\_Surf := a\_Erd\_Surf \cdot (mkg) = 9.807\,N$ $\quad a\_Erd\_Surf\_Internet := 9.81 \cdot \frac{m}{s^2}$ $\quad \frac{a\_Erd\_Surf}{a\_Erd\_Surf\_Internet} = 1$

$a\_So := \frac{a\_0 \cdot m\_Erd}{4 \cdot \pi \cdot r\_SoEr^2} \cdot (K\_Gx) = 1.781 \times 10^{-8} \frac{m}{s^2}$ $\quad F\_Grav\_So\_Er := a\_So \cdot m\_So = 3.545 \times 10^{22}\,N$ $\quad F\_Grav\_So\_Er\_Internet := 3.54 \cdot 10^{22} \cdot N$ $\quad \frac{F\_Grav\_So\_Er}{F\_Grav\_So\_Er\_Internet} = 1.001$

5.16 Dark matter and dark energy

With some logic analyzed, this energy would have to be invisible, evenly distributed in the space. Every other storage place of the mass (as concentration on a heap) or any other way would have been discovered long ago. With the now known space parameters, the storage place becomes visible. The dark energy is present in space in the form of pressure, and the dark mass is present in the form of density, which is perfectly consistent with logic. This opens new perspectives for high-yield energy sources.

5.17 Einstein's E = m*c²

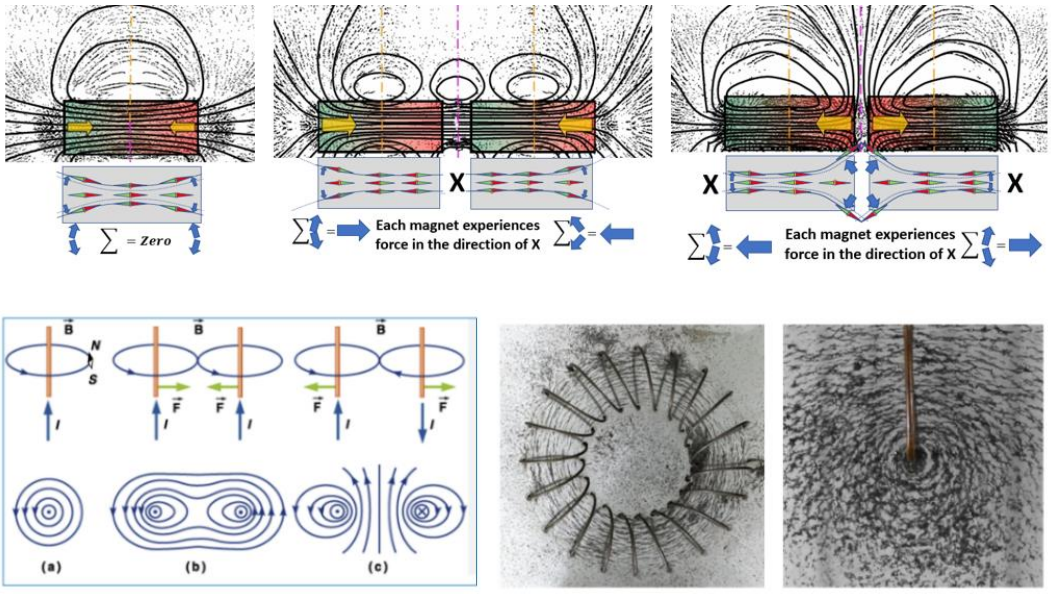
The question of where the energy comes from at the mass destruction is clarified with the new space parameters. The energy is stored in the space. Before the big bang, the components of the mass were concentrated in high density surrounded by a medium with the property impulse density. The "explosion" of the single components to the mass transferred the impulse to the space. The energy according to the famous formula of Einstein for one kilogram of mass is **E_mkg_E.** At a closer look considering the space with properties, the formula can be extended to **E_mkg_E_b,** without doubting the validity of the original formula. From this form, the momentum **I_mkg** of this energy can be calculated with a normal connection. This impulse was transferred at the birth of the mass (explosion, density change approx. 10^{17} -fold) to the environment (into the space) and appears today as impulse density **rho_I0.**

$E\_mkg\_E := mkg \cdot c^2 = 8.988 \times 10^{16}\,J$ $\quad E\_mkg\_E\_b := \frac{1}{2} mkg \cdot (c \cdot \sqrt{2})^2 = 8.988 \times 10^{16}\,J$ $\quad I\_mkg := \frac{2 \cdot E\_mkg}{(c \cdot \sqrt{2})} = 5.897 \times 10^{-6} \frac{m \cdot kg}{s}$ $\quad rho\_I0 = 1.817 \times 10^{6} \frac{kg}{m^2 \cdot s}$

5.18 The magnetic forces

The forces of magnetic fields both from permanent magnets and due to current are caused by real mass flows in the invisible medium. If one has gotten rid of the conviction that the space must be empty, all forces are documented by the known patterns of magnetic fields. Once accepted that the field lines represent a real mass flow, the forces are logically explainable by overpressure and underpressure. Any other view of the field lines made visible by iron powder is not justified. In particular, the forces within permanent magnets arise as follows: The force arises within the magnet as a result of the sum of the forces applied to deflect the dipoles. Consequently, the force **inside the magnets** results in the direction of the less deflected dipoles inside.

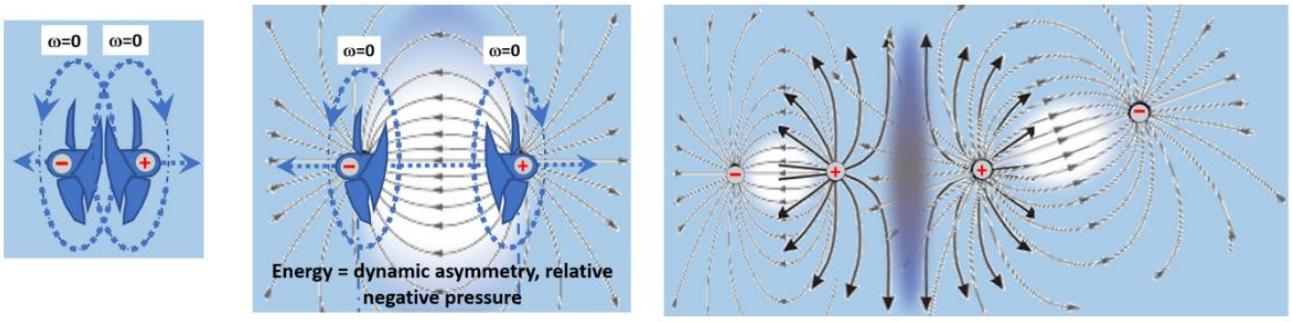
The flow images of the current also indicate a flow. This must be a flow of mass particles of the medium. Thus, the forces on the conductors arise just as with any flow as a result of local negative pressure or positive pressure.



5.19 The electrostatic forces

The explanation of electrostatic forces is less obvious, and the first access to it is through philosophy. In connection with the consideration of the processes concerning the electrostatics, something self-evident but forgotten and never mentioned must be accepted: All present observations and states are the sum of all processes since the beginning of the universe, since the second zero of the big bang.

The general description of the forces of the charges unequal "attracting" and equal "repelling" is a correct but inaccurate description. The "attraction" is the result of the fact that unequally named charges belong together and were separated at the big bang with force and way, thereby causing an asymmetrical field (energy) in the space that can be compensated only by the opposite movement of a charge again. The explanation of the "repulsion" of equal charges is then logically the effect that results if two incompatible fields are to be united. A primitive but descriptive model for this connection is visualized in the three following pictures.



5.20 The temperature in Kelvin

With the evaluation of the known connection from the kinetic theory of gases, the energy quantity of kelvin can be assigned. The correlation is shown in equation **(1)** with a different designation. Related to a single particle, this gives relation **(2)** related to a particle with a temperature change of one kelvin. Somewhat transformed the equation **(3)** appears. From this, the following can be seen: The amount of energy represented by **k_B** corresponds to two-thirds of the kinetic energy of a particle. Alternatively, the kinetic energy of a particle corresponds to one and a half times the temperature defined in Kelvin **(4)**.

$$\frac{1}{3}Nm\overline{v^2} = Nk_BT$$

$$\frac{1}{3}\cdot NT\cdot mx\cdot vx^2 = NT\cdot k\_B\cdot TK \quad (1) \qquad \frac{1}{3}\cdot mx\cdot vx^2 = k\_B\cdot 1 \quad (2) \qquad \frac{2}{3}\cdot\left(\frac{1}{2}\cdot mx\cdot vx^2\right) = k\_B \quad (3) \qquad \left(\frac{1}{2}\cdot mx\cdot vx^2\right) = \frac{3}{2}\cdot k\_B \quad (4)$$

Interestingly, this relation is also valid for the energy of the particles of the solids, as well as for the energy of the smallest particles in space.

5.21 The temperature of the space

If the space has a background radiation that has a temperature of approximately 2.7 Kelvin, so this is logically considered proof that the space is not empty because nothing can have no temperature. The previous realization of the assignment of the temperature to a particle shows that a particle of the space must have an energy of **E_part.** This must be the kinetic energy of a particle **m0_xx** according to the formula **E_part_kin**. The mean square velocity is calculated according to the kinetic theory of gases with **v_xx**, which leads to a particle mass of **m0_xx.** The transfer velocity corresponds to the usual ratio to the mean square velocity.

$$E\_part := 2.7\cdot K\cdot\left(\frac{3}{2}\cdot k\_B\right) = 5.592\times10^{-23}\,J \qquad E\_part\_kin = \frac{1}{2}\cdot m0\_xx\cdot v\_xx^2 \qquad v\_xx := \sqrt{\frac{3P0}{rho\_0}} = 5.193\times10^{8}\,\frac{m}{s} \qquad m0\_xx := \frac{2E\_part}{v\_xx^2} = 4.148\times10^{-40}\,kg \qquad \frac{v\_xx}{c\cdot\sqrt{3}} = 1$$

5.22 The empty space

The space does not appear empty but has the properties of an ideal gas. Pressure **P0**, density **rho_0** and momentum density **rho_I0** correspond to the previous properties of permeability, permittivity, and impedance. The space also has a basic acceleration content **a_0,** which can be calculated from the gravitational constant **Gx4Pi** extended by 4 Pi and **P0.** With it, most physical processes can be explained vividly.

$$P0 = 5.447\times10^{14}\,Pa \qquad rho\_0 = 6.06\times10^{-3}\,\frac{kg}{m^3} \qquad rho\_I0 = 1.817\times10^{6}\,\frac{kg}{m^2\cdot s} \qquad a\_0 := \sqrt{P0\cdot Gx4Pi} = 675.887\,\frac{m}{s^2}$$

5.23 The environmental conditions of the black holes

To speculate about black holes, a black hole with the mass of the sun and the density **rho_00** is assumed. This with an assumed density **rho_00** would consequently have a radius of **r_So_SL**. The conventional formula leads to an acceleration on the black hole of **a_So_SL_Surf.** This is consistent with the conventional expectation but is definitely wrong in a space with **a_0.** The complete formula **a_So_SL_Surf_b** shows the same wrong result, but the reason for the wrong result is obvious from it. The shielding **a_shil** cannot be larger than the acceleration **a_0.** This happens with **r_lim**; at this value, the shielding factor becomes one. This formula needs an extension for small distances and dense masses.

$$rho\_00 = 9.617\times10^{17}\,\frac{kg}{m^3} \qquad r\_So\_SL := \sqrt[3]{\frac{3}{4\cdot\pi}\cdot\frac{m\_So}{rho\_00}} = 7.905\times10^{3}\,m \qquad r\_lim := \sqrt{\frac{m\_So\cdot K\_Gx}{4\cdot\pi}} = 4.433\times10^{8}\,m \qquad \frac{m\_So\cdot K\_Gx}{4\cdot\pi\cdot(r\_lim)^2} = 1$$

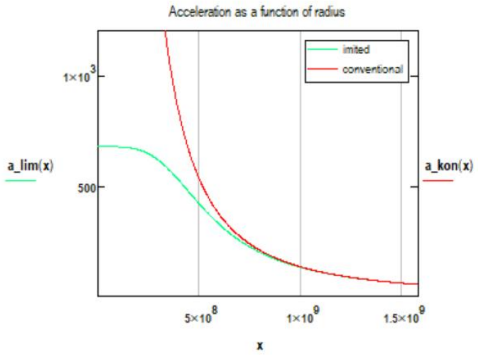
$$a\_So\_SL\_Surf := Gx\cdot\frac{m\_So}{r\_So\_SL^2} = 2.125\times10^{12}\,\frac{m}{s^2} \qquad a\_So\_SL\_Surf\_b := a\_0 - \left[a\_0 - \left(a\_0\cdot\frac{m\_So\cdot K\_Gx}{4\cdot\pi\cdot r\_So\_SL^2}\right)\right] = 2.125\times10^{12}\,\frac{m}{s^2} \qquad a\_shil := a\_0\cdot\frac{m\_So\cdot K\_Gx}{4\cdot\pi\cdot r\_lim^2} = 675.887\,\frac{m}{s^2}$$

The formula **a_all_range** shows the expected and logical result for the acceleration on the surface of the black hole. The function **a_all_range(mx, rx)** gives the results for the generated potential acceleration difference in the vicinity of a mass depending on mass and distance.

$$a\_all\_range := \frac{a\_0}{\sqrt{1+\left(\frac{r\_So\_SL^2 \cdot 4\cdot\pi}{m\_So \cdot K\_Gx}\right)^2}} = 675.887\,\frac{m}{s^2} \qquad a\_all\_range(mx, rx) := \frac{a\_0}{\sqrt{1+\left(\frac{rx^2 \cdot 4\cdot\pi}{mx \cdot K\_Gx}\right)^2}} \qquad a\_all\_range(m\_So, r\_So\_SL) = 675.887\,\frac{m}{s^2}$$

The graph for the analysis of the resulting values of the extended formula shows that the course with small distances is different from the conventional consideration. With large distances, the value is identical. Three values are particularly interesting. The value **Dist3** shows the point at which the theoretical shielding would correspond exactly to the basic acceleration of space. The value **Dist4** shows the acceleration according to the formula with the normal radius of the sun. The deviation from the conventional value here is **8%**. The value **Dist5** shows the acceleration content of space at the location of the earth. Together with the mass of the earth, this results in the known gravitational force **F_So_Earth.**

$$a\_kon(x) := Gx \cdot \frac{m\_So}{x^2} \qquad a\_lim(x) := \frac{a\_0}{\sqrt{1+\left[\frac{(x)^2 \cdot 4\cdot\pi}{m\_So \cdot K\_Gx}\right]^2}} \qquad Fact(x) := \frac{a\_kon(x)}{a\_lim(x)}$$



$Dist1 := r\_So\_SL$	$a\_kon(Dist1) = 2.125 \times 10^{12}\,\frac{m}{s^2}$	$a\_lim(Dist1) = 675.887\,\frac{m}{s^2}$	$Fact(Dist1) = 3.145 \times 10^{9}$
$Dist2 := 10^4 r\_So\_SL$	$a\_kon(Dist2) = 2.125 \times 10^{4}\,\frac{m}{s^2}$	$a\_lim(Dist2) = 675.545\,\frac{m}{s^2}$	$Fact(Dist2) = 31.461$
$Dist3 := \sqrt{\frac{m\_So \cdot K\_Gx}{4\cdot\pi}}$	$a\_kon(Dist3) = 675.887\,\frac{m}{s^2}$	$a\_lim(Dist3) = 477.924\,\frac{m}{s^2}$	$Fact(Dist3) = 1.414$
$Dist4 := r\_So$	$a\_kon(Dist4) = 273.905\,\frac{m}{s^2}$	$a\_lim(Dist4) = 253.852\,\frac{m}{s^2}$	$Fact(Dist4) = 1.079$
$Dist5 := r\_SoEr$	$a\_kon(Dist5) = 5.934 \times 10^{-3}\,\frac{m}{s^2}$	$a\_lim(Dist5) = 5.934 \times 10^{-3}\,\frac{m}{s^2}$	$Fact(Dist5) = 1$

$$F\_So\_Erd := a\_lim(Dist5) \cdot m\_Erd = 3.545 \times 10^{22}\,N$$

This shows that the environment of black holes is not an infinite "gravitational force" but is represented by the general space acceleration. This new consideration will have an impact on the ideas surrounding black holes.

6 Overall picture of the derivations

Now the medium, the ether, the vacuum or the space property presents itself simply and naturally in the form of an all-pervading ideal gas. The value of the mass is derived only by the temperature of the space. Interestingly, however, the value of the smallest mass **m0** is not relevant for the functioning of all models. The only condition for the smooth functioning of the models is the presence of this ubiquitous medium, which in turn requires a tiny mass.

With these, all-pervading space constants, all basic physical principles can be explained with mechanistic and descriptive models. Gravity can be understood as a simple differential force in an accelerating field. The electrostatic forces result from asymmetry in space. The cohesion of atoms is determined by pressure forces. The question of energy storage for kinetic energy is solved. The logical explanation for the energy of mass (**$E=mc^2$**) is found.

The results are logical and agree 100%, so no exception rule is needed. All statements were derived exclusively by logic and considering the basic physical laws, without the need for new theories. This finding is also consistent with the philosophical approach that a real effect (force) requires a real cause (space acceleration). Both physically and philosophically, this statement cannot be refuted logically.

7 Final consideration

With these all-pervading spatial properties, the basic physical problems mentioned at the beginning can be described with mechanistic and descriptive models.

- The constancy of the speed of light at a moving source result as a logical consequence because the radiated energy is transferred into a medium and the speed from emission depends only on the properties of the medium.
- The light is explained by a wave (resonance of pressure and density) in the medium
- The strong properties of the mass are explained by the ambient property.
- The mass at rest is defined by the **all-sided** space acceleration **a_0.**
- The force of the mass during acceleration follows as a reaction to the surrounding medium.
- The question of energy storage for kinetic energy is solved.
- The relativistic mass is a logical consequence of the ambient properties.
- The ellipsoid of the earth can be explained logically.
- The "attraction of electrons to the nucleus is plausible by pressure forces.
- The cohesion of the atomic nucleus is determined by compressive forces.
- The current thus becomes known as a cause and an effect.
- For Bohr's magneton, there is a logical explanation.
- The abstract field constants become understandable by natural values.
- Gravity results as a simple difference in an acceleration field.
- The difference between gravity and gravitation is cancelled.
- The "dark matter" and the "dark energy" become visible by pressure and density.
- The logical explanation for the energy of the mass ($E=mc^2$) is found.
- The magnetic forces result as a logical consequence by mass flow in space.
- The electrostatic forces result from asymmetry of the medium in space.
- The properties of the empty space are recognized.
- The amount of energy of the Kelvin is assigned.
- The space is not empty but has the properties of an ideal gas.
- The real environmental properties of black holes are detected.

This is by far enough evidence that there are deeper foundations. This will lead to considerable progress in all areas of physics. The long-sought unification of the fundamental forces will result, but not in the form of a single formula but on a common basis. This will also bring about the unification of the two mainstream theories. With some probability, solutions can also be found as to how the energy of space can be tapped for the benefit of humankind.

More old and newer, finished, and unfinished, correct and partly wrong solutions and models, on these or on other topics, also based on mathematically supported philosophical considerations for a real and natural physics can be found at:

Researchgate.net: https://www.researchgate.net/profile/Walter-Ruh

Academia.edu: https://independent.academia.edu/WalterRuh

viXra.org: https://vixra.org/author/walter_ruh

Galileo Galilei said about four hundred years ago:

"All truths are easy to understand
once they are discovered; the important thing is to discover them!"

Switzerland, Schaffhausen, June 23, 2023, Walter Ruh

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