A scientific-philosophical approach to nature

Abstract

The philosophy of science opens up an unexpected approach to physics and provides insights that go far beyond the established theories. While the theory of relativity and quantum mechanics provide ingenious theoretical models, these theories have so far lacked a deep understanding of the underlying natural processes. Since the theories of physics have existed for over a century, no fundamental progress towards a natural understanding has been visible. It is time to not only celebrate the mathematical models, but to discover the natural processes behind them. Philosophy of science allows us to look more precisely at theory and reality, to make a clear distinction between models and the real world, and to differentiate between abstract concepts and descriptive, natural processes. It allows us to see the relationship between theory and reality in a new light and thus opens up deeper access to nature. Through logic and clear common sense, the abstract formulas of physics can not only be understood as mathematical models, but the underlying physical processes can also be revealed. This philosophical perspective makes it possible to understand nature at a fundamental level and provides an explanation for the unification of the four fundamental forces of nature - gravity, electromagnetism, strong and weak interactions - through a common foundation. The so-called 'dark area' of physics - dark matter and dark energy - also becomes accessible from a new, clearer perspective. The findings provide a logical confirmation of the Big Bang and a possible explanation for its 'ignition'. This work shows that all theoretically founded models are based on comprehensible, natural processes.

Wherever only theories explain physical phenomena, the natural process behind them has not yet been recognized!

Let us recognize the nature behind the theories.

1 Prologue / Provocative questions

Some provocative questions about today's physics should serve as food for thought (The point of view determines what we see and what remains hidden). The aim is to question the foundations of the physical way of looking at things and to develop alternative approaches that lead to a deeper understanding of nature. The central question is whether freedom of thought still exists or whether existing science should not be questioned.

1.1 Provocative question about the attraction of magnets

Since childhood, we have been familiar with the attractive and repulsive forces of magnets - invisible forces that act at a distance. But there is no fundamental explanation of how these forces arise. Every human being needs a physical medium to exert tensile forces. Without such a medium, it is inconceivable to exert forces over distance. Why do we still accept the idea of long-distance forces in physics without a recognizable connection? What if we assumed collision forces instead of attraction forces? Perhaps there is no invisible "force of attraction", but rather local forces that cause objects to collide. This consideration prompts us to question our usual thought patterns. Could there be a more plausible, more natural explanation for these phenomena?

1.2 Provocative question on the attraction of masses

In elementary school, we learn that masses attract each other. In everyday life, however, this force of attraction is hardly recognizable. We know that the earth is "attracted" by the sun and therefore orbits around it. Shouldn't this idea be critically questioned? Can a gigantic "force of attraction" really act over immense distances? A steel cable that would transmit this force would have to have the diameter of the earth - a thought that illustrates the absurdity of such forces. Science explains this force through the curvature of space. But this theory remains abstract and far removed from a natural understanding. Would it not be possible to say: "Every real force needs a real explanation"? What if, instead of "attractive forces", collision forces were at work? Perhaps local external forces are pushing the Earth and the Sun towards each other instead of an invisible force of attraction. This consideration may seem unusual, but it only requires the courage to question existing thought patterns. Could this assumption - that collision forces explain the gravitational force - not provide a more logical and natural explanation?

1.3 Provocative question on the definition of electricity

Electricity is the foundation of our modern society. Without it, our culture would be unthinkable. While the effects of electricity have been thoroughly researched and utilized, the natural cause - what electricity really is and how the forces are generated - remains one of the least understood phenomena. Science is taking the wrong approach to the definition of electricity. The 1948 definition still had a natural reference to a force, but in 2019 the elementary charge was defined abstractly via Coulomb without explaining the underlying cause. The forces in electricity also remain mystical and theoretical.wouldn't it make sense to recognize that the natural cause of electricity is not yet understood? What if we could find a new, natural definition of the electron based on the SI units? This question requires the courage to question established ways of thinking. Such research could provide a clearer and more natural explanation for the phenomena.

1.4 Provocative question about the field constants

The correct meaning of the field constants permeability, permittivity and impedance is generally only known to electrical engineers and researchers. These are fundamental quantities that occur everywhere and permeate everything. Their current definition - theoretically via a force per ampere squared - is practical for scientists and electrical engineers for the calculation of real forces.

But the question arises: Can we, as engineers and researchers, not find a more comprehensible and descriptive definition for these all-pervasive properties of space?
Wouldn't it make sense to accept the philosophical maxim for a moment?
"We have not yet fully understood the natural background of these universal properties of space"? What if, on the basis of a natural definition of the electron, formulated in the SI units meter, kilogram and second, we could also discover a natural definition of the space constants? Would it hurt to take a step back from the usual thought patterns for a moment and take a fresh look at the established theories of physics with a touch of lateral thinking? Such an approach could not only provide a clearer explanation of the space constants, but also reveal our understanding of space and its fundamental properties.

1.5 Summary of the provocative questions

To summarize, despite immense progress in research, many aspects are still incompletely understood and contradict common sense and logic. Science is a process in which new findings have always resulted from new questions. Who is prepared to overcome the established patterns of thought? It seems that many physicists cling too tightly to existing theories and close themselves off to doubts and alternative approaches. However, progress requires the courage to question the familiar and break new ground. It is not about criticizing established theories, but about creating space for new, more natural explanations.

1.6 Closing words to the prologue

All of the above questions have been clarified in an insightful way and lead to a more realistic and natural view of physics. The intensive reflections and critical discussions with provocative thoughts have provided new, clearer insights that deepen our understanding of nature. It was not a question of rejecting old theories, but of placing them on a more comprehensible foundation. This approach, based on philosophical principles, logic and common sense, has led to revolutionary insights - from a simpler explanation of the "forces of attraction" to new perspectives on relativistic mass, the fundamental forces and dark matter.

2 Physics between established theories and undiscovered possibilities

The question of whether physics still holds undiscovered fundamental processes or whether the existing theories already offer the deepest possible understanding of nature has always been the subject of intense debate. While some philosophers are convinced that there are still hidden mechanisms behind the established theories, advocates of current theories question this assumption. They argue that mainstream theories already represent the optimum that science can produce to explain nature, and that any assumption about deeper, undiscovered levels is based on a misunderstanding of nature.

Skepticism towards deeper levels: Steven Weinberg: "There is no reason to believe that there are any deeper truths than those we have already discovered." Any notion of a deeper foundation behind the established theories is a misconception based on a false understanding of physics and its capabilities." (*Dreams of a Final Theory*, 1993).

Advocates of deeper levels: Lee Smolin: "The fact that physics has not progressed in recent decades is a clear sign that we've gotten off on the wrong track." There are deeper, as yet undiscovered principles that are blocking progress, and ignoring this possibility is a grave mistake." (*The Trouble with Physics*, 2006)

The position of this work:

"Theories explain nature" is not philosophically correct. Correct would be: 'Theories model nature'. A theory is infinitely far removed from true nature. It is just as absurd to claim that a theory can fully explain nature as it is to say that Antarctica can explain the desert or that love can be captured in mathematical formulas. Theories are brilliant, highly intellectual insights that help us to model phenomena and make predictions. However, they are not nature itself and must not be with the deeper truth. The formulations used everywhere (the curvature of space causes gravity) are not clean. The clean formulation should be: Science explains gravity theoretically with the abstract model of the curvature of space.

The theories of relativity and quantum physics are based on brilliant abstractions, but hardly anyone has seriously attempted to explore the natural processes behind these theories for over 100 years. A natural philosophy approach, however, shows that real, natural mechanisms can be recognized behind these abstract models - explanations that illuminate physical reality in new ways and lead back to the fundamental processes of nature.

Anyone who believes that nature can be fully explained by theories confuses theories with reality, has replaced curiosity with acceptance and lost respect for nature.

2.1 The preliminary work on the logical derivation of the natural conditions via the definition of the elementary charge

It is about finding the gateway for the new knowledge. The precise investigation of current and the search for a natural definition of the elementary charge opened the way to understanding current as cause and effect and to recognizing the true nature of the field constants.

2.2 The historical definition of electricity

Historically, current has always been defined by two effects with itself. In the 1948 definition, a force of **$2\text{-}10^{-7}$ N** between two one-meter-long conductors at a distance of one meter defined the resulting "current" as one ampere = **1A.** *This means that a measurable effect (force) is used to define an unknown cause (current) with a measurement, which in turn is another effect (magnetic field of the measuring device) of the same unknown cause (current).* The new definition from 2019 is even more abstract, as the current is finally defined with itself. *(The ampere, unit symbol A, is the SI unit of electric current. It is defined by specifying the numerical value 1.602 176 634 × 10-19 for the elementary charge* e*, expressed in the unit C, which is equal to A s, where the second is defined by* ΔvCs*.* This provides an approach. The current should also be explainable by natural causes and the effect should be recognizable as a consequence of the cause.

2.3 Approaches

Approach 1
The approach to the extended analysis of current is based on the observation of an imperfection in the context of current: The flowing current (amperes) 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]. This discrepancy is food for thought: The current should logically also be defined from a value with the units kg, m, s. Consequently, it should therefore be possible to derive a natural definition of the elementary charge with kg, m, s, which leads to a natural definition of the current.

Approach 2:
The vacuum has the property of permeability. This is a fundamental, all-pervading property of the vacuum and should therefore be regarded as a constant quantity of space. Permeability is defined by a force of 1.26×10^-6*N per ampere squared (abstract), which results in no real understanding. A definition of the elementary charge with the units kg, m, s would also lead to permeability with natural units. Through this transformation, it should be possible to convert the value of permeability defined with amperes into a value defined with kg, m, s and it should consequently appear as a natural and real spatial property.

Approach 3
Probably the most mystical and improbable explanation of a force in nature is the theory of the "attractive force" of the electron in the atom. According to the current theory, this "attractive force" is supposed to go to infinity at the smallest distance. From a natural philosophical point of view, this is an "unattractiveness" that cannot possibly be real. This is such an extreme idea that I have always lacked faith in this absurdity. The exact fact is: proton and electron move towards each other in the absence of other forces. From an exact point of view, this can be due to an attractive force or a collision force. From a philosophical point of view, both concepts (attractive force or compressive force) are equivalent at first glance. On closer inspection, however, "attractive force" is inexplicable, mystical and absurd. A real force can only be explained in terms of an external force. Since real forces can be applied quite naturally with surface area and pressure, speculatively speaking this would lead to an electron in the form of a surface area and a field constant in the form of a pressure.

Conclusion from the approaches:

- The most logical conclusion from these considerations is that it should be easiest to derive a natural definition of the electron by analyzing the force on the electron in the first orbit of Bohr's atomic model.

- The primary goal should be to replace the abstract definition of the elementary charge with a real definition based on the SI units meter, kilogram and second.

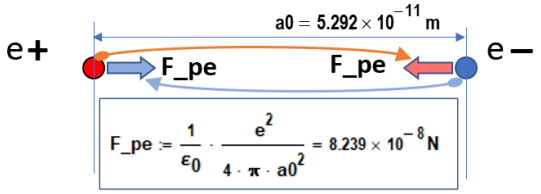
- The idea is that with the real definition of the elementary charge, the permeability and permittivity can also be defined in real terms. The secondary aim is to replace the traditional idea of an "attractive force" with a comprehensible model in which the theoretical approach is explained by a natural process - the interaction of pressure and surface area.

2.4 The derivation of the definition of the elementary charge with m, kg, s

2.4.1 The rejection of mystical attraction

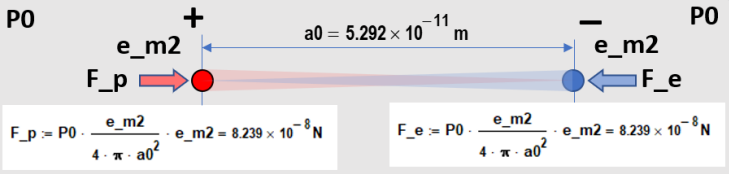
The conventional representation of the mutual remote force as attraction is unacceptable from a real scientific point of view. Mutual forces of attraction appear mystical and cannot be explained in a natural way.

The attractive force between a proton and an electron on the first orbital shell according to Bohr's atomic model



The rejection of the conventional model results in the only possible natural hypothesis/solution being the emergence of the force in a pressure field **P0** through mutual shielding

The natural, local force of each individual charge, which arises as a pressing force due to mutual shielding



This possible hypothesis has some strong logical arguments: The mystical "attractive forces", which are unacceptable from a natural point of view, are eliminated. With the help of an existing pressure field, a natural explanation of the local force arises through mutual shielding. This idea is not new, but ancient.
Sir Isaac Newton already wrote in his letter to Richard Bentley in 1851:
"*That gravity should be innate inherent an essential to matter so that one body may act upon another at a distance through a vacuum without the mediation of anything else by and through which their action or force may be conveyed from one to another is to me so great an absurdity that I believe no man who has in philosophical matters any competent faculty of thinking can ever fall into it. Gravity must be caused by an agent acting constantly according to certain laws, but whether this agent be material or immaterial is a question I have left to the consideration of my readers*".

The aim is to mathematically derive the exact relationship described by Newton and to support it with sufficient arguments. This can only be done if a definition of the elementary charge is found with the natural basic units of meter, kilogram and second. As a result, the field constants without reference to amperes squared must become visible with natural properties.

2.4.2 The mathematical derivation of the definition of the elementary charge with m, kg, s via the force on the electron in the first orbit of the atomic model.

This derivation is based on the formula for the force **F_e_p** on the electron in the first orbit of Bohr's atomic model

$$F\_e\_p := \frac{1}{\varepsilon_0} \cdot \frac{e^2}{4 \cdot \pi \cdot a0^2} = 8.239 \times 10^{-8}\,N$$

F_Def is the definition force on which the 1948 definition of the ampere is based.

$$F\_Def := 2 \cdot 10^{-7} \cdot N$$

This force, calculated back to the origin of the other conductor, results in the force **F_0**. The permeability **μ0** is defined with the force **F_0**

$$F\_0 := 2 \cdot \pi \cdot F\_Def = 1.26 \times 10^{-6}\,N$$

$$\mu_0 = \frac{F\_0}{A^2} = 1.26 \times 10^{-6}\,\frac{kg \cdot m}{A^2 \cdot s^2}$$

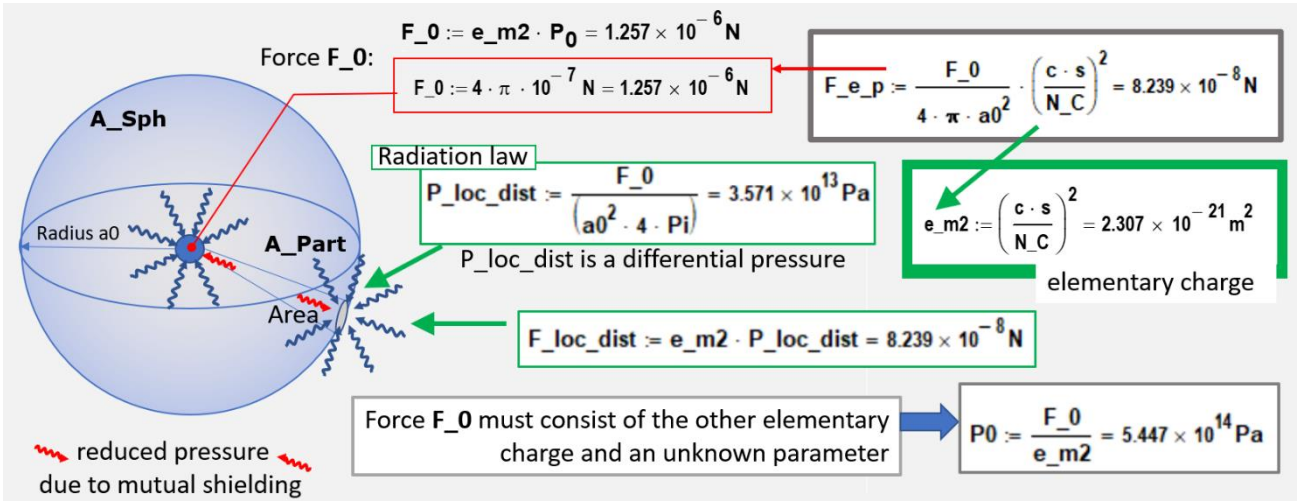
The permittivity **ε0** and the elementary charge **e** can be represented differently:

$$\varepsilon_0 = \frac{1}{\mu_0 \cdot c^2} = \frac{A^2}{F\_0 \cdot c^2} = 8.85 \times 10^{-12} \frac{A^2 \cdot s^4}{kg \cdot m^3} \qquad e = \frac{A \cdot s}{N\_C} = 1.6 \times 10^{-19} C$$

The equation for the force can be represented in three different ways:

$$F\_e\_p = \frac{1}{\varepsilon_0} \cdot \frac{e^2}{4 \cdot \pi \cdot a0^2} = \left(\frac{F\_0 \cdot c^2}{A^2}\right) \cdot \frac{1}{(4 \cdot \pi \cdot a0^2)} \cdot \left(\frac{A^2 \cdot s^2}{N\_C^2}\right) = \frac{F\_0}{(4 \cdot \pi \cdot a0^2)} \cdot \left(\frac{c \cdot s}{N\_C}\right)^2 = 8.239 \times 10^{-8} N$$

From a distance, the third variant of the calculation is recognizable as a point-shaped radiation of a force onto a surface. The basic force **F_0** radiates (is shielded) onto a spherical surface **A_Sph**. A part of the spherical surface **A_Part** experiences the corresponding force **F_Part.** The real properties of the electron are thus recognizable as **e_m2**, as a surface derived from known constants.



Logically (since the result is the force between two charges), the basic force **F_0** must be produced by another parameter and the countercharge (same magnitude). This must result in exactly the second parameter by dividing the force **F_0** by the newly defined elementary charge **e_m2**. The result shows a pressure **P0_e_m2**.

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

2.4.2.1 The transformation of the field constants

Due to the new definition of the value of the elementary charge, the definition of the field constants also changes. The conventional field constants defined from the elementary charge **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 the reciprocal 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

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

2.4.3 A second derivation for the natural properties of the field constants

In this section, hacker methods are used to decipher the natural puzzle behind the abstract definition of electricity piece by piece. We start with the quotient of permeability **μ0** over elementary charge **e** squared. As this value consists of verified physical values, it is certainly a constant, but the reference to A^4 is disturbing.

$$\frac{\mu_0}{e^2} = 4.895 \times 10^{31} \frac{kg \cdot m}{A^4 \cdot s^4}$$

It is imperative that the basic information about the nature of the current and the field constants is still contained (encrypted) in **URK_μ0**, but now without the unit ampere. The aim is to decode **URK_μ0** and break it down into its real, natural components. The goal can be achieved through lateral thinking and logic as well as an understanding of the relationships and probabilities.

$$URK\_\mu0 := \frac{\mu_0 \cdot A^4}{e^2} = 4.895 \times 10^{31} \frac{kg \cdot m}{s^4}$$

An analysis of the unit of **URK_μ0** indicates that the value is probably composed of density and velocity.

$$\left(\frac{kg}{m^3}\right) \cdot \left(\frac{m}{s}\right)^4 = 1 \frac{kg \cdot m}{s^4}$$

Logic and probability: In this context, only the speed of light **c** as a result of permeability and permittivity can be considered as speed.

$$c := \sqrt{\frac{1}{\mu_0 \cdot \epsilon_0}} = 2.998 \times 10^8 \frac{m}{s}$$

Using **URK_μ0** and c^2 instead of the reciprocal of the permittivity **1/ε0** gives the pressure of the space **P0**.

$$P0 := \frac{URK\_\mu0}{c^2} = 5.447 \times 10^{14} Pa$$

Using **URK_μ0** and c^4 instead of the permeability **μ0** results in a density of the space **rho_0**

$$rho0\_0 := \frac{URK\_\mu0}{c^4} = 6.06 \times 10^{-3} \frac{kg}{m^3}$$

URK_μ0 and c^3 give the impedance of the **space Z0_m2**

$$Z0\_em2 := \frac{URK\_\mu0}{c^3} = 1.817 \times 10^6 \frac{kg}{m^2 \cdot s}$$

The speed of light is unchanged and becomes a natural propagation speed.

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

By analogy with the conventional elementary charge, the natural definition of the elementary charge **e_m2** can now be confirmed. All values agree with those previously derived, which considerably increases the plausibility and probability of the correctness of this derivation.

$$e := \sqrt{\frac{e^2}{\epsilon_0} \cdot \epsilon_0} = 1.602 \times 10^{-19} C$$

$$e\_m2 := \sqrt{\frac{e^2}{\epsilon_0} \cdot \frac{1}{P0}} = 2.307 \times 10^{-21} m^2$$

What is interesting about this derivation is that the access route comes from the other side. In the first derivation, the natural value of the elementary charge was derived, from which the space constants could then be calculated. In this derivation, on the other hand, the space constants become visible, from which the elementary charge can then be calculated. The fact that both paths lead to the same results from opposite directions strengthens confidence in the correctness of the considerations.

2.4.4 A third derivation for the elementary charge and the permittivity

The aim is still to find a natural explanation for the collision force. Such a force can result from the interaction of pressure on the surface. When pressure is exerted on a surface, a force is created that can be understood as a collision force. This approach provides a natural basis that is in line with physical reality and is based on the principles of pressure and surface. The question is whether this can be linked to the properties of the elementary charge and the field constants.

A constant UCI (Universal Cosmic Constant) can be formed from the conventional value of the elementary charge and the permittivity. It results as the quotient of the property of the elementary charge squared over the property of the permittivity.

$$UCC := \frac{e^2}{\varepsilon_0} = 2.899 \times 10^{-27}\ \frac{kg \cdot m^3}{s^2}$$

This **UCC** is guaranteed to be a constant, but has the advantage that the unit ampere is eliminated. However, this constant still necessarily contains the information of a property of the elementary charge squared, divided by the property of permittivity. With the idea that permittivity could have something to do with pressure and therefore the electron would be a surface, there would have to be a surface squared and a pressure hidden in it. There are various possible representations for this UCC. The goal is achieved through reflection and suitable transformation. The values appear identical to the previous derivations.

$$UCC = \frac{e^2}{\varepsilon_0} = e \cdot \frac{1}{\varepsilon_0} \cdot e = \frac{\left(\frac{A \cdot s}{N\_C}\right)^2}{\varepsilon_0} = \left(\frac{A \cdot s}{N\_C}\right)^2 \cdot \mu_0 \cdot c^2 = \left(\frac{A \cdot s}{N\_C}\right)^2 \cdot \frac{F\_0 \cdot c^2}{A^2} = \left(\frac{c \cdot s}{N\_C}\right) \cdot F\_0 \cdot \left(\frac{c \cdot s}{N\_C}\right) = \left(\frac{c \cdot s}{N\_C}\right)^2 \cdot \frac{F\_0}{\left(\frac{c \cdot s}{N\_C}\right)^2} \cdot \left(\frac{c \cdot s}{N\_C}\right)^2 = 2.899 \times 10^{-27}\ \frac{kg \cdot m^3}{s^2}$$

The pressure and area we are looking for is not yet visible

$$\left(\frac{c \cdot s}{N\_C}\right) = 4.803 \times 10^{-11}\,m \qquad F\_0 = 1.257 \times 10^{-6}\,N$$

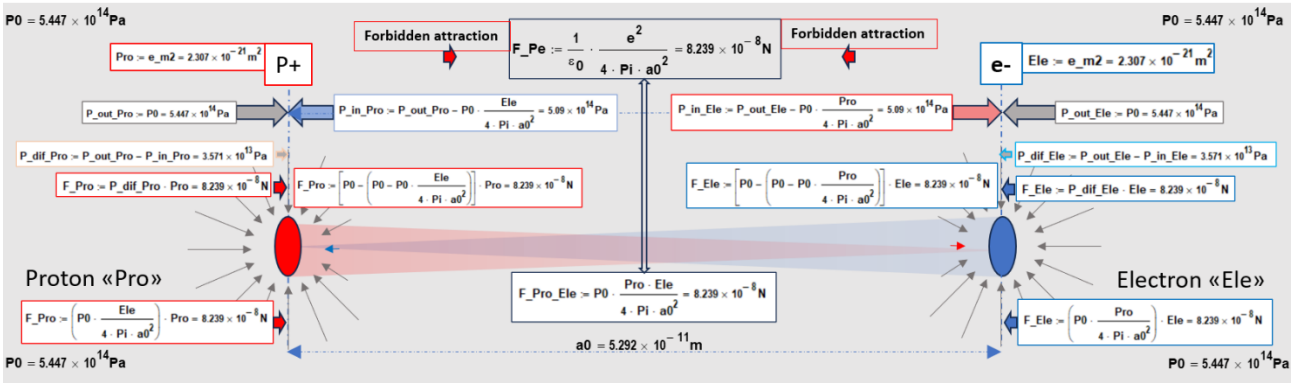
The pressure and area we are looking for is know visible

$$\left(\frac{c \cdot s}{N\_C}\right)^2 = 2.307 \times 10^{-21}\,m^2 \qquad \frac{(F\_0)}{\left(\frac{c \cdot s}{N\_C}\right)^2} = 5.447 \times 10^{14}\,Pa$$

The result shows that the pressure P0 corresponds to the reciprocal of the permittivity

$$e\_m2 := \left(\frac{c \cdot s}{N\_C}\right)^2 = 2.307 \times 10^{-21}\,m^2 \qquad P0 := \frac{(F\_0)}{\left(\frac{c \cdot s}{N\_C}\right)^2} = 5.447 \times 10^{14}\,Pa \qquad UCC := \frac{e\_m2^2}{\frac{1}{P0}} = 2.899 \times 10^{-27}\ \frac{kg \cdot m^3}{s^2}$$

Below is a detailed description of how the local forces on the electron and proton arise as a result of the relatively minimal pressure difference:



2.5 The properties of the space

The properties of the space can be read from the new values for permeability, permittivity and impedance. The pressure **P0** becomes visible via the reciprocal value of the permittivity **eps0_m2.** The density **rho_0** corresponds directly to the permeability value. The characteristic impedance of the vacuum **Z0_m2** shows **rho_I0** as the momentum density. The fact 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 known pressure **P0** can be used to determine the unique value for the factor **K_Gx** (factor for converting mass into area), which can be used to convert mass 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 gravity with the formula for an acceleration model, the known value for **K_Gx** can be used to determine the unique value for the acceleration property of space **a_0**.

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

It turns out that the known gravitational constant **Gx4Pi** is composed of the product of **K_Gx** and **a_0**, which is a great indication that the consideration is correct.

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

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

3 The new insights into the properties of space provide all the necessary parameters to find natural and descriptive processes for all the fundamentals of physics.

The force during the acceleration of a mass is generated by the transfer of momentum to the impedance of the environment at each atom of the mass.

The kinetic energy of the mass is stored in the surroundings of the mass in the form of increased pressure and density.

The energy of the mass is stored in the atom in the form of an impulse and is returned when the mass is destroyed.

The constancy of the speed of light results from the properties of space, which combines pressure and density.

The force between charges, the "attractive force" between charges, arises locally due to an asymmetry of space and acts as a collision force.

Magnetic force fields Forces are generated locally by the sum of the forces that act when dipoles are deflected from their preferred direction.

Relativistic mass of the mass at high speed corresponds to the increased force caused by the dynamic pressure of the environment.

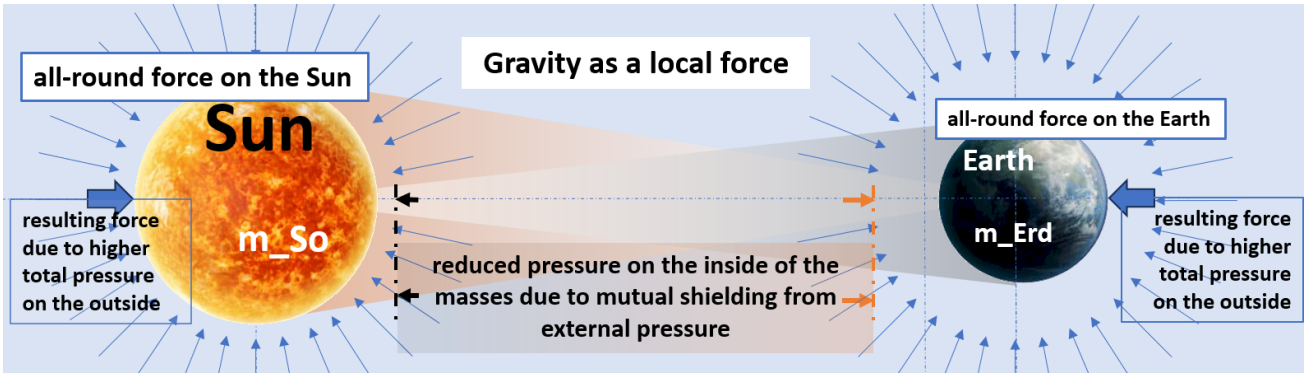
The cohesion of the elements of the atoms is based on pressure forces that are defined by the probability of the environment.

The equivalence of gravity and inertia, gravity and inertial mass are identical, since both arise from a universal acceleration property.

The infinite force of the black hole force is limited by a maximum force caused by the pressure in space.

The deflection of light by masses is caused by the continuous change in the refractive index of space near large masses.

The force of gravity is a collision force that arises from the mutual shielding of masses against the properties of space.



The dark mass is evenly distributed in space and is visible through the density of the mass of **6.06×10^{-3} kg/m^3**.

The dark energy becomes visible through the space pressure. One cubic meter of space has the energy of **5.4 - 10^{14} joules**.

$$E\_m3\_P0 := \frac{3}{2} \cdot P0 \cdot m^3 = 8.17 \times 10^{14}\,J$$

At first glance, this is a huge amount of energy per cubic meter. The 100 % yield of the free energy of a cube of this energy space with an edge length of around 10 m could cover Switzerland's entire annual primary energy requirement of around 810 petajoules (PJ). Unfortunately, exploiting this energy is not easy (probably not at all), as this energy is at the level of minus 270.45 degrees Celsius (approx. 2.7 Kelvin)

Conclusion:

The considerations show that behind the established formulas of physics lie previously hidden natural processes that have now been discovered. This insight is based primarily on a philosophical approach to science. The mathematical-physical analysis only serves to derive and confirm the results. The underlying natural mechanisms behind the abstract formulas are understood without refuting the existing theories. The realization that physics is ultimately based not only on mathematical models, but on real processes, raises fundamental questions about the understanding of nature. This shows that a real scientific-philosophical consideration must be the essential basis for everything. Theoretical physics has so far focused on describing and reconciling observations through mathematical models, but without fully exploring and understanding the deeper mechanisms of nature. A deeper understanding of phenomena such as acceleration, energy, gravity and the speed of light is now emerging through a re-evaluation of the fundamentals. This new perspective will permanently change physics and the philosophical understanding of nature and lead to significant breakthroughs.

Determination:

This work is presented 'as is'. The result is new and revolutionary. The presentation does not conform to the usual standards of scientific work - just as the results do not conform to generally accepted theories. The following tools were involved in its creation: Word and Excel from Windows, Mathcad 15 and, of course, ChatGPT to improve comprehensibility and grammatical correctness.

78 years old and deeply grateful

The brooding search for the natural processes behind the theories of physics has accompanied me for more than 65 years. My sincere thanks go to all the great companions who have actively and positively supported me on my professional path outside of this search. I am infinitely grateful to my wonderful, beloved wife, who has given me joy, peace and a happy family. She created the environment that made this work possible in the first place. I owe it to the PC tools to be able to put my thoughts on paper in a meaningful way. I am also particularly grateful to those who put obstacles in my way, ignored me and bullied me. They too have helped me get to where I am today.

Galileo Galilei said around four hundred years ago:
"All truths are easy to understand
once they have been discovered; the important thing is to discover them!"

Switzerland, Schaffhausen, January 11, 2025 / Walter Ruh

"Further work - finished or unfinished, with correct or incomplete approaches and models - on these or similar topics, based on mathematically underpinned philosophical considerations for a real and natural physics, is available at:

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