Title: The Unifying Theory: A New Theory of the Universe.

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Abstract.

Our understanding of motion has been influenced by the assumption that external and invisible forces act upon matter to cause acceleration. In this article, I refute the validity of this convention and propose an alternative perception that suggests matter's independence. That change in perspective gives rise to important principles and equations that contribute to resolving the conflict between classical and quantum mechanics, unifying the explanations for universal forces and explaining the Lorentz transformation. I start by introducing a unit, a number of fundamental particles, that replaces mass. Then, I suggest that motion is quantized with a frequency equal to speed divided by a variation of Planck's Length. I then explain that energy is the primary cause of motion and can be calculated by measuring time dilation. Finally, I introduce a single formula that describes gravity and electromagnetism.

Introduction.

Modern observations at the subatomic level have greatly challenged our theoretical understanding of the universe. At the beginning of the 20th century, quantum mechanics was born with a set of new principles. The novelty of the principles not only contradicts the popular conception of motion but also introduces a limitation to our ability to predict the behaviors of matter at the subatomic level [1]. The Bohr model was consistent with the solar system. That was a great accomplishment except for the condition that electrons leap between orbits without passing in between [2]. The wave property of matter was supported by one of the most important experiments in the 20th century, the double slit experiment. The experiment showed that particles do have wave-like properties [3]. While Schrödinger's equation contributes to describing the wave mathematically, Born's rule explains it as a probability of detecting the electron in certain locations [4,5]. As a result of all of this work at the subatomic realm, quantum mechanics is not only counterintuitive to nonspecialized individuals but also puzzling and strange even to the greatest contemporary physicists. Richard Feynman once thought, "I can safely say that nobody understands quantum mechanics" [6].

Challenges that arise from empirical observations are not exclusive to the subatomic level. Modern astronomical observations are also inconsistent with our current understanding of gravity. At the beginning of the 20th century, different observations confirmed that the observed mass in galaxies is not sufficient for the high velocity of dispersion within those galaxies [7-9]. In addition, other observations have confirmed that the rotational velocity of a disc of stars in nearby galaxies does not decline beyond the radial distance. [10-13]. In order to explain the odd phenomena, leading physicists and astronomers have suggested a radical resolution that hypothesizes the existence of dark matter [14,15]. Although it has not been observed, dark matter is estimated to count for around 27% of the universe [16]. The high percentage is around five times the percentage of the normal matter in the universe. As a result, our conception of the universe partly fails at the macroscopic level, as it does at the subatomic level.

Even without any contradictory observations, major contemporary theories face logical challenges. Despite its familiarity, gravity is explained by the general relativity but is still not fully understood. After the law of universal gravity was introduced by Sir Isaac Newton, Albert Einstein introduced his theory of general relativity, which does not only describe planetary motion with a higher accuracy than the universal law of gravity does but also explains the causality of gravity [17,18]. According to the general relativity, gravity is a consequence of the curvature caused by masses in a smooth but malleable fabric of space-time [19]. The theory has been supported by a verity of experimental validation such as gravitational lens, and gravitational waves [20]. However, the biggest challenge to the general relativity has not been overcome by the precision of the supporting observations. It arises from its theoretical incompatibility with the rest of the universal forces. Having a unified theory that describes all forces of nature is a dream that most of the theoretical physicists believe in, including Einstein, who spent his last decades trying to accomplish it [21]. In fact, the unification of forces is not only a theorists' dream; the standard model showed that forces of nature are expressed as particles mediating the attracted or repelled objects or particles [22]. In addition, observations at high energy showed that the effect of two of the fundamental forces became almost the same [23]. That's an indication that the forces might actually be unified at very high energy and that Einstein's dream is possible but not achieved. Nevertheless, almost every attempt to unify the general relativity with the rest of the forces introduces imaginary dimensions.

That is not the only challenge facing general relativity. Mass plays an important role in general relativity, and the concept of mass is, by itself, a great theoretical challenge. The quantity of inertial mass, defined as the ratio between of the force acting on an object and the acceleration due to that force, faces the challenge of circularity [24] because the force that is applied on the object is also defined by the product of mass and acceleration. Furthermore, the advent of special relativity only made things worse for the concept of mass since it showed that the mass of an object varies with its speed [25]. If mass is a mystery, energy, which is another fundamental property, can only be more mysterious.

History shows that unexpected observations and theoretical deficiencies are not the results of an arbitrary universe, but rather due to a misunderstanding of nature. Nature reveals more of its nature with advancements in technology, and there is no law in physics that forces our understanding to adhere to the conceptions that were developed in a different era of observation. In order to develop a theoretical framework that not only encompasses subatomic behaviors but also lacks logical deficiencies, physics must abandon the philosophical assumption that matter is a dependent and inanimate entity. I wish that the following theory will contribute to that.

The Number of Units.

In order to model matter's behavior, an unchangeable quantity that represents the amount of stuff in matter is needed. The ideal way to calculate the amount of stuff in an object is to identify a single primary component that varies in its behaviors to give each fundamental particle its properties, and then calculate how many of it is in an object. In modern science, an attempt to identify that component was conducted by String Theory. According to the theory, the smallest component of matter is not a point particle; instead, it is a vibrating string that vibrates in different ways to give each particle its properties [26]. However, the strings have never been detected or observed. Therefore, the best possible way to express the amount of stuff in an object is to calculate the number of fundamental particles. In fact, the amount of stuff in a particle or an object can be inferred not only from the number of fundamental particles in it, but also by any number that represents a cluster of particles or objects. For example, it is not incorrect to say that the amount of stuff in the solar system is 9 planets. The unit, planets, represents the amount of matter in a system but with very little precision.

The Quantization of Motion.

The key to resolving the conflict between quantum and classical physics is unifying motion and quantum leaps and tunneling. In other words, by developing a concept that encompasses both phenomena, the quantum realm will no longer be odd. However, the most important step is determining the direction of generalization. String theory has chosen to generalize gravity, and that is the wrong direction. This is because quantum physics has never failed in its predictions, unlike the general relativity. Also, the existence of extra dimensions is counterintuitive and has never been proven. Finally, reductionism has been one of the most successful concepts in all scientific fields.

Although Einstein has made great contributions to our understanding of the universe, his explanation of gravity was not only incorrect, but also misleading. Firstly, all of the observations that support general relativity's interpretation of gravity have not determined that the relation between motion and the curvature of space-time is causational and not just correlational. Therefore, proving that space-time curves does not necessarily mean it causes gravity even if it correlates with gravitational pull. Secondly and more importantly, the number of observations that refute the general relativity surpasses the supporting evidence. Starting with the other universal forces, including quantum physics, and ending with the unexpected astronomical observation, the accuracy of general relativity's explanation of gravity does not seem to exceed primitive observations.

The fabric of space accommodates matter's existence and its behaviors, but it does not cause motion. The general relativity accurately describes the shape of the fabric of space, but it misses the fact that these manipulations are due to motion, not the opposite. Nevertheless, matter has to abide by its shape where the general relativity applies accurately. In other words, although the general relativity must fail philosophically, its geometrical description is accurate and must be true as a platform but not a cause of motion.

The problem is not only with the general relativity, but also with the historical assumption that matter needs an external intervention to change its velocity. Modern observations have been proving that matter's behavior is not due to any external forces or circumstances but due to a natural ability for matter to change its location in the fabric of space. The only time that quantum mechanics sounds reasonable is when physicists abandon matter's objectification.

For an electron to tunnel or travel between certain orbits without passing in between is no different from an apple falling from a tree. The apple changes its location consecutively while electrons change their locations abruptly. In other words, they both appear in new locations in the fabric of space, but the location where the apple appears is more predictable than the electrons' locations. Therefore, the difference between classical and quantum mechanics can be described as difference in consistency.

Velocity is an indication that a particle or an object is changing its location consistently in the same direction as the velocity; however, the displacement that is associated with velocity is a variation of Planck's Length. For example, a moving object or a particle leaps between two positions in the fabric of space. The distance between these two positions contracts as velocity increases. That contraction is what Lorenz transformation takes into account. In other word, length contraction is due a decrease in the distance between two consecutive positions of a moving object or particle.

I assume that the distance between the two positions is a variation of Planck's length. Of course, the exact distance can only be determined experimentally; however, an approximation can help explain the concept. Planck's length might be, approximately, the distance between the two positions for an object or a particle that is moving with the speed of light. As the object or the particle slows down, the distance increase by a factor of $\sqrt{1-\frac{v^2}{c^2}}$.

Thus, the frequency of constant change in location determines the speed of objects or particles that are assumed to be in motion. In other words, all moving objects and particles are constantly changing their locations in the universe; however, those that change their locations more frequently appear to have a higher speed and shorter distance between consecutive incidents of relocations. Although the frequency of relocation is independent of the change of the displacement, time dilation accounts for a decrease in frequency as energy increases. Therefore, the frequency of changing locations can be calculated by using the following equations:

$$Frequncy\ = \frac{speed\ \sqrt{1-\frac{v^2}{c^2}}}{Planck's\ \ length}$$

$$Frequncy\ of\ light\ = \frac{The\ speed\ of\ light}{Planck's\ \ length}$$

Actual and Illusionary Frequencies.

The special theory of relativity equalizes the validity of observations in all frames of references. However, given that there is a variation in the quantization of motion, that perception has to be reconsidered. There is a distinction between observations in terms of validity. In other words, there is only one actual frequency that corresponds with the speed relative to the absolute rests; all other frequencies in other frame of references are illusionary. Length contraction between two consecutive incidents of reloction of light distinguishes between actual and illusionary frequencies, and gives an accurate estimation of the actual frequency using the following equation:

$$f = \frac{L'C\sqrt{1-\frac{L'^2}{Planck's\ Lenght^2}}}{Planck'sLength^2}$$

f: The actual frequency

c: The speed of light

L’: The measured length between two consecutive incidents of relocation of light.

The Cause of Motion and Energy.

The exact dynamic at which matter relocates itself is a mystery and might only be interpreted philosophically and metaphysically. However, energy plays the most obvious role in the phenomenon. Matter's ability to relocate, which is energy, is directly proportional to its momentum as expressed by the theory of relativity.

In addition, there is an implicit way to calculate energy in general. That is, by measuring time dilation. However, in order to do that, the general relativity theory's perception of time has to be abandoned. Time is not a dimension in the fabric of space as described by the theory of relativity. Instead, it is a subjective experience that correlates only with energy. All experiments that supported time dilation were not due to a change in velocity nor were they due to a curvature in the fabric of space, but due to a change in energy. For v<<c, energy can be calculate by the following formula:

$$t' = \frac{t}{\sqrt{1-\frac{2\,E}{U\,c^2}}}$$

$$E = -\frac{t^2 U c^2}{2{t'}^2} + \frac{U c^2}{2}$$

t: proper time

t': measured time

U: The number of fundamental particles in the object.

C: The speed of light

E: energy

Forces of Influence

Although matter's behaviors should be attributed to an internal property, energy, it can be influenced by external factors. External forces change momentum and, consequently, change energy. Therefore, exerting a force on an object to accelerate it is an act of influencing its energy. The force of influence can be calculated by Newton's second law of motion. However, a number of units should replace mass, as illustrated earlier.

$$\vec{f} = \vec{a} \, . \, u$$

a: acceleration.

u: number of fundamental particles.

f: The force of influence.

Forces of Genuine Actions.

On the other hand, motion can happen genuinely without the need for forces of influence when we regard the concept of natural forces (gravity, electromagnetism, and nuclear forces). A change in momentum, and consequently, a change of energy, takes place after the exchange of messenger particles: gluons, photons, weak gauge bosons, and gravitons [22]. A certain amount of energy, which can also be calculated by E=$\int \overrightarrow{f} \, dx$, is transferred during the exchange of messenger particles, and that action enables particles to relocate as an attraction or repulsion. However, this transfer of energy does not require acceleration unlike the transfer of energy that is due to the force of influence. For example, two objects at rest, and are exposed to two forces with the same magnitude, but different types. One of the forces is due to a stretched spring, which is a force of influence, and the other force is due to gravity, which is a force of genuine actions. The first object, attached to the spring, does not experience a transfer of energy, consequently, does not undergo time dilation; however, the spring, itself, experiences a change in energy due internal forces of genuine actions. On the other hand, the other object experience a change in energy, consequently, undergoes time dilation. Therefore, time dilation close to earth is not due to a curvature of space-time, but rather due to a change in potential energy. Therefore, there is no need to hypotheses a dimension for time.

The magnitude of the force of genuine actions is equal to half the magnitude of the force of influence that would replace the forces between two objects or particles. That reality is due to Newton's third law of motion since each unit exerts the same force on the other.

$$|\overrightarrow{f}|_{\text{Influence}} = 2\,|\overrightarrow{f}|_{\text{Genuine Actions}}$$

To calculate the force of genuine actions, a physical tendency has to be calculated first. The physical tendency is a vector quantity that represents the quantity of genuine attraction or repulsion behavior. The following formula calculates the physical tendency between two units that attract or repel each other. However, the number of their units excludes fundamental particles that are inactive during the exchange of messenger particles. For example, if half of an object is electrostatically charged, then only half of its fundamental particles will be used as a unit when calculating the physical tendency behind electromagnetism. Therefore, the active number of fundamental particles represents the number of fundamental particles that are involved in the process of exchanging messenger particles. However, the equation is limited by consistent tendency. Consistent tendencies are characterized by an infinite range of effect. Therefore, the following equation does not accurately describe nuclear forces.

$$\vec{D} = \frac{\vec{A}.r^2}{u} + \frac{\vec{a}.r^2}{U}$$

D: The physical tendency ($meter^3.unit^{-1}.second^{-2}$).

A: The acceleration of one of the objects (object 1) along r

a: The acceleration of the other object (object 2) along r

U: The number of active fundamental particles in object 1.

u: The number of active fundamental particles in object 2.

r: The distance between the two objects.

The following equation calculates the force of genuine actions exerted on an object or particle due to another object or particle.

$$\vec{f} = \frac{\vec{D}\, U\, u}{2.r^2}$$

f: the force due to genuine actions.

D: The physical tendency between the two objects or particles.

U: The number of active fundamental particles in the objects or particles.

u: The number of active fundamental particle in the other object or particle.

r: The distance between the particles or objects.

The verity of masses among elementary particles might either be due to a verity in magnitude of a specific physical tendency, which causes gravity, or due to an undiscovered smaller structure of the elementary particles. The latter indicates that there is a constant magnitude of the physical tendency that causes gravitational pull.

Similarly, the high velocity of dispersion in galaxies and the flatness of the rotational velocity are either due to an inaccurate estimation of the number of fundamental particles or the effects of undiscovered physical tendencies.

Conclusion.

Newton's law of universal gravity showed that there was nothing mysterious about planetary motion. Maxwell's equation showed that there was nothing mysterious about magnetism either. Now, it is the time to claim that there is nothing mysterious at the subatomic level. The price of that unification is not extra dimensions, nor is it dark objects. The price is abandoning an incorrect philosophical assumption that was valid for a certain era but is no longer valid. For humankind to continue its impressive discoveries about the universe, it has to accept radical, but logical, ideas even if they contradicts conventions or philosophical assumptions.

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