UNIFIED THEORY OF MATTER

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PREFACE

From the title we can tell that this is a book concerning theoretical physics. I have sent similar copies of this book to physicists before, but they had trouble accepting my theories because they lacked mathematical equations. The reason why I neglected to include equations is that I cannot find a way to express my theories using the current math, at least with my mathematical background. I instead chose to approach my theory with a more conceptual and visual point of view in discussing force, charge and energy etc. The approach may be more acceptable to those with a chemistry background. The ultimate goal of this book is to explain what the basic component of all matter is and how it affects our universe. If you have a strong background in mathematics, you may be able to find a way to describe my theories with math to make these concepts more acceptable to physicists. Those in other sciences with a curiosity in theoretical physics may be interested in this book also.

This book begins with introducing the basic component of all matter in this world, and then discusses what force, charge, energy, and light are and various other phenomenon frequently observed in the universe.

TABLE OF CONTENTS

CHAPTER 1: The Basic Component of All Matter

Science, at its most fundamental level, revolves around understanding the nature and behavior of matter. Since the behaviors of larger, more complex bodies are determined by the behaviors and interactions of its more basic constituents, finding the most basic common component of all matter and identifying its fundamental behaviors and properties would undoubtedly answer many of science's current questions.

Science currently holds that matter in our world is made up by two types of material: one is the particle, the other one is field. Sometimes, the particle and wave are classified as different states of the same material. I must clarify that wave is a behavior of material and not material itself. For example, waves in water are caused by water particles moving in a wave-like manner. Water is the material and the wave is the behavior of these particles. Other materials, such as space, time etc. may also be considered as forms of matter by some; this will be clarified later on in this book. There are also other types of material often mentioned, such as dark material, dark energy, etc. Since these materials can often interchange between one another, it is logical to conclude that they are constructed of the same basic component.

1.1 Pair Production

Dirac's prediction and Carl D. Anderson's pair production experiments showed that passing a gamma ray through the strong electromagnetic field near the nucleus resulted in the creation of an electron and positron (1,2,3). It also demonstrated that a gamma ray can be created when an electron and positron are merged together.

For matter in the pair production experiment, two scenarios can occur when the gamma ray strikes the electromagnetic field near the nucleus: the gamma ray either undergoes a complete transformation, breaking down and reforming into new sub-materials due to the electromagnetic field near the nucleus when it passes through, or only the physical structure of the gamma ray itself is reorganized into two new structures. In case one, the interactions between the gamma ray and the nuclear electromagnetic fields would cause the gamma ray to completely transform into a new sub-material distinct from the material of the original gamma ray and reform into two structures, which we identify as the positron and the electron. If this were true, then not only would the electromagnetic field in the gamma ray separate, the electromagnetic field near the nucleus itself should also separate into the new sub-material since it is also composed of electromagnetic field. The result would be an electron, positron, and an atomic nucleus surrounded by other structures made up of the new sub-material. Since this is not what occurs in reality, the scenario is proved to be false leaving case two where the gamma ray is reorganized structurally upon passing through the nuclear electromagnetic field to form a positron and electron.

Based on these observations, we can reasonably establish that the positron and electron are composed of electromagnetic field. Since the change was purely physical in the gamma ray, it suggests that gamma rays themselves are structurally rearranged positrons and electrons. That is to say, gamma rays, positrons, and electrons are essentially made of the same substance: electromagnetic field. This is perhaps a very difficult concept to accept as it goes against what we are used to believing that basic components of matter are comprised of various particles, not fields.

1.2 The Relationship Between Electric Field and Magnetic Field

Magnetic fields are generated when electrically charged particles exhibit movement, such as when an electron runs in continuous circular paths. Magnetic fields have never been observed to exist by themselves as a separate, physical material; they are always formed alongside electric fields. Once the electrical current stops, the magnetic field disappears. In materials with a “permanent” magnetic field such as a magnet, it has been shown that electrons move in circular paths inside the material causing a magnetic field. This leads to the conclusion that magnetic field is not a physical substance in itself; it is an effect created by the spinning or moving of electric field. If a magnetic field were a substance itself, it should be separable from the electric field and exist independently, but this has never been observed. Historically, magnetic field was described separately from electric field due to differences in their behavior. The magnetic field is simply an effect on the surrounding environment that results, similar to the wind created by a spinning fan. The wind is not a physical substance that can be isolated and contained; it is a physical phenomenon resulting from the disturbance of air particles by the fan. Based on these observations, we can conclude that the magnetic field is merely a property of the electric field and not a substance itself.

From on the above discussion, we can now conclude that the positron and electron are composed of electric field. The terms electric field and electromagnetic field can be used interchangeably.

1.3 Properties of the Electric Field and the Structure of the Electron and Positron

The electric field is identified with the physical tendencies to be uniform in density and direction. This is what has been observed so far. The reason for these properties requires further study and is not included in this discussion. Due to its properties, if electric field were to be placed in a random, empty space, it should immediately begin reorganizing itself into an arrangement that allows it to have both an even density and a uniform direction. The primary assumption of the structure of the electric field based on these two properties would be a flat, uniformly directioned arrangement similar to that of a rectangle, as shown in ***Figure 1***.

Figure 1: *Parallel field structure*

This model of the field satisfies the second property of electric field uniformity in direction, but does not allow for the field to be even in density. If we imagine ourselves at the very edge of this parallel field, then we can see that in one area, the field density has some nonzero value while in the area immediately next to the field edge, the field density is zero. In order to satisfy both properties, the structure that best allows for the field to achieve an even density and uniform direction would be a spherical structure similar to the one shown in ***Figure 2*** with the structure's densest area being near the center and gradually extending out into space with a decreasing density at a specified rate. This radiating field can extend outward a great distance away, but as it spreads farther and farther from the center, its density decreases.

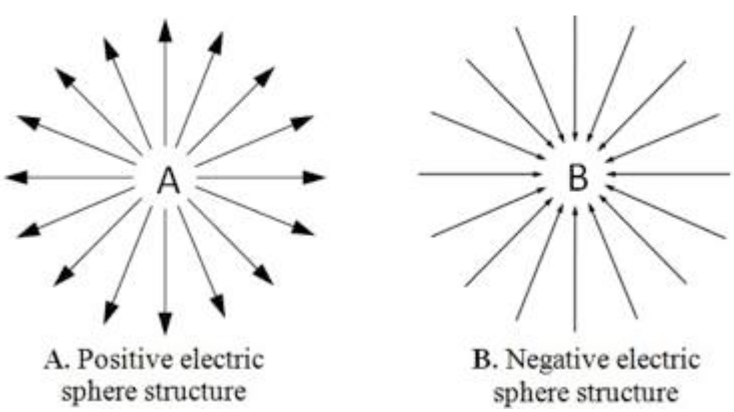

Figure 2: *Spherical field structure*

The electric field as a spherical structure explained above can have two variations that have an equal tendency to occur. The first is a ball-like structure with the field radiating outward from a central core of empty space (***Figure 2-*A**). A second model is also a ball with identical properties and density but with the field radiating in the opposite direction, in toward the center (***Figure 2-*B**). The center of the sphere is empty because the field is always opposite in direction to the field directly across from it, causing repulsion. Both of these sphere structures satisfy the two main properties of the electric field and are the two basic forms electric field should exist in its natural state. These two structures are reflected in the opposing natures of electrons and positrons.

Another relative stable structure is a circular structure of field as shown in ***Figure 3***. This structure will be discussed in the section on black holes.

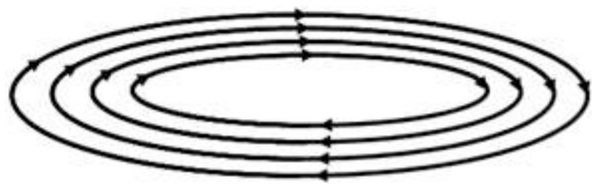

Figure 3: *Circular loop field structure*

The difficulty in accepting the idea that matter is composed of electric field is that we always think of particles as having shape and volume, while field is abstract and shapeless. In reality, the field and particle have never been separated; we have never observed a particle without field around it. With the following discussion, we will find that field is not abstract; it is the underlying basic component of all material.

1.4 Electron-positron Interaction

Electric fields have a tendency to maintain a uniform direction as defined by one of its basic properties. The two variations in its structure, which were discussed in Chapter 1.3 naturally result in interactions with one other. ***Figure 2*** illustrated the two spherical forms that can occur in nature. As soon as these two opposing structures come into contact with one another, the electric field's tendency to achieve uniform direction comes into play. Both spheres shift and adjust to try and maintain their own consistent direction. Once an area of their field becomes aligned, they begin to pull toward each other as in ***Figure 4.***

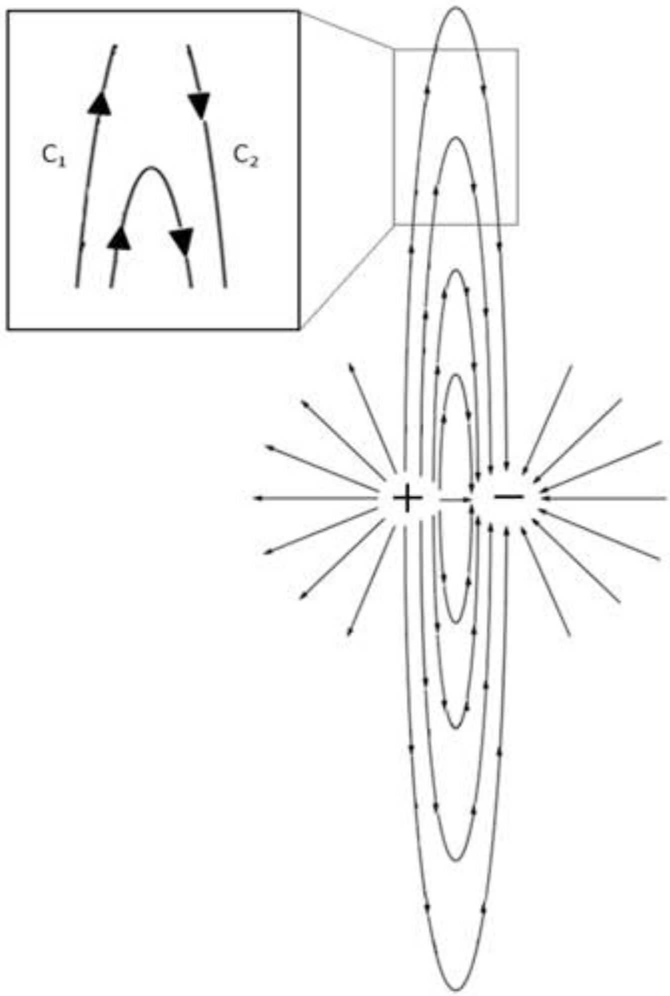

Figure 4: *Electron-positron attraction*

As the two spheres near each other, the field between them becomes squeezed and distorted. The field in areas C_1 and C_2 are initially rather aligned to each other when the spheres are far apart. As the positive and negative spheres get closer to each other due to attraction between the aligned field, areas C_1 and C_2 are pressed so that they become oriented increasingly parallel to one another (magnified area in ***Figure 4***). Since C_1 and C_2 are opposite in direction, they repel one another. As C_1 and C_2 near each other, the density of the field between them increases and provides a repulsion that continuously increases in magnitude. The two spheres stop moving toward one other once the net opposing and attracting interactions become equal in magnitude.

Areas C_1 and C_2 begin repelling each other as soon as the two spheres align with each other, but the force is negligible since the spheres are farther apart from one another and the field is not bent to such an extreme degree.

This double ball structure is the structure of the photon of γ-ray. We will discuss why this structure allows photons to travel at such high speeds in Chapter 3.

1.5 Force

Another very basic term used in physics is force. As we have discussed above, when two oppositely charged bodies are placed in a system, their positions might not align or balance perfectly. Governed by the properties of the electric field, they will automatically adjust themselves to the most reasonable position. If they are too far away from one another, they will attract one another. If they are too close together, they will repel from each other. We interpret these pushes or pulls as force. Rather, force is not a separate, external influence on a body; it comes from the body itself and the bodies it is interacting with. Force will only occur if electric fields are imbalanced. As electric field exists in spherical structures, force between spheres frequently result due to the inability of round shapes to align perfectly with each other as cubes can.

With the following discussion, we will find that all matter and gravitational field in this world are made up of electric field. So we can say that force occurs when electric fields uneven in density and/or nonuniform in direction attempt to rearrange themselves so that the two above properties may be achieved.

1.6 Charge

Charge is a very basic term used frequently to describe a body that can move when it is placed in an electric field. We also know that both the electron and positron are charged particles.

As discussed in Chapter 1.4, a rectangular or parallel electric field is formed between an electron and positron when it is seen on a large scale. When an electron or a positron is put in a parallel field, their round shapes cannot align perfectly with the parallel field around them. This causes them to move toward a more reasonable position within the system according to their properties**.** So we can conclude that charge results from the spherical shape of an electric field.

The charge of an electric sphere is determined by it's "in" or "out" field orientation. An "in" sphere would have a negative charge while the "out" sphere would have a positive charge. Particles with opposite charges, like the electron and positron, seem to "attract" each other strongly due to the field tendency for uniform direction. Particles with the same charge repel each other because there is no way to adjust the two structures so that their fields flow in the same direction. When there are no outside forces present, two spherical particles will adjust themselves until their field directions are aligned, such as with a positron and an electron, or they will repel each other, such as with two electrons.

Since both an electron and a positron are made of identical material, we can predict that positively and negatively charged particles, such as the positron and electron or charged particles which have lower field density than the positron and electron, can interconvert from one to another.

1.7 Subatomic Structure of the Atomic Nucleus

In a nuclear reaction, the atomic nucleus discharges a β-ray (electron/positron), γ-ray and other particles. But regardless of the particles released, the overall charge of the entire reaction remains the same. The common misconception of a nuclear reaction is that an electron/positron and the various other particles released are formed from materials in the nucleus when the nuclear reaction occurs. But the charge of the atomic nucleus, upon releasing an electron or positron, decreases accordingly to the number of electrons or positrons released. For example, in a nuclear reaction where one electron is released, the atomic nucleus increases by a positive charge of one. Since charge is determined by the electric field structure of a particle, this would only be reasonable if the electron had retained its structure in and out of the nucleus. If the electron had been formed in the nuclear reaction, the charge would not have remained constant. The same process applies to the positron. In nuclear decay, a positron or electron are released in each step, and at each step, the atomic charge either increases or decreases by a negative charge of one depending on whether a positron or electron was released. This implies that the atomic nucleus itself is constructed of electrons and positrons since they do not change their structure in or out of the nucleus as shown by charge. If the nucleus of an atom is made of electrons and positrons, then all matter in the universe is constructed of electrons and positrons.

Congregations of electrons and positrons can also form large particles like protons and neutrons, etc.

Other particles formed in nuclear reactions, such as the neutrino or other low field density particles, will be discussed in the section on nuclear reactions.

1.8 The Gravitational Field

Since material are made of electron and positron, a normal material has an alternatively positive and negative charge on the surface because two spheres of the same orientation cannot exist next to each other in such close proximity ***(Figure 5)***.

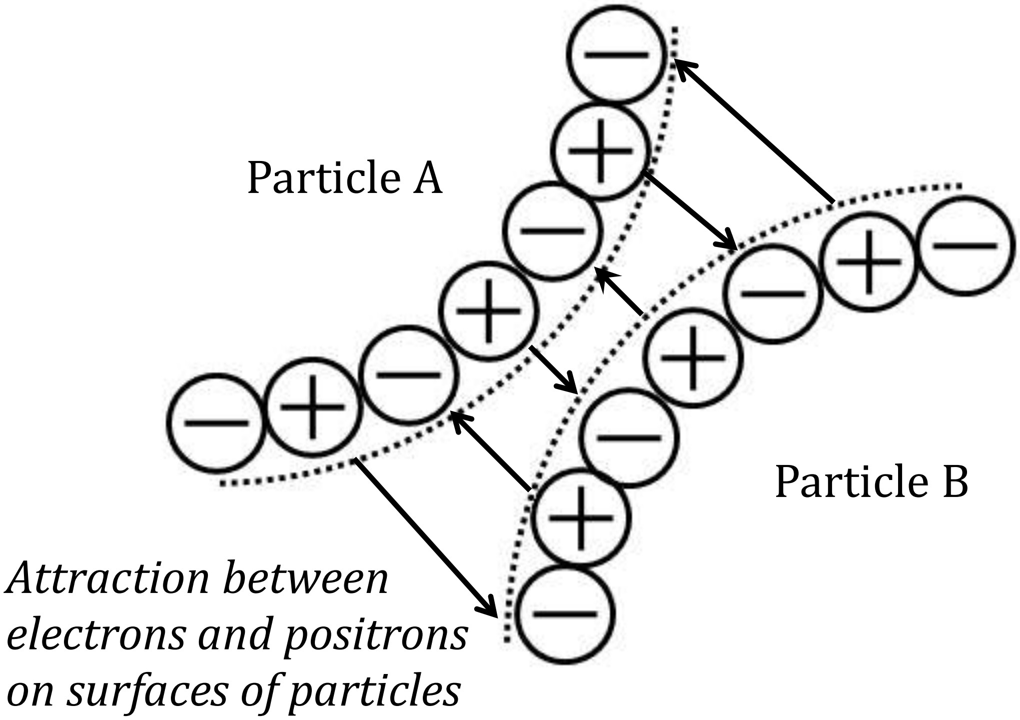

Figure 5: *Surfaces of two particles*

When two surfaces near each other, the alternating charges attract one another. We call this attraction gravity. Since all matter is made of electrons and positrons, the more mass the object has, the more electrons and positrons it contains and therefore, more attraction to other objects. All larger objects have a surface identical to ***Figure 5.*** No matter where they are in the universe, they will always be in contact with other objects of the same surface. No matter how far they are, the two surfaces will attract each other, resulting in the phenomenon we identify as gravity.

Christian Beck and Michael Mackey in their laboratory tests on dark energy found that when the frequency of electromagnetic radiation drops below a certain level, the electromagnetic radiation disappears (4,5,6,7). They attempted to explain this phenomenon using dark material, but I believe this is actually an example of the exchange between electromagnetic field and gravitational field. Because gravitational field is a form of low density electric field, when the field density in the electromagnetic radiation drops lowers than that of the gravitational field, it will become damaged and absorbed by the gravitational field. Photon absorption will be explored in depth in Chapter 3.

Based on all of the above discussion, we can conclude that the world is made up of electric field.

1.9 Reinterpretation of $M_1 = aM_2$

Suppose we have two bodies with masses M_1 and M_2. Based on current physics, it is very easy to write down $M_1 = aM_2$ to demonstrate the relationship between the two masses. Mass is defined as how much matter in an object. If M_1 or M_2 are constructed of different basic components or different ratios of basic components, how can we compare their mass? Only when two bodies are made up of a single component can they be compared. This means that, although we do not realize it, we have been treating matter as if it were composed of a single component since the beginnings of physics.

1.10 Field Density

Electric fields tend to align in the same direction. When a number of spheres are placed together, they adjust. But this adjustment can only occur between spheres of equal density. If a sphere of lower density than the remaining spheres were to be introduced, the sphere would be “torn” apart as each of the other more dense spheres surrounding it attempted to adjust it to conform to their own field direction. Theoretically, electric fields can exist at a very low density. But due to this hierarchy of density, only the densest particles would be able to remain in an environment. The less dense particles would have immediately been ripped apart and absorbed by the densest spheres. Therefore, in an environment, only the densest particles would remain. This is why there are no particles of a lower density than an electron in the nucleus.

We can say that field density is a relative value. In any given location, the densest, or standard, field is that which can damage all others.

In our environment, the center of the positron or electron has the highest density and is thus possesses the standard field density.

1.11 Low Density Electric Field Particles

We have mentioned that electric field density is at a maximum at the center of an electron or positron. Theoretically, any kind of particle whose density is lower than that of an electron or positron may exist. Since the density of the particle is lower, it becomes damaged by higher density field particles such as the electron. Normally, lower density particles cannot exist for too long unless they become photons. This can help us understand the Fractional Quantum effect (8). This will be clearer after we discuss how a photon is formed in Chapter 3.

Based on this, we can conclude that there are no low density particles in the nucleus. The observed low density particles, like the neutrino, are formed during a nuclear reaction. We will discuss more about this in the section about nuclear reaction.

1.12 Particles Lack Boundaries

We will discuss the universe in the last paragraph in this book. From now to the second to last paragraph, all of the discussion will be about the substances in the universe. Please do not mix them.

From the basic component of matter and the properties of electric field, we can see that individual particles of matter do not actually have a definable boundary; the field extends until it meets with other field. To separate the particle and the field is inaccurate; in reality, they are never separated. The boundary that we use to define individual particles is actually a limit we have set outlined by the path of a photon around a particle. But even photons of different wavelength have different reflection path radii. In terms of electric field, there are no boundaries on a body.

1.13 Vacuums

A vacuum is currently defined as an area devoid of particles, but from the above discussions we can see that the areas of space that we currently deem as vacuums are actually areas filled with low density electric field. This implies that true vacuums do not exist in the universe.

CHAPTER 2: Movement

Even though all material in the universe is connected by electric field, when we study a certain body, it can be advantageous to separate it from the electric field around it. For example, when we study a chair, in some cases, it may be necessary to ignore the gravitational field around it. But we have to remember that the models or theories generated by these simplifications can only be used in certain conditions. In certain conditions, when the ignored field plays a significant role, it has to be included to avoid error. If we continue to follow the model of isolated bodies, we are able to discuss some properties made more apparent by isolated bodies. First we start with movement.

Movement is so basic in physics that it is involved in almost all areas of study and theory. We will discuss two parts in this chapter: 1) why a body moves, 2) The absolute meaning of movement and the relative meaning of its description.

2.1 Why a Body Moves

We have discussed in Chapter 1 that the electric field has a tendency to maintain a uniform direction and density. When the field in between bodies cannot satisfy those properties, they will adjust their positions to best achieve those properties. This rearrangement of unbalanced field is what we see as movement.

2.1.1 Rolling or Angular Movement

Since the basic components of all matter are spherical structures, larger particles (protons, planets, etc.) are spherical in shape as well. This kind of structure is superior in maintaining an internal structural balance, but is unable to completely balance with other spherical bodies. When two spheres encounter each other, the distance between the fields at each point on each sphere is different and so the two sphere systems cannot reach a balanced configuration. As a result, the spheres roll around one another and continue to do so as long as they are not affected by any external electric fields. Because of the mass difference, lower massed particles appear to roll around higher massed particles. For example, electrons roll around the nucleus. This kind of movement does not cause any net exchange of electric field between the two bodies in the system. Photon movement is a very good example of rolling movement; this will be discussed in Chapter 3.

2.1.2 Movement in General

We already mentioned the attraction between the electron and positron in the last chapter; repulsion will now be discussed.

Let us analyze the simple movement of an electron in a parallel electric field. When an electron is placed in the electric field, not all of the electric field of the electron will be oriented in the same direction as that of the uniform field. As a result, the field in the electron will shift in position to attempt to line up with the uniform field. This shifting causes the uniform field to warp as well as that of the field in the electron. This warping of field causes instability to the balanced spherical structure of the electron itself and so in order to re-achieve its original balanced condition, the electron will move. If the external uniform electric field is formed by another electron, the movement is seen as electron-electron interaction. Let us start with the initial state of this system. Since electrons repel each other, they are initially a far distance apart. To bring them closer together, an external force has to be applied to one or both electrons. This push causes the density of electric field around the electrons to increase. When the external force is suddenly removed, some electric field still left around the electron. This extra leftover electric field prevents the electron regaining its original balanced state. The electron will keep moving until it loses the extra field to the environment, such as in collisions with other field or from friction. The speed of the electron will decrease as field is lost.

In a large particle, which is made up of electrons and positrons, the field direction on the surface should be alternating in direction. On a neutral body the amount of field pointing outward and inward is equal so the net charge of the body is zero ***Figure 6***. For a charged particle, there is more field pointing either outward or inward than in the opposite direction. Thus, the net charge is not zero. For example, a negatively charged body would have more field oriented inward than outward as in ***Figure 7***. In the field produced by this kind of body, the electron is still repelled. The movement is still the same as in the electron's field. Excess field causes the electron to lose its original balanced state which in turn causes the electron to move away until the extra field is lost. For the same reason, removing a quantity of field from a balanced body will also cause the body move.

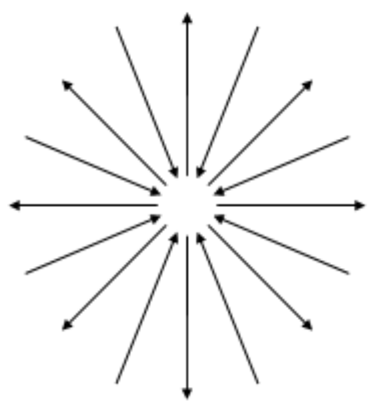

Figure 6: *Neutral particle*

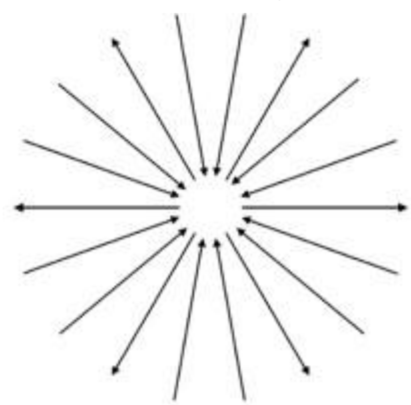

Figure 7: *Negative particle*

In all circumstances and systems, movement of a body is always caused by either an excess or lack of field that prevents the body from attaining a balanced state.

So it can be said that movement occurs when an addition or subtraction of field from a balanced body causes it to lose this balanced state.

Theoretically, we can define an absolute static condition in which the electron or positron are perfectly balanced without any interaction from any other electric fields. But since all material is connected to each other through electric field, this kind of condition does not truly exist in our universe or it is very hard to be defined.

A point we should mention here is how the internal structure changes as different conditions are applied to a body. For example, assume there are two identical bodies: one at rest in a cart (also at rest), the other one on a cart traveling at some nonzero velocity. Since the moving body and cart are not at rest, they must have some kinetic energy in the form of extra mass. As such, when the two bodies are compared, their internal structures should be different from one another because the addition or subtraction of electric field causes all of the electric field in that body to become imbalanced and shift. If the cart is moving because someone applied a force to it, it means that some field was transferred to the cart and the body on the cart. This field causes the entire internal structure of the body shift to a new condition resulting in movement of the body and cart. If there is no friction between the body and the cart, then the field from the person who pushed the cart has not been transferred from the cart to the body. Thus, the body will not move with the cart and the cart alone will begin moving from rest. We can say that bodies in different moving condition have different internal structures.

From the above discussion, we can conclude that movement is due to imbalances in the internal structure of a body resulting from the gain or loss of field. We can choose any other body as a reference to describe a moving body, but we have to remember that the reference itself may be in motion. To determine if a body is moving or not, you need to compare its internal structure to that of an absolute static body, like an electron or positron whose field lines all point radially perpendicular from the center.

2.2 A Description of Movement, Kinetic Energy and Momentum

Movement is generally described in terms of velocity. ***Figure 8*** is a simple model where body A moves towards body B with speed v. If we choose A as a reference point, then B moves toward A with speed $-v$. This is because distance lacks an absolute value; it can be either AB or –AB depending on the chosen reference point. For the same reason, time has the same property.

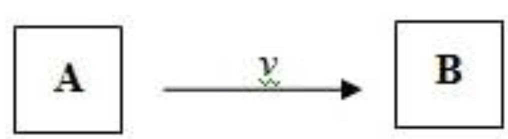

Figure 8: *Body A and B system*

If A and B collide, and movement of one or both bodies changes, then electric field has been transferred from one body to another. No matter what body is chosen as the reference, the net direction of electric field transfer is always the same, either from A to B or B to A. We cannot say that field is transferred from B to A in one reference frame while, when the collision is viewed in another reference frame, field is transferred from A to B.

Kinetic energy and momentum have always been described in terms of their influence on the motions of bodies, but they have never been defined qualitatively with absolute value. Because speed is defined in the relative terms of time and distance, momentum and kinetic energy are naturally relative as well; they can change when different references are chosen. If we use the transfer of electric field to describe momentum and kinetic energy, momentum and kinetic energy can now be described qualitatively with absolute value: it is the transferred electric field when the bodies collide.

Although we may know that kinetic energy and momentum consists of transferred electric field, it is not easy to describe the momentum and kinetic energy quantitatively in terms of transferred electric field because it is difficult to measure how much electric field has been transferred and how this transferred field affects the internal structure of the respective bodies. Also, when electric field is transferred from one body to another, some of the field may be changed into photons or heat etc.

In certain cases involving rolling movements, such as the rolling of an electron around the atomic nucleus, there is no net electric field transfer. We can still use angular kinetic energy or angular momentum to describe such a system, but this angular kinetic energy and momentum specifies the distance or the strength of the interaction between the two bodies. Loss or gain in kinetic energy or momentum from this system means that the distance between two bodies has changed.

2.3 Discussion of Time, Space, Material and Movement

Space, time and material are three basic concepts in physics theory and our daily life. Even though we used them every day, their real meaning and relationships are still discussed because they are involved in almost all physics theory. Below is a discussion on their definition and relationship. After that, we can clarify some confusion in current physics.

2.3.1 Space

Let us start with pure space without any time or material involved. Space does not have a starting or ending point; it is infinite in all directions. Mathematically, space can be defined by three dimensions: X, Y, and Z. Once a zero point and the direction of X, Y, Z is chosen, all other points in space immediately become defined as well. Since space is endless in all direction and uniform at all points, there is no concept of movement.

If we set a frame in pure space, then this frame is similar to Lorentz's ether system. The difference is that this space system has no material (ether) in it.

2.3.2 Time

Time is similar to space, as it also does not have a starting or ending point. But once a zero point is chosen, all other points on the time line are defined. As a result, time does not have the concept of movement either.

2.3.3 Material

Material is the only thing that has an absolute and definite value at all times in our world: it either exists or it does not. If nothing exists, we give it the value of zero. If it exists, we assign it a nonzero value. Current physics theory has negative mass or energy, etc. We will discuss why this happens later.

2.3.4 The Relationship Between Space and Material

We always think that there is first an empty space, and then material fills in that space. What we are actually referring to is whether or not there is material in the room. If there is an absence of material, we say there is space where the material would be if it were present. If material is present, then we say that there is a lack of space. We can move material in and out to gain or lose space, but we cannot move space. This implies that space is always there and, furthermore, it does not interact with material. But relative theory says that material and space are related. We will discuss why this happens later.

We can say that our universe is made up of a finite amount of material present in an endless space. So we can say that space is endless, but the universe has an edge and is not infinite.

2.3.5 Method of Measuring Time and Space

We use a clock or ruler to measure time and space, but clocks and rulers themselves are made of material. They are not time and space.

For space, once a zero point and an x, y, z coordinate system are set as a reference, a ruler is chosen to measure the space. All points in the space have an absolute value.

For time, once a zero point on the timeline is chosen and a clock is chosen to measure the time, all time points have an absolute value.

Space and time are uniform at all points.

2.3.6 The Relationship Between Change and Space, Time

If we put a piece of iron in a dry nitrogen container, you can store it for a very long time. If this container is put in any place of same environment, it can still be kept for as long as you want without change. But when it is put in chloric acid, it can react quickly. This reaction means the original balance condition is broken. The electron in the iron atom rearranges to form a new balance condition. This tells us the change or movement of material is not relied on time and space. It relies on the other materials, which make contact with it. Only other materials can break its original balance. Time and space cannot make an object change, but we need them to describe the changes. Change is actually caused by rearrangement of material.

2.3.7 Description of Movement

We have discussed that all changes in material are due to the movement of material from one object to another. But in current physics, movement always means a change in relative location between particles. Since it is included in some of the most important theories, like the theory of relativity, we will discuss it here separately.

We always use speed to describe movement. Speed has distance and time in it. As we discussed above, once a reference point is chosen, space and time has its absolute value. If we introduce a particle to this system, then the speed should have its absolute value. This value determines if the object moves or not to the pure space frame. This system is similar to Lorentz's aether system. If a totally balanced electron or positron is introduced to this system, it should not move. So we can say that movement has absolute meaning both materially and mathematically.

We have discussed the relationship of time, space and material. Let analyze the confusion of current physics.

2.3.8 Time and Space in Relative Theory

There is an event H happening. We can choose any coordinate system to describe it. Einstein starts his theory by comparing two coordinate systems: one is a stationary system K defined by the coordinates X, Y, Z; the other is a moving system K' defined by coordinates X',Y', Z'. Based on our discussion about space, these two systems are not space any more because space cannot move. They are bonded to the reference objects. Although we still use the same unit of length, the X, Y, Z, and X', Y', Z' is not space, they are actually the distance between the event and the moving reference object. But they were incorrectly called space. This concept switch causes space to be related with movement.

We may argue about how we can choose a coordinate system to describe an event in space if there is no object as a reference. If we can find an absolutely balanced object as reference, like perfect balanced electron and positron, the frame will be the same as the frame in pure space. Otherwise we cannot use X, Y, Z and X', Y', Z' to stand for space in relative theory and all other theories. This should be the distance to the reference object. To a pure space and time system, no matter how a reference point is chosen, movement has its absolute meaning, that the speed is constant. But when choosing an object as a reference point, the movement turns to be relative.

2.3.9 Time dilation

Lorentz noticed time dilation when he tried to transfer his coordinate system from aether system to object. Then he put an uncertain factor in his time and space. Later this factor was defined with speed v and c. After we discuss movement , we know that to make an object move, some material transfer from or to the object must be involved, and in some cases, internal rearrangement; this means the moving object is not the same compared to the static object. For example, we have two balls, one is static, the other is moving. We always treat the balls the same in classic physics. To make the ball move, we have to add or remove some energy from it. This will also affect the chemical reaction or other properties of the ball. This is why we observe time dilation. If we have two clocks, one is static and one is moving, they may not be synchronized any more. We are comparing different clocks.

Since both Einstein and Lorentz mentioned the observers in two different frames and both observers observe the same event by receive the photon from the event, there is a correction for this because both observers have different distances from the event. This correction can be simply calculated in Galilean transformation. This correction can be done in between any kind of coordinate system, like rotating frame etc.

2.3.10 Light speed

Because of a photon's unique structure (this will be discussed in chapter 3), it cannot attain balance. So it keeps moving until it is absorbed by other object. This is why its speed does not rely on the light source. Moving is its own property. But photons will interact with the environment. If we assume the environment is even, we can treat a photon as if it has a constant speed. This speed is based on a pure space and time frame, but for observers in different speeds, its speed is different.

In relative theory, Einstein mentioned that light speed is the same to all the observers. This is not correct theoretically, but in reality, most objects' speeds are very low compared to light speed. So we can approximately treat light speed as constant to all observers.

2.3.11 Why Relative Theory Works in Many Cases and What Confusion Does It Cause?

Even though we should use pure space and time to describe movement theoretically, in reality we have to use an object as reference to measure those values. This automatically makes these application to be relative. So relative theory is useful in many real cases, but it mixes up the distance and space concept. Energy was treated as relative, then mass as well. This causes confusions in further development. Another problem is that time dilation is incorrectly interpreted.

2.4 The Relationship between Speed and Mass

Einstein's equation (*below*) states that the speed of a particle is related to its mass. As such, it implies that in order for an electron to reach light speed, an infinite amount of mass must be added to it. But in the pair production test, the addition of a positron to an electron results in a photon that travels at light speed. This means that speed is solely determined by the structure of a body, not its mass.

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

CHAPTER 3: Light

We mentioned the γ-ray photon structure in the section on electron and positron interaction. The next step would be to ask if bodies with identical structure but lower densities at the center of the double ball structure could exist. Lower density implies lower energy; since light does indeed vary in energy, this indicates that photons with a density lower than that of the γ-ray do exist. These photons have lower a mass than that of the γ-ray; γ-rays are the photons with the highest mass.

3.1 Photon Movement

When we discussed rolling movement in Chapter 2, we mentioned that the electron circles the nucleus with a rolling movement. Another example of this movement is demonstrated by photons. In the double ball structure of the photon, the alignment of field is strongest where the distance between the centers of the two spheres is shortest. Field farther away from this axis is unable to reach the same density as this denser field and so the system of the photon is perpetually imbalanced. As a result, the two spheres attempt to reach a balanced state by rolling. The special case with a photon is that both the positive and negative spheres have the same mass; thus, they do not exhibit the rolling movement of atoms where the smaller body rolls around the larger one. Instead, the two spheres roll against each other causing a forward movement. From the above discussion, we can say that moving is a property of photons where its speed is caused by itself. Light speed is not affected by the speed of the light source, but since there is constant interaction between the traveling photon and the field in its environment, light speed is affected by the field environment the light is passing through.

Since both spheres in a photon are equal in size and density, they roll forward at the same angular speed. Thus, the direction of movement for a photon is always perpendicular to the radial line between the centers of the two spheres. The direction of photon movement is determined by the initial conditions of the light source. Once it begins moving in a certain direction, it will continue to travel at a nonzero speed until it becomes destroyed by another denser particle or field. Other particles or field can cause reflection or inflections in the path of the photon, but no matter which direction the photon changes, the direction of movement is always perpendicular to the radial line between the double spheres in the photon.

3.2 Wave Phenomena in Light

Both light and waves on the surfaces of liquids exhibit wave phenomena, but they are different in nature.

3.2.1 Wave Behavior with a Medium

A frequently observed wave phenomena is wave behavior in water. Such waves are usually caused by periodic oscillation of some source that causes the surrounding area to exhibit wave movement in the water. Due to the existence of a media, water, when two waves encounter each other, interference of waves from different sources can be calculated by adding or subtracting the wave forces from each wave.

3.2.2 Wave Behavior Without a Medium

Light waves are different than water waves. Photons traveling in the same light beam interact with one other as well as with photons in adjacent light beams. From ***Figure 9***, we can see that light has wave properties. The wavelength of light is the distance from one sphere in a photon to the next sphere identical to itself and oriented in the same direction. Because higher density photons attract one another with greater force, they have shorter wavelengths.

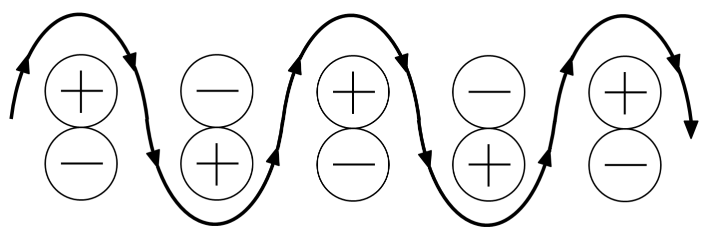

Figure 9: *Wave properties of light*

In the light interference test, photons should not be cancelled out when they meet again after passing through the double slits. But because the photons from the two slits can only be oriented in two configurations where the photons in the second configuration are oriented in the exact opposite direction of the first, they will repel or attract each other when they meet again. This causes some areas to have higher concentrations of photon beams and appear bright while other areas have lower concentrations and appear dark (***Figure 10***). We call this photon beam interaction, interference.

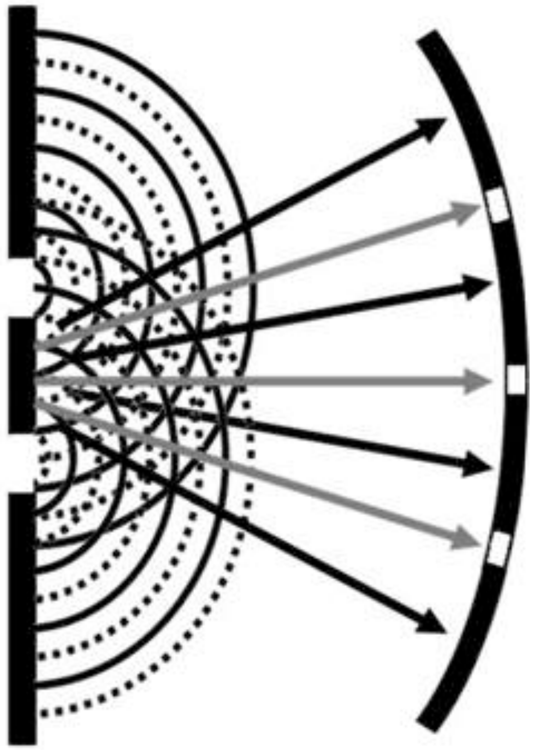

Figure 10: *Light interference in the double slit experiment*

3.3 The Emission and Absorption of Light

Photons have both a positive and negative spherical component. When a photon encounters an atom, the positive sphere becomes attracted to the atom's electrons while the negative sphere becomes attracted to the nucleus as shown in ***Figure 11***.

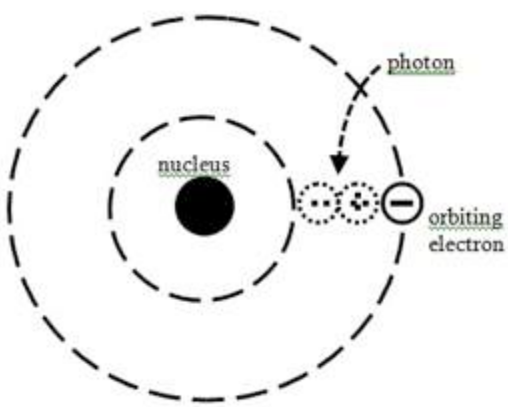

Figure 11: *Absorption of a photon by an atom*

With the exception of γ-rays, other photons have lower field densities than that of the field between the nucleus and its electron and so are destroyed as they enter this higher density field. The destroyed photon contributes excess field which is distributed evenly around the nucleus of the atom, causing the electron to move farther away from the nucleus. An atom in such state is defined to be excited.

The excited atom, as a result of absorbing extra field from a photon, has been altered from its ideal stable state. When the excited electron attempts to return to its original stable condition, the extra electric field between the electron and nucleus will be expelled. The expelled field can immediately rearrange to form positive and negative spheres and leave the nucleus as photons or as individual charged spheres. The charged spheres can easily interact with other bodies. Photons leave the atom quickly due to their neutral and fast moving nature.

Two or more photons which have lower density than the electron or positron have the potential to form a larger neutral particle. These particles are the neutrinos. In neutrinos, the individual spheres have a lower density than that of the electron or positron. Thus, they can be absorbed by atoms.

The field density of γ-rays, being constituted of an electron and positron, is very high. As a result, the field between the electron and nucleus of an atom cannot damage and absorb γ-rays without destroying itself. γ-rays are the only photons that are able to penetrate the nucleus.

In lower frequency light, the field density in a photon is lower than that of an electron and positron. Because its density is lesser than the critical density threshold set by the electron/positron, these lower density photons can merge together to form new, more dense photons if the combination of the two photons' field results in an equal or lesser field density than that of the γ-ray. A photon formed from two other photons has a frequency that is twice that of the original photons. Photons of different density can merge also to form a new photon with each sphere in the double ball structure possessing half of the total mass of the original two photons. This may happen very frequently in the early stages of photon formation.

3.4 Further Explanation on the Movement of Photons

From the light absorption section, we can see that the field from a photon is destroyed and distributed around the atom when it becomes absorbed by that atom. Such extra mass does not contribute to any linear movement in the atom and does not cause the atom to change in location in any way.

When light strikes and is reflected from some material, it may lose some of its field mass. As a result, the reflected light should have a longer wavelength (or lower energy) than the incident light wave. This is the phenomenon observed when light strikes a material and imparts a nonzero kinetic energy onto the material as seen in solar sails. The kinetic energy imparted onto the sails is the mass lost by the striking photon.

Another phenomenon of light is that when photons travel from a medium of lower density into a medium of higher density, their speed decreases. When they re-emerge from the higher density medium back into the lower density medium, their speed increases back to their original speed. This is never seen in kinetic movement. For example, a bullet cannot regain its original speed after it passes through a wall because it loses a portion of its field to the wall. On the other hand, photons with components of a lower density than that of an electron can be compressed radially inward by the field in a denser medium so that their density is always equal with that of the medium. When the field density of the medium increases, the photon is compressed to a smaller size, its density and frequency increases, and its speed drops. This will be further discussed in Chapter 3.5. When the photon returns to a lower density medium, it expands and its density and frequency decreases while speed increases. The photon did not lose any field during the process and so its total mass has not changed. So we can see that light speed is determined by its internal structure and media only; its speed is unrelated to the speed of the light source.

3.5 The Speed of Light

Imagine the movement of a photon as two gears of equal size and the same number of teeth rolling into one another. The speed of the gears is determined by two factors: one is the diameter of the gears (gears with larger diameters will move faster), longer wavelength photon should move faster based on this factor, second is the rolling speed of the gears. Photons with a shorter wavelength roll at a higher speed because the interactions between the positive and negative components are stronger; as a result, they travel at a faster pace with a greater angular velocity. Based on the fact that high frequency light has a lower speed in a given medium than a lower frequency light, light speed is mainly determined by the diameter of the photon.

We have discussed that there is no vacuum in the universe. Vacuum is a weak field medium. In a given medium, there are numerous areas of weak field that exist between individual atoms and between the electron and the nucleus of each atom. When light passes through a medium such as glass, only the photons which travel in the areas of weaker field can pass through undeflected. The photons which hit the electron or nucleus will be absorbed, then expelled (reflected). Since light speed is proportional to its wavelength in a material medium, such as glass, it should also be proportional to its wavelength in the vacuums as we have defined them. Einstein’s assertion that light speed is a constant value in vacuum is inapplicable here because areas devoid of electric field do not exist.

CHAPTER 4: Energy

We have discussed the absorption and emission of light. When a photon is absorbed, the whole structure of the photon is damaged. The electric field from the photon merges with the body and causes the energy level to increase. Also, when two bodies collide with each other, some of the lower density field transfers from one to the other. This causes the bodies' energy condition to change. Based on the above discussion, we can conclude that energy is the low density electric field which is transferred from body to body and causes changes to body conditions. Because of its low density, its mass is always ignored.

In reality, kinetic energy and momentum are rarely conserved because the field of the kinetic energy or momentum is not as stable as heat. This means that the kinetic energy or momentum has a tendency to turn into heat because heat is a more stable condition. But we can assume that the kinetic energy or momentum is conserved at the moment two bodies collide.

The above discussion can help us understand why work can turn energy to heat without environment change, but heat cannot turn back to work without environment change because heat is a more stable condition.

In Newton's first law, it states that if no other force interacts with a body, the body will either remain in place or move with a constant speed along a straight line. First of all, there are no such conditions in which a body is not subject to a force of some kind since all bodies in the universe interact with one other. Secondly, the kinetic energy of a body will tend to be converted to heat as it moves along since heat is a more stable structure; this causes the body to gradually slow down until the body is balanced with its environment whereupon the body will move with constant motion.

In a vacuum, there is no spherically arranged field (particles), but extremely weak (low density) parallel field or near parallel field still exists. This field is usually caused by particles which are far apart from one another; the distance between them is filled by extensions of their respective fields. This low density field can interact with other bodies that pass through it, but as soon as the body passes, the low density field resumes its original structure as the particles it originated from did not change. This shifting of low density field is what is observed as fluctuations in vacuum energy.

From the above discussion, we can see that material can be transferred either through an exchange of particles or an exchange of field. In an exchange of particles, a body of some sort is transferred from one body to another, such as the transfer of an electron from one atom to another. In this type of transformation, the body being transferred maintains its own basic structure and so particle transfer can also be referred to as a transfer of mass. The other kind of transfer is field transfer, such as photon absorption. In this type of transfer, the photon's original structure is destroyed and merged with the absorbing body to form a new body. The field being transferred is also known as energy. In most cases, there is energy transfer when mass is transferred, but the energy component is not treated as mass.

CHAPTER 5: Other Properties of Matter

5.1 The Structure of the Proton Determines Its Stability

The stability of matter is determined by both its inner structure and its external environment. A proton is considered a relatively stable particle; based on our previous discussion, we concluded that a proton consists of numerous positrons and electrons bound together by their electric fields. The proton mass cannot simply equal the sum of the masses of the individual electrons and positrons because in binding to each other, some field from each electron or positron may be lost in order for greater stability to be attained. Since the proton has a net positive charge, it is reasonable to assume that it contains one more positron than electron. This implies that the total number of positrons and electrons should be an odd number in a proton. The currently accepted mass ratio of a proton to an electron is 1836.15267245:1 from experiment values. Due to the undetermined net loss of field from all electrons and positrons in the proton, the exact number of electrons and positrons in a proton is undetermined. The actual number would depend upon the geometric structure of how the electrons and positrons are arranged in the proton; different arrangements could also result in different amounts of electric field lost and thus affect the calculation in the number of electrons and positrons based on the individual mass of the proton and electron. If we assume a proton has a total of 1837 electrons and positrons, we can then calculate that there are (1837-1)/2 = 918 electrons and 919 positrons.

Although we are unsure of the geometric structure of the proton, we can still understand why it is stable. The ideal structure should be spherically shaped because such a structure allows for each electron or positron to most evenly interact with the positrons or electrons around it. A possible geometric arrangement for the proton could be for the extra positron to be located in the center surrounded by layers of electrons and positrons. To keep each layer stable, the number of electrons and positrons in each layer should be equal in number. As surface area increases layer by layer, the number of positrons and electrons should also increase. But with this of kind structure, the positrons and electrons between layers cannot align perfectly; this causes the positrons and electrons in the proton to roll over one another so that each layer is continuously moving relative to the layers above and below it.

Figure 12 shows the surface of a proton. Due to the positron at the center of the proton, the electrons in the electron/positron layer immediate to the positron are pulled slightly closer to the center than the positrons in the layer so that the surface of the layer becomes “bumpy” when viewed from above.

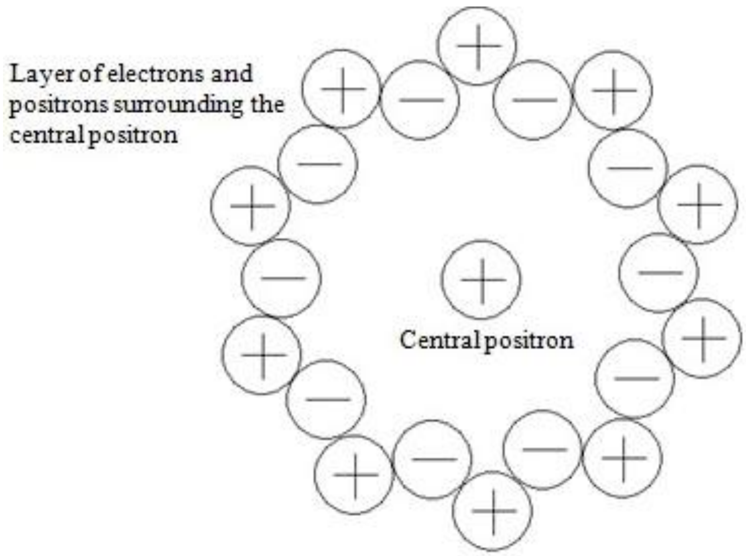

Figure 12: *Electrons move closer to the center of the proton than the positrons*

Protons have a limitation to their size and how many layers they can accumulate because unit area charge decreases with distance from the charge; at some point, the repulsive force of the electrons in the outermost layer will overwhelm the attractive force of the positron in the center and the positrons in the outermost layer. Thus, no more electron/positron layers can be bound to the proton.

Because the proton has a net positive charge, it will still attract electrons. The proton does not have sufficient positive force to bind this electron to form a layer around it but the positrons on the outermost layer of the proton still have enough strength to hold the electron in orbit around the proton. Because the layers of the proton are constantly moving, the electric field density and direction around the proton is constantly changing as well causing the orbiting electron to change direction and proximity to the proton as they move around it. The result is a proton with an extra electron rolling around it. This is the structure for the hydrogen atom. If we map out all the paths of each electron around the proton, it resembles a cloud of electrons. If the proton is a perfect sphere, the electron paths around the hydrogen nucleus should be a perfect circle.

5.2 Why the Movement of the Electron is Quantisized Outside the Nucleus

Each layer of the proton is constructed of numerous electrons and positrons; if we connect each electron or positron to the electrons or positrons immediately adjacent to it with imaginary lines, a multifaceted geometric cage is formed. If we apply these lines to each layer, each layer becomes a successively larger cage and the proton becomes a series of cages each nested inside the next. These series of cages are only stable in certain configurations; if the proton is forced into some other configuration, it reverts to the stable configuration that takes the least amount of rearrangement from its current structure. To give a similar example, if we drop a rectangular prism with side 1< side 2<

side 3 onto a surface, it tends to land in a configuration in which one of the two side 2 x side 3 faces, or the faces with the maximum surface area, is touching the surface. All other configurations, such as landing on one of the other faces with less surface area or landing on an edge, are not impossible but tend not to occur due to their instability. Only certain conditions are stable.

When a photon is absorbed by an atom, the electric field from the photon is destroyed and spread out around the entire atom. This excess field in the atom causes changes to both the positions of orbiting electrons and the inner structure of the nucleus. If the change induced by the excess field results in a stable configuration for the atom, then the atom may remain in this configuration for a longer lapse of time. Thus, we observe such a photon to have been absorbed. But in many cases, this extra field does not result in a stable configuration. In these cases, the extra field is expelled back out from the atom and the atom resumes its original structure. Thus, the quantum behavior of atoms is due to the nucleus' ability to only absorb field that results in certain set stable configurations.

The quantum concepts from Schrodinger's equation and atomic spectroscopy can be explained in a different way. According to Schrodinger's equation, the atomic spectroscopy of hydrogen should be the most complex out of all the elements since it contains only one electron. Because all other orbits in hydrogen are empty, an electron can fall from an excited state to a lower state in any number of combinations, resulting in photon emissions of numerous energies. For other atoms, some of their orbits are filled by other electron and so the excited electron should have more limited combinations when it falls from an excited state and thus emit photons with fewer energies. But in reality, the atomic spectrum becomes more complex as the number of electrons increase in the atom.

Also, in different elements, as an excited electron falls to the same energy level, the atomic spectra should follow the same pattern. For example, all elements before Na in the periodic table should have the same atomic spectrum pattern when the electron drops from some higher energy level to the 3s orbit. But this is not true.

Finally, based on Schrodinger's equation, all isotopes in an element should have the same atomic spectroscopy. But it is also not true.

Actually, Schrodinger's equation gives us an electron arrangement when the atom is in a certain stable configuration. The atomic spectroscopy is due to the nucleus shifting from one stable configuration to another in various combinations. When the number of protons and neutrons increases in the nucleus, the number of stable configurations possible for the atom increases as well. This causes the spectrum of more massive elements to be more complex. The differences in atomic spectra of isotopes can be explained by their having different numbers of neutrons in their nuclei. Different numbers of neutrons results in different numbers of stable configurations which in turn causes the spectrum differences.

5.3 The Neutron's Stability In and Out of the Nucleus

Table 1 lists the various masses for neutrons in different isotopes of helium.

Isotopes of helium		He_2^3	He_2^4
Mass of electron(Me)		0.00054863	---
Mass of proton（Mp)		1.00782500	---
Mass of helium isotopes (Mhe)		3.016029319	4.002603254
Mass of neutrons in helium isotopes	Mhe-2Mp-2Me	0.999282059	1.985855994
Mass of each neutron in helium isotopes	Mn	0.999282059	0.992927997
Mass difference between proton and neutron	Mp-Mn	0.008542941	0.014897003
Ratio of mass difference/electron	(Mp-Mn)/Me	15.57140678	27.15309576

We can see that the mass of a neutron differs in different isotopes. We know that the proton is stable both in and out of the nucleus. Two protons will repel each other because they both have a net positive charge, but if they share an electron equally between them, the negative charge of the electron draws the protons together and prevents them from flying away from one another. If we look at this from another perspective and group the electron with one proton, then the proton-electron pair becomes neutral in charge, forming a neutron that is slightly more massive than the proton. This is the basis of protons and neutrons in an atomic nucleus. When two protons share an electron, the whole system cannot be stable as we discussed in hydrogen atom structure. Forming a region in between the protons that is shared by both can stable the whole system. As shown in ***Figure 13***, this loss of electrons and positrons allows for greater stability in the proton-electron-proton structure. In this structure, both neutron and proton have the same structure as proton.

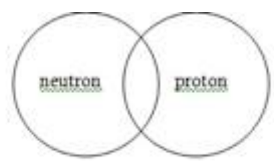

Figure 13: *Sharing of field between two protons*

But when the proton pair is broken up again, one of the protons ends up with less mass than it originally began with, rendering it unstable. This is why the neutron is only stable in the nucleus. The overlapping shared region between a proton and neutron can be different in different isotopes or in different elements due to the differing number of protons and neutrons. This causes the calculated neutron to have different masses in different circumstances.

5.4 Nuclear Reactions

Nuclear reactions occur when the normally stable nucleus becomes destabilized somehow. To counter the instability, the electrons and positrons rearrange to form a new nucleus with a more stable configuration. Rearrangement of the nucleus typically involves the expulsion of extra electrons and positrons which are released in the form of α-rays, β-rays or γ-rays. Theoretically, any particle with a mass in between that of a proton and an electron may be expelled from a nuclear reaction; they may be positively charged with a higher ratio of positrons to electrons, negatively charged with a higher ratio of electrons to positrons, or neutral with an equal ratio of positrons to electrons. We call these expelled particles mesons.

Low density electric field is also released in the nuclear reaction. They do not contain enough field mass to form an electron or positron and so become low density particles. They may be positively charged, negatively charged, or neutral. Charged low density particles are easily attracted to other high density particles, but their low density allows other higher density particles to easily damage their structure. Only neutral, fast moving particles, such as photons or neutrinos, can escape with their structures intact. In fact, it is due to their low mass and density that makes the neutrino so difficult to detect; the structure of the neutrino is easily damaged by higher density fields that may be used to detect them. Neutrinos can also penetrate materials due to their small size and neutrality, but in any case, they do not possess sufficient density to penetrate to the nucleus as the higher density gamma rays can. An example of neutrino capture and destruction by higher density fields is the Cowan–Reines neutrino experiment in which the neutrino is captured and destroyed by the higher density proton.

The neutrino’s speed is determined by its density and size; larger neutrinos have a lower velocity while smaller neutrinos have a higher velocity. The speed of neutrinos covers a large range depending on their size. Neutrinos formed by longer wavelength photons may travel faster than shorter wavelength photons.

5.5 Limitations to Quantum Theory and Entanglement

Our explanation for the quantum behavior of atoms differentiates from Bohr's theory, but it more clearly explains the anomalies in atomic spectroscopy. Schrodinger’s equation is based on his assumption that the atomic nucleus is spherical in shape. His equation is very successful in predicting the behaviors of chemical reactions, but in quantum theory, the field around a particle is ignored. Thus, quantum theory can be thought of as a theory that gives approximate values. Quantum field theory is based on the same concepts as quantum theory. Based on our discussion, it is clear that while quantum field theory gives accurate qualitative results under certain conditions, it is incorrect as a theory.

One of the impacts of current quantum theory is the understanding of some pheonemanon such as entanglement. As we discussed above, all of the material is connected with each other by electric field. They influenced with each other. The whole world is entangled together. For example, the interaction between planets, the interaction between positron and electron, all are the same as entanglement.

5.6 Neutron Stars

When a planet’s density increases, the available space of movement for an electron in the atom will become limited. When the electron becomes so limited that it becomes packed onto the atomic nucleus itself, the structure of the atom collapses and the orbiting electrons become pushed onto the nucleus into a single conglomerate structure. The proton's structure becomes more densely packed as in ***Figure 14***.

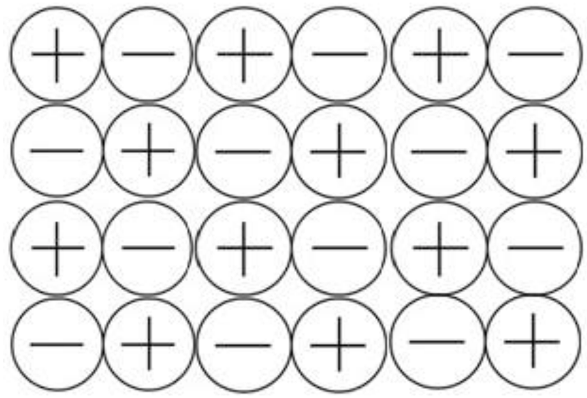

Figure 14: *Electron and positron packing in a neutron star*

This type of arrangement has a minimum amount of space between the individual positrons and electrons in the atom and so the atom overall has a very high density. The compaction of the orbiting electrons onto the proton also makes them neutral in charge; such compacted electrons and positrons are what form a neutron star. The atom structure disappears in this high compacted structure. Its density is even higher than the nucleus. Extra electric field is also released in the form of photons or other particles when the orbiting electrons and the nucleus merge. This results in the emission of light when a planet begins to collapse into a neutron star. Once it becomes a neutron star, it will cease to emit light or other particles; rather, passing particles, photons, or field will tend to be pulled into the neutron star, structurally destroyed and compacted onto the star. As a result, the neutron star appears as a cold star.

5.7 Black Holes

When we discussed the electric field structure of the positron and electron in Chapter 1, we mentioned that there is another relatively stable arrangement for electric field: the looped field structure. Looping the field into a circular shape gives this structure superior stability because all field in a loop is able to maintain a uniform density and structure. In the circular loop structure, the field density can become very high because concentric fields can become extremely densely packed. Its high density can damage regular electrons and positrons. Because it can damage electrons, positrons, and therefore photons, it looks black. We call such a structure a black hole (***Figure 15***).

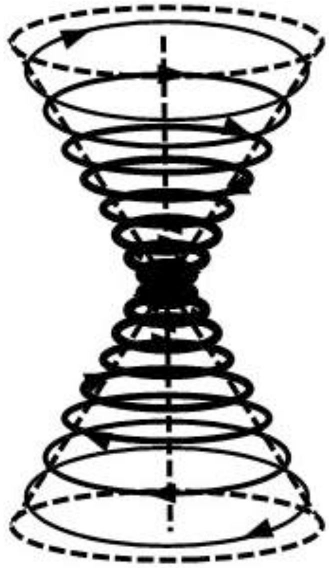

Figure 15: *Structure of a black hole*

Before the field becomes a black hole, it must become very densely packed, as in a neutron star, so that any additional mass causes the spherical structures of the electrons and positrons in the atoms to collapse. The collapse of such a large quantity of electric field is what gives the black hole its high density. Circular electric field can be created in the laboratory but because of the relatively low density of these loops, they are easily damaged by higher density particles.

The high density structure of the black hole allows it to exist for long periods of time. Its ability to absorb surrounding field also causes it to increase in mass and size. Black holes are destroyed when their mass reaches such a critical mass density that the loop structure can no longer be maintained and the center of the loop collapses. Field in the black hole is flung out where they reform immediately into spherical shapes, then, eventually, new planets.

5.8 All Material Has a Positive, Nonzero Mass

Because all particles are made of electric field with a positive, nonzero mass, all particles themselves, including the photon, must have a positive, nonzero mass. A photon is commonly considered to have zero rest mass. This is incorrect. Photons' special structure prevents them from ever being at rest. Thus, a photon can be considered to have no rest mass since it is never at rest, but it does have a nonzero mass. All material, whether particle or field, possess a nonzero mass.

5.9 Sources of Cosmic Radiation

We have discussed that gravity is a form of electric field interaction and photons are emitted and absorbed when the field changes in density. When planets move, their changes in position disturbs the surrounding field, causing some electric field to be emitted in the form of photons and other particles to be absorbed. Since planetary bodies are in constant motion, this emission and absorption of field occurs continuously and the net amount of field emitted becomes a significant amount. This constant emission of field is the source of cosmic radiation in the universe.

5.10 Red-shift and Blue-shift

When light travel from a high density gravitational field to a low density gravitational field, the light stretches to a longer wavelength. Vice versa, when light travels from a low density gravitational field to a higher density gravitational field, the wavelength becomes shorter. This phenomenon is referred to as red-shift and blue-shift. We have discussed that the gravitational field is a form of electric field. As we mentioned in the section on light speed, the photon can become expanded or contracted by the density of the medium it is traveling through. When it travels from a high density field to a low density field, such as from glass to air, its size expands resulting in a wavelength increase and a speed increase. The positive and negative spheres continue to roll in a constant speed and so a larger radius results in a higher speed.

Following this reasoning, the density of all particles, including the electron and other particles, can become changed by the density of the field around them. Field density changes with the environment.

5.11 Dark Material

The concept of dark material was created when experimental results for planetary behaviors failed to match with results calculated using Newton’s laws. Thus, it was theorized that there must be material that was undetectable by conventional means which caused the difference. This is actually a good example demonstrating the limits to Newton’s laws. While Newton’s laws can be highly accurate in certain situations, they should be used with caution because the internal structure of bodies contributes to their behaviors. Two bodies with identical mass may interact with their environment differently if they have different structures. This will be discussed in Chapter 5.16.

5.12 Low Density Field Material

In reality, there does exist large quantities of material which are not easily detected. This undetectable material is comprised of the low density field that exists between planetary bodies or any two particles a long distance away from one another. Since electric fields extend outward far away, as long as there are no other higher density fields to destroy or alter it, the field from planetary bodies will continue to expand into space, decreasing in density the farther they spread out from the center of the particle that they originate. In deep space, the distance between two particles can be enormous and the field between them can become very weak. This kind of low density parallel field is undetectable directly with current instruments as they are easily destroyed and parallel, so it appears dark to observers.

5.13 Anti-material

The atomic structure of the matter around us contains a positively charged nucleus orbited by electrons. But the opposite configuration can also occur in which the proton particle contains an extra electron rather than a positron, thus giving it an overall negative charge. Such an atom would be orbited by positrons rather than electrons. If a conventional atom with a positive nucleus meets with its counterpart with the negative nucleus, the electrons and positrons in each will disintegrate into γ-rays and other particles. This counterpart to the conventional atom is what we call anti-matter. Because of this destructive reaction, only one configuration of material can exist in this world. The material that is left is the form that was more numerous and so was spared from annihilation. Anti material may be formed in large quantities in the early stages of nuclear reactions, but because the conventional form of matter is far more numerous, upon meeting with normal material, any anti-material will be destroyed upon contact and rearranged into photons or other particles.

5.14 The Spin of Electrons

The spherical structure of the electron and other large particles makes it very difficult for the two to reach a static state of equilibrium with one another. An electron near the nucleus will roll around it in an attempt to achieve a stable equilibrium state, but the spherical geometry of both the electron and neutron prevents this from occurring. This constant imbalance is why electrons spin when they move around a nucleus.

5.15 Wave Behavior in Matter

We have seen that gravity is a form of electric field. On the surface of large particles, the electric field alternates in direction since the surface of large particles alternate in electrons and positrons. This alternating field causes charged particles to travel up and down perpendicular to the surface, continuously attracted and then repelled by the alternating field as they move over the surface. This path resembles a wave and thus, charged particles are seen to exhibit wave behavior as they move. Neutral particles exhibit wave behavior also since they too, are constructed of positrons and electrons and are also affected by the alternating electric field. When smaller bodies, such as the electron or positron, move in an alternating field, their wave-like path becomes more noticeable than in larger bodies.

5.16 The Unified Force

We have discussed that all forces are caused by the electric field's attempt to rearrange itself into a configuration with uniform density and direction. The question is why forces were separated and described in different ways in physics. Based on our discussion, we can see that force is proportional to the density between two bodies. The density itself is proportional to both the mass and distance from the bodies. Newton’s law, Coulomb's law, and the strong interaction in the nucleus are mathematical descriptions of the same force in different situations. Theoretically, the force between bodies should have a different description at each moment and position because the fields that make up a body are constantly changing. Descriptions of forces are complicated by the fact that the structure of two bodies is also affected by changes in their positions.

Attraction or repulsion is determined by both the field direction and the affected bodies' relative positions. For example, an electron and positron attract one other when they are a distance apart, but when an electron and positron are pushed too close together they begin to repel one another.

Ideally, we hope to use one simple equation to describe all interactions between bodies, but in reality, it is impossible using current mathematics and technology because particles are in constant motion and field is constantly changing. We can use certain equations to describe forces in certain circumstances, but we have to remember that this description is an approximate description. We must also determine if the equation fits the circumstance when we try to apply that equation. This is why Newton’s law and Coulomb's law result in erroneous calculations under some conditions.

We classify different types of force based on how strong the interaction is. As we discussed, the interaction is determined by the field direction (attractive or repulsive) and field density (interaction strength). When two neutral bodies are far away, their electric fields cannot directly align due to the structures do match between two bodies. This weakens their force on one another. Additionally, the field density between two bodies becomes relatively low when the distance between them increases which is why gravity is weak. When two bodies get closer field density increases and the number of interfering bodies decreases so the gravitational force between the bodies becomes stronger. If the individual particles from the two bodies can align very well, the attractive force can be very strong and the two bodies will tend to decrease in distance from each other. For example, if we cut a crystal in half, then both pieces are neutral and do not stick back together. This is because the new cut surface has interacted with the field both in itself and in the environment and has reorganized to form a new stable structure. But if we can keep the surface of both particles as before they were cut, then we can ideally put the two halves back together. Then the interaction between two cut pieces are very strong.

We have mentioned that speed is related to particle structure only, but force is related to both mass and structure.

5.17 The Meaning of Existence

Since all matter is made of electric field, only materials that can affect electric field are detectable. There may be an infinite number of different types of material other than electric field in the universe, but if they cannot interact with electric field, we cannot detect them and so they do not exist to us.

5.18 The Uncertainty Principle

Any type of qualitative measurement is based on the interactions between the material and the detector. The result we observe in the detector is not describing an interaction occurring at the time the measurement was taken but rather of an interaction that has already occurred. In this way, all measurements are inaccurate.

5.19 Conservation of Mass and Energy

Based on the above discussions, we can see that charge, momentum, and kinetic energy, etc. are properties of electric field. Because energy, charge and momentum are themselves related directly to mass, the only value that is absolutely conserved in any system under any circumstances is mass. Energy in a system is conserved in the sense that the total mass of a system does not change, but energy is not conserved in that some mass from energy may become absorbed by a particle, becoming matter rather than energy, and thus not be accounted for in calculations of movement, heat, sound, light, etc. that results from interactions in a system.

5.20 Application of Mathematics in Physics

Mathematics is a very important tool in science, but application of mathematics to scientific theories must be carefully considered. For example, it is easy to conclude using mathematics that one drop of water plus another drop of water equals two drops of water. But in science, this result can have different meanings. The two drops of water can be one big drop of water; it can be in a capillary or on a flat surface, etc. We need different mathematical equations to describe each of these conditions of the water droplets. For the same reason, when we use math to describe some natural phenomena, we need to clearly understand what is happening with the matter we are studying. Each step of the calculation needs to be based on what is actually happening to the material; calculation of a result does not tell you what has happened exactly qualitatively and can lead to inaccurate results when the same equation is applied under different circumstances. For example, when Newton and Coulomb created their mathematical models and equations, they did not know what force is, or why and how it occurs. What they did was create a law based on empirical observations under common conditions. When their laws are used under similar conditions, they work relatively well, but under more extreme conditions, the laws become more and more inaccurate. Similarly, energy, momentum, etc. is used constantly in physics, but we do not know what they are. Although we talk of time, space and matter constantly, we are not very clear about their relationships to one another. When we put all these factors together and process a very complex calculation, the result can have lost its meaning.

From the above discussion we can see that it is very difficult to use one math equation to describe all behavior for all material in the universe because all material is interconnected by field and they are all moving relative to one another. But for certain conditions or setups, we can devise a simplified model and use math equations to describe such a model in order to try and extract usable values from theory.

5.21 The Universe

Based on our discussion, we can see that all particles from the electron to large planets and beyond are made up of electric field. Field density decreases as distance from the center of a body increases at a rate determined by the properties of electric field**.** Lower density particles should have a smaller radius since they have a smaller volume of field with a higher density.

The basic components of matter are electrons and positrons. Due to the symmetrical shape of the sphere, it is probable that the shape of the universe is spherical as well with a size and shape that changes as the material that constitutes it changes. Due to the attractive forces between electrons and positrons, matter should eventually compact together. When its size increases, it tends to form neutron stars, then black holes. When black holes reach a critical mass, they implode and the field that is flung out from the implosion rearranges to form new particles or planets. As such, matter goes through a continuous cycle of forming and collapsing.

We normally think the universe have space first, then material fill in the space. Since the space is infinite, the universe should be infinite. Based on above discussion, we can see that the universe is made up material (electric field). Some certain amount of material forms the universe. Material has is edge. The universe has edge too.

There may be other universes in existence alongside our own also constructed of electric field. Different universes may merge to form a new, more massive universe.

CONCLUSION

Based on the interactions between particles and particles, particles and fields, and fields to fields, we can conclude that all matter in our world is made up of electric field. Because electric field has the intrinsic properties to achieve uniform direction and density, it tends to exist in radiation form which is the basic form for all particles. These intrinsic qualities also results in the force, movement, and all other phenomena we observe in the universe.

Any type of body, such as a planet or black hole etc., undergoes a continuous cycle of formation, growth, and collapse. We can use time and space to describe their size, properties, and processes that occur during their lifetime, but electric field does not have a starting or ending point. It constantly exists in one form or another. Thus, time is meaningless to electric field.

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