

# Unified Fluid Dynamic Theory of Physics

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Mainstream physics claims that it is impossible to physically understand basic aspects of physics. This paper contradicts this claim by describing a new theory of physics that is presented in a recent book of mine with this same title. This new physics theory provides a physical understanding of gravity, photons, electrons, protons, neutrons, nuclear forces, electromagnetism, quantum mechanics, the universe, and more. These new physical understandings together form a unified theory that stems from basic laws of physics and fluid dynamics. Here, space, mass, length, and time remain essentially normal. This unusual theory is remarkably different from Einstein's relativity, current theoretical physics, and the ether theory of the 1800s. Instead of filling a mind-boggling 11-dimensional space with tiny strings, as in a recent theory in theoretical physics, a normal 3-dimensional space is filled with spatial fluid. This theory describes how a new pulsing concept provides quantum and gravitational properties, and how ring-shaped masses of rotating spatial fluid provide what are known as electromagnetic fields and the nuclear strong and weak forces. All neutral particles are combinations of these fluid rings. These fluid rings and neutral particles then form atoms that lead to a universe that is probably very different from the Big Bang. This radically new theory of physics provides a far better physical understanding of physics, unifies physics, and offers a new understanding of our universe.

## 1. Introduction

### 1.1. The Problem and The Solution

None of the unified theories proposed in mainstream physics provides a physical understanding of physics. This result is not surprising. After all, if basic phenomena such as gravity and nuclear forces are not physically understandable, then how could any unified theory based on them be physically understandable?

However, the current mathematics-based approach to theoretical physics has worked so well that it has provided remarkable technological advancements.

Alternatively, I believe that a new physics-based theory of physics, such as the one described here, would have led to even greater technological advancements. The discovery of DNA is an excellent example where a new physical understanding has led to revolutionary new understandings and advancements.

In general, I believe that if something physically exists, then it must be physically explainable. In other words, it is possible to develop a new theory of physics that physically explains physics.

Such a new theory is described here. Readers will find new concepts and surprises in nearly all areas of physics. These concepts and surprises agree with experiment and observation, and with each other, as they must in order to provide both a valid and a unified theory.

### 1.2. Background

The development of this new theory of physics was neither easy nor quick. I started this new theory of physics as a spare time activity in 1950, two years after graduating in mechanical engineering from Caltech. My goal was to develop a physical understanding of physics.

At that time, theoretical physics offered no physical descriptions for electrons, protons, neutrons, nuclear forces, gravity, quantum phenomena, etc. After over 60 years, theoretical physics still offers no such descriptions.

When starting this theory, I was employed at an aircraft company. In 1951, I fortunately changed jobs to begin a 27-year career in *fluid dynamics* at a Navy Research Lab in Pasadena, CA.

Although this physics theory was a spare time activity, I made reasonably good progress. However, theoretical problems occasionally blocked progress, sometimes for several years.

Finally, in 1998, I was ready to publish. My wife and I flew to the east coast to meet with Professor Cynthia Kolb Whitney, Editor in Chief, *Galilean Electrodynamics (GED)*, to discuss publishing. She read my manuscript, helpfully recommended papers to read, and suggested people to contact.

This new theory was published as "A Proposed Unified Field Theory" in three parts in GED in 2000, 2001 and 2003 [Refs. 1-3]. Since these three parts were quite technical and included 74 equations and 20 illustrations, I prepared a Part IV [Ref. 4] that summarized the theory without equations or figures. This Part IV was published in GED in 2009.

In the meantime, around 2005, I started the book that is mentioned in the above abstract, which was self-published through AuthorHouse in September, 2011 [5]. For convenience, the *last half* of this 164-page book contains the above-mentioned GED papers as appendices. The central 8 pages are unusual because they acknowledge and describe *intuition*, which I used extensively in developing this new theory.

### 1.3. The First Step

When starting this theory, it was well known that photons travel at the speed of light, are identical except for their frequency, spin one way or the other about their travel axes, and act like both waves and particles.

This new theory began with the intuitive idea that *photons pulse*. This first step, together with many other new concepts that were subsequently needed, became the keys to the radically new theory of physics that I am about to describe.

I reasoned that, if photons do indeed pulse, then they most probably begin as a compact sphere of compressed fluid, spread

out spherically, and then return to a compact sphere again, all done while travelling forward at the speed of light, and spinning.

However, if a photon expands into a vacuum, then it would expand forever. The only way that I could find for a photon to pulse was for it to physically expand into *the same kind of fluid* from which it is made. Therefore, if photons do indeed pulse, then *space could not be empty* as Einstein assumed. With this first step, I launched into what literally became a life-long quest.

#### 1.4. Base Theoretical Physics on Mathematics or Physics?

Theoretical physicists are unable to physically describe basic aspects of physics. Leaders in physics, such as Professor Richard Feynman [6] teach that it is *impossible* to physically understand basic phenomena in physics.

Theoretical physics assumes that space is an empty vacuum. Therefore, physicists must use only those theories that work *in an empty vacuum*, such as electromagnetic theory, Einstein's Relativity theories, and quantum theory; these theories are primarily based on mathematics.

Alternatively, I found that if space was instead filled with a fluid, then physics suddenly becomes physically understandable. The reason is that fluid dynamic theory is based on physical laws that include the conservation of mass, momentum and energy. Furthermore, fluid dynamic experiments involve fluid flows, physical models, physical data, and observable results.

Returning to theoretical physics, physicists have developed mathematical methods that work exceptionally well for analyzing and explaining physical phenomena. A good example is the highly successful use of probability theory in predicting quantum phenomena.

For instance, when photons or elementary particles are fired at a plate that contains narrow slits, they form a diffraction pattern on a detection plate, acting as if each photon or particle had simultaneously passed through all slits. Physicists can accurately predict these diffraction patterns by calculating the probability for each and every photon or particle to follow every possible path from the emitter to each and every possible point on the detection plate. A result of this huge success is that most physicists seem to *really believe* that probability drives quantum mechanics. Obviously, no photon or particle can make these probability-based calculations before selecting its path.

A second example of using mathematics in place of physics was Einstein's conclusion that gravity results from warping space and time. This conclusion is easily expressed mathematically, but it is *impossible to visualize*. Also, experience tells us that "space" and "time" are extremely different concepts that physically act totally independent of each other. However, Einstein's *assumption* that space is an empty vacuum left him with no alternative to explain gravity. As a result, physicists seem to *really believe* that space and time warp together.

A third example is that Einstein mathematically showed that matter cannot exceed the speed of light because mass would otherwise become infinite, and both length and the rate of time would approach zero. Physically, there is no way that either mass, length or time can change with speed. However, most physicists seem to *truly believe* that these characteristics change with speed, and that nothing can exceed the speed of light.

I like Sir Arthur Conan Doyle's statement, in the words of Sherlock Holmes [7]: "When you have excluded the impossible, whatever remains, however improbable, must be the truth".

Applying Sherlock's statement to theoretical physics, one could say that it is *impossible* for space to warp with time, and *impossible* for either mass, length or time to change with speed. Whatever remains, however improbable, is *the truth*, which is that space, time, mass, and length remain normal, and that *space cannot be empty*.

Consequently, if space is filled with spatial fluid, then theoretical physics becomes based on physics, and mathematics plays a supporting role.

#### 1.5. Fluid Dynamics

Fluid dynamics is the field of study that relates to the flow of fluids. Fluids are defined to include air, water, and nearly any other kind of gas or liquid, or mixture of gases or liquids.

All fluid flows are continuous, which means that adjacent pieces of a fluid are connected such that there is *no slip* within a fluid, or between any solid, liquid or gaseous form of a fluid.

Also, there is no slip between different kinds of fluids, such as air and water, as evidenced by wind-induced water waves. Furthermore, the conservation laws for mass, momentum, and energy always apply in fluid dynamics.

Since photons are new in fluid dynamics, I had to introduce them carefully in order to satisfy the rules of fluid dynamics. Furthermore, "photon spin direction" had to be added to the conservation laws because photons are observed to spin one way or the other in *equal numbers* throughout the universe.

#### 1.6. Experiments that Support a Spatial Fluid

An important question is: How can space be filled with a fluid when the well-known Michelson-Morley Experiment (MME) [8] conducted in 1887, proved that there is no ether?

A short answer is that this experiment proved only that the earth *does not slip* through any assumed ether; this experiment did not prove that space is empty. When this MME was conducted, "ether" was assumed to fill all space, through which *everything else slipped*. In any case, the MME very clearly supports the new theory discussed in this paper.

Please note that I call this space-filling fluid "spatial fluid" and not "ether" because: (1) spatial fluid follows the no-slip rule, while the "original ether" did not, and (2) spatial fluid is hypothesized here to be the *source of everything else* in the universe, which is very much unlike the ether of the 1800s as far as I know.

A second important experiment that strongly supports the new theory discussed here is the *Sagnac experiment* that was conducted in 1913 [9]. Sagnac very nicely proved that *the speed of light is constant in any direction relative to the earth's surface*. This result was verified whether or not the experimental apparatus was at rest or rotated relative to the earth's surface. This Sagnac experiment clearly verified that there is no slip between the earth and any hypothesized fluid that might fill space.

A third experiment, and the one that provides the most direct support for the theory discussed here is the recent experimental finding [10] announced May 3, 2011 by a Stanford-NASA-Lockheed/Martin team that resulted from the NASA Gravity

Probe-B satellite experiment. This experiment is said to verify both Einstein's original *space-time warping* theory of gravity, and his *space-time vortex* theory that relates to a vortex generated by earth's rotation. This experiment directly supports the existence of the *no-slip spatial fluid* discussed here that forms a vortex that is induced by earth's rotation.

## 2. Description of this New Theory

### 2.1. Spatial Fluid

All space is assumed to be three dimensional, and to be filled with spatial fluid. This fluid cannot be seen or felt, but its effects can be observed and measured. This theory shows physically how everything stems from spatial fluid. As a consequence, everything in the universe is related to everything else. The overall result is a new physical understanding of the universe that is impossible to achieve in current theoretical physics.

### 2.2. Photons

Photons are considered here to be disturbances in spatial fluid that travel at a *local* speed of light. Photons form whenever pure energy is inserted into spatial fluid. Photons result from lightening, explosions, heat, light bulbs, and even striking a match. Typically, large numbers of photons are formed. The *quantity* of photons depends on the *magnitude* of the energy input. The *natural frequency* of photons depends on the *intensity* of the disturbance. All photons are alike except for frequency, which Planck found to be exactly proportional to photon energy.

It seems strange to me that theoretical physics states that photons have no mass. It is well known that photons have momentum, which is defined as mass times speed, and since photons travel at the speed of light, then *photons must have a mass*.

In this new theory, photons move forward while pulsing outward and back at their natural frequencies. A photon is hypothesized to start each incremental cycle as a highly compressed dot-like sphere of spatial fluid that is moving forward at the local speed of light while spinning one way or the other about its travel axis. The photon then expands outward in all directions while each of its parts transfers its spin, forward speed, and outward movement to the surrounding fluid.

An expanding photon will soon "over-expand" due to the *outward momentum* of its moving parts. This overexpansion causes the pressure in the expanding photon to reduce *below* that of the surrounding spatial fluid, causing the photon to compress back into a new, highly compressed, dot-like sphere located exactly one wavelength ahead of where expansion started.

This periodic expansion and compression is somewhat like that of a deep underwater explosion bubble that expands and contracts several times as it slowly rises to the surface.

A photon travels in a straight line unless a side force acts on it. Any asymmetry in a photon's surroundings can deflect a photon from a straight path.

Also, just like any kind of wave in any fluid, the *fluid particles* in a photon change during each cycle. For example, the water particles in an ocean wave change as the wave moves. Each water particle in a wave moves through an elliptical pattern, ending up very close to where it started. It is only the *wave* that

moves from A to B; every *water particle* in that wave returns very close to where it started, after moving through an ellipse.

Similarly, the spatial fluid particles that re-compresses into a new dot-like photon are *not the same fluid particles* that had previously pulsed outward. In other words, a photon moves by expanding its mass into the surrounding spatial fluid, and then extracting an equal mass from a *new batch of surrounding fluid* as it compresses back into a dot-like form again. In this way, a photon continuously expands and contracts as it moves forward from dot to dot.

The new features of photons presented here are that they travel at a *local* speed of light, have a mass that is *extracted* from the surrounding fluid, and that they *pulse*.

Furthermore, a photon's mass, as theorized here, can come only from the surrounding spatial fluid. As a consequence, every photon is accompanied, on the average over each cycle, by a region of spatial fluid whose *reduction in mass* is exactly the same as the mass of that photon.

Photon pulsation occurs so rapidly, that each photon *acts as if it had a steady-state constant mass*. Similarly, the region of spatial fluid that accompanies each photon *acts as if it also had a steady-state reduction in mass*. This reduction in mass causes a reduction in pressure in the surrounding fluid that is proportional to that photon mass, and which is assumed to be exactly inversely proportional to distance from that photon [5].

### 2.3. Neutrinos

Neutrinos are not to be confused with neutrons. Neutrinos are much like photons because they travel at the speed of light. However, unlike photons, neutrinos can pass undetected through the earth. How can this be?

In this new theory, a neutrino consists of *two counter-spinning gamma photons that travel in tandem* at or near the local speed of light. Three variations of such neutrinos are possible, which are: each of the two possible spin directions of the lead photon, and the spacing between the two gamma photons.

This proposed model of a neutrino essentially eliminates all interaction with matter because of having no net spin; therefore, such a neutrino could readily pass through the earth.

Furthermore, since this neutrino model has no net spin, it might even be able to fluid dynamically travel *slightly faster* than the local speed of light.

### 2.4. Quantum Phenomena

Because of its pulsing behavior, a photon can be stopped and detected only once per cycle, and that is when it is in its most-compressed state. At all other times, a photon has expanded far too much to be halted.

The hypothesized pulsing action physically explains how and why photon behavior is quantized, why a photon's position cannot be measured any closer than one wavelength, and why quantum phenomena act much faster than the speed of light.

I will soon show how *all matter inherits its quantum behavior from photons*. Overall, this new pulsing concept physically explains all quantum phenomena, *as discussed more fully in [5]*.

### 2.5. Gravity

Here, gravity also results from pulsing. Every photon, and also particle of matter as I will soon show, is hypothesized to lie

at the center of a region of reduced spatial pressure. This reduced pressure is proportional to that mass, and is assumed to be inversely proportional to distance from that mass.

Consequently, any other mass that lies in this region of reduced pressure will be attracted to that given mass, and vice versa. This attraction force is a *buoyancy force* which is considered here to be the gravitational force.

Buoyancy forces in fluid dynamics are calculated by multiplying displacement by pressure gradient. "Displacement" is defined in fluid dynamics as the volume of fluid displaced by a given mass, which is here proportional to mass.

"Pressure gradient" is defined as the change in pressure per unit distance. Therefore, since pressure varies inversely with distance from every mass in this theory, the pressure gradient is inversely proportional to the square of distance from that mass.

Putting it all together, the buoyant force that pushes any two masses together is proportional to the product of their masses, and inversely proportional to the square of the distance from each other. This force is the gravitational force after being multiplied by an appropriate constant in any region in space [5].

Consequently, we find that that both quantum and gravitational phenomena result from the newly introduced pulsing property of photons and matter. Since the effects of each pulse are felt outward to great distances within each cyclic period, *both phenomena will act far faster than the speed of light.*

## 2.6. Electron and Positron Rings

Electrons and positrons are well known to physically form in regions where gamma rays are concentrated, such as in proton colliders. The theory presented here provides a physical explanation for the formation and structure of electrons and positrons.

In fluid dynamics, any two side-by-side spheres that spin about parallel axes in opposite directions will attract each other.

Therefore, it is hypothesized that any two photons that have the *same spin direction* and that *approach each other closely enough along parallel paths* will attract, and then orbit each other [5]. Once in orbit, these photons will fluidly elongate along their common orbital path until they merge into a ring. (This elongation and merging action will probably require millions of cycles, which can take place in a tiny fraction of a second.)

According to the conservation laws of physics, this new ring will rotate at the speed of light, and its *core* will continue to pulse and spin, much like the formative photons. This new ring will look and act somewhat like a smoke ring; similarly, it will have a *natural speed* that is induced on itself by its spinning core.

Planck's law applies to each new ring. Therefore, each such ring will pulse at twice the frequency of the formative photons. Furthermore, the known energy of electrons is such that the formative photons must be gamma rays that lie in the middle of the upper half of the gamma ray frequency range, which is a *remarkably high energy level.*

In compliance with physics nomenclature, the cores of electron rings will spin counter-clockwise in the direction of core speed. Alternatively, the cores of positron rings will spin clockwise. The fact that equal numbers of photons spin each way throughout the universe means that equal numbers of electron rings and positron rings are formed.

Electron rings have the *smallest mass* of all known stable particles of matter. These electron and positron rings *will inherit* all of their quantum and gravitational properties from photons.

More precisely, these tiny rings are considered to be *super flywheels* because they have *twice the energy storage* of normal flywheels. Note that these flywheel cores *spin and pulse*, which are shown to exactly double flywheel energy [5].

The radius of electron rings is calculated by assuming that the ring rotates once per cycle for stability. In theoretical physics this radius is a function of Planck's constant, the speed of light, and so-called electron charge. The angular momentum of an electron ring is calculated to be 0.5 times Planck's constant, which provides a spin of  $\pm 1/2$ , where the sign depends on ring orientation [1]. The natural speed of an electron ring is induced by core spin, and is found in [3] to be the product of the speed of light and the fine structure constant, which is approximately  $c/137$ .

Since there are no free positrons, one might well ask: "What happened to all of the positrons?" The answer is coming next.

## 2.7. Proton Rings

Protons are well known to be 1836.25 times more massive than positrons, and yet protons and positrons have similar electrical properties. How can this be? How is a proton formed?

At a time near the beginning of our universe it is believed to consist of a mixture of electrons and positrons, here called electron rings and positron rings. It is hypothesized that a proton forms from 919 positron rings and 918 electron rings. (The slight reduction in proton mass from the original 1837 is considered to be binding energy needed to keep a proton ring intact.)

Here, dynamic forces act on electron rings and positron rings that cause them to "*point*" in the same direction when they approach each other [1]. (Rings are said to point in the direction of the fluid that is induced through their centers by their core spins.) Consequently, in a mixture of rings, a positron ring will end up lying between two electron rings.

In this geometry, the three rings will mesh, much like three meshing gears, thereby preventing annihilation. It is hypothesized that all of the fluid will then smoothly drain from each electron ring into the central positron ring [5].

Applying the conservation laws of mass, momentum and energy, the mass of the center ring is *tripled*, its core spin will be *reversed*, and its diameter will reduce by a factor of 3. During merging, all three rings will continue to rotate at the local speed of light. This new ring is called an *e-3 ring* because it acts like an electron ring due to its core spin, but it is 3 times more massive, and 3 times smaller.

This new e-3 ring is then hypothesized to soon attract and mesh with *two positron rings* to form what I call a p-5 ring. This p-5 ring acts like a positron ring, but it is 5 times more massive and 5 times smaller than a positron ring. This meshing and merging is hypothesized to continue until a p-1836.25 ring is formed, which is a *proton ring.*

The overall result is that all positron rings will disappear in an early universe, while the *number of new proton rings* will exactly match the number of *remaining* electron rings.

## 2.8. Similarities Between Electron and Proton Rings

Here, the nuclear energy of all electron rings and proton rings agree with Einstein's  $E = mc^2$ , where  $E$  and  $m$  refer to the nuclear energy and mass of each entity. In all cases, half of the energy,  $E$ , consists of translational kinetic energy, and the other half consists of combined spin and pulsing kinetic energy.

Although electron and proton rings have greatly different masses, their natural speeds, ring vortex strengths, core spin speeds, and spins are identical except for sign. Furthermore, the maximum (fully compressed) densities of their rings are found to be proportional to the fourth power of their energy or mass; and the elasticity of their rings is proportional to the square root of ring energy or mass [3].

## 2.9. Electric Forces

Here, all electric forces in modern physics are analogous to fluid-dynamic "ring-ring forces" that act between fluid rings.

For example, if two nearby rings dynamically align and rotate in opposite directions, then they will fluid-dynamically attract. If these rings rotate in the same direction, then they will repel. In other words, the *direction of ring rotation is analogous to electric charge* in modern physics.

Note that fluid rings can either point up or down; consequently, these rings have geometries that are akin to "spin up" and "spin down" for electric charges. On the other hand, *point electric charges* in modern physics lack these physical attributes.

Interestingly, the calculated angular momentum and magnetic moment of electron rings and proton rings exactly match the measured values for electrons and protons [1].

Furthermore, the pulsing properties of these hypothesized rings provide them with quantum and gravitational properties that exactly match those of electrons and protons.

## 2.10. Magnetic Forces

Magnetic forces are best illustrated with bar magnets where equal numbers of electron rings and proton rings are aligned. The spinning cores of these aligned rings induce an overall flow of spatial fluid that is *drawn in from the south end* of a bar magnet and *ejected from the north end* of the magnet. Each aligned ring acts like a tiny fluid pump. The return fluid flow forms a pattern outside of the bar magnet that is visualized by placing iron filings on a sheet of paper held above the magnet.

Fluid theory shows that either two out-moving jets (north ends), or two in-moving jets (south ends), will repel. Alternatively, an out-moving jet will attract an in-moving jet.

Note that any fluid flow induced by the *rotation* of the aligned electron and proton rings exactly cancels out. Also, *ring pulsing* provides a gravitational force that is typically very much weaker than the magnetic force.

## 2.11. Neutrons

A neutron is well known to have a mass that is very close to that of a proton *plus three electrons*. Here, a neutron is hypothesized to consist of a proton ring that lies exactly *inside* an e-3 ring. In other words, both rings lie in the same plane and rotate about the same axis in the same direction.

This hypothesized neutron geometry causes the *cores* of the two rings to spin in opposite directions, which produces a very strong fluid-dynamic *attraction force* between the ring cores. This core-core force causes the outer e-3 ring to greatly contract, and the inner proton ring to slightly expand, which further increases their mutual attraction force.

Theoretically, ring flexibility is inversely proportional to the square root of ring mass [2]. As a result, the diameter of the e-3 ring in a neutron remarkably shrinks down to only 4.70 times that of a free proton.

Furthermore, this 2-ring geometry explains the observed, and very puzzling, distribution of electric charge that is found within a neutron. Neutrons, like all neutral particles in this theory, consist of *combinations* of ring particles [2]. The so-called *charge distribution* within this neutron model agrees with experiment, and explains why all neutral particles *must consist* of a mix of so-called positive and negative charges.

Isolated neutrons break up within about 10-15 minutes. What causes this breakup? I recently realized that the opposing core spins of these two rings cause opposing side thrusts that *almost*, but not quite, cause a neutron to break apart. Therefore, only a very small side force is needed to move the outer ring *far enough sideways* to break a neutron into a stable proton ring and an unstable e-3 ring. The e-3 ring will then immediately break into a stable electron, and one or more gamma rays or neutrinos. In other words, an isolated neutron is marginally stable.

## 2.12. The Nuclear Strong Force

In this new theory, the *nuclear strong force* is the fluid dynamic force that acts between the spinning cores of fluid rings, and which is called here a *core-core force* [2].

Note that the cores of two fluid rings can geometrically lie very close together if one ring lies inside another, or if two similar-sized rings lie in nearby parallel planes. In either geometry, the resulting core-core force is a 2-dimensional force that is thousands of times greater than typical *ring-ring* forces that are here analogous to electrical forces.

These core-core forces are far stronger than ring-ring forces because the cores of adjacent rings typically *lie very close together*, and also because *adjacent lengths* of ring cores are far greater than the *thicknesses* of rings that lie side-by-side in the same plane.

## 2.13. The Nuclear Weak Force

The nuclear weak force is defined here as the *force needed to break a neutron apart*. It is well known that the weak force is thousands of times weaker than electric forces. Interestingly, the weak force results here from the *strong force* that binds an inner proton ring to an outer e-3 ring in a hypothesized neutron. This surprising result provides a new physical understanding between the strong and the weak force.

## 2.14. Proton-Neutron Pairs

Visualize an e-ring that lies midway between two smaller proton rings wherein all three rings rotate in the same direction around the same axis. This geometry is my concept of a proton-neutron pair [2].

Note that the two proton rings are attracted to the central e-3 ring by a strong core-core *attraction force*, while the two proton rings are kept apart by a strong core-core *repulsion force*. The

result is a set of extremely strong triangular forces that hold this geometry together. This hypothesized geometry solves still another major physical mystery in modern physics regarding what bonds protons and neutrons so strongly together in nuclei.

Theory shows that ring flexibility varies inversely with the square root of mass or energy. The outer e-3 ring in a proton-neutron pair is reduced (by attraction) down to only 1.68 times that of a free proton ring [2], which in turn has a diameter of only 1/1836 that of a free electron ring.

### 2.15. Energy stored in Matter

Physically, how is it possible for matter to contain so much nuclear energy? A short answer is that matter in this new theory consists of kinetic energy that moves in circles at the speed of light. In other words, matter is much like a flywheel that stores energy. Specifically, matter is here more like a *super flywheel* because it not only rotates at the speed of light, but this already-enormous flywheel energy is doubled by the *extra energy* provided by the spinning and pulsing of the flywheel core.

For example, a calculation presented in [5] shows that 1 gallon of water, if converted at 100% efficiency, would supply enough electric power for 10 million homes for one year. This energy far surpasses that of any other known power source. Note that modern physics lacks such a physical explanation.

## 3. The Universe

### 3.1. Theory of the Universe in Modern Physics

A theory is a hypothesis that explains experimental results and observations. Therefore, theories can disagree with each other, but experiments and observations are facts that seldom if ever change.

Ref. [5] includes a brief summary of what is known about stars and galaxies. Stars and galaxies are born, and eventually die. There are about 300 billion stars in our galaxy, and roughly 300 billion galaxies in the universe, which brings the total of stars to around  $10^{21}$ . Stars are categorized as three types: those that eventually become white dwarfs, neutron stars, and black holes. Astronomers find that most stars have planetary systems. Stars are spaced so far apart that their distances are measured in light years. Our star, the sun, is a second-generation star, which means that it was not among the first set of stars formed in a hypothesized Big Bang universe.

### 3.2. A New Theory of the Universe

Here, the observed red shift in light coming from distant stars and galaxies is theorized to be *at least partly caused* by a loss in photon energy with distance. Consequently, the universe is considered here to be either a modified Big Bang universe, or one of many different kinds of steady state universes [5].

This *seemingly very minor change* in interpretation of the red shift leads to possible universes that can be surprisingly different from the Big Bang. These possible universes range from an infinite universe that may or may not have existed forever; to different sizes and ages of finite, steady state universes; and finally to Big-Bang-like universes whose red shift is caused by any of an infinite number of ratios between a Doppler shift and a photon energy loss.

Furthermore, note that if space is infinite, and if it is filled with spatial fluid, then any number of *finite independent universes* could exist *without adding new spatial dimensions*.

In view of these possible new universes, it is difficult without more analysis to determine what kind of universe we live in. However, I intuitively favor either a *finite steady-state universe*, or what might be called a *steady-state expanding universe*. The latter universe is interesting because it is envisioned as being an expanding universe whose birth and death rates of stars and galaxies exactly match so that its total mass and size remain constant.

## 4. Mathematical Similarities and Physical Differences Between Modern Physics and this Fluid Dynamic Theory

Physicists and fluid dynamicists have independently noted similarities between equations used in modern physics and fluid dynamics; these similarities are not coincidental [3].

For example, in electrostatics, the equation  $\nabla \cdot \mathbf{B} = 0$  is analogous to  $\nabla \cdot \mathbf{V} = 0$  in fluid dynamics. In magnetostatics, the equation  $\nabla \times \mathbf{B} = \mu_0 \mathbf{J}$  is analogous to  $\nabla \times \mathbf{V} = \mathbf{\Omega}$  in fluid dynamics where  $\mathbf{V}$  is the fluid velocity, and  $\mathbf{\Omega}$  is fluid vorticity. Also, magnetic flux,  $\mathbf{B}$ , in modern physics is analogous to fluid velocity,  $\mathbf{V}$ .

Electron charge  $q_e$  is analogous to fluid-dynamic circulation,  $\Gamma_e$ , of a hypothesized electron ring. The electrostatic force,  $F_{ee} = q_e^2 / 4\pi\epsilon_0 r^2$ , between two electrons is analogous to the fluid-dynamic force between two hypothesized side-by-side electron rings,  $F_{ee} = q_e^2 / 4\pi\epsilon_0 r^2$ . Likewise, the side force on an electron moving through a magnetic field is analogous to the fluid-dynamic side force acting on an electron ring that moves sideways through spatial fluid.

The gravitational force  $F_g = Gm_1m_1/d^2$  between two masses is analogous to the fluid-dynamic buoyant force between two masses, which is proportional to  $m_1m_1/d^2$ .

However, as mentioned earlier, the two major differences that exist between modern physics and this new theory are that space is here filled with spatial fluid, and that conservation laws apply. As a result, space and time here do not warp together; and length, mass and time do not change with speed. Instead, changes in the density and pressure of spatial fluid here provide gravity, and permit the speed of light to change. Also, instead of mass approaching infinity, and length and time approaching zero when speed approaches the speed of light, the *power needed to increase speed* approaches infinity. However, unlike modern physics, this power never reaches infinity, so mass can here exceed the speed of light [5].

The overall difference between modern theoretical physics and this new theory is that this new theory is based on physics instead of mathematics, which permits all of physics to finally become physically understandable, and truly unified.

## 5. Conclusion

### 5.1. Current Theoretical Physics

In theoretical physics, space is an *empty vacuum*. As a result, it is impossible to physically understand gravity, quantum phenomena, electrons, protons, the nuclear strong and weak forces, etc. Physics students are taught that the speed of light is constant and cannot be exceeded; that space and time warp together; that mass, length and time each change with speed; that nature is based on probability; and that unobservable gluons and quarks hold nuclei together. These teachings are based more on mathematics than on physical principles.

### 5.2. This New Theory

I believe that the above teachings are incorrect. This paper describes a very different theory of physics that is based on fluid dynamics and the conservation laws of mass, momentum, and energy. Here, space is filled with *spatial fluid*, and as a result physics becomes physically understandable, and unified.

Spatial fluid is hypothesized to be the source of photons. Photons are then hypothesized to form electron rings and positron rings that combine to form proton rings and neutrons. These particles then form atoms that lead to our universe. It is further hypothesized that photons lose energy with distance, which means that our universe is very different from the Big Bang.

If this new theory is correct, or at least mostly correct, it may lead to new research and technology, and hopefully to unexpected new discoveries and products.

### 5.3. Verification

This radical new theory can be verified in different ways. Ref. [5] lists forty new findings that result from this theory. Each such finding can be considered as a prediction that can be tested for verification.

The acceptance of this new theory will surely depend upon how well it unifies physics, agrees with experiment, explains

known phenomena, and solves any remaining physical mysteries in physics and related sciences.

## 6. Acknowledgments

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