

Holistic Physics in a Self-Organizing Universe

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Holistic physics is based on our perception of whole systems and patterns. It is hypothesized that matter consists of a hierarchy of orbital systems: particles, atoms, gravitational systems. From the properties of light space is inferred to be a nonmaterial medium. Three laws of Kinematic Geometry and postulates of holistic physics are listed. Holistic physics complements dynamics in defining physical reality.

The Dichotomy

There is a dichotomy in nature over which scientists and philosophers stumble. Everything is composed of parts, while at the same time is a part of something larger. An object, therefore, can be viewed in two ways. It can be looked upon as an individual object in all the uniqueness of its composition and form, or it can be seen as a part of something larger, either the encompassing environment or a category of similar objects which have properties in common. In other words, everything has a specific and a general nature.

Specific properties and general properties are independent of each other but exist in an object simultaneously, like two sides of a coin. And this division in nature is reflected in our thinking. We can think of the specific features of an object or think of the object in all its generalities. We cannot, however, do both simultaneously. One is at the exclusion of the other. If we close our eyes we can visualize a house in its entirety. To count the windows we have to shift and think of the windows as we count them.

The perceptions of seeing whole systems or the detail of their compositions give different views on the complexity of the world. When whole systems are seen they are seen in their simplest form as something that is a part of a setting. When the object is seen as a composite, we separate it from its surroundings and view it in all its complexity. One perception is holistic; the other is analytical.

The mathematical and analytical side of our perspective sees nature in the detail of its composition. It is developed from the left hemisphere of the brain where associations are linear, specific, and continuous. The right side of the brain is spatial and recognizes complete systems and whole patterns. It is this side in which we formulate theories. The two methods complement each other but differ by the two ways in which we think. Both are necessary to make an interpretation of reality complete.

The axioms of linear logic cover the principles of continuity and causality. Algebra and related mathematics follow these principles. Relationships and proportionalities are united across an equal sign which is inviolable. Holistic logic, on the other hand, defines nature in terms of systems and hierarchies. These two perceptions are reflections of nature where they correspond to the ways in which stability is achieved.

Two Methods of Stabilization

There are two principal ways by which nature stabilizes: through symmetry of action, and by system formation. An equilibrium is a balancing of action by its reversal in linear symmetry. And systems are seen in their entirety by our perception of whole objects and patterns. Newton made linear symmetry his second law of motion: for every action there is an equal and opposite reaction. Modern physics evolved from Newton's laws of motion and force concept and tries to account for everything with linear mathematics. without any regard for a holistic physics of systems.

Four hundred years ago particles were inconceivable and atoms were a vague concept. Newton did not think of the orbiting of the moon and planets as systems related to matter. In the 17th century worldview the perpetual motion of the moon and planets was the problem. As a result, he devised an equation for orbital motion by combining rectilinear inertial motion that exists only in the abstract and action at a distance that is metaphysical. Newton's equation is extremely useful, but it was improvised as a mechanism for a particular condition and does not properly apply to other levels of matter.

Physicists, however, accepted Newton's dynamics as a model and used reductionism with modifying theories to describe the physics of atoms and particles. In physics, everything owes its existence to dynamic equilibrium, and orbital motion is a balance between perpendicular forces. In order to follow these principles at each level of matter, physicists added adjustments to make the equations accurate.

As physicists investigated atoms and particles, they added new forces to gravity and electromagnetism. A strong nuclear force was needed to hold protons and neutrons together against the repulsion of the proton's charge, a weak nuclear force involved radioactive decay, and the quarks theory for particle structure required an intense bonding mediated by gluons. In each case, physicists invented specific properties for each force to make the force concept applicable. As a result, we are now encumbered with a staircase of forces, none related to the others, each with its own set of conditions for its particular situation.

Gravity only attracts, electromagnetism both attracts and repels, the strong nuclear is a repulsion at a distance less than 10-13 cm, and its attraction drops to zero rapidly at distance greater. The weak nuclear force cannot extend farther than the size of a particle. And in its perverse manner the force of the gluons for quarks is reversed and becomes stronger with distance.

The forces vary in strengths enormously. If gravity were given a value of one, the weak nuclear would be 10²⁵ times stronger, the electromagnetic force 10³⁶ times stronger, and the strong nuclear force 10³⁹ times stronger. This is an enormous span and there is nothing in the theory of matter to give reason for this huge spread in strengths for forces of nature.

Efforts to unify the forces have been without success. If the force principle were an actual part of nature there would be no reason for their not being able to be unified. Something is apparently wrong with the original concept of force acting across space that keeps it from being a valid universal principle.

When physicists tried extending the procedure to account for the structures and behaviors

of particles, the complexity became staggering. In quantum mechanics theorists extrapolated to absurdities. The projections no longer fit into a rational universe. These projections for the most part are not predictions, but rather adjustments made after the fact for events that have been unpredictable. In order to fit these happenings into existing mathematical order physicists have taken their equations and expanded them so that they predict the observed result. As measurements have become more precise and new discoveries made, the equations adjusted to account for them have grown. That is why the equations have become so complex. An example of this is the so-called standard model based on quarks for the structure of particles.

In the quarks model there are 36 quarks in six “flavors” and three “colors”, with the same number of antimatter counterparts to explain strong interactions. There are eight fields for the gluons, four fields for the weak and electromagnetic interactions, six types for the leptons, a large number of “fudge factors” for the so-called “Higgs” particles, and 19 arbitrary constants not based on any theory whatsoever that are added by hand to equations to describe the masses of particles and strengths of interactions. The mathematics of this standard model is formidable. It takes a half page to write the equations. All of this to account for the basic properties and behaviors of a few hundred particles. If nature is mathematical, we are using the wrong approach and the wrong mathematics.¹ As we study the smallest parts of nature, the order should be simpler, not more complex.

Algebra equates relationships. It can deal easily with abstractions, but is not limited to reality. Negative values, irrational and imaginary numbers, zero and infinity, are all manipulated in algebra as readily as real numbers. Algebra, therefore, can be used to create nonentities and unreal relationships. In using algebra, the equal sign is inviolable, and nature is an unbroken continuity of causality. Its failing, however, is that equations can be balanced with fictional substitutes and even fudge factors that have no existence in physical reality.

The problem is the nature of the force concept. A force is a measure of influence exerted along a line between two points. To explain curvilinear motion a balance is made between a force of attraction and tangential inertial motion. All motions and structures are accounted for by a lattice of straightline forces. Physicists are trying to explain three-dimensional reality with one-dimensional lines. They are using dynamics to try to explain the composition of systems.

Geometry, on the other hand, is forced to be real and describes structures that are not readily amendable to abstractions. It is quantitative and deals with physical dimensions: sizes, proportions, and shapes. Structures are closed and have limits. There is no space in algebra, in geometry it is indispensable. To learn the principle and comprehend the nature of material existence we need to think of the universe as consisting of systems, and use holistic physics to describe them.

Atoms consist of particles, and gravitational systems consist of massive bodies of atoms. There is a definite compositional hierarchy. If then we consider that atoms and gravitational systems have the same structural pattern of lesser components encircling a nucleus, and take a larger perspective of physical reality, it is a reasonable supposition that all three stages of the hierarchy are founded on the same principle and represent three structural levels of matter.

Recognizing particles, atoms, and gravitational systems as a hierarchy of systems greatly simplifies the nature of matter. With each stage founded on the same principle and structural pattern, there should be no large difference in complexity between them. This contradicts the standard model for particles derived by physicists through reductionism where the simplicity of Newton’s equation is lost to the complexity of quantum mechanics.

If motion is the natural state, and matter exists in a vertical hierarchy, then motion is an integral part of structure and the solar system and other gravitational systems are forms of matter.

With atoms and particles, these three stages of structure are based on the same pattern and are the skeletal frame of the material world, while the seemingly irregular motions of bodies, atoms, and particles in interstitial space are incidental. The structural pattern of lesser components encircling a nuclear center gives insight to the true nature of space and motion. Space, matter, and motion come together in a geometric relationship. Nature is mathematical but physics is not using the mathematics that integrates it.

The Irrational Basis of Newtonian Physics

Modern physics looks upon the law of inertial motion as its basic and fundamental law. The principle is simple: a body left to itself remains at rest; or if it is put into motion it will continue to move in a straight line indefinitely unless interfered with in its movement. To us the concept is perfectly clear, plausible, and even self-evident. It seems obvious that this is the natural behavior of matter. But less than four hundred years ago to nearly everyone the idea seemed not only false, it seemed even absurd. The reason is that pure inertial motion does not occur in nature. It is utterly and absolutely impossible.

The problem with current physical theory is that it is founded on irrational values. To make his equation work Newton created an irrational number, the gravitational number G . This is like inventing pi because we can't square a circle. It is a mathematical device to use linear math to describe a curvilinear world.

Science is founded on the principle that nature is rational and the contention that phenomena can be understood solely through reasoning. Nature is detached from the impositions of social values and allowed to stand alone in a natural order assembled from the constants and regularities that we observe. There cannot be a conflict between science and reason, therefore, without science forfeiting its birthright.

There has never been any cause to question science's legitimacy until the modern era of physics. In the past century, however, physicists have all but abandoned theories based on reason and have relied almost exclusively on mathematical formalism to solve their problems. Empirical information is framed in mathematical equations, put into balance with fictional factors, and justified by theories with little regard for their rationality. It is a practical procedure for devising workable models, but it scrambles the concepts of a coherent nature.

The problem is the irresistible allure of the mathematical procedure. Mathematical formalism is so powerful that it is easy to be deluded into the belief that if something can be shown mathematically, then it must be true. There are, however, rules and restraints in physics that don't exist in mathematics. In physics you have to comply with observational results. You try to find a reason for each physical phenomenon and fit it into the established understanding of reality. Cause, therefore, is a vital part of physics.

But there is no such equivalent in mathematics. In mathematics, why something happens is irrelevant. As a result, our conceptions of mass, length, time, and energy have a different image in our minds than the ones represented by mathematical relations. Mathematics simply deals with the calculations of relations between these concepts. A mathematical demonstration never implies that it is supported by experimentation.

Physics, therefore, is supposed to be based on realism, while mathematics doesn't have to be. Things don't have to be a part of reality to be calculated. Physically, it makes no sense to consider negative or imaginary masses, although mathematics can be used to calculate them. And mathematics allows us to calculate the effects of time reversal, despite the fact that this reversal is not compatible with experiments. There are, therefore, certain rules in physics that are not pertinent in mathematics. These rules cannot be disregarded. And in fact, in order to for a

physical theory to be considered valid, physics must take precedence. Mathematical physics must be physics to which mathematics has been applied, and not merely mathematical relationships uncontested by realism.

Physicists frequently make the assertion that the new theoretical concepts cannot be comprehended on a rational basis, and that they must be accepted as physical fact because of the beauty of the complex, arcane, mathematical equations. This has led to the philosophically untenable belief that mathematical expressions have a greater ability to express rationality than mental concepts. Mathematical models can be devised that cannot be visualized, but that is different from being inconceivable. A model that is incomprehensible is irrational and does not represent either nature or science. Any equation containing an irrational number will give an irrational answer.

But nature doesn't have irrational values. These are simply mathematical inventions to calculate values that we want to know using linear mathematics. Nature comes in whole numbers or fractions of whole numbers. If we want to discover the mathematical basis of nature, then we have to do it without irrational numbers.

We have to assume that the universe is continuous and directly causal. In physics there is a disconnect, however, between dynamics and the structure of matter that originated with Newton when he inferred action at a distance across space. This violated the principle of continuity and turned gravity into a mystical force.

Continuity implies direct interaction. Newton's impression of space was that it is simply a void with no participation in the physical universe. He believed that objects fall because there is an attraction between masses and they are being pulled by gravity. But this theory disregards continuity. The undisputed fact is that when objects are released in space near large bodies they fall spontaneously. If the principle of continuity is adhered to, then bodies fall because of a response to their space environments. Space as a non-participating void is not a valid concept.

The Holistic Side of Perception

To gain insight to the nature of the universe it is necessary to make a conceptual shift from Newton's 17th century worldview. Our impression of space having no part in the physical world has to be changed. In Newtonian physics matter and space are separate concepts, and the universe is regarded as consisting of matter in a void with which there is no interaction. All actions originate from matter and are matter on matter. Space is merely the arena in which the actions are played out. In reality, though, there is no division between matter and space. The universe does not consist of matter in space, it is matter and space together with motion in an integrated relationship.

Our impression of matter is from the aggregates and molecular compositions of atoms that we sense and measure, but to understand the relationship between matter and space we need to identify matter with its basic structural levels. If matter consists of orbital systems in stages, our image of matter becomes more tenuous than that of a physical substance that affects us directly.

Matter has mass (inertia) and occupies space; space is all-pervasive and cannot be shielded against. These singular properties are mutually related in a manner consistent with a definition of both matter and space. The properties result from bodies resisting displacement. There is an interaction between a body and its space environment that holds it in a centered position. Instead of assuming gravity to being a force of attraction between bodies across a void, we can assume a body generates a gravitational field in its surrounding space, and it is the field that resists displacement. An orbital system encloses a space volume by screening out everything

larger, giving the effect of being impenetrable and occupying space. In reality, there is no separation of matter from space, the orbital system is simply a frame of motion in space. Space appears to be all-pervasive and inseparable simply because space is part of the composition, like water to a jellyfish.

With a gravitational field a condition generated in space, and bodies under compulsion to remain centered in their ambient space, there then is only one other condition to account for objects falling spontaneously. Gravitational fields weaken the tension of space to transmit waves and cause light's velocity and the equilibration of fields to slow. The consequence of this is gravitational fields imparting a non-uniformity on space and giving it shape. The shape around large masses is a gradient that diminishes in intensity volumetrically with distance.

An object in space near large bodies, therefore, is in a space gradient which affects the equilibrium of its own field and causes its field on the downside of the gradient to be redshifted. To remain centered in the nonuniform environment the object falls into the gradient to equalize its own field by the Doppler effect. What has been regarded as gravity is simply the effect of objects moving spontaneously to stay at the center of their space environment.

Physics at the Divide

For two hundred years Newton's theory seemed to be a valid description of the material world. Light was never considered necessary for the mechanics based on matter-matter interactions. Newton simply assumed instantaneity and believed that light travels through space as particles the same way matter travels through space. The discovery of light's transverse wave nature presented a problem that was puzzling until Maxwell showed that light was electromagnetic. The physics seemed to be on sound footing and near completion. Then toward the end of the 19th century an experiment was carried out to measure the earth's movement around the sun.

The Michelson-Morley experiment of 1887 created a paradox in physics that has never been resolved.² Newtonian physics is based on the impression that light and objects move through space and relative to it. Using an interferometer Michelson and Morley tried to measure the movement of the earth by its effect on the velocity of light. To their dismay and the bewilderment of all they were unable to detect any change whatsoever in light's velocity. From every direction that it was measured light remained unaffected by the earth's movement.

This was incomprehensible. Unlike sound which we can move relative to and even overtake, light always stays the same. This means that no matter how fast we should try to chase a beam of light, we could never catch it. We simply cannot move in any relationship with it. It is always moving away from us at the same velocity as any light moves toward us from the opposite direction. Regardless of our relative motion to other things, to a beam of light we are always standing still.

It is generally assumed that Einstein resolved this Michelson-Morley paradox by his theory of relativity. The fact is, he did not. He took over earlier suggestions that attempts to measure a change in light's velocity fail because any would-be change is nullified by a compensating change in the object used to measure it.

Einstein's reasoning is similar to that originally proposed by Lorentz and Fitzgerald, namely that there is a contraction of length and dilation of time in one frame of reference with respect to the length and time in another reference frame. The difference is that Lorentz and Fitzgerald assumed the contraction and time dilation were caused by the earth's physical reference frame moving in interaction with an ether; whereas Einstein assumed that they were caused by the intangible relative velocity between successive reference frames of the moving

earth. Einstein's assumed "causative factors," however, prove to be impossible for exactly the same reason the Lorentz and Fitzgerald theories were impossible. It is not rationally possible for a contraction and time dilation in one reference frame to cause the velocities of two light beams in opposite directions at assumed velocities $c - v$ and $c + v$ to simultaneously be converted to c . In other words, the presumed conditions to nullify a reading of the earth's forward movement simply cannot, at the same time, nullify a change in reading the light's velocity in the opposite direction. The velocity of light is absolute, but it cannot be proven by invoking the movement of the earth.³

Einstein believed that we can move relative to the velocity of light but cannot measure the effect on it because of it being offset by relativistic changes in our instruments by relative motion. If this were true, however, it would negate the Doppler effect and radar would not be possible. Einstein, therefore, had to reconcile his relativity theory with factual existence of the Doppler effect. To do this he used an irrational mathematical technique.

The equation which he uses to express the Doppler properties of light was derived on the assumption that an imaginary right triangle with one side a physical dimension of length, one side a non-physical dimension of time, and one side an imaginary line, can be treated as a case of the Pythagorean theorem. This implies relationships that are not justified. The Pythagorean theorem applies only to triangles composed of sides where all have physical dimensions of length. The Doppler equation so derived has no rational meaning.⁴

The velocity of light is constant but it cannot be because of relativity. From the Michelson-Morley result Einstein concluded that matter has no absolute motion and dismissed Newton's absolute space as unnecessary. Matter has only relative motion. It does not move relative to stationary space, it moves relative to light. And because of relativity, light's velocity is constant.

This, however, is based on the assumption that light can exist independently, and that presents a problem. A motion by definition is relative to some reference. Light, once emitted, has an existence independent of matter. In order to be a motion, however, it has to be moving relative to something. Since it doesn't need matter to exist, matter obviously is not the defining reference for light. There can be no question that light moves through space. Considering that it isn't possible to move through something without moving relative to it, light must be moving relative to space. Einstein's wave/particle duality and contention that light can self-propagate is a paradox only in relativity. With space as light's medium, light travels as a wave and can be detected as either a wave or as a particle, depending upon how it is measured.

Einstein, therefore, did not resolve the paradox, and his explanation for light's constant velocity cannot possibly be true. He gave a Newtonian answer. The difference is that he dismissed Newton's absolute space as unnecessary and believed that matter has only relative motion. In other words, he still believed like everyone else that we can move relative to light, but we just can't measure it.

The most apparent conclusion that we can draw from the null reading is that the movement of the earth cannot be added to or subtracted from the velocity of light, and therefore, cannot be related to it. They are two kinds of motion moving to different references.

Light and matter move through space in different ways. Light moves as waves transmitted by the space medium, and moves relative to it. Matter, on the other hand, because of the nonmateriality of space has no interaction with it except suspension by its gravitational fields. Bodies, therefore, pass through space untouched by its extreme rigidity that gives light its properties. Only the shape of space created by the gradients of gravitational fields around large masses affects their courses. Relative motion does not relate directly with space. It is our

perception of bodies moving relative to each other. A body moving toward or away from another can be measured by the effect of contracting or elongating a light signal as light's travel time changes with the varying distance. Relative motion, therefore, can be measured by the Doppler effect. But this isn't what Michelson and Morley were trying to do. They wanted to measure the effect on light from the same point on earth as the earth moved through the ether they believed to be the medium for light waves. The ether doesn't exist and the medium is space itself, but the problem and answer are the same. They couldn't measure the effect of the earth's movement on light simply because the earth, with respect to the space medium, isn't moving. It is suspended in it as it travels through space unencumbered by its rigidity that makes the waves of light possible. The result is light with a constant velocity as waves in space being constant in all directions because the earth is stationary in the selfsame medium.

The earth does, however, revolve around the sun. In this respect we encounter the true nature of motion of material bodies. Bodies are centered in their space environments but move spontaneously due to the space being nonuniform around other masses. Because the shape is a gradient around masses, a body in motion follows the contours and makes an orbit. As an integral part of an orbital system, motion is quantitative, closed, and absolute. Motion as a rate applies only to dynamics and is separate from the physics of systems.

There has always been a problem fitting light into Newtonian physics. Light consists of transverse waves, which require an extremely rigid medium, and being nonmaterial, so too must be the medium. This requires a new conception of space, but physicists could not change from the impression of a void. As a result, they theorized an ethereal medium for light in space, and it was this luminiferous ether that Michelson and Morley imagined the earth moved through relative to light.

When physicists came to the divide between the dichotomy of linear causality and whole systems, they had to take a direction. They didn't see the perceptual road to the right which resolves the paradox, they followed Newtonian physics to the left and the irrational. The presumed explanation for the Michelson-Morley paradox was relativity. Einstein kept light's velocity as a constant, and made all motion relative to it. To rationalize the null reading he believed that the physical properties of matter changed - lengths elongated, time slowed, mass increased. It is permissible to add correction factors to make measurements accurate, but relativity is based on the idea that the only reality is that of dynamics and that the correction factors are a part of nature. Einstein, therefore, contended that the universe is warped and distortion as we move through it at high velocities relative to light.

The belief that dynamics was the single road to reality led physicists into a quagmire. The interactions upon which they depend to determine position and momentum fail at the level of Heisenberg's Uncertainty before the edge of reality is reached. There is a limit to the interactions of order that borders on virtual reality. Physical reality breaks down and the rules of physics are no longer applicable. But this is based on the belief that reality has to exist by our rules of dynamics. This is why the equations for quantum mechanics are so complex. The mathematics is carried far beyond the reach of the rules of dynamics. Nature exists by its own rules. It simply has order and is rational on its own in a reality that is no longer coupled to our physical side.

When faced with the Michelson-Morley paradox it was a time to question the theoretical basis of Newtonian physics and its limitations. The experiment inadvertently brought in conflict the physics of causal perception with the holistic perception of whole systems. Dynamics of causality is relativity where the universe is as we experience it and centered on us, whereas the holistic physics of systems takes us to an expanded perspective of the universe as it exists on its own with or without us.

Holistic physics describes the universe in its simplest form. It consists of a hierarchy of systems of lesser components orbiting a nuclear core which generates the space environment around which the system forms. Space, matter, and motion are fully integrated in systems that are self-organizing.

The Laws of Kinematic Geometry

Motion is nature's most fundamental variable, and the manner in which it is accounted for forms the basis of physics. Newton founded dynamics on his three laws of motion. The falling of objects and the orbiting of gravitational systems were described mathematically by his equations. Newton, therefore, believed that motion was the result of forces, and curvilinear motion the vector of an inertial motion by an applied force perpendicular to it an attracting force acting at a distance between masses. Without force everything would be mired in inertia or flying off in endless directions.

In Newtonian physics all actions were matter acting on other matter in a spatial void. Matter was characterized by having mass with no accounting for its existence. There was no conception of matter having a well-defined mathematical structure. Motion was a separate concept with no explanation for how motion originated. Newton believed that the universe was like a clock that God set in motion at the time of Creation and it has continued to run ever since.

Soon after Newton's laws of motion, the concept of energy was developed and all forms of motion were given an energy value. Toward the middle of the 19th century physicists formulated the Laws of Thermodynamics and gave their equations an inviolable reference. The first law is a conservation law stating that matter and energy can be neither created nor destroyed. The second law states that energy flows toward lower levels, and hence from order to disorder (entropy).

The effect of the energy concept was to remove motion as an independent factor from the equations of physics and regard it only as a part of energy. Matter has energy invested in its composition and structure, but knowing the energy value tells nothing about how it is contained or how it is released. The energy concept removed any consideration of a structure theory for matter based on motion and space.

Matter is still characterized as having mass, but there is no understanding what mass actually is. Einstein showed that mass has an energy equivalent by the equation $E = mc^2$ without showing how and why they are related. By combining Planck's energy equation for light, $E = hc/l$, and $E = mc^2$, he showed that light has a relativistic mass, $m = h/lc$. The motion of light, therefore, has a mass value, but the significance of this to the structure of particles was not realized.

Einstein contended that the mass of an object increased with motion relative to light. This, however, is a dubious theory and not relevant to a comprehensive physical theory. The diminishing of an applied force by the recession of the object from the force with accelerating an object to greater velocity is a common experience and gives the same equation with a more rational explanation. Because neither space nor motion are participants in physical theory based on dynamics, there is no rational theory for matter. The direction that physics has taken has been away from any theory of matter which is consistent with matter having quantitative dimensions, geometric structure, and stability. It is believed that all forms of matter exist because of a fortuitous balance of forces. In nature, space, matter and motion are fundamentals that exist integrated and united. A valid physics should have them united in theory.

In the integration of space, matter, and motion, objects do not require forces to move. They move spontaneously in response to their space environments. An object under the impulse

to remain centered in its gravitational field will move into a gravitational gradient of a large mass to equalize its own field by the Doppler effect. Gravity is not a force of attraction between masses, it is simply the effect of spontaneous motion due to a universe that is self-organizing.

Bodies moving spontaneously in response to the space environment redefines motion and places physics on a different set of laws. The laws of motion for Kinematic Geometry are as follows:

1. A body in space will move spontaneously to equalize its gravitational field and remain centered in ambient space.
2. Unobstructed motion in space is potentially closed and orbital.
3. Motion is an integral part of structural matter.

The Holistic Physics of Kinematic Systems

Consider now the circumstances that gave rise to Newton's theory. If the earth had been a point mass, as Newton had to assume for his calculations, when the apple fell it would have continued past the orchard and toward the point earth at an accelerating pace, zoomed past the point and on to the other side, decelerating until stopping momentarily, only to fall back again to complete a highly elongated orbit with no gain or loss of energy. The only reason Newton saw it fall to the ground and imagined it was pulled by the earth was because the earth bulged out and got in the way. He saw only a small portion of the overall system and devised his mechanics to explain that small drop.

Because atoms and particles are smaller, we think of them as forms of matter. The movement of the sun, moon, and planets, on the other hand, we think of as motion in our perceptual environment and relative to us. It was being able to break this perceptual lock and rearrange the motions into a simpler conception that was the great achievement of Copernicus. We need to do now a comparable mental shift and imagine the solar system in its entirety like atoms and particles and the pattern that they follow. The only difference is that with the gravitational system we are inside looking out through the skeletal frame of the material world.

With this new worldview we can more easily change our impression of space; it is no longer a void through which bodies move, it is an integral part of the system. It is the interior of the orbital system that sets off the volume from surrounding space. Speed up the orbital time proportionally to the size as an electron is to an atom, and the orbit is no longer seen as a rate, it is a complete screen that defines the size of the system.

Newton inferred that gravity is a force acting at a distance across space in order to complete his mechanics for orbital systems. The physics is a practical description of the motion of bodies in space, but it didn't account for light. Light is like nothing else in our experience. Its existence depends solely upon its motion. Stop a light beam and it ceases to exist. Interference experiments demonstrate its wave nature, and its double refraction in feldspar indicates that the waves are transverse. Waves are the way energy is transmitted through a medium. Considering the nonmateriality of light, we can reasonably infer that its medium is nonmaterial. Space is not the do-nothing void of Newton's 17th century worldview, it is the nonmaterial medium for light and fields of a new physics, a holistic physics of systems.

Space is a nonmaterial medium for light waves and induction fields.

If now we accept this conception of space and the orbital nature of the successive stages of matter, we can relate fields to space and structural motion. The two fields - electrical and

gravitational - are generated as reverberations in surrounding space by the structural motion of particles. This motion has to be contained in space as a medium like light, and that points to the photonic nature of particles. Fields are reverberations in surrounding space by the structural motion of particles. There are two spatial components of orbital motion - the spiral twist of the orbit and the oscillation of the wave. The opposed helical turns generate the oppositely charged electric fields, the oscillation produces the unpolarized gravitational field. The fields are produced simultaneously, and in the case of the electron and positron, of equal intensity.

A field reverberating in space weakens the tension of space and reduces its ability for transmitting light waves and equilibration of gravitational fields. A gravitational field weakens the cohesion of space and retards the velocity of light and the equilibration of fields.

Space has cohesion, but without waves it has no features. The waves of light and fields, bestow on space a condition proportional to their density (frequency). This gives the properties of fields. Energy is the potential between levels of field concentrations, and in our space environment a frequency has the energy value of $E = hf$, where h is Planck's constant.

A space content is the field concentration times its volume. The constituent photons of particles have the energy and concentration, $E = hf$. The field created by the reverberations from the structural motion is of equal space content, but attenuated by its dispersal. The space concentration of a field, therefore, diminishes volumetrically with distance. The space content of a field is equal to that of the source.

The field extending into the surrounding space is a gradient diminishing with distance. An orbiting component encircles the field at a motion that encloses the equivalent of the complete field in one revolution. With atoms, the entire electrical fields of the proton and electron is enclosed within the confines of the neutral atom.

In a gravitational system, on the other hand, only a part of the field is enclosed, but the orbiting component has orbital motion and time that contains in one revolution a space content equal to the space content of the generating source. This gives insight to the nature of matter, motion, and time.

The Constancy of Space

Einstein has motion relative to light with "relativistic effects" as correction factors to see and measure the universe from our perspective. This is based on our conventional impression of motion as a rate. But this isn't objective reality. It is disconnected from the real world of matter and space. The primary role of motion is to transform space to matter. Everything else is incidental.

Motion is not independent of space, as in Newton's theory, it is either waves in space (light, fields), or spontaneous and relative motion of bodies because of field conditions imposed on space, making it nonuniform. The centering compulsion of bodies is responsible for motion in two ways: spontaneous motion to remain centered in a nonuniform space; and orbital motion by displacement from the centered position by applied force. The displacement span adds to the length of the orbit. An orbit length is an absolute value and overrides any misalignment with the centering impulse.

Space without matter and motion is limitless, eternal, and without form. Motion adds dimensions, matter adds fields and shape. The material world arose from motion transforming space into stages of matter: particles, atoms, and gravitational systems. A motion requires a reference to give it definition. Each structural motion is distinctive by the manner in which the motion is produced, while absolute space is the common reference for all three motions.

Photons, which are the basis of particles, move as waves through space as a medium;

electrons move relative to the proton's positive field; and bodies in space move by two causes, spontaneous motion to be centered in a nonuniform space, and orbital motion from displacement of its centering. Orbital systems are based on components in motion enclosing a space content generated by a nuclear body, and the space has a concentration due to wave density, and a volume enclosed by the orbital motion. The space enclosed by an orbit is equal to the field.

Space as a quantity cannot be changed, but space can support a field reverberating in it, and if bodies are centered in their space environments, this affects their spontaneous motion. The path of a body is compelled to follow the shape of the space and close on itself. The space it encloses is the content of the field, but this content cannot be greater or less than its source. This gives a fundamental constant. The space content of all orbital systems is equal. There is then the simple equation: Field density X volume = Space content.

Small orbits move fast, large orbits considerably slower. Motion of bodies in space is closed and orbital, but what determines the velocity of orbits? There are three elements to an orbit: its length, velocity and time. All three are interrelated by $l = vt$ to fit the composition.

How are they governed?

The length is closed and absolute. When the system forms, therefore, the velocity and time, which are together, have to change appropriately. They are bound to the length to enclose the space content in a complete orbit, the required constant of all orbital systems. Velocity and time can change to meet conditions, just as moving spontaneously to conform to a space environment, but the length cannot. They therefore move spontaneously to fit the composition.

To accept the holistic concept we have to overcome our impression of motion as a rate. That is relativity of seeing motion partially and not in its entirety. If we accept that matter is founded on orbital systems, then we have to accept orbital motion as a quantity and absolute.

There is a critical difference between a field being reverberations in the space medium and the current conception of a field in a void. A field as part of space explains inertia (mass) as a resistance to displacement. There is no comparable explanation where space is regarded as a non-resisting void. When force is applied to an object in orbit, it doesn't go faster, it goes farther. The displacement span is added to the orbit length to increase the size of the system. In dynamics the force converts to angular momentum to be consistent with orbital systems being the result of a balance of forces.

The Case for Two Physics

When we weigh an object or measure its impact on a detecting device, we cannot do it without interfering with its natural state of motion. Whenever we measure the weight, resistance, or force of an object, by necessity we obstruct it. We are interjecting ourselves or our probes into the workings of nature and measuring a response to our interference. We are measuring not a true property of nature that exists with or without us, but rather a response by nature to our interruption. Momentum and force are engineering terms used to describe the work necessary to alter physical conditions to our liking. These imposed properties were picked up by physics and became the basis of dynamics. No one can question the necessity to measure values to make an assessment of nature. But when we are formulating a comprehensive physical theory we have to separate the responses of nature to our disruption from the properties of nature that exist independently of us. A physics based on forces, the energy concept, and causality is extremely powerful for developing technology. There is, however, an inherent deception in using dynamics to form our conception of physical reality. We have to measure values, but the result is a worldview from our perspective centered on ourselves, and that is like thinking the earth is the

center of the universe.

If we want to know the true nature of the universe we cannot use an imposition of dynamics to discover it. We have to conceptualize a universe that accounts for its responses to our measurements without imposing our theories of force and energy on it. This is not to disclaim dynamics, but rather to recognize it as a human-oriented science that doesn't reflect the basis of reality.

On the other hand, if we accept that motion is the natural condition, and inertia is the resistance when we try to change the conditions of nature in motion, then a whole new conception of the nature of matter emerges. Instead of matter having inertia and being forced to move, we see objects in free space moving spontaneously in a universe that is self-organizing.

There are, therefore, two physics: the dynamics of causality and the holistic physics of systems. Since dynamics is based on linear causality, and holistic physics on whole systems, they complement each other in the way of our dual perception. Holism is the overview; when we measure something we use dynamics. But to interpret the results we should have them consistent with the principles of holistic physics.

Consider gravity. If gravity were a force of attraction it should be possible for a rocket to simply move away from it. But this is not the case. The rocket must first accelerate fast enough to clear the curvature of the earth and go into orbit. It then must continue to enlarge the orbit by further acceleration until it escapes the earth's system. This then puts it into orbit around the sun. To escape the sun the procedure must be continued to go into orbit in the galaxy. It seems like a round about way to leave, but there is no other way.

Motion in space is potentially orbital. When an object near the earth falls it isn't being pulled to the earth by an attracting force, it is moving spontaneously to make potentially an orbit of the gravitational system. Gravity, therefore, from a large perspective, is not a force at all, it is simply an effect of objects responding to their space environments.

Where the Answer is Holistic

When a physical theory becomes incomprehensible or illogical, then the concepts upon which it is based are questionable. There are in physics and cosmology two cases in which a new conception is needed to keep the science rational: They are the structure of particles and the origin of the universe. These theories are closely related because particles are the initial level in the formation of matter. In both cases physicists are barred from the rational answer for an origin by their commitment to dynamics and the energy concept for reductionism.

Physicists have never given a rational explanation for mass and electric charge. They have instead accepted dogmatically that these properties are innate with matter and have gone no further. Since mass and charge reside in the particles, this position is logical concerning all compositions of matter composed of these particles. The position cannot, however, be assumed regarding constituents making up the particles themselves.

A creation process cannot be explained empirically. Reductionism does not lead to a final solution, it merely reduces the question to another level. The procedure of assigning properties to ever smaller constituents does not terminate for the simple reason that properties are not fundamental, they arise at some point of formation. The answer to the nature of particles is not in hypothetical particles with physical properties, but in the origin of properties themselves.

This is the limitation of causality and reductionism. Cause and effect are bound to the properties and behaviors of the material world. By retracing the process of formation, everything that we know can be explained, at least in theory, by the series of steps which brought it into being. This, however, is a closed mechanism in which the duration is bracketed by a beginning

and an end without explaining the beginning.

Holistic physics originated out of the proposition that particles have a system that is consistent with a general structural order for a hierarchy of matter. The discovery of this system cannot be arrived at through the analytical method, since the properties of a system do not exist in the constituents, but are created in its formation. The fundamental properties of mass and charge, which reside in the particles, must therefore originate in the assembly of particles.

This inescapable tenet of logic was disregarded in the formulation of the quarks theory. There is no provision for the creation of mass and charge. These properties are merely fractionated and distributed among even smaller particles of which the known particles are supposedly formed. In doing so, the theory eliminates the primary reason for the particles to exist. The quarks concept is essentially a mathematical model. The theory to rationalize it is simply an overextended use of reductionism. It does not answer the crucial questions regarding matter, nor does it rely upon real terms. Energy is the catchall abstraction, and forces and fields are contrived with little regard for how or why they exist.

In its strictest sense creation is the formation of something out of nothing. In a freer sense of the word it is the combination of things which form by their assembly something which has properties that do not exist in the individual parts. Atoms bear scant resemblance to their constituent particles. Molecules have physical and chemical properties that are not present in the atoms. At some initial point matter itself was created by the same principle.

The cycle of theoretical development has passed from atoms to particles. Just as Mendeleev arranged the elements into a Periodic Table based on chemical properties, so too have the particles been tabulated according to their similarities. But Mendeleev had no inkling of the underlying causes of the properties. Only after the structure of the atom was worked out did it become apparent why the elements possessed their respective properties.

Particle physics is at the development stage reached by Mendeleev. The properties and behaviors of particles can be correlated and patterns discerned, but the underlying structures and compositions cannot be induced from these data. Something not possessing the character of particles came together to create particles and their properties. The answer to such a problem is not to be arrived at by reductionism because particles do not have in their properties the specific information which would indicate the nature of their synthesis. A new concept has to be introduced into the equation. For physicists energy has become the origin of everything. They treat energy as though it is an entity.

But except for the direct identification with electromagnetism, it is an abstraction. When a pendulum swings to and fro, it doesn't gain or lose anything, it merely changes its position in space and responds to it. By putting a heavy dependence on the energy equations and the Laws of Thermodynamics, physicists have separated the science from specific identifications and created an abstract reality. And this has relieved them from being explicit in their theories about energy.

Einstein's equation $E = mc^2$ gives the equivalence of mass and energy, but without a structure theory or any clear understanding of mass, there is no way to explain how mass and energy interconvert. In the photonic model of particles the rest mass of particles is due to the relativistic mass of constituent photons.⁵ The structure of protons and neutrons consist of dissociated halves of photons enclosing the field generated by a neutrino core, analogous to electrons around the nucleus of atoms.

The loss of mass in the fusing of protons and neutrons is now completely analogous to the combination of atoms. The H₂ molecule involves the consolidation of the kinetic energy of electrons; the fusing of nucleons involves the consolidation of pion gamma rays. A decrease in

the kinetic energy slows down electrons and releases the difference as heat; whereas a decrease in the energy of gamma rays elongates their wavelengths and releases the difference in mass as its energy equivalent. And this reduction in the relativistic mass of the constituent gamma rays is the loss of rest mass of the protons and neutrons fused to make the helium nucleus.⁶

The origin of the universe and the formation of particles involve the issue of creation. And when mathematical physics has been applied to solving the problem of creation it has fallen far short of the goal. The Big Bang theory is not an account of the creation of the universe, it is merely an extrapolation back in time and space to some stupendously dense concentration of energy.

Creation, however, is the formation of something out of nothing. Current theory never leads to this final resolution. Instead, it relies upon the experimentally established interconversion of mass and energy to find the conditions when the equilibrium is shifted entirely to the side of energy. The sequential formation of the various particles is explained by a shift of the thermodynamic equilibrium through expansion to matter. Philosophers and theologians are then left with the task of reconciling the origin of the energy and how it happened to be in such an impossible condition.

It has been assumed that the origin of the universe and what came before it cannot be understood in a rational manner. But holistic physics is based on the reasonable inference that space is the nonmaterial medium for light waves and fields, and the sourcespring from which matter and energy originated. Since space has cohesion but no features that we associate with physical reality, we can then reason that creation actually did occur out of nothing.

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