

RECIPROcity

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The statement on lines 5 & 6 [of the "Outline of the Deductive Development of the Theory of the Universe of Motion"] that "the expanding universe is ... the steady expansion of space" really threw me. I was not prepared for that. I had found, in teaching special relativity and Maxwell's equations during the 1960's that I could derive SR based on only one assumption: space has no properties at all. I am obviously wrong, but I don't really understand why. Now I am asked to understand that space and time don't form Einstein's space-time continuum but that they do not exist at all apart from motion, and that they are completely reciprocal aspects of motion. I ask if there is an easier way to help someone understand that. I would like to, but frankly at this moment I don't. Getting this fundamental postulate across obviously requires that an overwhelming number of valid conclusions can be derived from it and I understand that that is what Dewey Larson has done. I have an enormous amount of respect for someone who has worked in such great detail as he has on the most fundamental of physical problems.

I look forward to hearing more about the progress of RS.

J. Edward Anderson, Professor. RECIPROcity, XVIII, 1, Winter, 1988

Our only way out.....seems to be to take for granted the fact that space has the physical property of transmitting electromagnetic waves, and not to bother too much about the meaning of this statement.

Albert Einstein and Leopold Infeld EVOLUTION OF PHYSICS, 1938, p.153

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Are Motion and Space-Time Quantized?

Frank H. Meyer & Rainer F. Huck
International Society of Unified Science, Inc.

(Some of the gist of this paper has been contributed to the Fall Meeting of the Minnesota Area Association of Physics Teachers, October 29, 1994 at Gustavus Adolphus College, St. Peter, MN.)

Plato is my friend, Aristotle is my friend, but my better friend is truth.

-Isaac Newton, While an Undergraduate Student , University of Cambridge, 1666.

ABSTRACT

This inquiry offers evidence that motion and space-time are one and that since motion is quantized, so are space and time. Furthermore, the inert, static space-time continuum postulate of relativity theories and classical mechanics is shown to be irremediably flawed. Our new general theory, named by its builder, 'the reciprocal system of general physics', defines motion in a new, more adequate way: as the relation between two uniformly progressing reciprocal quantities, space and time. Motion, as defined, is measured in terms of *speed*, the scalar magnitude of the relation between space and time. By reason of the postulated reciprocal relation between space and time, each individual unit of motion is a relation between one unit of space and one equivalent unit of time, motion at *unit speed*. All physical entities are compounds, formed from such units of motion and constituted by finite speed displacements from unit speed, measured in terms equal to $1/n$ and $n/1$, when or where n is respectively an integral number of time quanta or of space quanta. When n is 1, unit ratio equals unit speed. The reciprocal system identifies unit speed as *the speed of light*. D.B. Larson's reciprocal system of physics discloses that the 'expansion of the universe' is the equable scalar unit time progression at the speed of light with the *outward* scalar unit space progression of *physical locations*, whether or not occupied by photons and/or galaxies, unevenly balanced when or where galaxies are involved, by the *inward* scalar gravitational motion of matter, accelerated in proportion to the inverse distance squared.

I. INTRODUCTION

It has been usual for physicists to affirm tacitly that no smallest length of space and no shortest interval of time appears to exist¹. Another way of saying this is that space and time are infinitely divisible. A short way of saying the same is to say that space and time appear to be continuous. To take for granted that space and time may be continuous or infinitely divisible can be to think that space and time may not be quantized, as our ancestors once 'knew' matter and energy to be unquantized or continuous, not finitely divisible.

When originating and developing his theory of relativity, Einstein² and his followers taught that both space and time are better to be thought of as together unquantized and preferably represented as inert³ in the reference frame of a four-dimensional continuum, one of time, three of space. Many physicists, including the quantum physicists, have followed Einstein, agreeing with him that, however applicable quantization may be to light, electricity, magnetism, matter, "anti-matter" etc., no evidence or reason can be discovered for seeking whether space and time or motion may be similarly quantifiable.

An exception has been the talented quantum physicist, Feynman⁴: "I believe that the theory that space is continuous is wrong, because we get these infinities and other difficulties, and we are left with questions on what determines the size of all particles. I rather suspect that the simple ideas of geometry, extended down into infinitely small space, are wrong."

A rather more remarkable exception is Einstein⁵, a learner in his later years from mistakes of his earlier career: "I am tending to the belief that it is impossible to continue further with this continuum theory." Einstein⁶ came closest to acknowledging that all sides of the physical universe may be quantizable in the very last paragraph of an Appendix to the end of his 1955 revision of his book, *The Meaning of Relativity*, published by Princeton University Press in the year of his death:

"One can give good reasons why reality cannot at all be represented by a continuous field. From the quantum phenomenon it appears to follow with certainty that a finite energy can be completely described by a finite set of numbers (quantum numbers). This does not seem to be in accord with a continuum theory and must lead to an attempt to find a purely algebraic theory for the description of reality. *But nobody knows how to obtain the theory.*"(our italics)

Does nobody know how to obtain a theory that more truthfully describes the physical universe as entirely finite and quantized? Evidently nobody Einstein knew during his lifetime. However, somebody, a contemporary of Albert Einstein, did quietly work and try to obtain and did publish such a theory as early as 1959. The person's name is Dewey B. Larson and his 1959 publication⁷ is entitled *THE STRUCTURE OF THE PHYSICAL UNIVERSE*. For thirty one years more he worked to test and elaborate and publish the first revalued general theory of physics in human history, aimed at unifying physics. Mr. Larson was professionally a practicing mechanical engineer, rather than a physicist, who nevertheless chose physics as his hobby, as a physicist might choose music or golf for his or her hobby. He died May 25, 1990, 91 years young.

One of us is a PhD in electrical engineering; the other has been a practising research physicist in medicine, industry and education for half a century and a long-time member of the American Physical Society, the American Association of Physics Teachers and the American Crystallographic Association. We think that Dewey Larson is of interest to physicists in that his sustained inquiry probably sheds light on how it is that twentieth century physicists have not yet learned how better to unify our science.

II. THERE MAY BE NO NECESSARY TRUTHS.

The special and general theories of relativity and Newtonian mechanics have included among their essential premises two propositions: 1.) that motion is inapplicable to physical space and time and 2.) that physical space and time are infinitely divisible or continuous. Both propositions are invented; neither has been discovered nor proved to be necessarily true.

The dogma that motion is inapplicable to space and time may not be a necessary truth. By the way of a scholium to be found in Newton's PRINCIPIA, this doctrine entered the science of physics some time ago without proof. Newton in effect declared categorically that space absolutely remains always the same and absolutely immovable, independently of time progression. Newton in effect also declared categorically in another scholium that time, independently of immovable space, flows equably and by another absolute name is called duration. This, however, did not mean that Newton agreed with Aristotle that time is an aspect of motion; more probably, he held with his predecessor at Cambridge, Isaac Barrow⁸, that the progression of time is not an aspect of motion.

The Newtonian creed that space, time and motion exist independently of each other and are unrelated physically was accepted uncritically by many physicists throughout the eighteenth and nineteenth centuries. The dogmas taught by this creed that space and time are essentially unrelated to each other, that matter is prior to motion and that motion is definable essentially in terms of matter rather than in terms of space and time, may not be necessary truths. If not, then it may not be impossible for moving to occur without some *thing* or *object* moving. If not, then it is possible for space to progress outward with time progression at the absolute uniform speed of light in vacuo.

Physicists no longer uncritically accept the Newtonian dogma that space and time are essentially unrelated. Einstein did physics a service by questioning this dogma. He had a hunch that so far from being unrelated to each other, space and time probably are more closely related than Newton ever dreamed. Just *how space and time are related physically* Einstein left unresolved; Einstein's answer being entirely *mathematical*. Furthermore, that physical space is non-Euclidian is not necessarily true anymore than that physical space is Euclidian is necessarily true. In Einstein's opinion this space is not Euclidian; in Larson's opinion, it is Euclidian, as Newton believed.

The dogma that space and time are infinitely divisible is not a necessary truth. The dogma that motion is unrelated and inapplicable⁹ to space-time is not a necessary truth. The dogma that matter is quantized, while motion is not, is not a necessary truth. The dogma that matter exists prior to motion is not a necessary truth. There appear to be no necessary truths.

III. MOTION APPEARS TO BE ONE WITH SPACE-TIME .

When Larson⁷ postulates that the physical universe is composed entirely of one component, motion, existing in three dimensions, in discrete units, and with two reciprocal forms, space and time, he possibly but not necessarily is reporting a new truth. This Larson proposition is full of meaning. Its meaning includes the claim that space and time are quantized or finitely divisible, because motion is quantized or finitely divisible. This means that , if Larson's reciprocal system of physical theory be true, then a smallest length of space and a shortest interval of time exists and can be discovered. Larson⁷ calculates the smallest spatial length to be in the order of magnitude of 4.55×10^{-6} cm and the shortest time interval to be 1.52×10^{-16} sec. See Larson's calculations later.

When Larson⁷ alleges, in contrast to Einstein², that space and time are quantized or finitely divisible, he probably, but not necessarily, is reporting a truth. When Larson⁷ identifies space-time with motion, he appears to be reporting a probable truth. The oneness of motion with space-time, implies, as does Newton's space & time theory, that both space and time possess not only relative(coordinate) components but also absolute(clock) components. Space-Time Progression in the reciprocal system of physics involves the absolute uniform progression of both space and time at the finite speed of light in vacuo. For those who still consider uniform space progression with time progression unnatural, you may wish to cope with the conjectural difficulty of Michelson¹³ and Minkowski¹⁰ "of never being able to decide, from physical phenomena, whether space, which is supposed to be stationary, may not be after all in a state of uniform translation." You may wish also to confront the difficulty Einstein² experienced trying to fit the speed of light together with an imponderable stationary ethereal space: "Our only way out seems to be to take for granted the fact that space has the physical property of transmitting

electromagnetic waves, and not to bother too much about the meaning of this statement. We may still use the word ether, but only to express some physical property of space.”(p.153)

When Aristotle alleges, in opposition to Leucippus and Democritus, that matter is continuous, he reports his opinion true and that of his adversaries false, and for centuries generations of natural philosophers go along with Aristotle in thinking that matter therefore could not be atomic. Evidence recently has accumulated to show that matter appears not to be continuous, not infinitely divisible, as Aristotle inventively imagined, but is instead finitely divisible or atomic. Similarly, evidence accumulated by Larson⁷ and Feynman⁴ and others now indicates that *motion*, space and time also appear to be finitely divisible and quantized rather than infinitely divisible or continuous.

IV.MOTION APPEARS TO EXIST PRIOR TO LIGHT AND MATTER.

Those who have been taught that matter is prior to motion do not readily conceive the possibility that space-time, space and time could be forms of the existence of motion rather than of matter. They are more inclined to believe that motion, space and time must be forms of the existence of matter. The Newton-Einstein⁹ dogma against any direct relation between space-time and motion also has prejudiced members of the physics profession to accept without proof that matter is the only possible origin and source of all motion. However, contrary to the dogma that motion must be a form of the existence of matter, it has not been ruled out at all forever that matter and energy may be, like space-time progression and the energy of light, electricity, magnetism and “anti-matter”, simply additional forms of the prior existence of motion.

They who take for granted the priority of matter to motion deny the possibility of the existence of any case of motion unless something material is moving. In terms of the definition of motion implicit in his reciprocal system of physics, Larson discovers that before physical entities, such as photons of light and atoms of matter, may exist, motion in the reciprocal forms of space and time can have existed. Note that by ‘reciprocal’ Larson is meaningfully defining *motion* as **always** nothing more than a *multiplicatively inverse relation between space and time*.

According to this definition, motion involves a *uniform progression* of both space and time. Larson defines a point, or segment, of the line of the space progression *at a given time* as a **physical location in space**. He defines a point, or segment, of the line of the time progression *at a given place* as a **physical location in time**.

V. EXAMPLES OF SPACE-TIME PROGRESSION

Larson's reciprocal system of physics implies that *the speed of light* in vacuo is the constant magnitude of the scalar three-dimensional uniform *outward* space-time progression of **physical locations**, whether or not occupied by photons of light. If the reciprocal system be true, the speed of light means not a photon's speed *through* space, but rather is the speed of its *physical location*, in which the photon originates and remains, so long as it continues to exist.

Every individual *physical location* is constituted by a **unit of motion**. Each individual physical location is a relation between a unit of space and a unit of time, motion at unit speed. The universe begins with the scalar *outward* space-time progression of physical locations. These are the *primary* motions, the motions which may and can exist independently of the existence of motions of other types.

Because Larson postulates that the universe of motion is three-dimensional, he may represent the scalar progression of space by a line in a *stationary* three-dimensional spatial reference system, measuring the corresponding progression of time by a scalar device, a clock. In this reference system, a positive motion is represented as *outward* from a reference point, and a negative motion as *inward*.

Similarly, Larson represents the outward and inward scalar progression of time by a line in a *stationary* three-dimensional temporal reference system, measuring the corresponding progression of space by a scalar device, a clock. Just as the spatial reference frame is useful for counting finite speeds *less* than unit speed for *motions in space* of the familiar **material** sector, so the temporal reference system is useful for counting finite inverse speeds *more* than unit speed of *motions in time* of the less familiar **cosmic** sector of our universe.

The initial point of the progression of an individual unit of motion is zero. As the distance between two points cannot be less than zero, it follows that the *primary* motions are necessarily *outward* , increasing the distance relative to the initial points.

Therefore, if the reciprocal system of physics be true, any two *physical locations* are progressing outward from each other at unit speed; that is, their separation is increasing at the rate of one unit of space per unit of time.

Larson defines the *natural system of reference* as that system in which the primary motions do not cause any change in the *positions* of the *physical locations*.

If the reciprocal system of physics be true, then the *natural system of reference* is progressing outward at unit speed, that is, the speed of light , relative to the spatial and/or temporal systems of reference.

The postulate of Larson's reciprocal system of physics specifies that nothing exists physically other than discrete units of motion. The *natural reference system* is a direct consequence of the existence of the primary units. Thus, this reference system is the framework, or background, of the universe of motion and does *not* represent any activity *in* that universe. The *natural system of reference* , as defined, is therefore the *physical zero*, or datum level, from which all physical activity extends.

A very important macroscopic manifestation of space-time progression is 'the expanding universe', reported by astronomers, which some have tried to account for with the hypothesis referred to as the Big Bang. The Big Bang is not a necessary truth. The hypothesis is a good example of "these infinities and other difficulties" quantum physicists get by avoiding all consideration of the possibility that light, electricity, magnetism, matter, etc. are quantized, because motion, space and time also are *quantized* . Briefly, the Big Bang theory has been well

stated by Joseph Silk¹¹ : "The central thesis of Big Bang cosmology is that about 20 billion years ago, any two points in the observable universe were arbitrarily close together. The density of matter at this moment was *infinite* ." A relevant question may be asked: Before, during and after this moment, when the density of matter was allegedly infinite, were time, space and motion infinitely divisible?

Larson identifies the outward progression of the *natural reference system* as "the expansion of the universe." According to Larson's physics, the galaxies do not move *through* space. The expanding universe is rather the uniform scalar expansion (outward progression) of space with time progression at the speed of light, balanced by the inward scalar gravitational motion of the matter of the galaxies with speed varying as inverse distance squared.

While only the galactic motion can be observed, all physical locations participate in the outward motion, irrespective of whether or not they are occupied by galaxies. All galaxies and the physical locations that they occupy, are moving uniformly outward from all others. Hence each is moving in all directions. A motion distributed uniformly over all directions, has no specific, or inherent direction; that is, it is *scalar*. Thus, *the expansion of the universe* is described by the reciprocal system as a positive *scalar* motion of all physical locations, represented as *outward* in the spatial reference system.

VI. SPACE-TIME PROGRESSION VERSUS GRAVITATIONAL MOTION

Larson's reciprocal system defines a universe of motion in which **scalar motion of physical locations** is not a unique phenomenon confined to the expansion recognized by the astronomers, but is the basic form of the motion from which *all* physical phenomena and entities are derived.

Larson's theory probably provides a satisfactory answer to a question asked by Newton in Query 20 (28 in the second edition) of his *OPTICKS*: "What hinders the fix'd stars from falling upon one another?"

At this point Larson has arrived by deduction from his basic postulate at an explanation of the general background of the physical universe that is essentially in agreement with the astronomers' *assumption*. (Larson's derivation leads to a *uniform* outward speed, rather than a speed that varies with the distance, as produced by the kind of *expansion* assumed by the astronomers, but this difference is easily accounted for, because there is a known force, *gravitation*, that acts against the outward motion, with a magnitude varying as an inverse function of the distance.)

The reciprocal system of Larson's physics proposes that uniform outward space-time progression is what hinders the fix'd stars as well as the galaxies from falling upon one another. Space-Time Progression also perhaps is what hinders gravitational collapse and black holes.

The advantage of deriving this explanation of the universal background from a set of general premises rather than merely assuming its existence, lies in the fact that further deductions may be made from these same premises. Instead of a single process involving the universe as a whole, the explanation that Larson has derived from the premises of his theory of the universe of motion identifies the *expansion*, as previously mentioned, as the result of *outward scalar motions* of *individual physical locations*. This opens the way for the existence of other scalar motions of the same physical locations, called by Larson *independent motions*.

Such a well-known independent motion is gravitational motion, the characteristic motion that produces matter and the perceived motion of all matter. All well-known physical entities, including low and high frequency light photons, electrons and positrons, etc. as well as material and cosmic ("anti-material") atoms, are produced, according to the reciprocal system, by distinctive compounds of translational, vibratory and/or rotational *independent motions*.

Independent motions originate from the same source as do the primary motions: the reciprocal character of the relation between the two essential aspects of physical motion, space and time. This means, to begin with, an *equivalence* between the individual unit of space and the

individual unit of time, resulting in the already noted absolute uniform unit speed of scalar three-dimensional space-time progression. For physical entities and phenomena to emerge from the reciprocal character of motion, equivalence between the quantum space and time units is essential to provide Nature's standard speed measure, unit speed, the space-time ratio of unity, the initial level of all physical activity, the measure from which all physical entities and phenomena may be counted. No independent motion, no physical entity, no physical phenomenon appears to exist except as a speed *divergence* from this one to one correspondence, a speed *displacement* from the unit speed ratio.

The reciprocal character of motion includes beyond equivalence (beyond one to one correspondence), the further implication that under certain conditions associations of n units of one of the two components of motion appear to exist and that under those conditions the n units of this kind are *equivalent* to $1/n$ units of the other motion component.

Larson⁷ has discovered that what makes speed displacements for forming physical entities compatible with the one to one correspondence of the space and time quanta of unit speed is the existence of a difference between space (or time) as a separate entity and space (or time) as a constituent of space-time. The difference, one that the theory's postulate allows, is one of direction.

If the reciprocal system be true, and motion, space and time be quantized, then space-time progression interacts with gravitational motion in orderly but quite different ways, depending on whether the interaction occurs outside or inside a unit of space. The case of outside is illustrated by the macroscopic expanding universe, in which scalar gravitational motion plays the familiar role of the attractive force, while scalar space-time progression constitutes the repulsive force. The sense of space-time progression is always scalar outward *away* from unity; that of gravitational motion, scalar inward *toward* unity. At relatively short distances gravitation predominates, and the net motion is inward. Since the gravitational motion decreases with distance, while the outward progression remains constant, the opposing motions reach equality at some greater distance; which Larson calls the *gravitational limit*. . Beyond this distance the net

motion is outward, increasing with distance, and approaching unity (the speed of light) at extreme distances. (This theoretical pattern of net speeds is verified observationally by measurements of the Doppler shift in the radiation received from the distant galaxies.)

The case of inside is illustrated by submicroscopic solid cohesion, in which scalar gravitational motion plays the unfamiliar role of repulsive force, while scalar space-time progression plays its reversed role of attractive force. Space-time progression is always scalar *away* from unity; however, within a unit of space, away from unity is toward zero. It follows that the progression within the space unit, as seen in the spatial reference system, is *inward*. Gravitational motion is always scalar *toward* unity. Within a unit of space gravitational motion is therefore *outward* in the spatial reference system. Within the unit of space the effect of a change in separation of atoms due to an unbalance of the opposing motions reduces the unbalance, and eventually results in the establishment of a stable equilibrium, which accounts for the existence of the crystalline state of matter.

VII. LARSON'S CALCULATIONS OF MOTION, SPACE AND TIME QUANTA

Larson learned how to measure Nature's smallest time interval and shortest space length after he learned how to express the *place* of a photon. He has discovered that a photon's place is in a **uniformly translating physical location**, moving with unit speed, whether or not occupied by the photon. Like Newton and Wigner¹² he found a photon's place to be different from that of an electron, neutron, proton or meson. Within the formalism of quantum mechanics, predicated on an assumed inert, continuous space-time, they did not find a place to position the photon.

Mathematical unity, unit speed (the speed of light), **not** mathematical zero, is the true physical zero, the reference origin Nature prefers. Unit speed involves *equivalence* between space and time quanta, both as to magnitude and dimensionality. Mathematical unity is the true physical zero, because the reciprocal character of the space-time relation *also* implies that **all** physical entities, beginning with the photon of radiation, result and emerge *only* from speed displacement *below or above* unit speed.

Larson⁷ thinks that the natural quantum of time can be computed, when the following information is available about a photon whose oscillatory translation involves one outward unit, followed by one inward unit, constituting a full cycle of oscillation in a measurable time interval. If the frequency of such a photon has been counted in the cgs unit of cycles per second, the time quantum may be calculated as follows:

When cycles/second is chosen as the frequency unit, it is assumed that frequency is a function of time only. Frequency is equivalent to velocity, a ratio of space to time. Thus, the natural unit of frequency is a quantum of space divided by a quantum of time. This is equivalent to a half cycle per time quantum, since a full cycle includes one motion unit in each direction. Larson has found that the frequency of the specified photon was measured by Rydberg¹⁴ and is reported by Larson⁷ as having the value of 3.2880×10^{15} cycles/second. As previously indicated, this measured value of the Rydberg fundamental frequency will be expressed for the present purpose as 6.576×10^{15} half-cycles/second. Larson⁷ says :

“Expressing the frequency, which is actually a velocity, in terms of reciprocal time in this manner is equivalent to using the natural unit of space in combination with the cgs unit of time as the cgs unit of frequency. In other words, omitting consideration of the space term in selecting the unit of measurement has the same effect as giving it unit value. The *natural unit of time* in cgs terms is therefore the reciprocal of the Rydberg frequency or 1.52×10^{-16} second.

“We may now multiply this figure by the natural unit of velocity, 2.9979×10^{10} cm/sec, to obtain the *natural unit of space*, 4.55×10^{-6} cm.”(The Structure of the Physical Universe, p.25.)

Thus, unit speed, the speed of light, appears to be formed by the ratio of a space quantum to a time quantum. Neither absolute zero speed nor infinite speed appears to exist in the physical universe. Since all physical entities are manifestations of motion, they are measured in terms of $1/n$ and/or $n/1$, when or where n is a finite integer and not zero. The speed of all individual units of motion is unit speed, which occurs when n is unity. No infinities are possible. The physical zero is unity, rather than the mathematical zero.

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"Both space and time are assumed to be infinitely divisible-to have no ultimate structure."
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"While fields and particles come and go, space and time lie inert, providing the stage upon which the actors play their roles."
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"But does time not imply motion? Not at all, I reply, as far as its absolute, intrinsic nature is concerned; no more than rest; the quality of time depends on neither essentially; whether things run or stand still, whether we sleep or wake, time flows in its even tenor. Imagine all the stars to have remained fixed from their birth; nothing would have been lost to time; as long would that stillness have endured as has continued the flow of this motion."
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"Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an ether. According to the general theory of relativity space without ether is unthinkable; for in such space there would not only be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. *The idea of motion may not be applied to it*."
(our italics).
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"The interpretation of these results is that there is no displacement of the interference bands. The result of the hypothesis of a stationary ether is thus shown to be incorrect and the necessary conclusion follows that the hypothesis is erroneous."
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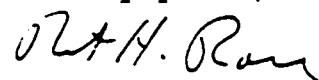
November 14, 1994

Dr. Frank H. Meyer
1103 - 15th Avenue. S.E.
Minneapolis, Minnesota 55414

Dear Dr. Meyer:

We have reviewed your paper, "Are Motion and Space-Time Quantized?" (our manuscript number 6398), and I am sorry to report that it would not be an appropriate paper for this Journal.

Sincerely yours,



Robert H. Romer

RHR/kk

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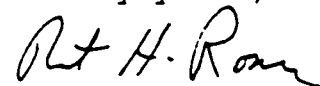
November 22, 1994

Dr. Frank H. Meyer
1103 - 15th Avenue. S.E.
Minneapolis, Minnesota 55414

Dear Dr. Meyer:

Thank you for your letter of November 17, concerning MS #6398. To answer your curiosity, I have to say that it was unfortunately all too easy to realize that your paper was not an appropriate one for this Journal. I think that if you had looked at some recent issues of the Journal, and/or read our "Statement of Editorial Policy", you would have realized that fact before you sent it to us. I refer in particular to the sentence beginning: "Papers announcing new...". That policy is hardly a new one at this Journal; that sentence has been part of AJP's editorial policy for decades.

Sincerely yours,



Robert H. Romer

RHR/kk

FRANK H. MEYER
1103 - 15th Avenue S. E.
Minneapolis, MN 55414

November 30, 1994

(612) 331-6086

Dr. Robert H. Romer, Editor, AJP
Merrill Science Building, Room 222
Box 2262, Amhurst College
Amhurst, Massachusetts 01002

Dear Dr. Romer,

Thank you for your Letter of November 22, which satisfactorily answers my curiosity. MSP #6398 is inappropriate for AJP, because "Papers announcing new theoretical or experimental results or papers questioning well-established and successful theories are more appropriately submitted to one of the archival research journals for evaluation by specialists."

Everybody sees according to his or her own light. The reciprocal system of physics describes "original research that clarifies past misunderstandings" about the divisibility of space-time, space and time and "allows a broader view" of the established subject of quantum physics. The reciprocal system of physics "demonstrates new relationships" between the nature of motion and space-time. In both classical and relativistic mechanics, ^{MOTION AND} space-time are traditionally represented as apparently unrelated. The finite equable speed of time progression cannot be specified at all independently of acknowledging that space also progresses uniformly outward with the same finite speed. The reciprocal system finds this finite speed of space-progression with time progression to be the unit or quantum of speed equal in magnitude to the speed of light in vacuo. The reciprocal system of physics shows "new ways of understanding, demonstrating or deriving the familiar result" of the 'expansion of the universe' that is postulated in the astronomers' latest theory of the recession of the distant galaxies.

"The third assumption [of the reciprocal system of physics, Dewey B. Larson affirms] is that space and time exist in discrete units. This, too, is an extrapolation from known facts into the region of the unknown. In the early days of science it was generally believed that the primary physical phenomena were continuous and infinitely divisible, but as knowledge has grown during the succeeding centuries one after another of these phenomena has been found to exist only in units. The atomic structure of matter was the first to be demonstrated. Later the unit of electricity was isolated and still more recently the work of Planck made it clear that radiant energy follows the same paths.....Since experience shows that as our knowledge widens more and more and more physical phenomena are proved to exist only in discrete units, it is merely a reasonable extrapolation to assume that if all of the facts were known this would also be found to be true with respect to the basic entities, space and time."

The reciprocal system of physics is as old as Leucippus and Democritus and predicated on the same experience that led them to discover that matter probably is composed of discrete units, atoms.

Sincerely,
Frank H. Meyer
Frank H. Meyer