String Theory Analysis
And its Use as a Model for the Reciprocal System

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ABSTRACT

Summary and overview of what I comprehend regarding the stages that current physics has been through and will be at its hoped-for penultimate goal presently, and what its advocates have achieved and partly solved, and what they hope has yet to be solved, and will be solved, gray matter permitting.

Then, hopefully, we can use that methodology with appropriate RS-Larsonian modifications to reveal to the world at large a viable mathematical successor to Relativity, Quantum Mechanics and String Theory showing that we do not need (8+2)- or (24+2)-dimensional topology to produce a renormalizable physical universe satisfying the conditions of self-consistency.

We must produce a mathematisation of RS, and it must acknowledge the current state of knowledge of topology and all its characteristics, as long as we don't stray from the Larsonian path of deductions from the postulates.

Whereas the latest thinking is predicated on the ultimate building block of all existents being the vibrating string, as opposed to the now-rejected vibrating "blob," we at ISUS intend to show it to be the vibrating space unit of R.S. theory (see Appendix).

When paradigms evolve, they not only attempt to explain the phenomena, events and existents that are observed, they also have implicit predictions built in, even if not obvious at the outset. Then the prediction(s) should be able to be demonstrated in order to validate the rightness of the paradigm. Sometimes, an experiment to demonstrate this is required, and if such an experiment is outside the ability of the paradigmist, then the very paradigm is unverifiable and therefore does not carry much weight, other than the momentum, generated by the PR machine and the accolades of the scientific trendies, of which there are many.

OVERVIEW of CURRENT PHYSICS (Since Newton)

1 EINSTEIN'S THEORY

- It is predicated on geometry, and is incomplete.
- It makes use of Riemann's metric tensor, the Ricci tensor and Minkowski space.
- It depends on the Lorentz transform and a hyperbolic geometry, to allow for a curvature of space-time.
- It explains light waves travelling through a medium.

One of its predictions is the gravitational disturbance wave, commonly called a "gravity wave," whose existence is suggested by the quadrupole moment term in a solution equation of the original tensor equation. In effect, these transverse waves would be produced by changes in gravitational fields. They would travel at the speed of light, transport energy, and induce relative motion between pairs of particles in their path, or produce strains in more massive objects.

As yet they have not been detected.

It provided the first explanation of the apparent bending of light when passing close by a gravitating body and also it accounted accurately for the precession of the perihelion of Mercury, which Newtonian physics could not do. (However, RS also calculates these correctly; see later.)

Another prediction is the Big Bang with its discontinuities.

2 KALUZA-KLEIN THEORY (KKT) (Original form 1919-1930)

It utilities five-dimensional hyperspace and explains that light is a vibration of the *fifth dimension*. Later shown to be a useless theory as is.

3 THE STANDARD MODEL

It utilities the Yang-Mills Field, which supersedes Einstein, without being based on geometry. It alleges that there are four forces of nature: *Weak Nuclear Force, Strong Nuclear Force, Electromagnetic Force* and *Gravitational Force*.

It predicts quarks in all their multifarious and combined forms. Quark confinement prevents their separation. These quark "bundles" are called "multiplets" and they can be subject to a discrete set of vibrations to represent the various subatomic particles. This discipline is called "Quantum Chromodynamics" (QCD) and is used to explain the so-called *Strong Nuclear Force*. This force is deemed to provide the energy that fuels the stars and is the source of energy released by the hydrogen bomb.

When two particles collide, the theoretical consequences are calculated by Perturbation Theory, which depends on approximations called "Quantum Corrections." In other words, these quantum corrections are added to the usual Newtonian and Einsteinian physics expectations and are analogous to Ptolemaic epicycles, used by the geocentric theorists of old. The theory cannot give a direct consequence; it needs a correction.

The *Electromagnetic Force* includes Maxwell's Theory and is part of Quantum Electrodynamics (QED).

All the above is based on superficial symmetry. This means that the shape of an object is preserved after deformation and/or reflection and/or rotation and/or inversion. This is extended into a space-time symmetry, where in Special Relativity we consider a rotation between space and time. (So does RS; see later.)

Another superficial symmetry is with respect to the permutations of a set of objects.[1]

The *Weak Nuclear Force* governs the properties of two particles, the electron and the neutrino. This symmetry is called SU(2). This force is deemed to govern certain forms of radioactive decay, such as radioactive rock that melts and drives volcanoes.

The *Electromagnetic Force* has U(l) symmetry, which rotates the components of the Maxwell field into itself.

The fudged "unification" of these three fundamental forces splices the three theories [Yang-Mills,

1 With 3 objects, we have 6 permutations ABC BCA CAB ACB BAC CBA, called S(3). In the case of quarks, we call it "Special Unitary" symmetry, (referring to the matrices having unit determinants), hence it is called SU(3).

Maxwell (QED) and QCD] into one large symmetry SU(3) X (SU(2) X U(l). This shows the three multiplets artificially bound together rather than as a single symmetry with the distinct disadvantage that they cannot be rotated among one another.

The *Gravitational Force* is the attractive force that keeps planetary systems in their orbits, binds the galaxies and keeps our feet on the ground.

INCREASING THE NUMBER OF DIMENSIONS

The original presentation by Maxwell consisted of eight equations in three dimensions. When they are rewritten using time as a fourth dimension, they reduce to a single tensor equation. This beauty of expression and apparent simplicity belies the over-riding considerations of a suitable theory for the physical universe.

a) There is no single symmetry group, albeit unstable.
b) It does not describe the subatomic world economically.
c) It does not explain where the three symmetries came from, they are just spliced together by proclamation, without any deeper understanding of their origin.

This use of *hyperspace* brought out the conjecture of the alleged entities, called "wormholes," another untestable type of existent. This comes about if the hyperspace is "multiply-connected," but this is untestable, therefore pure speculation. Causality comes under scrutiny also, since wormholes depend on acausality for their existence.

The hypothetical existence of a wormhole came from an exact solution to Einstein's equations. The first particular solution was found by Schwarzschild, and it provided the possibility of a black hole of a spherical nature and concomitantly a horizon, called the "Schwarzschild Radius," and a hypothetical bridge, called the "Einstein-Rosen Bridge," which is impassable, because at the center of this spherical black hole there would be infinite curvature and an infinite gravitational field.

Subsequently, in 1963, Kerr found another exact solution to the same equations and found that the black hole was a disc, at whose center there was a large, but finite, curvature, therefore was able to be passed through, hypothetically. (See more on Kerr later).

Subsequent to this, Kip Thorne found yet another exact solution predicated on the presence of exotic matter, which had negative energy, so his wormhole was very amenable to time travel, but the catch is finding or creating matter with negative energy. Perhaps hunting the Carrollian snark[2] is a more profitable enterprise.

So this is reminiscent of the numerous solutions of perturbation theory. Maybe neither of the foregoing three solutions apply to this universe, since they are untestable.

This theory, the Standard Model, expands the conjecture of the Big Bang by surmising that, at the instant of its occurrence, the 10-dimensional hyperspace was split by the huge Planck energy release, into two universes called "orbifolds," our four-dimensional subjective physical universe and a six-

2 *The Hunting of the Snark* (An Agony in 8 Fits) is typically categorized as a nonsense poem written by Lewis Carroll, the pen name of Charles Lutwidge Dodgson. Written from 1874 to 1876, the poem borrows the setting, some creatures, and eight portmanteau words from Carroll's earlier poem "Jabberwocky" in his children's novel *Through the Looking Glass* (1871). The plot follows a crew of ten trying to hunt the Snark, an animal which may turn out to be a highly dangerous Boojum; the only one of the crew to find the Snark quickly vanishes, leading the narrator to explain that it was a Boojum after all. Henry Holiday illustrated the poem, and the poem is dedicated to young Gertrude Chataway, whom Carroll met at the English seaside town Sandown in the Isle of Wight in 1875.

dimensional objective universe, compactified into an almost infinitesimal size. This cracking of the unstable 10-D universe is the alleged cause of the rapid outward expansion of the universe, eventually to include all the later-formed galaxies.

4 GRAND UNIFIED THEORY (GUT)

This theory contrived a larger single symmetry group, e.g. SU(5), O(10), E(6)

SU(5) uses 24 Yang-Mills Fields within a single symmetry. However, such a proposition must be testable otherwise it comes into the category of "The moon is made of cheese." The high energies required are formidable and unreachable in laboratories, but there was one prediction that was testable. A proton allegedly decays into leptons, with a half-life of 10^{29} years! So tanks of pure fluid ranging in mass from 60 to 3,300 tons were buried in the earth with thousands of photoelectric tubes to catch the decay and there should have been a handful of decaying protons each year. Alas and alack, not to be!

5 KALUZA-KLEIN THEORY (KKT) (RESURRECTED AFTER 60 YEARS)

An attempt to unify gravity with the other forces.

In the 1930s it was a 5-dimensional theory and it was discarded because it was non-renormalizable. The fifth dimension was allegedly compactified by being wrapped up into a circle.

If, say, there are N quarks within a particular multiplet, it has a symmetry SU(N). So KKT was now extended to N-dimensions, where the symmetries were recognised as vibrations of a hypersphere in N-Space. This resulted in a "supersymmetry," where the multiplet consisted of equal numbers of fermions and bosons and they could be rotated into one another.

The downside is that the usual commutative arithmetic does not apply to this newly-emerged number system so these "super-numbers" had to be described and were found to be self-consistent. Further, this "super-gravity" used 11-dimensional space and "predicted" a new particle, called "sparticle." It subsumed Yang-Mills fields, but it increased the size of the Riemann tensor vastly from 10 components to hundreds of components.

However, none of the predictions were testable and there never were any "sparticles" found in the debris of particle accelerators. This KKT improvement has less infinities, but is still non-renormalizable.

6 SUPERSTRINGS and 10 DIMENSIONS

Allegedly, according to this theory, if one works with the concept of strings then analysis determines that strings can vibrate self-consistently only in (8+2)- or (24+2)-dimensional hyperspace. Allegedly the string is about 10^{20} times smaller than a proton and each mode of vibration represents a distinct resonance or particle, which, from a distance, are indistinguishable from each other. Thus each subatomic particle corresponds to a distinct resonance that vibrates only at a distinct frequency.

String theory then goes on to surmise, apart from accounting for the myriads of particles, that also, as the string moves in space-time, it executes a complicated set of motions. These strings can break into smaller strings and/or collide with other strings to form longer strings. Allegedly this theory is superior

to the preceding ones due, in the main, to the fact that the quantum corrections are finite.

The complicated motions of the strings are subject to the constraint: that they must obey a large set of extraordinarily restrictive self-consistency conditions on space-time. This constraint reduces to either (8+2)- or (24+2)-dimensional hyperspace.

String Theory also gives a simple origin of the symmetries that are found in particle physics as well as general relativity.

The most successful version of string theory, to date, assumes the "heterotic" string, which consists of a closed hybrid string that has two types of vibrations, clockwise in (8+2)-dimensional space and counterclockwise in (24+2)-dimensional space, of which 16 dimensions have been compactified.

However, something fundamental is missing from this theory; the very physical principle that underlies this theory has yet to be uncovered. There is no basic postulate or set of postulates from which all the foregoing can be deduced. It needs to incorporate a theory of initial conditions (TIC). As it stands, it is manifestly incomplete. It violates one of the fundamental properties of good physics, called "Unitarity," which is the conservation of probability. It cannot predict particle interactions, so that is why one must add small quantum correction terms to restore unitarity. (This is the fudge aspect, to compare with Ptolemaic epicycles restoring the balance to the imbalance of geocentricity.)

Perturbation theory and topology come in at this point and one finds conformal symmetry in two dimensions.

However, what is needed further is a *field theory* of strings, if superstring theory is to be proven successful. It is necessary to preserve the duality, which is present in string theory, but field theory does not usually allow duality because of the rules laid down by Feynman.

However, this was overcome and expressed through Cohomology Theory. Ultimately, its success depended on it being able to calculate the mass of the proton from first principles and then all particles. To date, that has not been done. The excuse given is that no one, or computer program, is smart enough to solve the field theory of strings or any other non-perturbative approach to string theory.

So we don't blame the theory, we say, instead, that "the solution requires techniques, that are currently beyond the skill of any physicist, mathematician or computer program. The fault is in our primitive mathematics."

The methodology is: Using perturbation theory, one calculates quantum corrections. Because of the absence of a TIC, there are millions of so-called solutions found, amidst which there may be one that is correct. Each such solution implicitly describes a universe that may have something in common with our own physical universe, such as subatomic particles, but from then on it is at variance. Another solution may produce too many or too little quarks etc. etc..

So the only logical way is to solve it directly through non-perturbative techniques, such as the Reciprocal System uses.

The essence of the mathematics (that concludes the only two possible values of N for N-Space are the (8+2)- or (24+2)-dimensional spaces), is buried within modular functions. These are cloaked in a degree of mystery; perhaps the only mathematician, who ever really understood them fully, was Ramanujan, after whom is named the Ramanujan function, used in the theory of modular functions.

We should then have a super-symmetry, albeit inherently unstable, hence the split at the time of the alleged Big Bang, causing a phase transition. This split is called "symmetry breaking."

The paradox arises though: if immediately prior to Big Bang there was the splitting of the 10-D manifold then because it was, by definition, an unstable configuration of super-symmetry, it, too, must have been preceded by something more stable, since we would not envisage a succession of unstable antecedents. Then what was this manifold, and how would it be described, and what would cause its ultimate instability?

Here we enter, perhaps, the realm of membranes, p-branes, (providing p in p-brane is not greater than 1, then we can still have perturbation expansions), and D-branes (after Dirichlet). The string is called a "one-brane." There are three kinds of dualities (S, T and U), Gauge Theory and other mental convolutions to tie up our gray matter, *ad nauseam*, *ad infinitum*.

All this niggles at the reader to a degree, since the question arises as to whether this *modus operandus* would raise the hackles of William of Ockham. Is there not a simpler viewpoint and concomitantly a simpler mathematics to handle all this? (Yes, the Reciprocal System.) Poor old William of Ockham spinning in his grave at faster than light orbital speeds.

The direct test of the theory required the physicist to have at his disposal energy of the magnitude of Planck energy 10^{19} BeV. Perhaps there is an indirect test, for the alleged "false vacuum" or for the presence of sparticles.

Also this theory does not eliminate the paradox of the asking of the question regarding the status quo before the alleged Big Bang. This could be a meaningless question if the universe was created with the Big Bang, since time and space originated then, yet the trendy physicists don't disregard that question nor do they question the very veracity of the Big Bang concept. Worse still, they claim that the background radiation is the echo of the Big Bang, rather than look for an alternative explanation. This is, in part, due to Gamow's prediction of that echo. However, Larson explained it very successfully in the Reciprocal System as part of the cyclic interchange of matter between sectors.

Summarily, all recent theories since Newton are expressed in the form of one or more partial differential equations, be they vectorial or tensorial. Such a D.E. can only be solved if the would-be solver assumes some initial and/or boundary conditions. Such an explicit assumption carries with it some concomitant implicit assumptions, probably not suspected by the solver and which will eventually manifest themselves to an interested analyst.

A solution produces a particular metric or world line for the given example, thereby defining the type of space or manifold that describes the universe. Some world lines can be found to be twisted to form closed loops, named "Closed Timelike Curves" (CTCs), which are a contentious issue among the cognoscenti.

Einstein's tensor equations yielded many solutions, many of which have been described as pathological, yet that very description depends on the attitude of the mathematician. e.g.

i) The universe is a Minkowski space, which is flat, signature = -2.

ii) The Schwarzschild Universe, an Einstein Space. This is used for explaining planetary motion about the sun, giving a more accurate solution for the precession of the perihelion of Mercury, than was obtained by the method of Newton.

iii) The Einstein Universe used to explain the null geodesics for light rays being closed curves. It has variable curvature.

iv) The De Sitter Universe is an Einstein Space where the null geodesics are straight lines. It has constant curvature.

v) The van Stockum Universe, amended by Tipler, based on a cylindrical topology violates causality.

vi) The Godel Universe, predicated on initial conditions being that the universe was filled with slowly rotating gas and/or dust, had some pathologies, (CTCs), including acausality linked with time-travel, thus violating Mach's Principle.

vii) This was deemed to mean that Mach's principle was incomplete, but it could also mean that Einstein's equation was incorrect and that Mach got full marks.

viii) The Kerr Universe contains myriads of ring-like black holes.

ix) The Newman-Unti-Tamburino Universe (NUT) allows for CTCs and time travel with a bizarre spiral-like topology.

Hence showing that mathematically exact solutions to Einstein's equations each have a limited applicability, or none at all, and therefore there is a flaw in that very equation.

All the preceding metrics show how there is a continual redefining of the model for the physical universe according to what problem is to be solved, showing how the original Cartesian-type metric served only as a basis on which to "build" the appropriate "refinements," to obtain the appropriate metric. All are very contrived and not one of the theoretical physicists is willing to admit that there never can be a solution that will have no pathologies of any degree. This is the way with partial D.E.s.

This is where Dewey Larson steps in with the *Reciprocal System of physical theory* to show that one can describe the universe *without* mathematics (initially) and then look for the appropriate equations later.

7 RECIPROCAL SYSTEM OF THEORY (RS)

The Reciprocal System explains the apparent bending of light and the precession of the perihelion of Mercury with the same accuracy as Relativity, albeit with a different methodology. There are many other accomplishments too numerous for inclusion in this paper.

Using the methodology of Michio Kaku, a superstring theorist, let us examine the RS paradigm.

The solution to the topology problem appears to be a space-time symmetry, where, if we rotate from space to time, there is no overall change. We have two orbifold-like sub-universes, mutually embedded (orthogonally orientated), each of which, when observed from within, has *exactly the same topology*, existents, etc., as the other. Only when considered from *without* does the theorist realize that they are *not* identical, but are obedient to the *Law of Duality*. The space of one is the time of the other and *vice versa*.

There is no need for quantum corrections, perturbation theory or non-perturbation theory. There is no requirement to look for or expect this paradigm to subsume Maxwell's Equations, Relativity, Yang-Mills Fields or Kaluza-Klein Theory within a large tensor of super-symmetry.

The symmetry is there and is best expressed as SU(3) X SU(3) without any disadvantage for the lack of a truly combined symmetry as with Superstring Theory. Hence there are no compactified vestigial dimensions to boggle one's mind. One does not need quantum corrections, perturbation theory, non-perturbation theory, parallel computing etc. to solve any relevant equations.

The RS produces a physical universe with two solutions for the (3+3)-dimensional manifold and these

orbifold-like zones are known as the “Material Sector” and the “Cosmic Sector,” and from the perspective of an observer within such a sector, his sector is exactly the physical universe as we know it by our observations. What is more, one can see clearly that the rotation between space and time demonstrates the symmetry by changing the physical sector into the cosmic sector and vice versa.

Probably, it can be described to have arisen from a non-perturbative vacuum, and as such is the “holy grail” after which the theoretical physicists of today aspire, even though they are yet to find out about RS.

Further, RS resolves the “four forces” problem in a surprisingly counter-intuitive manner. There are in fact only two so-called “forces,” (better to be called “motions”), and each manifests itself in two ways, according to whether it is within or without a well-defined “unit distance.”

One of the forces obeys the inverse square law and always acts towards the unit boundary and we recognize it as gravity when it is acting from outside that unit boundary, however its manifestation from within that boundary has the appearance of a repulsive force, and as a result it enables certain stable equilibria to manifest, such as in metallic crystals in the microcosm and in globular clusters in the macrocosm.

The other force obeys a different law for calculation of its magnitude, and it is always away from the unit boundary, therefore mainly appears to be a repulsive force in the macrocosm, such as driving galaxies apart. It eliminates the unproven conjecture regarding an initial Big Bang, thereby abolishing mankind’s requirement for a so-called “beginning to the universe.”

“We’ve had none, got none and don’t need none.” (Shaky’s Peer)

Now to another theoretical approach to a (3+3)-dimensional universe.

8 THE INTER-CONNECTION BETWEEN ATOMIC AND COSMOLOGICAL VALUES

The group-theoretical and combinatorial topological methods of Robert Oros di Bartini have established the analytical connection between basic physical values without recourse to Einstein’s Equations. He derives tables of physical constants, never done before. Concomitantly, he seems to have derived theoretically the same metrizable physical universe as Larson has done in RS, albeit from a different perspective, founded in solid mathematics.

EXTRACT

The maximum volume of the imaging extension occurs at $n = \pm 6$ and consequently the most probable and the least improbable extremal distribution of elementary images of the specimen A corresponds to the six-dimensional configuration. The existence of this total specimen A is six-dimensional.

The closure of this configuration is expressed with the volume condition extremity and die symmetry of its distribution.

All even-dimensional spaces may be regarded as products of two odd-dimensional extensions of the same dimension and of opposite orientation, embedded into one another.

All spherical formations of the dimensionality “n” have an orientation in spaces (n+1) and in the highest measurements, all odd-dimensional projective spaces are orientable when immersed into an

extension with the same dimensions, white spaces of even dimension are one-sided. Thus one form for the specimen A is a (3+3)-dimensional complex manifold, consisting of the product of a three-dimensional space-like extension and an orthogonal three-dimensional time-like extension, both of which possess an orientation.

The introduction of homogeneous coordinates makes it possible to reduce the theorems of projective geometry to algebraic equivalents and the geometric relations to kinematic ones.

APPENDIX

We take the Basic Premises of RS as our qualia and look for the only type of oscillation possible, which is the RS equivalent of a string as used in String Theory.

Since all space units are traveling away from each other (the recession), if we consider a periodic reversal of direction, we soon realize that it sets up a vibration (oscillation), which interferes with the progression only, however, in the line of that progression, but all this does is prevent one of the three possible scalar dimensions from being used for the recession. Immediately we see that this basic vibration, [(oscillation), (VSUla)] is an amalgam of one space unit with two or more time units and would manifest itself within time as a vibration whose constant speed is half unit speed (or less), each way. This vibration unit is then free to move outward along a line, that can be in any direction within a plane, which is orthogonal to the vibration.

Since this particular example is a vibration within unit space, it must be in time, but it is less than unit speed. We cannot identify it at this stage, but we can say it is a type of latent energy, a precursor to electro-magnetic waves, which are a relationship between at least two space units and at least four time units. (Naturally, there must be the counterpart to this vibration in the cosmic sector, using the Principle of Duality, meaning it would be an outward progression in time of a spatial vibration within one time unit, at twice unit speed.)

Perhaps this is the very vibration (oscillation), which upon rotation becomes the rotational base, but it has a right to existence as a vibration alone. Perhaps it is ubiquitous and almost as prevalent as the outward expansion of the space units, and perhaps, when there is a high energy release, say a galactic explosion, that it may be rotated and hence the energy of the rotation is converted to matter. After all, with an expanding universe, there tends to be a lessening of the density of matter throughout, unless there is matter created and this may be one way to “help” maintain an average density.

Next step along the line of deductions would be to consider this temporal vibration (oscillation) within a space unit and have it make a periodic reversal along its line of outward recession, whereupon we would have a double vibration (VSU2a), which would have one scalar dimension left for it to join the outward recession at unit speed. This also has to be identified, as does its reciprocal counterpart.

We consider, next, that two space units in the line of the outward recession, may simultaneously reverse their direction periodically, and thereby we have an ASSOCIATION of two contiguous space units, each with two time units, and the overall result is a vibration of length two space units, whose speed is half unit speed, but in this case we have a spatial entity (VSUlb). In this case, and in the one above, the vibration can no longer recess in the same line of outward direction of the recession, along which the vibration moves backwards and forwards, and since there are still two dimensions open to such a recession, so the vibrating “unit” may recess in any direction along a PLANE, which is orthogonal to the vibration, and hence not in ALL directions in 3-D space, but in all PLANAR directions. In the first, unidentified, case we can only assume some form of latent energy, but in the second case we have

coplanar electro-magnetic waves.

Now let us consider the former case, which can be subject to a direction reversal and becomes a doubly-vibrating unit (VSU2b), each vibration can be at half unit speed and still be temporal and this new unit still has one dimension left, along which to recess at unit speed, so it does. This is neither discussed nor identified in the texts. Perhaps it can be called "latent mass." An extension to this derivation would be to add more time units to the aggregate, resulting in a slower vibration and therefore a variety (series) of doubly-vibrating aggregates.

Next, reconsider the latter example of the contiguous (tandem) pair, vibrating together in space. As is, this entity may recess along any line in the plane orthogonal to this vibration and manifest itself to us as an electro-magnetic wave, but, if further, this is subject to a periodic direction reversal along that line in a third scalar dimension, thus putting a halt to its outward recession at unit speed, then this doubly-vibrating unit (VSU3b) is no longer a wave and may be a non-gravitating mass and has to be identified. Since it is a very probable consequence, no less probable than rotations, it may well be some form of cosmic particle or neutrino and as such travels at unit speed in the remaining scalar direction, orthogonal to the plane of the double vibration, and it probably does not have mass. It is also most probable that this vibration in the third scalar dimension is within one space unit, meaning in a temporal environment, since the probability that the contiguous pair of space units comprising the basis for the first vibration will associate with contiguous space units in the second scalar dimension is slight, if not near improbable. So, at this stage, we consider the original vibration to be two space units long and the second vibration to be only one space unit long.

These VIBRATIONS are the first part of the derivation of the two antagonists to the natural recession. This vibration in the third scalar dimension most probably will be only one space unit long, for the same reason as above. This object, then, can be considered as a candidate for various types of rotation, (about a choice of three axes, perhaps), whether regular or oscillatory in its nature, and this rotation probably gives it its property of gravitation.

This ROTATION is the second part of the derivation of the two antagonists to the natural recession.

If one then looks into the mathematics of these entities and what they represent, one is confronted with the serious consideration as to whether they can be described with triplets and represent the atoms of elements in a comparable way as in the texts of D.B.L., and further, if they may describe the Reciprocal System of theory more understandably, with, perhaps, some advantage, yet to be determined, but with no disadvantage.[3]

My take on science, in common with D.B.L., is that one must not intermix metaphysics and science in any presentation or publication. Dewey made that very clear by leaving his *Beyond Space and Time* for separate publication; alas he did not live to see it in print. Although he used a scientific approach via logic and observational evidence in BST, he knew that it must be separated from his paradigm for the physical universe in any publication. In other words, we must eschew the anthropic principle in pure science. Kaufman brings consciousness into his basic postulates; enough said.

Any paradigm for the physical universe must be able to produce equations somewhere along the line of arguments, deductions, etc..

If we compare RS with the other recent paradigms, we see that Larson's is unique by being founded on

3 In my papers, SVM and Che Sera Sera, I raised the question re the Larsonian chain of deductions from the postulates, that left open the yet-uninvestigated possibility that, rather than nominating the number triplets to represent rotations, that RS basic theory may, in fact, be better understood if the triplets represent vibrations.

a philosophically reasoned postulational base and therefore was not open to multitudinous and multifarious alternative universes; at most there is the occasional fork in the road of deductions and this gives pause to go back to the postulates in order to remove ambiguities. Also there can be the occasional hidden fork, missed by Dewey, later to be found and investigated by his advocates.

Back to equations and their traps: There are specific problems to which a unique equation can be applied, e.g. A circle with radius = 2, centered at the origin is uniquely determined in a Cartesian framework by $x^2 + y^2 = 4$.

However, some people like to look for a generalized equation that will subsume the family of all circles centered at the origin, using one parameter for the radius. Some go further and find a more general equation for the super-family of all planar circles, using three parameters, but one must get rid of all parameters to specifically represent the original circle.

There are many examples where a mathematician wants to solve an equation for a correct solution, but as part of the preliminary procedure, he knowingly introduces inadmissible solutions. The simplest type of algebraic example is $(x + 6)^{0.5} = x$. In order to solve we square each side and end up with $x^2 - x - 6 = 0$, which solves for x = -2 or 3. However the original equation only admits one solution, namely x = 3, thereby demonstrating that the process of solving can introduce inadmissible solution(s).

One can introduce erroneous solutions into other types of equations, or worse still, one can provide an umbral equation to fit a particular problem and find that it also fits other problems that are far removed from the original problem, which, if not pointed out, will be misleading.

General equations are extremely important, since as one looks for equations for physical laws, one finds partial differential equations arise and their solution involves a constant function as the constant of integration. Since there are infinite possibilities for such a function, one must be ever aware that it may be difficult to find the correct expression and that other expressions for the function are inapplicable to the problem at hand. It is acceptable mathematical practice to admit that all solutions have an interpretation and the exploratory search for meaning can be very educational and often beneficial, but there may be no valid reason to accept them.

BUT, the bottom line is that if one is attempting to define the physical universe with a set of equations, one must have a postulational base to which those equations apply. This is what Larson established long before any mathematics arose. Hence there is only one physical universe described by RS, as it should be. At no time is there more that one physical universe to be contemplated. That is what the philosophy of science is all about.

However, along come the so-called “theoretical physicists,” who have no idea how to understand what the physical universe is, other than what they learned from other paradigms. Until Einstein’s theory, all paradigms were based on observation, therefore were subjective.

Einstein broke the mold by hypothesizing a complex Minkowski space and in so doing, established an objective paradigm whose very physical nature had to be deduced from the equations, which were tensorial partial D.E.s. Hence the proliferation of solutions and, in consequence, the multiplicity of different spaces, all of which satisfied the original equation but none of which was sufficient, in itself, to solve and explain all the observational perplexities.

One solution elucidated for light paths being curved, another worked out for planetary orbits being elliptical, etc.. But the solvers never conceded that this was an indication of a flawed paradigm, since ultimately in the best case scenario the mathematics should be free of cognitive dissonances and there should be a unique solution for all cases. So all these guys, in effect, formed an exclusive band of

cognoscenti and in order to join this "club," one had to avoid "rocking the galactic boat."

The current long-lasting "brilliant" idea is to apply the quantum theory of the microcosmos to the whole physical universe, so we have a ubiquitous and unlimited wave function that can be solved for a myriad of bizarre solutions to "prove," for instance, that we can have wormholes that connect us to parallel universes (al la Hawking), etc.. This fallacy is based on the supposition that the observer affects the observed, just because it works that way in the microcosmos.

None of these guys seem to know the greatest test of them all, *Reductio ad absurdem*. In fact, they are life members of "the theater of the absurd," but their status amongst the cognoscenti gives them a special immunity to adverse criticism. They scratch each other's back in a mutual admiration society.

Maybe we should all pack our bags and take a trip along the Einstein-Rosen bridge to a universe that accommodates physicists that understand paradigms far better?

Historically, there are very few notable physicists who have made a success with science fiction; (Hoyle & Sagan were successful). All these wormholes etc. are fodder for the science fiction aficionados, yet we are constantly presented it by these guys, each with a "straight face" that we should accept it all. Even multiple universes connected by wormholes, WOW. The "fudge factor" is never admitted to, but the results of their so-called research is akin to the pseudo-fisherman casting about with his line to hook whatever or whomever he can, even if a poor "fish," like the man in the street, is baited with a wormhole.

Consider the infamous Schrödinger Cat Paradox, which is another example of the mis-used equation for the wave function for the universe. This function has produced correct predictions for quantum theory only, yet is boldly assumed to be applicable for the macroscopic universe and that includes "The Cat in the Box," who belongs more in the children's Dr. Seuss books. Demonstrably, the cat is only able to exist in one state, either alive or dead. The fact that it may be screened from observation does not put it into a so-called "nether state" (a sum of all possible states).

The theorists know that, ordinarily, they should reject a theory that produces a cognitive dissonance, but, because they have so much invested in quantum theory, they illogically apply it to the whole physical universe; enough said.

Think of the billions of dollars already spent and thereby wasted on looking for exotic matter that does not exist, decaying protons, etc.. They'll soon have grants to research the feasibility of building time machines, laboratory transversible worm-holes, exotic matter with negative energy, methods to extract vast energy from vacuum (Casimir effect), antigravity machines, acausality, etc.. Meanwhile millions die from famine, drought and poverty!

Chaos Theory, Catastrophe Theory and fractals can describe the macrocosmos far better than the fudged version of Quantum Theory, yet they are rarely included in the publications of the theoretical physicists these days because those disciplines are no longer the "flavor of the month."

It was Hawking in the main, who initially suggested that quantum theory could be used for the whole physical universe, Quantum Cosmology. What I would like to know is, "Did he attempt any justification for that proposition?" How did he convince so many others to accept that illogical step, since there was no experimental or observational evidence to support it?

The latest "grasping as straws" announced that "The wormholes had to exist to keep our universe stable, from exploding outward." Perhaps the proponent (Coleman) would change his mind if he knew of RS and the cyclic interchange of matter and energy between the physical sector and the cosmic

sector.

Essentially, the few physical principles needed to define a paradigm can be expressed in plain English without mathematics and Larson demonstrated that with RS. This can be done with Relativity too. However, when mathematics is used, it subsumes the set of all possible self-consistent structures and there are a vast number of them.

The relationship between physics, based on physical principles, with mathematics, based on self-consistent structures, comes to light when the physical principles are expressed mathematically. This draws on many distinct branches of mathematics usually, thereby uniting them, sometimes for the first time into a newly named discipline; e.g. Homology, Homotopy, Algebraic Topology, Combinatorial Topology etc.

In all areas of life-experience and academic pursuits there are trends and/or patterns that arise. The significance of these patterns can be the kernel for understanding. So is it with a sought-after paradigm for the physical universe.

All the attempts at paradigms from Einstein onwards, as listed in my previous paper on String Theory, are looking for a self-consistent topological space, wherein a rotation of the representative matrix does not produce any untestable surprises, such as inexplicable particles, acausality, worm-holes, black holes etc. Well, RS does just that if we approach it using the same methodology. The only difference from all the other attempts is that we use a (3+3)-dimensional space and, instead of a string that vibrates, we use the vibrating space unit of RS.

Then we can carry on the investigation and see what further arises, if some of you gurus who read this, will cooperate in this opportunity to put our collective foot in the door of today's research.

Whereas the underlying principle of physics for the Superstring theory is unknown, and perhaps unknowable, because it started as an *ad hoc* guess that appeared to work, with appropriate modifications over the years and redefining the properties of the string and the number of dimensions. By contrast, the RS was founded on a well-thought-out physical principle and now we have to find the mathematics to describe it.

Here we can make use of the current theorists' work by "climbing over their backs" and modifying their matrices in accordance with our postulational base.