THE PULSE OF THE UNIVERSE.

By T. H. Ray

"*Everything should be made as simple as possible, but no simpler.*" ~ Einstein

Abstract

All life has a pulse.

Introduction

Einstein's wish to make everything "… as simple as possible" obviously qualifies the meaning of 'simple'. Less obvious is that he also reflexively qualifies the meaning of 'possible'. Zeno, who asked the seminal question "Is motion possible?" probably wasn't thinking "Is relative motion possible?" as Einstein and Mach were—nor the solution that follows, "All motion is relative motion". So although motion's possibility is still an open question, there is little doubt that we perceive and measure the world in relative motion. Though we might believe that a fundamental digital reality—solid state information—underlies physical phenomena, it will remain a belief, and unmeasured, for as soon as we invoke a measurement standard—an ordered relation—we take it to mean relative to something else. If a measurement were other than an ordered relation, we couldn't know it as real, for what is real leaves a record.

Simple is both real and possible, **Real** ⇔ **Possible**, though not simultaneously.

Einstein was quoted by Karl Popper: … "*A disastrous fear of metaphysics … [is the] malady of contemporary empiricist philosophizing … this fear seems to be the motive of interpreting, for example, a 'thing' as a 'bundle of qualities' – 'qualities' which may be discovered, it is assumed, among the raw materials of our sense … I, on the contrary, do not think that any dangerous kind of metaphysics is involved in admitting the idea of a physical thing (or a physical object) as an autonomous notion into the system, together with the spatio-temporal structure appropriate to it …*" [1]

… in defense of metaphysical realism, which could (and maybe should) be the basis for what is 'real and possible'. The operational principle here is correspondence—what is real corresponds to what is possible in a reciprocal manner. Together, they form an objective framework, a scientific framework that we know as *theory* and *result*, and to which theory is always primary. Because theory transcends a physical result (and even a mathematical result) it is unavoidably metaphysical. And it *always* leads to an inevitable conclusion—a physical manifestation of the possible—

by which we are led to admit that the possible is equal to the inevitable, one of the cornerstones of quantum theory (Feynman, sum of path integrals).

Research

Let's call the theory of the real, Φ, and the theory of the possible, Λ. What we find that is $\Phi = \Lambda$ only in the case where Λ is Popper-falsified. Which negates Φ, making the equation $\Phi - \Lambda = 0$. What we notice algebraically is that Φ and Λ are mutually dependent; if Λ has a positive value, Φ is negated. If negative, Λ adds information to Φ. $\Phi + \Lambda = N$.

We interpret this as a negative value for Λ. And we interpret the least "move of time" (LEJ Brouwer's term for a mathematical act) as -2 in two dimensions, correspondent to the dimension ordinal number. To make this value tractable to complex analysis, we have to rig the Hilbert space to permit continuity in one dimension.

$\Phi \subseteq \mathcal{H}$, $\Lambda \subseteq \mathcal{H}$

$\Phi + (-2) = real$

Since the Hilbert space is an n-dimensional plane, the theory of the real, Φ and the theory of the possible, Λ lend themselves nicely to two one-dimension orthogonal lines, respectively—the real and the imaginary—with double zero origin. Integration of the lines produces a line made of a real and an imaginary part: $a + ib$. This line is a point, analytically.

To see why, let us prove this **theorem** from first principles: *a point {s} can simultaneously approach any set of points {S} of any cardinality and separation, provided it is far enough away.* ■

Taking {s} as origin and assigning {S} cardinality 1, {s} → {S} is a coordinate system, making a "move of time" suggested by the term 'simultaneously'. A half time cycle is represented $\{S\} \leftarrow \{s\} \rightarrow \{S\}$

Corollary: *If all points are attracted to the center of their local coordinate system, there are at minimum 3 separable points on a one-dimension line segment.*

Following from the corollary, $\{S\} \rightarrow \{s\} \leftarrow \{S\}$.

So we generalize the meaning of 'spacetime cycle' to *n* dimensions $\begin{matrix}\{S\}^n \rightarrow \{s\} \rightarrow \{S\}^m \\ \{S\}^m \leftarrow \{s\} \leftarrow \{S\}^n\end{matrix}$

And it should be obvious that {s} contains infinitely many copies. A theorem due to Brouwer calls for *invariance of dimension*. $X^n = Y^m IFFm = n$ ■

Following from invariance of dimension, the pair of equations above implies a single event in a single dimension, *independent of any observer*. $m = n$

Using Einstein's definition of quantum as a singularity surrounded by a large vector field, call the "… phase of the resulting field …" + 1 or – 1. Say it's a simple harmonic phase. Then one has $m = F/a$ in one dimension, a displacement function that displaces itself—with a restoring force $F = -kx$.

Every micro scale experiment is context for field reaction and the displacement field:

Einstein founded general relativity on Mach's mechanics. Because space plays no role in Mach, and spacetime is physically real, Einstein preserves Mach's pure relativity of motion without giving up an absolutely local material rest frame. That "no space is empty of field," a principle held dear by both Einstein and Descartes, suggests that field influence is primary even in the 1-dimension ground state of spacetime. We are out to experimentally show that such a ground state exists.

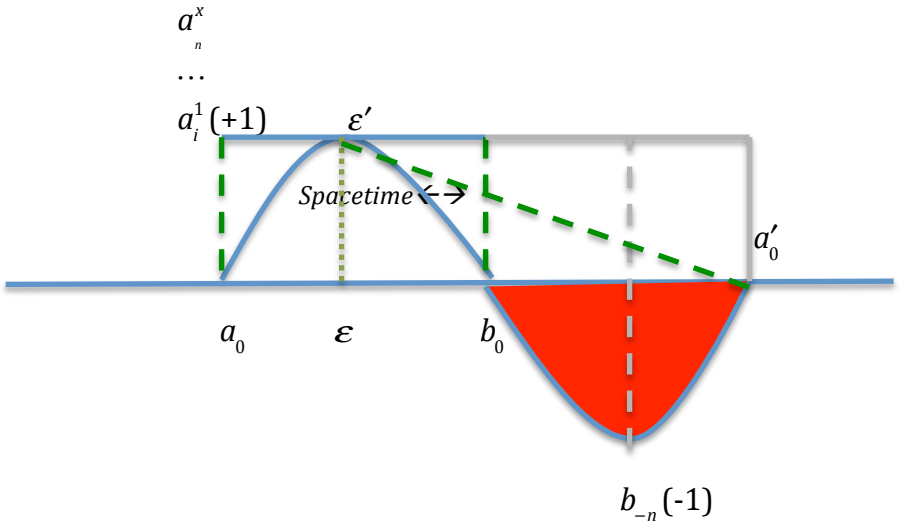
"The notion "material point" is fundamental for mechanics. If now we seek the mechanics of a bodily object which itself can not be treated as a material point – and strictly speaking every object 'perceptible to our senses' is of this category – then the question arises: How shall we imagine the object to be built up out of material points, and what forces must we assume as acting between them? The formulation of this question is indispensable, if mechanics is to pretend to describe the object completely. It is natural to the tendency of mechanics to assume these material points, and the laws of forces acting between them, as invariable, since time alterations would lie outside of the scope of mechanical explanation. From this we can see that classical mechanics must lead us to an atomistic construction of matter. We now realize, with special clarity, how much in error are those theorists who believe that theory comes inductively from experience. Even the great Newton could not free himself from this error ('Hypotheses non fingo')." [2] **

** "I make no hypotheses

Now we are going to simulate a 1-dimension continuum in 3-dimension spacetime. This is possible by appealing to point-set topology—two real antipodal points approach zero and pass through each other, as solitonic waves.

$$\Phi + (-2) = real$$

In other words, any real event requires 2 real points and –2 imaginary points. Because $\sqrt{2}$ and $\sqrt{-2}$ are indistinguishable on the real line—we take the values as 1 complex point. $\sqrt{2}^2 + \sqrt{-2}^2 (i^2)$ translates to 4 + 4, which extends the line 4 positive square units in each orthogonal direction. 4 X 6 = 24 points in the simplest coordinate system.



Self-interacting spacetime in 1 dimension.

A 4-dimension physical event is a spacetime event, with feedback to the origin. We can describe positive feedback as an out-of-control state—such as light, which comes from every direction—and only behaves when subjected to the control state, whether a lens, lattice or other device. Light is not natively in motion—there are insufficient conditions to define "in motion" absolutely—we speak of one thing moving relatively to another thing.

Imagine that the vertical line terminating in ε' is a pendulum in 1 dimension—to what do we attribute equilibrium? The spacetime exerts no force of its own. When mass interacts with spacetime, there is 1 equilibrium point, with 1 degree of freedom, *at a time*. So although the change from ground state appears to manifest simultaneously with measurement, it really is a product of the evolving field dynamics, therefore time dependent, and accounting for the quantum jump.

We should find the real point $\frac{1}{2}$ on the positive real line, in the interval $[0,\infty)$ with the limit + 1, so that the interval becomes a finite $[0,1]$ with an infinite

representation for '1', which makes it a finite set of infinite elements, [3] which is itself infinite, and perceptually coherent (local) though infinitely extended.

Both electromagnetism and gravity operate at infinite distance.

We have suggested a neutrino experiment,[4] designed to show resonance between the "pulse" represented in the figure, and a topological soliton wave.

The challenge was to answer "What is fundamental"?

In a living universe, what could be more fundamental than a simple harmonic oscillation? In a dead universe, what creature could experience it? Will the metaphysical questions never cease—and will we cease running away from them?

References

[1] Popper, K. *Realism and the Aim of Science*, p. 80, Routledge 1983
[2] Einstein, 'Physics and Reality', J. Franklin Inst. 221, 349-382 (1936)
[3] Weyl, H. [1918] *The Continuum: A critical examination of the foundation of analysis*, translated by Stephen Pollard and Thomas Bole, Dover Books 1994 republication originally published by Thomas Jefferson University Press, Kirksville, MO, USA 1987.

[4] Ray, T. "Dynamic spacetime imposes a matter continuum." *ResearchGate* https://www.researchgate.net/project/Chasing-the-source-of-gravity-down-a-black-hole-and-back accessed 22 January 2018