THEORY OF THE OBSERVER, IMAGINARY MANIFOLDS AND SO FORTH

Eric Nemo

There is little point in attempting to convince any learned community of the validity of arguments made from a standpoint of the layman, as it benefits such communities to support each others' belief systems. This is just as true of the modern physics community as it was for the 17^{th} century church. The basis of Western understanding of reality on a particularly nihilistic form of reductionism tends to exclude not only any new idea whether or not it has merit on grounds of noncompliance with consensus, and thus halt the progress of our understanding by centuries at a time but also the phenomenology which has been observed by native cultures around the world for millennia. If one is willing to admit one may be wrong, the consensus of fools is escaped, and freedom of thought becomes possible. After all, the world is not flat, the Earth /does/ go around the sun- and Occham's razor tells us the simplest solution is often the correct one. Of course it would be beyond hubris to suggest that the author is in any way more "right" than anyone else, but mankind has encountered a variety of frustratingly unsolved phenomenological problems in formulating his laws of the universe, and has only actually succeeded in explaining 4% of reality- so, other than to maintain some form of "security by obscurity" in compensation for intellectual insecurity, why not take the time to speculate, and why not try to reduce the problems to a form which might be tractable by the layman?

The "force / field" model:

The interaction of a monopolar particle with a field (using the former in a more classical fluid mechanical sense) is defined mathematically by the product of the particular property the field acts upon (υ) and the field strength at that point (a), and defines a force, thus:

$$F_{\upsilon} = \upsilon_1 a$$

As all particles generate fields according to their static properties, "a" can be written in terms of υ also:

$$a = K\upsilon_2$$

where K is a universal constant. For gravitational force we have:

$$\upsilon = m \ ; \ a = g, K = G/r^2$$

with mass "m", gravitational acceleration (field strength) g and G Newton's constant.
For electrostatic force on the other hand we have:

$$\upsilon = q \ ; a = E, K = k_{\epsilon} = 1/\epsilon_o 4\pi r^2$$

with q the particular charge, E the electric field strength and k_{ϵ} Coulomb's constant. A general force law can be deduced from the above to take the form:

$$F_{\upsilon} = \frac{\upsilon_1 \upsilon_2}{kA}$$

This picture can easily be drawn to show the boundaries of an atom- the collection of points at which the electron might be in the Bohr model in 3D space, and the proton in the centre, providing an (albeit oversimplified) model which is suitable for at least an educationally compulsory understanding of the atom itself! It's just algebra. As a mathematical form (in the linguistic sense), most mathematics (if not all) can be translated into algebra.

Time, frequency and the quaternions

Time is a mysterious thing- and can have up to three reciprocal dimensions of frequency with an imaginary attribute to our eyes- in fact *needs* at least one to explain oscillations, so we can "borrow" numbers from various sets to describe "observables" in our own reality, but only if they behave mathematically as they do physically- for example the right hand rule, three perpendicular axes which descrbe how an electric field (i) and perpendicular magnetic field (j) interact with a charge, pushing it along an inertial field line (k). Accepting that imaginary forces might be just as visible as real ones, we might modify what we remember from High school physics:

$$\mathbf{F = (i)q(i)E + (i)q(j)B(k)v}$$

Equally, the precessional motion of a gyroscope might be simply accounted for by defining the axis of spin as "i", that of precession "j" and that around which gravitational torque acts "k", giving us a formula which conserves units of energy, or, if rearranged, angular momentum:

$$\mathbf{m(i)\omega r^2 = -m(k)gz(j)\Omega}$$

<u>The more fundamental issue..</u>

It is often joked that mathematicians, physicists and engineers share a collection of viewpoints rather than a collective one concerning the founding principles of the universe- the mathematician's is that math is the founding stone of the universe, and the universe's deviation from the laws of mathematics (in the form of a slight "bending" of the numbers) is just universal imperfection; the physicist's perspective is that the universe itself is perfect, and the math somehow flawed; the latter believes both are fine to within tolerances!

If we take that the universe can be adequately described by mathematics, then by definition the interaction of one thing with another is defined by a *product.* In the above situation we have the product of a sphere with a point[1]. However it is represented, the variable υ is a property of each interacting particle (electron, moon, water droplet etc.)- the other factors involved are the geometry of the space between the particles, the constants of proportion which somehow mysteriously inhabit that space (?!!). The product of like properties of two things defines their interaction, the properties of the space (-time) between define the energy of the interaction. If we suppose that the process of "wavefunction collapse" supposed by the Copenhagen interpretation of quantum mechanics (Bohr again) requires no intrinsic energy we can suppose that it, being an interaction, just requires the product of two things mathematically to describe.. The observer and the system are our two variables υ_1 and υ_2 , but with a far simpler form:

$$\upsilon_o\upsilon_s = 1.$$

which is to say that we can say that the system (υ_s) exists only by interacting with it ourselves. The variable representing the observer (υ_o). To produce a number the variables involved must be unitless- *but not dimensionless.* The argument is that something's existence implies that it has dimensionality even if it cannot be measured in units of anything in particular. The variable describing the system is a unitless function, formed by multiplying all relevant dimensional quantities in the system together in such a way as to define for Bohr that the system exists- which is to say with a probability of one. This function is the wavefunction of the system, and can be decomposed into various parts with different dimensions.

<u>Space-time, manifolds, dimensionality</u>

We interact with the world around us- so in this case each of us is described by a single unit quantity, and the world as another such quantity, the product of which is our experience of it. Our everyday realityb is built out of massive, neutrally charged objects embedded in three dimensions of space and experiencing entropy indicative of a fourth dimension of time (giving us all the "pieces" we need for Einsteinian relativity). Taking mass to be a dimensional quantity (it's relativistic variance being the argument), we can say our everyday world is a five dimensional thing, and we (the observers) are a real point quantity, 1. The odd behaviour of gyroscopes, electrons jumping about erratically between atoms in a crystal, and the "singing"of a wine glass with the application of a wet finger are all examples in everyday life of things

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1 a more acurate model defines the atom as a cloud of negative charge (electron) surrounding a very small, heavy fixed point (nucleus). This cloud, or mass-wave which comprises the electron is defined by the electron's wavefunction, which is a solution to the Schrodinger equation.

which require more than real numerical quantities to describe- rotating frames of reference, resonance and reaction frequencies, electromagnetic fields- all that all of these things require us to do in order to accurately model and understand their behaviour (which we determine from experimental observation) ultimately is to be able to take the square root of a negative number, and do algebra..

The intrinsic nature of the observer and the phenomenology of reality

We have up until this point defined υ_o as a real positive quantity- and we have assumed that if a phenomenon is visible then the dimensions in which it occurs are also so in some form. We can represent this using a simple three-axis and origin construction, the origin representing the observer. There are two sets of numbers which can be defined as including a real point at their origins- a real three-space with an observer (r) [r,x,y,z], and the quaternion group [r,i,j,k] – which are all we need to mathematically describe all of the phenomenology at the end of the last section. (r in this case is a real unitless unit quantity (sometimes our technical language just.. fails.)

Eight dimensions

Usefully, we have one "natural" form. It is a subset of eight dimensions, four of which are the quaternion group. The interaction of an imaginary observer, "o", with imaginary dimensions [i,j,k] results in three more imaginary dimensions, [l,n,m] with "o at the origin. The product o[x,y,z] does not produce any more new dimensions. Four subsets of 4D worlds-containing-observers might be constructed:

[r,x,y,z] ; [r,i,j,k] ; [o,i,j,k] ; [o,l,n,m]

Oddly enough the latter two sets describe well the interaction of observer with wavefunction in fairly well, if the wavefunction is considered to occupy dimensions [i,j,k] pre-observation, and [l,n,m] afterward. Feynman suggested that the double-slit experiment pattern could be drawn as a complex function until "observed" (in this case by bouncing a photon off the electron from the gun and generating a point location at which the electron must be)- so in three-space this would be the former pair of the four sets. An imaginary observer observing real three-space would make the same amount of sense as a real observer observing three imaginary ones indirectly (as rotation frequencies or field couplings.) Also, on the fringes of accepted physical theory we have the "dark sector" of cosmology. Given that using an imaginary mass (om) in the gravitational force equation produces a repulsive effect rather than an attractive one, and that fields in the space [l,n,m] are mathematically distinct from fields in [i,j,k], it may be possible that the "dark sector" of physics consists of particles and fields confined to the former space.

Speculation on relevance to the phenomenology of consciousness

A common dream experience is time compression- which should not, by the laws of physics, be able to occur. There is an argument along the lines of "anything is possible with a sufficiently advanced computer", but the fact that our *sense* of time is affected implies that there is some aspect of the manifold we are constructing the dream within which more naturally lends itself to phenomenology which are by nature the inverse of those observed in the physical "outside" universe. Mathematically such inverse phenomena would be expected only if an object had either the property of going faster than light or being within a black hole- or perhaps just existing as an *imaginary* point. Were this the case, it could be implied that imaginary dimensions would be directly perceptible, and reals indirectly somehow. We would also need a system of numbers which contained at least four imaginary numbers. Were we to have access as observers with a fixed either real or imaginary dimensionality, represented:

$$\upsilon_o = (r + o)$$

we would find ourselves able to perceive two distinct three dimensional manifolds both directly (off into space) or indirectly (gyro oscillation frequencies)- if we had a mutable (complex) nature with two extremes, one imaginary and one real, we would be able to perceive three different three-spaces from two perspectives. Perhaps we dream in [l,n,m] as the imaginary observer, but can also see the pure quaternion set [i,j,k]- and in reality we see our regular [x,y,z] and indirectly the same [i,j,k].