Progress in Post-Quantum Theory

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Background

David Bohm, in his "causal theory", made the correct Hegelian synthesis of Einstein's thesis that there is a "there" there, and Bohr's antithesis of "thinglessness" (Nick Herbert's term). Einstein was a materialist and Bohr was an idealist. Bohm showed that quantum reality has both. This is "physical dualism" (my term). Physical dualism may be a low energy approximation to a deeper monism of cosmic consciousness called "the super-implicate order" (Bohm and Hiley's term), "pregeometry" (Wheeler's term), "substratum" (Dirac's term), "funda-MENTAL space" (Hameroff's term), "Chi" (Chinese medicine & Falun Gong) etc., but for our immediate pragmatic purpose of constructing naturally conscious nano-computers and of virtually reverse engineering alleged reports of propellantless UFO propulsion (French Intelligence Report, 1999 CNINews1@aol.com Vol. 5, No. 11, Part 1 -- August 1, 1999 & NIDS report "Best UFO Cases - Europe", I. Von Ludwiger) to the stars and beyond, physical dualism will work.

The Idea

Reference: http://www.hia.com/pcr/vigier/slides/Vigier.HTM

Extending Bohm's heuristic informal metaphysical ontology, metaphysics is running in the background of all theoretical physics models, I postulate that the physically real, though nonmaterial, de Broglie pilot q-bit information waves (both "active" and "inactive") are intrinsic "mental" wave fields in configuration space that guide the motion of arbitrarily complex dynamic self-organizations of matter. Therefore, it is obvious how thought moves matter. What is not so obvious is how matter generates conscious experiences in these quantum pilot fields of thought. Again, "thought", or "mind-stuff" (Jeans), is, I postulate, a physically real quantum-computing field of nonclassical q-bit information. Its quantum action on matter, in the sense of Bohm's "causal theory", AKA "The Force" alluded to in George Lucas's "Star Wars", AKA "spooky telepathic action at a distance" (Einstein's term), in the presence of post-quantum back-action, is sentient "intent". Shannon's c-bit information theory is not good enough here. These mental quantum pilot wave fields acting directly in configuration space are, for the most part, unconscious. We know that mental states need not be conscious (Freud and Jung). With regard to Stuart Hameroff's claim that Roger Penrose thinks that configuration space is not physically real, but is only a "useful mathematical fiction". John S. Bell wrote:

"That the guiding wave, in the general case, propagates not in ordinary three-space but in a multidimensional-configuration space is the origin of the notorious `nonlocality' of quantum

mechanics. It is a merit of the de Broglie-Bohm version to bring this out so explicitly that it cannot be ignored."

Historical Note.

J.P. Vigier has been visiting us here in San Francisco all summer. He says that Einstein arranged for Bohm to slip out of US before the Feds could arrest him. Louis de Broglie sent Vigier to Brasil to work with Bohm where they were soon joined by Richard Feynman. The three of them worked together for several months and Feynman was always supportive of Bohm.

The Post-Quantum Generation of Consciousness AKA Qualia.

I reject all physical explanations of consciousness based on the notion of "collapse" either "R" or "OR" in Penrose's notation, and all appeals to the "measurement problem" and the "hard problem" (David Chalmers). IMHO all of these ideas are completely barking up the wrong tree because they are merely spurious artifacts of Bohr's incomplete ontology. I also reject the many-worlds interpretation sans the Bohm point as also incomplete even though it also dispenses with "collapse". However, my model does completely satisfy David Chalmers's essential desiderata for a physics of consciousness (Scientific American, Dec. 1995).

The generation of indivisible moments of consciousness requires post-quantum "back-action" of matter on its mental pilot wave field. The quantum action of intent of mind on matter combines with the post-quantum reaction, or back-action of matter on mind to form the spontaneously self-organizing (Stuart Kauffman's "At Home in the Universe") derandomizing (e.g., extracting zero point energy from the metastable dynamic vacuum for useful work) "strange loops" (Doug Hofstadter' "Godel, Escher, Bach") of sentient intent-conscious experience. These strange loops come in two dual forms.

Intent from the future loops with experience from the past, as in ordinary memories, together with the "pre-sponse" or "backward causation" (Huw Price's "Time's Arrow") reported first by Ben Libet and later by Dean Radin and Dick Bierman.

Intent from the past loops with experience from the future as in precognitive remote-viewing (Jim Schnabel's book "Remote Viewers") and in any kind of creative mental act.

Note, both Hal Puthoff and Bill Church (Jupiter Technologies) confirm the accuracy of Ch. 11 of Schnabel's book e.g. http://www.hia.com/pcr/parsifal.html

My basic post-quantum "equation pictures" (like Feynman's diagrams) of post quantum theory are

Psi -><- X

Psi = the sentient post-quantum mental de Broglie pilot q-bit information field of thought in Bohm's "implicate order".

X = the "explicate order's" (Bohm) material configuration consists of extended source particles (Vigier's bilocal models, Sidharths's naked singularities at the Compton length h/mc, my "toroidal rings of light from "Space-Time and Beyond" (1974) with radii

$$h/mc = \text{larger outer radius of rotating torus}$$

and

$$e^2/mc^2 = \text{smaller tube radius of the torus}$$

of Vigier's theory of light with rest mass

$$m^* = hH/c^2 = 10^{-65} \text{ gm}$$

in a superconducting vacuum, in addition to the classical force fields. The classical force fields include chunks of 3D dimensional space, as in the rumored controllable warps and wormholes allegedly used by advanced intelligences in "unconventional flying objects" (NASA engineer, Paul Hill's book, "Unconventional Flying Objects" that is reliable engineering detective work on the real UFO data).

The classical force fields that make up X include the 1892 Maxwell-Hertz electromagnetic field (possibly the version of Thomas E. Phipps Jr?), the Einstein metric gravity field, the torsion connection fields of various kinds, and the Yang-Mills fields of the weak and strong interactions. Now it may be possible to simplify this so that Maxwell-Hertz and Yang-Mills are different kinds of torsion fields based on different kinds of Cartan connections for parallel transport of "tetrads", AKA "vierbeins connecting tensors to spinors and twistors (Penrose-Rindler), that twist as well as translate.

-> is the quantum action arrow of "intent" of mind moving matter. This intent is only sentient when looped with post-quantum reaction.

<- is the post-quantum reaction (AKA back-action) arrow of matter on mind generating the indivisible moments of consciousness of duration t(C).

C = consciousness factor

whose equation picture is

$$C = (Psi ->< - X) – (psi -> X)$$

psi in

psi -> X

is the unconscious mental de Broglie quantum wave of the "causal theory" of Bohm, Hiley and Vigier. Vigier adds the sub-quantum stochastic "aether" to Bohm's 1952 theory based on discussions with Einstein at Princeton. The consciousness factor C is the warping and twisting of the quantum pilot fields in the implicate order by the motions of matter-geometry in the explicate order analogous to the warping and twisting of the spacetime geometry by the motion of matter in Einstein's metric theory of gravity supplemented by additional nonvanishing torsion connections, e.g. G. Shipov in Moscow who visits us soon to join Vigier in our joint summer workshop with several organizations.

psi -> X

with action of psi on X, but no compensating reaction of X back on psi, of course, violates Einstein's "universal relativity principle" of "no absolute physical objects". ("On the Aether", 1924) Bohm shows that this suffices to give "uncontrollable quantum randomness" (Bohr), the "signal-locality" required in "quantum cryptography", "dense coding" and "teleportation" (Eberhard, aka, "no-cloning" & Shimony's"passion at a distance") and the "sub-quantum heat death" (A. Valentini's Ph.D. under Sciama at Cambridge) in which

$$dP/d^{3N}r = psi^*(r_1...r_N, t)\ psi(r_1...r_N,t)$$

for the Born probability density in N-particle configuration space when there is nonlocal connectivity AKA "entanglement". Note that "decoherence", the enemy of quantum computing, is uncontrolled entanglement with the environment.

Was Einstein wrong?

My post-quantum theory is the "covering theory" (Mr. Phipps) of Bohm's theory just as general relativity is the covering theory for special relativity, though both may turn out to be fundamentally wrong if Mr. Phipps is correct? Mr. Phipps complains that mere "covariance", in which the terms in a tensor or spinor or twistor equation all scramble in the same way under a frame transformation, is no substitute for "term by term invariance" under that frame transformation element of a group or something more general like a semigroup or something from category theory perhaps? Mr. Phipps also claims that the partial time derivatives in Maxwell's classical electromagnetic field equations (Faraday's law of EMF, Amperes's law with displacement current, Gauss's law with retardation and advanced effects) need to be replaced by total time derivatives in which the convective v.grad terms, in a certain approximation, represent the velocity v of the field detectors. Maxwell's theory assumes all of the field detectors (i.e. absorber particles) are relatively at rest. The same assumption is not made for the source particles and this asymmetry means that Maxwell's theory is incomplete i.e. "underparametrized". Like Wheeler-Feynman, Hoyle-Narlikar and Huw Price, Mr. Phipps has a kind of backward causation and a classical version of "quantum delayed choice" in his replacement of the Lorentz group kinematics demanded by a velocity flow field for the absorber particles. The velocity addition law that Phipps proposes looks very different from Einstein's but it differs

numerically from Einstein's by only 0.036c at most. On the other hand, Mr. Phipps's new kinematics does show how a distant astrophysical object can appear to be moving faster-than-light because of the operational difference between frame-invariant "proper time" on a single worldline and "frame time" that requires a pair of world lines i.e. a physical rod with clocks at the two ends. Using these formal ideas combined with a detailed operational analysis of the different meanings of relativity ("event" versus "object"), Mr. Phipps argues that while there is time dilation, there is no Lorentz contraction and that the relativity of simultaneity is incorrect. There are no crucial experiments that directly test for Lorentz contraction. Mr. Phipps proposes one "Einstein's train on a different track" with a pulsed distant point light source in the plane of a rotating disk with two diametrically opposed light detectors fixed to the rim, each pointing to the light source. Einstein predicts a time delay for the detector signals, which Mr. Phipps says, will not be found. This is a doable experiment at order v/c. Furthermore, Maxwell's equations together with Newton's mechanics are term by term invariant under his replacement of the Lorentz transformations. Possible evidence for this is found in the method of synchronizing the 24 atomic clocks of the GPS satellite system (Van Flandern). Needless to say this is a profound change in relativity that is consistent with the absolute simultaneity of Bohm's quantum potential Q. It is too soon for me to endorse Mr. Phipps's allegations. They are interesting and deserve careful scrutiny.

"All The King's Horses
 And All The King's Men
 Couldn't put Einstein
 Together again?"

How consciousness is generated.

Post-quantum theory has "signal-nonlocality" with strong "backward causation". This is IMHO necessary for all life which has some complexity (N) dependent rate of consciousness generation given by my post-quantum formula connecting cosmology to brain biology and psychology. The rate at which our indivisible moments of consciousness are generated, if not wiped out by competing decoherence mechanisms, is

$$1/t(C) = HN\&$$

H = Hubble's constant of the cosmological red shift

$$1/H = 12 \text{ billion years} = 10^{17} \text{ sec}$$

N = number of nonlocally connected q-bit nodes in the sentient post-quantum computing network protected against those Darwinian "slings and arrows of outrageous fortune".

& is the index of refraction of classical transverse polarized light signals connecting the N nodes of the distributed network.

According to Stuart Hameroff, who has conjectured that the hydrophobically-caged electrons in the microtubules making "single-electron transistor" SET q-bit switches (in my picture not Hameroff's) are the "Eccles Gates", i.e. the material "Seat of The Soul",

$$N = < 10^{18}$$

for humans. This gives a maximum consciousness rate of the order of 10 indivisible ("binding") "occasions of experience" (Whitehead) per second. Curiously, this is about the same number Evan Harris Walker's model gives. My model is intrinsically "holographic" (Bohm-Pribram). The caged electrons form a coherently phased array of tiny electric dipole nano-antennae, as in Nick Herbert's "finesse", whose collective modes are the Frohlich modes. Our experience of the flow of time is actually a direct detection of the expansion of space in the Big Bang cosmology, alternatively it is caused by the rest mass of the photon in Vigier's reintepretation of the cosmological redshift without the expanding space of the Big Bang. This is seen in the H dependence for t(C). It becomes clearer from the Hoyle-Narlikar cosmology based on Wheeler-Feynman backward causation. I will justify this another time.

For the Einstein-De Sitter big bang model, with global cosmic time

$$t = h/kT$$

T is the Kelvin temperature of the cosmic blackbody background. The global frame of comoving Hubble flow in which this radiation is isotropic operationally i.e. pragmatically defines "absolute rest", k is Boltzmann's statistical constant of entropy, i.e. conversion of Shannon c-bits to irreversible dissipation, h is Planck's quantum of action of mind on matter.

$$H = 1/t$$

$$1/t(C) = kTN\&/h$$

Showing an infinite rate of consciousness production in the initial Big Bang singularity $t = 0$ where T is infinite in this particular model for the "Mind of God" (Hawking, "A Brief History of Time"). Therefore, N needs to increase as t increases to keep up the consciousness production rate. In contrast, for the steady state cosmology with no big bang, H = constant.

Short Decoherence Time Problem.

Tegmark's very short decoherence times tacitly presuppose thermal equilibrium and, therefore, do not apply to the non-equilibrium sentient collective modes of which the pumped Frohlich mode analog of a Bose-Einstein condensate is a good toy model.

Orch-OR.

My model is not at all a reformulation of Penrose-Hameroff "Orch OR" theory. I do not use $t(C) = h/E_{self}$, where $E_{self} = Gm^2/a$ which is a toy model given by Hameroff. My basic formula comes from 14.6 of Bohm and Hiley in which it is shown that a Gaussian back-action dependence of the de Broglie pilot wave on the positions of N particles results in a GRW equation. However, my physical interpretation of this is not the same as that of GRW or Bohm and Hiley. The Gaussian back-action closes a spontaneously self-organizing cybernetic (Norbert Weiner) feedback-control loop between the mental pilot wave and its attached matter. Therefore the GRW formula is not at all one of phase decoherence but of phase coherence creation causing the conscious experience if it completes before other decoherence mechanisms can take effect. Decoherence erases the conscious experience and allows the next one to form in the stream of conscious experiences.