Signal-Nonlocality Signature of Inner Consciousness

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Abstract

What physical object in the brain et-al is the hologram? It must be a ground state condensate of some collective mode that is biologically relevant, e.g. Freeman-Vitiello model[i]. My key point here is that signal nonlocality violation (Antony Valentini[ii]) of orthodox quantum physics is a necessary condition for inner qualia to emerge - for our consciousness to form.[iii]

The key equation for signal nonlocality is

$$P \neq |\psi|^2 \tag{1.1}$$

When we pump an open dissipative system (e.g. a laser) we prevent the relaxation of H to zero - that's what we are (e.g. model of H. Frohlich[iv] on biomembrane). The H function is ~ log of the ratio of the LHS to the RHS ---> 0 in sub-quantal thermal equilibrium, i.e. signal locality limit of no cloning a quantum et-al.

$$H \sim \int \log \frac{P(q)}{|\psi(q)|^2} dq \tag{1.2}$$

The integral is over the entire classical field/particle configuration space (q) moved by the pilot wave $\psi(q)$. The spontaneous relaxation equation of motion for closed QM systems is

$$\frac{dH}{dt} = -\frac{1}{\tau} H$$
$$H(t) = H(0) e^{-\frac{t}{\tau}} \tag{1.3}$$

In contrast for an open pumped dissipative structure (e.g. Prigogine[v], Haken[vi])

$$\frac{dH}{dt} = -\frac{1}{\tau} H + \beta \frac{dE}{dt} \tag{1.4}$$

$\beta dE/dt$ = external pump power flow.

Take the time Fourier transform for complex frequency also τ & β are kept

constant for now, if not they induce cross-mode coupling via the convolution theorem.[vii]

$$H_\omega = \frac{\beta(i\omega + \varpi)E_\omega}{\left(i\omega + \varpi + \frac{1}{\tau}\right)} = \frac{\beta E_\omega (i\omega + \varpi)\left(-i\omega + \varpi + \frac{1}{\tau}\right)}{\omega^2 + \left(\varpi + \frac{1}{\tau}\right)^2} \qquad (1.5)$$

There is no AC resonance in this model because it is lacking a second order time derivative.

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[i] http://portal.acm.org/citation.cfm?id=1594473

[ii] http://eprintweb.org/S/authors/All/va/Valentini

[iii] In the Bohm ontology the classical electromagnetic field configuration and the electrical charges are classical hidden variables moved by their quantum pilot waves, but they do not back-react on their pilot waves. This is the approximation that Valentini calls "sub-quantal equilibrium" where the nonlocal entanglements cannot be used as a stand-alone communication channel. This is signal locality where $H = 0$ and quanta in arbitrary states cannot be cloned. I note in passing that Hawking's chronology protection conjecture preventing time travel to the past around closed timelike world lines seems to violate the no-cloning theorem of signal locality. When there is direct back-reaction of the hidden variables on their pilot waves we have signal nonlocality beyond the orthodox quantum theory that only applies to closed systems. An external pump opening the system maintains $H \neq 0$. In addition, if we have "More is different" (P.W. Anderson) spontaneous symmetry breaking in the ground state of the system we then have a set of Goldstone phases with which to possibly imprint and extract hologram information.

[iv] http://www.usyd.edu.au/news/science/397.html?newsstoryid=3955 - recent update

"Their research, published in the US journal Proceedings of the National Academy of Sciences earlier in 2009 and in the US journal Physical Review E on 13 August 2009, provides evidence against a popular model of human consciousness, which incorporates Fröhlich condensates in microtubules inside cells, acting like cellular quantum computing elements."

This paper's conclusion that Roger Penrose's gravitational collapse of the quantum state in the human brain is falsified is disputed by Stuart Hameroff (e-mail to me 12/15/09). It will take time to resolve this controversy. Hameroff says he only needs the "weak" phase of the Frohlich condensate not the strong coherent phase. Quite apart from that, the basic Penrose mechanism is general and not inextricably tied to the Frohlich condensate as a necessary condition. The origin of consciousness I propose in this paper is not dependent on Penrose's gravitational collapse idea. Indeed, there is no actual collapse in the Bohm ontology that I use.

[v] http://en.wikipedia.org/wiki/Ilya_Prigogine

[vi] http://itp1.uni-stuttgart.de/en/arbeitsgruppen/?W=5

[viivii] http://en.wikipedia.org/wiki/Convolution_theorem

$$(f * g)(t) \stackrel{\text{def}}{=} \int_{-\infty}^{\infty} f(\tau)\, g(t-\tau)\, d\tau$$

*In mathematics, the **convolution theorem** states that under suitable conditions the Fourier transform of a convolution is the pointwise product of Fourier transforms. In other words, convolution in one domain (e.g., time domain) equals point-wise multiplication in the other domain (e.g., frequency domain). Versions of the convolution theorem are true for various Fourier-related transforms. Let f and g be two functions with convolution $f * g$. (Note that the asterisk denotes convolution in this context, and not multiplication. … Let $\mathcal{F}$ denote the Fourier transform operator, so and are the Fourier transforms of and , respectively. Then*

$$f * g = \mathcal{F}^{-1}\{\mathcal{F}\{f\} \cdot \mathcal{F}\{g\}\}$$

$$\mathcal{F}\{f * g\} = \mathcal{F}\{f\} \cdot \mathcal{F}\{g\}$$

$$\mathcal{F}\{f \cdot g\} = \mathcal{F}\{f\} * \mathcal{F}\{g\}$$