



Comment

Evidence of massive global synchronization and the consciousness
Comment on “Consciousness in the universe: A review of the
‘Orch OR’ theory” by Hameroff and Penrose

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Received 27 September 2013; accepted 15 October 2013

Available online 18 October 2013

Communicated by L. Perlovsky

The blind faith that Hodgkin–Huxley type neuron bursts explain the neural information processing completely would collapse soon, and then the brain building projects [1] all over the world will face the danger of banking on an incomplete picture of a neuron. In the last decade, a series of discoveries were made in the logical processing of arguments in the thousands of dendritic and synaptic channels [2–6], which are mathematically massively complex computations. One input and one output type Hodgkin–Huxley neuron bursts neglect every part of meticulously designed local logical processes and lead us to an absolute simplistic world, which brain builders manipulate further to fit their needs. Ample arguments would trigger the collapse of HH model [7] and the vacuum created thereafter needs to find a material inside the neuron that would give rise to the synchronous firing of neurons and consequent computations. The recent finding of microtubule’s resonant oscillation [8,9] that could vibrate axon brings Orch-OR into the picture as an extremely essential concept to fill the vacuum.

Hameroff and Penrose have rightly argued here [10] that the wireless communication of axons via resonant vibrations around a hundred micrometers diameter domain alleviates the biggest criticism of the Orch-OR proposal. The orchestration of resonant vibrations can occur globally between all neurons across the entire brain. For that communication, an axon inside a neuron does not require sending incredibly powerful signal wirelessly throughout the brain, by crossing the fatty myelin sheath. Conical radiation/absorption only in its vicinity via dual polar ends of a neuron would be enough to trigger a cascade communication globally throughout the entire brain. This article therefore closes the series of historical argument/counterargument on the “gap junction” forever [11].

The entire episode of objective reduction also gets a new dimension because resonance frequency bands of brain materials cover a wide range. Inverse of frequency is time, so we have now the experimental evidence of multiple clocks, each for a resonance band. Thus, transition of information or signal from one clock-world to another consolidates the imaginary time concept [12]. In addition, the fractal shape of entire brain architecture suggests that one clock is physically located inside another clock. Hence, we get information processing in an imaginary space. When we have both an imaginary space and an imaginary time, then we get a generalized hyperdimension space. Therefore, the discovery of resonance and wireless processing lead to a layered architecture of multiple space–time metric stacked one

DOI of original article: <http://dx.doi.org/10.1016/j.plrev.2013.08.002>.

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above another [13]. This is exactly Hameroff and Penrose have been arguing as the foundation of brain's information processing for decades. This article [10] therefore marks the beginning of developing a comprehensive mathematical modeling of the brain. Hopefully, in the near future, with more experimental understanding of the space–time metric, Orch-OR would evolve to a complete deductive mathematical expression of consciousness—a dream that entire mankind is eagerly waiting to see.

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