

Is The Prespace the Natural Location of our Consciousness and of our Primary Cognitive Entities?

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We retain important to add some further comments to our recent submission to *NeuroQuantology* (Conte, 2013a; Conte, 2013b; Conte and Todarello, 2013). The thesis of the paper is that Information, Cognition and a Principle of Existence are intrinsically structured in the quantum model of reality. There is an intrinsic “factor of knowledge” that supports its structure from its starting. We reach such evidence by using the Clifford algebra. In detail we analyze quantization in some traditional cases of interest in quantum mechanics and, in particular, in quantum harmonic oscillator, orbital angular momentum and hydrogen atom. We adopt the basic von Neumann results that projection operators represent logical statements and we demonstrate that are intrinsically structured in the cases of quantization that are taken in consideration.

As further comment we retain important to outline that when we speak in the

paper about information, cognition and principle of existence as intrinsically structured in the quantum model of reality, we are obviously speaking about our more primitive cognitive entities. This is a feature that is implicitly contained in our previous text, and that we outline here explicitly in order to avoid possible confusion.

The other important feature that we aim to outline here is that one of the location. In front of our basic thesis that information, cognition and principle of existence are intrinsically structured in the quantum model of reality, it becomes of relevant interest to delineate where, according to our formulation, quantum reality is located.

It is well known that when we study cognitive functions there is first the request to define where and how we must consider the location of the cognitive abstract entity. We have the non-locality of consciousness and of our more primitive cognitive processes. This is a basic question of physics but also of philosophy, of neurophysiological and of psychological studies. There is the question where consciousness is located in human brain. It is well known that starting with Kant (Kant, 1985), just to mention philosophical significant approaches, a lot of authors gave contributions to this matter.

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Our position is that the limit is in an assumed principle. At any cost, in the past and also in the current studies, we are attempted to assign a space of location to consciousness and to cognitive abstract entities. This kind of reasoning assumes in principle that the geometry is fixed. It is the Euclidean one. It is the counterpart of an assumed but not evidenced position in which it is admitted the idea of an absolute, primitive, unique space, representative of this geometry. Neuropsychological and neurophysiological approaches maintain the same Kant's view point that the space is the absolute Euclidean space. This space is primary and nothing may happen without direct relation to such space. Reasoning in this manner it remains the problem to identify the place of consciousness and of primitive cognitive processes. In spite of the greatest efforts to find the place of the consciousness, evidence indicates that it cannot be conceived in such traditional physical space. In our approach both physical and mental coordinates are represented as images of a more fundamental space that we call *prespace* in accord to Hiley (2000), Wheeler (1980) and other authors. Hiley (2000; 2002) outlined that also in physics we should not consider space-time as primary. Correctly he evaluates that, if it is taken as primary, ipso facto locality becomes absolute and we become unable to solve non locality of some physical systems. It follows that we become unable to identify location also for psychological and cognitive entities. Instead space-time manifold dominates events of classical-deterministic-physics. This science has locality as well as determinism built into it right at the beginning. Our basic insistence to consider such given space-time as basic structure of all natural dynamics is at fault. The usual space-time is merely an appearance, a feature that may be abstracted from some deeper structure and that holds as long as our paradigmatic approach is based on an accepted deterministic vision of the things while instead in the picture of a deeper structure it no more can be taken as basic and primary. In this manner locality itself becomes a mere relationship able to appear with convenience in our macroscopic and in classical world but it actually would not be considered as universally valid.

Quantum reality

Quantum phenomena, actually happening in such deeper structure, are projected into our usual space-time by our macroscopic instruments of observation and, in general, by our empirical experience. In this manner an idea of a prespace arises (Conte, 2002; Conte *et al.*, 2004; Conte *et al.*, 2004a). Some fathers of physics as Wheeler and Eddington (1937) outlined the importance of such view point. Hiley discussed the importance to consider prespace as proper indication of the mental space for location of consciousness and of primitive cognitive processes. We have given repeatedly confirmations in this direction (Conte *et al.*, 2004b; Conte *et al.*, 2006; Conte *et al.*, 2007; Conte *et al.*, 2008; Conte, 2009; Conte *et al.*, 2009a; 2009b; Conte, 2010a; 2010b; 2010c; Conte *et al.*, 2010; Conte, 2011a; 2011b; 2011c; 2011d; Conte *et al.*, 2011a; 2011b; Conte, 2012a; 2012b; 2012c; 2012d; Conte *et al.*, 2012a; 2012b; 2012c). We indicate that the actual space of Clifford algebra is the deeper structure from which the usual space derives. The space of Clifford algebra should be the space and the usual space time should be its mere projection. We have obtained that Clifford algebra enables to formulate the basic scheme of quantum mechanics that includes information, cognition, and the principle of existence. In conclusion we think to consciousness and to cognitive processes as moving out from the scheme of classical deterministic physics following consequently the quantum behaviour of reality. In this manner we totally adhere to the basic Wheeler (Wheeler, 1980) scheme, and we admit that “the first day” was quantum principles that we attribute to basic axiomatic Clifford algebra, and “the second day” was the classical geometry that we attribute to basic space-time projection of such axiomatic Clifford structure. Of course, given a Clifford member q of, we may correspond a point (in a real four-dimensional space identified as Minkowski-space as just outlined from Imaeda (1976) time ago.



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