

## Exploration

# On Non-locality II: Quantum Physics & Non-locality

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### ABSTRACT

In this second article of the six-part series, we discuss the role of physics and quanta in non-locality and indicate that these models are diverse, not just entanglement but there are at least nine other models. We introduce the idea of a global term “relative quantal non-locality”. These ideas provide a perspective to understanding non-locality in consciousness sciences. There may or may not be commonality as both models are diverse. We define consciousness. We also discuss Kafatos’s three-tier classification and show how it can be integrated into levels of the relative non-locality model. We emphasize the need for a broad classification of non-locality.

**Key Words:** quantum physics,, discrete, entanglement, consciousness, relative, framework, non-locality, space-time, level, relative non-locality, dimension, beyond, infinity.

### Physics and non-locality

Something is missing when trying to explain the well-documented, so-called strange Einsteinian “spooky action at a distance”<sup>19, 20, 21, 22</sup>. Einstein recognized the “entanglement” phenomenon in physics, where quantum state particle pairs or groups interact such that the quantum state of each particle cannot be described independently, but must be given for the *system as a whole*—metaphorically they “talk” to each other at great distances<sup>23-25</sup>.

We now discuss so-called quantal non-locality briefly. Certainly, the most well-known current related phrases in physics are “quantum non-locality” and “entanglement”. But there are other kinds of quantal non-locality. Do not be concerned about all the technical terms. Please just regard the Table 1 and the lines that follow simply as an introduction to the diversity of the different terms. Importantly, these models are diverse, and do not consist just of so-called “entanglement” but there are at least nine other models.

**Table 1:** Listing of different kinds or postulated mechanisms of non-locality in physics

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| <ul style="list-style-type: none"><li>• Entanglement.<sup>23-25 26-28</sup></li><li>• “Non-local Aharonov–Bohm effect”<sup>29</sup>.</li><li>• “Non-local Lagrangian”<sup>30</sup>.</li></ul> |
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- “Non-local generalization of the London’s equation” including now the non-local kernel proposed by Pippard<sup>31, 32</sup>.
- Field Theory<sup>33 34, 35</sup>.
- Wheeler’s Quantum foam<sup>36-40 33</sup> and Wheeler Feynman Absorber theory<sup>41, 42</sup>.
- Emergence of the Universe<sup>43, 44 45, 46 47</sup>.
- Stapp<sup>48-50</sup>.
- Bohm’s work<sup>51</sup>.
- Elements of Einsteinian special relativity<sup>36-38, 52</sup>.

We could call this “non-locality” Relative Quantal Non-locality (RQNL), remembering that we are not talking about just one potential kind of RQNL.

Quantum non-locality<sup>53</sup> refers to quantum mechanical predictions of many-system measurement correlations that cannot be simulated by any local hidden variable theory. These refer to the main Physics use of non-locality, namely entanglement<sup>23-25 26-28</sup> seen as synonymous with “quantum non-locality”.

These descriptions and concepts are complex and so we enumerate them in Table 1 only to show that there are many other kinds of non-locality in physics.

## RNL in Physics

In physics we could use a global term such as “*Relative quantum non-locality*” (RQNL) (relative to 3S-1t framework, but not categorized or categorizable in psi terms.) Importantly, as discussed below, it is unlikely that there is only one RQNL, because there are several different theoretical models.

Non-locality is applied in many physics contexts. The sheer wealth of theories, models or data on non-locality in physics, attests to its possible complexity and the likelihood that one is not dealing with a single phenomenon.

John Bell coined the term “non-locality” in physics<sup>54</sup>. In physics, *non-locality* is regarded as action at a distance: It is the direct interaction of two objects that are separated in space with no perceivable intermediate agency or mechanism (which is why it is “spooky”)<sup>21, 22</sup>. Quantum non-locality<sup>53</sup> refers to quantum mechanical predictions of many-system measurement correlations that cannot be simulated by any local hidden variable theory. These refer to the main Physics use of non-locality, namely entanglement<sup>23-25 26-28</sup> seen as synonymous with “quantum non-locality”.

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## Non-locality in Consciousness

Perhaps the most well-known link with non-locality in Consciousness Research possibly linking psi and physics is the phenomenon of “entanglement”. Indeed Dean Radin, entitled his book on psi as “*Entangled Minds*”<sup>55</sup> and sometimes, consciousness researchers refer to “quantal entanglement” as supporting the consciousness linked “relative non-localities” we’ve discussed. But entanglement is a different concept: entangled quantum states produce such correlations when measured<sup>23, 27, 28, 56, 57 26-28, 57</sup>, as demonstrated by Bell’s theorem<sup>54, 58, 59</sup>. In Quantum Physics, this is the linkage of ostensibly separated energy packets, particles, or photons in time and space manifesting at the 3S-1t level.<sup>4</sup> Bell, in fact, recognized that there may be a further commonality in non-localities and also how complex interpretations can be:

*“Perhaps experimental parameters and experimental results are both consequences, or partially so, of some common hidden mechanism. Then the apparent non-locality could be simulated.”*<sup>54</sup>

One or more of these may or may not turn out to be the same relative non-locality that has pertinence in psi. But these ideas in physics are not our focus here. This is particularly so, as these concepts might turn out to be very different from “non-locality” in consciousness research, but they show that even in physics, “non-locality” is not a singular term with one consistent meaning, and is not regarded by different theorists as arising from the same phenomena or causes.

Similarly, we should certainly try to understand psi phenomena —so-called extrasensory perception and psychokinesis, and even more extremely, the possibility of survival after bodily death. We argue that the easiest way to explain these is by accepting the existence of higher dimensions.

## Consciousness: the concept

Consciousness has traditionally been the most difficult of all terms to describe and its everyday use has varied. Given that we’re differentiating relative non-locality in two major contexts, Physics and Quantal compared with Consciousness Research, it behooves us to define consciousness. The everyday use of the concept of “consciousness” has led to different interpretations sometimes due to specific specialties conceptualizing it in specific ways, and has made its unification difficult.

We recognize that to communicate the broad range of Consciousness (C), as a unified concept, and as a general unitary term across the infinite and finite, we have to phenomenologically classify it. This we have done with our TDVP model<sup>9, 12, 15</sup>, and we can apply our new EPIC classification to “non-locality” too. Consciousness involves four key phenomenologically different classifications: the “EPIC” components —Existential C, Paradigmatic C, Information-meaning C, Cybernetic C. Yet each component can be applied to every description of C.

This we have done elsewhere in detail.<sup>60 b</sup> We attempt to provide for the broader concept of Consciousness applying a multi-pronged “EPIC” approach:

We recognize a major theme of this paper, what “exists” as opposed to what is “experienced”: This is the E of EPIC: The *Existential “distinctions”* of Consciousness further subdivided into “extent, content and impact distinctions”: The extent substrates include the measurable ordinal-level Consciousness dimensions tethered, as indicated, to the measurable often interval-level Space and Time dimensions; the *content matrix* reflects the “Consciousness container” comparable with mass- energy containers, at all physical finite levels as well as even (a difficult concept) the infinite level. The third distinction is critical *Consciousness impact*: where Consciousness impacts and influences the container and the dimensional elements.

*The P is for Paradigmatic levels of Consciousness*: We recognize that Consciousness involves a four-level gradation. These four levels are all applicable to living humans, but in the non-locality context can be from a different “framework” as well, as in, for example, near-death experiences.

- *Qualit Consciousness*: the most basic consciousness (Qualit) level always exists in *everything* inanimate or animate as everything contains the *most fundamental discrete finite physical meaning*. Qualits are quanta plus meaning. Here we are discussing Quantal Non-locality.
- *Neurobiological/ Neurological Consciousness*: the endpoint nervous system expression of all living (animate) beings. They have awareness and responsiveness.
- *Psychological Consciousness*: involving humans and animals. The psychological is disputably partly separated from the neurological. In these we’re discussing what may be misunderstood as non-local but involve psychological and neurological elements.
- *Higher Consciousness is the final level which is* disputably outside the brain: This might involve dreams, meditation, creative, transcendent, psi and altered *states (and these may involve a dimensional non-locality)* plus mystical, infinite and transfinite elements (again as we will see, higher levels of non-locality).

The I of EPIC is *Information* which is general and converted to *meaning*: Infinitely large repositories of general information are expressed as direct targeted, specific meaningful information.

The C of EPIC is *Cybernetic* consciousness communications: This provides a mechanistic input, central and output model, applicable to any consciousness models like stimulus-organ-response, dendrite-neuron-axon, or stimulus-brain (central)-motor. In non-locality, we examine the specific and the general and the description may not just be at the receiving level, it may impact and be impacted.

The four EPIC prongs are always applied together, reflecting the unification of consciousness in its broadest general applications. They suggest a unification of all kinds of Consciousness, which in this series, we may make clearer for some examples, with the introduction of the term “gimmel” allowing for the major component of infinite flow from the infinite of a consciousness,

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<sup>b</sup> <http://medcraveonline.com/JPCPY/JPCPY-01-00036.pdf>

linked with its tethered mass-energy elements to the finite and integrating therefore all levels such as quantal through to the cosmological.

## **The applications of non-locality in physics to consciousness research: Kafatos**

Interestingly, Isaac Newton in 1692 regarded action-at-a-distance as *"so great an Absurdity that I believe no Man who has in philosophical Matters a competent Faculty of thinking can ever fall into it"*.<sup>61</sup> But times changed clearly (as in Table 1).

There may be one area of commonality in our classification of Non-locality in Consciousness Research, namely the theoretical model as in the *"Conscious Universe"*<sup>62, 63</sup> of Menas Kafatos of non-locality in physics. This is so because Kafatos, too, recognized the need to divide non-locality. In his classification, he applied non-locality in Physics into three elements<sup>62, 63</sup>:

Type I is spatial non-locality;

Type 2 is temporal non-locality; and

Type 3 non-locality is both spatial and temporal.

This differentiation into three is logical from the 3S-1t physical framework. It is different from the classification we propose below, because it does not recognize different levels but it at least recognizes that Non-locality (he did not describe non-locality as "relative" or involving different "frameworks") can be different depending on degree of space and time, although as in physics, consciousness has been ignored.

However, using the Kafatos classification, we could still introduce consciousness into many of these concepts. For example, if we apply Kafatos's concept into the psi model, we could argue that remote viewing in the present is Type 1 (in Physics possibly entanglement would be). We will see that it is likely in our (Neppe-Close) classification placed as the kind of non-specific non-locality that we simply label "delta" and so is placed within the Relative Delta Non-locality level (our RDNL level). Kafatos describes what is effectively foreknowledge (technically called precognition as his Type 2).

This is equivalent to our recognition of time without space (our RUNL level). We developed this model independently of Kafatos. It corresponds with our recognition of Time along one dimension not only present, but past and future as well so we called that Relative Time Non-locality. The concept of precognitive remote viewing would be Kafatos Type 3. In our classification we would want more detail to classify it more accurately, and without such description just regard it again as Relative Delta Non-locality. From this, we're able to see how limited previous conceptualizations were, but at least Kafatos made an attempted remarkable phenomenological jump.

## **The necessity for various levels of non-locality in reality**

"Non-local" requires the prefix "relative" because it only then becomes meaningful as it has to

be relative to specific parameters. The differentiation is beyond academic: It allows us to appreciate the depth of reality because Space, Time and Consciousness are all terms that have meaning only relative to specific parameters. These terms are not absolutes when we describe finite reality.

Our conventional scientific reality is the consensual basis of what we, as living sentient beings, experience. Therefore, relative non-locality is *from the framework of* our common sentient living experience. We only know of 3S-1t: For us, 3 dimensions of space (length, breadth and height) embedded in a moment in time (the present) is the whole of reality, but it is simply our *whole direct reality experience*; it is *not all of reality* because we already know there are, for example, 9 spinning finite dimensions.

We can see how these ideas promote other examples of different levels of non-locality or apparent non-locality. We can regard a phenomenon as “non-local” yet:

- be mistaken, because we might *misinterpret* reality due to brain impairments or abnormal hallucinations as “real”. That ostensible non-locality would be “*pseudo*”;
- we could argue that sometimes our “consciousness” is just that little more than what is produced by the brain<sup>60</sup>: Maybe part of our dream is just beyond 3S-1t alone. And what about the experiences relative to an expert meditator, for example? And we could even speculate that our living sentient reality should never be regarded as 3S-1t because it always includes some meaningful consciousness<sup>60</sup>. So, our experiential reality would then be 3S-1t plus 1 or more “Consciousness” dimensions.<sup>4, 12, 15</sup> It could be interpreted that that a “consciousness” is relatively non-local because it is not directly *in* Space and Time—it is separate, though linked: However, that differentiation would be semantic.

*(Continued on Part III)*

**References** (See Part VII)