Review of: "Quantum Emptiness: A Scientific Exploration of the Heart Sūtra"

Francesco Galofaro[1]

1 Department of communication, arts, and media, University Institute of Modern Languages, Italy

Potential competing interests: No potential competing interests to declare.

There are many philosophical, religious, and mystical interpretations of quantum theory. Some of them aim to solve open problems in Quantum Theory, such as measurement and the relation between classical and quantum physics. It is difficult to understand whether these readings are really relevant to Quantum Theory, unless they can inspire improvements or inspire experiments.

The reviewed paper suggests many analogies between quantum theory and the Heart Sūtra. It is an interesting demonstration that each culture can interpret QT's counterintuitive notions and concepts, translating it into the codes which are used to map reality inside the culture. Every culture has the right to do this, in order to provide a meaning to the picture of reality resulting from QT. As the author writes, "paradox is only a conflict between reality and the perception and feeling of what reality ought to be."

However, when questioning the relation between the quantum world and the classical world of human experience, the idea that the latter is just an illusion created by the senses seems not to be a real progress. The world of experience may be an illusion: still, it is a coherent, intersubjectively shared, stable illusion. The paper does not provide an interpretation for this switch from the quantum to the classical world.

I suggest to the author to reflect on the latter problem. Furthermore, a final paragraph should be added, in which the author can propose how the Heart Sūtra can inspire further progress in physics. As a reviewer, I am convinced that philosophy can suggest real advancement in many scientific fields, as it happened in cognitive sciences and in Artificial Intelligence. The aim of philosophy is not to confirm science - science does not need it - but to cooperate with science for a deeper insight into reality.

List of problems:

Introduction

- "One such intriguing aspect involves particles spontaneously manifesting and subsequently annihilating, only to re-emerge in disparate space-time contexts." Here the author quotes a popular-science book. Scientific literature should be referenced instead. In particular, the author claims that particles re-emerge in disparate space-time contexts. However, since particles are indistinguishable in principle, how do we know they are "the same"? The principle of indistinguishability in quantum theory challenges Leibniz' principle of identity of indiscernibles, one of the bases of

western ontology.

- The reference to Peirce's model is very interesting, but the author does not develop it during the following comparison nor in the conclusions. Is this model relevant to a better understanding of the relation between Quantum Theory and the Heart Sūtra?

Interdisciplinary resonance

- Redhead's (1982): references should be placed in endnotes.
- The author should prove the analogies between QFT and the Heart Sūtra by quoting the latter. For example, he writes: "Particle emergence and annihilation, quintessential processes in QFT, beautifully mirror philosophical depictions of illusion and reality, such as those found in the Heart *Sūtra"*. The author should provide an example of the aforementioned philosophical depictions.

On Multiple realities

The author writes: "Rather than the certainties that we have grown accustomed to, quantum mechanics proffers a probabilistic landscape. In the context of Buddhist philosophy, these quantum probabilities find resonance in the (consciousness realm), where the intricate interplay of (reception), (perception), (action), and (cognition) governs the nature of conscious experience."

One of the major problems of the paper concerns the specific similarities between Buddhism and quantum probability. In fact, the Buddhist notions presented in the text could also support classical probability. Classical and quantum probability are sensibly different: for example, quantum entanglement violates Bell's inequality.

Quantum landscape

The author writes: "When an observation occurs, the system collapses into a singular state. This notion profoundly challenges deterministic, classical perspectives, suggesting instead that reality at the quantum level is intrinsically probabilistic. This same notion is resonant with the declaration from the Heart Sūtra (…)" The author sees a similarity between the Heart Sūtra and a phenomenon that is still an open problem in Quantum Theory, i.e., measurement. "Measurement" is not part of QT, and the reason why the system collapses into a singular state is unclear - it is not part of QT. For example, a very debated question, involving different philosophical perspectives about reality, is: when the spin of an electron is measured, and the system collapses into a singular state, what can we say about the other state? Was it "unreal"? And, otherwise, where does it go? Thus, my humble suggestion is to limit the philosophical interpretations to established quantum theory.

Deconstructing the Heart Sutra's Labyrinth

The term "deconstruction" is used as an equivalent to "analysis" (see also the introduction). However, in philosophy, deconstruction is an approach aimed at demonstrating that metaphysical hierarchies such as being/nothing, form/matter, etc., in which one term is taken as primitive while the other is considered derivative, are not natural, as some philosophers claim, but conventional and constructed by texts. It seems to me that the use of the term "deconstructing" is inappropriate

in the context of the paper.

Implications for Contemporary Understanding

- The author claims that "in addressing global challenges like climate change or social inequities, an interconnected worldview emphasizes collective responsibility and the intrinsic value of all entities". Similarly, in personal realms, understanding the non-dual and interconnected nature of existence can foster a sense of compassion (…)". It is not clear why, in order to produce political and moral change, the Heart Sutra is not sufficient and a deep understanding of QT is needed.
- It is unclear whether a collaboration between QT scientists and philosophers could lead to a better insight into reality or to design new experiments inspired by the Heart Sūtra.