

Essay

Approach to Physical Reality: A Note on Poincaré Group & the Philosophy of Nagarjuna

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Abstract

We argue about a possible scenario of physical reality based on the parallelism between Poincaré group and the sunyata philosophy of Nagarjuna. The notion of "relational" is the common denominator of two views. We have approached the relational concept in third-person perspective (ontic level). It is possible to deduce different physical consequence and interpretation through first-person perspective approach. This relational interpretation leave open the questions: i) we must abandon the idea for a physical system the possibility to extract the completeness information? ii) we must abandon the idea to infer a possible structure of physical reality?

Keywords: Physical reality, Poincaré Group, philosophy, Nagarjuna.

1 Poincaré Group

There are two universal features of modern day physics regarding physical systems: all physical phenomena take place in 1)space-time and all phenomena are (in principle) subject to 2)quantum mechanics. Are these aspects just two facets of the same underlying physical reality? The research is concentrate on this fundamental point. The notion of space-time is linked to the geometry, so an interesting question is what geometry is appropriate for quantum physics². Can geometry give us any knowledge about the nature of physical space where the physical laws take place? Can geometry give us the possible scenario of the physical reality? A fundamental aspect of a geometry is the group of transformations defined over it. Group theory is the necessary instruments for expressing the laws of physics (the concept of symmetry is derived from group theory.)³.Physics and the geometry in which it take place are not independent. We retain there is a close relationship between space-time structure and physical theory. Space-time imposes universally valid constraints on physical theories and the universality of these laws starts to become less mysterious (i.e. various paradox). The invariance under the group of transformations

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²note -1- It was suggested, for instance, that the universal symmetry group elements which act on all Hilbert spaces may be appropriate for constructing a physical geometry for quantum theory.

³note -2- Some authors retain the symmetry is the ontic element, and the physical laws like the space-time are secondary

is a fundamental criterion to classify mathematical structures. Poincaré introduced notion of invariance under continue transformations. The Poincaré Group is the group of translation, rotation, and boost operators in 4-dimensional space-time. Now, some natural questions are: **does space exist independently of phenomena?** Itself has an intrinsic significance? A system defined in this space through physical law could exist by itself? We call "absolute" reality the reality of a system that do not depend by its interaction with other system. The problem is that we have not a single system. In this brief note, we abandon the idea of absolute reality and we argue in favor of a relational reality, because relational reality is founded on the premise that an **object is real only** in relation to another object that it is interacting with. In the relational interpretation(2), the basic elements of objective reality are the measurement events themselves. This interpretation goes beyond the Copenhagen interpretation by replacing the **absolute reality with relational reality**. In the relational interpretation the wave function is merely a useful mathematical abstraction. Some authors proposes that the laws of nature are really the result of probabilities constrained by fundamental symmetries. **Relational reality is associated with the fundamental concept of interactions**. These later analysis of the "relational" notion bring us to approach the same problem utilizing the sunyata philosophy of Nagaujuna.

2 Concept of reality in the philosophy of Nagarjuna

The Middle Way of Madhyamika refers to the teachings of Nagarjuna, very interesting are the implications between quantum physics and Madhyamika. The basic concept of reality in the philosophy of Nagarjuna is that the fundamental reality has no firm core but consists of systems of **interacting objects**. According to the middle way perspective, based on the notion of emptiness, phenomena exist in a relative way, that is, they are empty of any kind of inherent and independent existence. Phenomena are regarded as dependent events existing **relationally rather than permanent things**, which have their own entity. Nagarjuna middle way perspective emerges as a relational approach, based on the insight of emptiness. Sunyata (emptiness) is the foundation of all things, and it is the basic principle of all phenomena. The emptiness implies the negation of unchanged, fixed substance and thereby the possibility for relational existence and change. This suggests that both the ontological constitution of things and our epistemological schemes are just as relational as everything else. We are fundamentally relational internally and externally. In other words, Nagarjuna do not fix any ontological nature of the things:

- 1)they do not arise.
- 2)they do not exist.
- 3)they are not to be found.
- 4)they are not.
- 5)and they are unreal

In short, an invitation do not decide on either existence or non-existence(nondualism). According the theory of sunyata, phenomena exist in a relative state only, a kind of '**ontological**

relativity'. Phenomena are regarded as dependent (only in relation to something else) events rather than things which have their own inherent nature; thus the extreme of permanence is avoided.

3 Conclusion

We have seen the link between **relational and interaction** within a space-time governed by own geometry. Nagarjuna's philosophy use the same basic concept of "relational" in the interpretation of reality. We note that our parallelism between the scenario of physical reality and the relational interpretation of the same reality is based on third-person perspective approach (i.e. the ontic level, relational view include the observer-device). Different considerations could be done thought first-person perspective approach, in this case we retain the impossibility to establish any parallelism. Finally, we note that probably the relational approach stimulate the interest to fundamental problems in physics like: the unification of laws and the discrete/continuum view(1).

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