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From Einstein's Physics to Neurophilosophy: On the notions of *space*, *time* and *field* as cognoscitive conditions under Kantian-Husserlian approach in the General Relativity Theory

Abstract

The current technoscientific progress has led to a sectorization in the philosophy of science. Today the philosophy of science isn't is informal interested in studying old problems about the general characteristics of scientific practice. The interest of the philosopher of science is the study of concepts, problems and riddles of particular disciplines. Then, within this progress of philosophy of science, neuroscientific research stands out, because it invades issues traditionally addressed by the humanities, such as the nature of consciousness, action, knowledge, normativity, etc. As a result, the new area of interdisciplinary study of neuroscience and philosophy arises: neurophilosophy. This emerging area applies neuroscientific concepts to traditional philosophical questions, limiting their responses to neuroscientific revelations about nervous systems. Neurophilosophy research focuses on problems related to the indirect nature of mind and brain,[1] computational or representative analysis of brain process,[2] relationships between psychological and neuroscientific research,[3] adequate adaptations of physical and philosophical concepts in neuroscience[4] and the place of cognitive functions.[5]

Now, the temporal representation of *conscious experience* and the types of the neural architecture to represent *objects in time*[6] have aroused scientific interest. Under these interests, we focus on the studies on the temporary triadic structure of *phenomenological consciousness* in Dan Lloyd[7] and Rick Grush.[8] From Grush's studies, the importance of Kantian ideas for cognitive neuroscience emerges, due to the active way in which Kant conceived *space* and *time* as forms of intuition, within which the mind interprets its experience. Under this perspective, the theoretical arguments of Dennett-Kinsbourne[9] and Eagleman-Sejnowski[10] represent winks in the direction of Kant-Husserl within the neuroscientific goal while considering that the contents provided by the mind included *space*, *objects* and perception of *causal relationships*. Then, theories of cognitive neuroscience are beginning to suggest that these elements are also, as Kant argued, interpretative elaborations provided by mind / brain, and not only content received from outside. In other words, current cognitive neuroscientific theories try to pass from its Humean phase to a Kantian phase. So, the challenge has been to explain that these elements are provided by the mind and the world itself, and how they have the content they have come from. These are lacking in current studies. Filling this gap helps to involve the analysis of the scientist's *experience* in his theoretical attitude.

In this sense, an investigation under the Kantian-Husserlian approach that involves pure intuitions *a priori* with the *experience* of the scientific and neuroscientific concepts represents a *ground-breaking*. At present, a neurophilosophical study about this does not exist. In this sense, one feasible proposal for research would be based on the application of neuroscientific results of Moser-Britt[11] to philosophical problems of foundational notions in relativistic physics: *space*, *time*, *space-time*, *field*, etc., under the Kantian-Husserlian approach, which allows to demonstrate the multidisciplinary link between neurophilosophy and physics. This represents a *ground-breaking* area in current interests in scientific research, with a positive impact in the field of neuroscience, and contributing to the study of *abstraction* emphasizing the importance of Kant's Copernican turn and Husserl's phenomenological ideas in the construction of physical theories.

Keywods: Space-Time, Field, Husserl, Weyl, Einstein, Neurophilosophy

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