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A Short Note Quantum Mechanics: Bundle Theory

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Description

In terms of mere logical bundle theory, the current essay proposes a new metaphysical interpretation of Relational Quantum Mechanics (RQM). The central claim is that in RQM, a physical system can be characterised as a mere logical fusion of attributes whose values fluctuate depending on the observer. RQM accepts an ontology of attributes that has its roots in David Hume's inheritance, abandoning the Aristotelian tradition focused on the notion of substance. In this regard RQM is made compatible with a property-oriented ontology, in which the concept of object can be clearly defined, and moderate structural realism, in which relations and relata are both fundamental and the relational quantum mechanics, should be considered a full-fledged realist interpretation of quantum theory under this reading.

Quantum Mechanics (QM) is concerned with the observable qualities of physical systems in relation to specific observers according to this interpretative framework. In this context, quantum systems can be marked out in a various ways by observers and these representations are not mutually exclusive. As a result of RQM's relational nature, the concept of an absolute, unique reality is obliterated.

A theory of matter based on the concept of elementary particles with wave qualities, which allows a mathematical explanation of the structure and interactions of matter based on these properties, and which combines quantum theory and the uncertainty principle. A quantum mechanical representation of a system (state of physical quantities) should not be taken as an absolute (observer-independent) description of reality, but rather as a formalisation or indexing of reality, the system's attributes in relation to a specific observer. Quantum mechanics can be thought of, as a theory regarding system states and physical quantity values in relation to other systems. The notion of an absolute observer-independent state of a system as well as an observer-independent attribution to values of physical magnitudes withers away in RQM in pursuit of a relational view of quantum states. Indeed, according to relational quantum physics a system's state can only be properly characterised in reference to another system that keeps as an external observer. RQM, moreover contradicts the theme of an absolute, observer-independent reality. The conceptual vision of reality does not lead to subjectivism, despite the fact that it is a fundamental departure about the world we live in. In this context, the term 'observer' in RQM refers to any physical item with a specific defined state of motion; for example an electron, an air molecule, a Geiger counter, or a human experimenter can all be observed. As a result, this idea is contrary to other approaches to quantum theory; do not have any power to create reality-which existing per sec.

In the context of relational quantum physics, a new metaphysical interpretation of physical systems determining them as mereological bundles of characteristics. In essence, this interpretation of RQM characterises quantum systems as collections of attributes that can take on contextual values in relation to certain observers. More specifically RQM is compatible with a mild kind of structural realism, according to the Relational Quantum Mechanics (RQM).

To provide an object-oriented ontology for RQM in this paper, much philosophical work remains to be done in order to clarify the theory's rich metaphysical implications such as which interpretation of probabilities is best suited for this framework and the extension of this approach to the standard model of particle physics and so on. This is a beneficial move because it will permit physicists and philosophers to discuss the foundations of quantum theory from a fresh, hopefully cooperative perspective.

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