Journal of Explorations in Philosophy and Religion

Volume 3. Issue 2. Autumn and Winter 2024. Pages 65 to 83.

Research Paper

Quantum Entanglement: A Challenge to Physicalism

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Volume 3. Issue 2. Autumn and Winter 2024. Pages 65 to 83.

10.22080/jre.2025.28087.1226

Received:
November 22, 2024
Accepted:
January 6, 2025
Available online:
February 15, 2025

Keywords:
Quantum entanglement, Quantum superposition, Physicalism, Locality principle, Quantum

Abstract

What is quantum entanglement and what implications does it have for our understanding of physicalism, particularly in the context of the nature of reality and the relationship of particles to each other? How does the phenomenon of quantum entanglement challenge traditional notions of causality and locality in physical theories? Can quantum entanglement be reconciled with a materialist view of the world, or does this require a paradigm shift in our understanding of consciousness and reality? Physicalism, the philosophical position that the physical world is the only reality, has long been the dominant view in philosophy. However, recent discoveries in quantum mechanics, particularly the phenomenon of entanglement, challenge the physicalist interpretation of existence. This article uses a descriptive-analytical approach to answer the above questions and concludes that quantum entanglement provides implications such as quantum nonlocality, quantum teleportation, holism, correlation, and quantum consciousness that provide a serious critique and challenge to physicalism. Quantum entanglement, characterized by nonlocal correlations between particles, challenges fundamental assumptions of physicalism, particularly its reliance on the principles of locality and determinism, and physical certainty and predictability. We also argue, by examining the role of the observer in quantum measurement, that the act of observation not only affects the state of entangled systems but also raises profound questions about the nature of reality and consciousness. In this paper, physicalism is critiqued through the lens of quantum entanglement, a phenomenon that fundamentally challenges our classical intuitions about reality.

Extended Abstract

1. Introduction

Quantum entanglement is a phenomenon in which two or more particles are linked together in such a way that their quantum states cannot be described independently. These particles are completely correlated, even at great distances, and measuring the state of one of them instantly determines the state of the other. This phenomenon contradicts the principle of locality in physics, which states that objects are only affected by objects close to them. Also, the theory of special relativity limits the speed of effects to the speed of light. While classical physics emphasizes the existence of independent particles, in the quantum world, particles can be superposed and their properties depend on each other.

2. Methods

By employing the analytical-descriptive method, the article aims to provide a comprehensive understanding of the quantum entanglement problem and its philosophical significance. This approach not only clarifies complex ideas but also invites readers to critically engage with the challenges that quantum mechanics poses to established philosophical doctrines.

3. Results

The theory of quantum entanglement challenges the limitations of physicalism and suggests a need to rethink the relationship between the physical and non-physical aspects of reality. It suggests that the physical world is not an independent system, but rather an open, relational system that is influenced by non-physical entities. To better understand reality, a multidisciplinary and comprehensive approach is needed that includes both physical and non-physical perspectives. By embracing the complexities of entanglement, we may discover new insights into the nature of reality and our place in it. It leads us to rethink our understanding of reality and our relationship to the world around us.

Funding

There is no funding support

Authors' contribution

The authors of this article are Seyyed Mohsen Hashemi and Seyyed Mohammad Ali Dibaji.

Conflict of interest
Authors declared no conflict of interest.

Acknowledgments
I would like to express my gratitude to all the teachers who helped me write this article.

Volume 3. Issue 2. Autumn and Winter 2024. Pages 65 to 83.

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