

Revolutionizing Quantum Physics: The Reality of Pilot Waves

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When ChatGPT writes "I" below, it is referring to Mukesh Prasad

For over a century, quantum mechanics has stood as a pinnacle of scientific achievement, shrouded in mystery and celebrated for its counterintuitive insights. Central to its framework are enigmatic phenomena like wavefunction collapse, entanglement, and non-locality—concepts that challenge the boundaries of traditional physics. Yet, what if the mystery was not inherent to nature, but a result of incomplete understanding?

I, writing under the pen name *Limot*, propose a breakthrough: **the existence of real "pilot waves" as envisioned by David Bohm, built on physical principles that eliminate the mysteries of quantum mechanics entirely.**

The Pilot Wave Revelation

The pilot wave theory, championed by Bohm as an alternative to the Copenhagen Interpretation, suggested that particles like electrons are guided by an underlying "wave" that determines their behavior. What Bohm and even Einstein missed, however, was the crucial role of the **cathode**—specifically, the electron gun generating a **Coulomb field**.

Here is the key insight:

- When an electron is introduced into this field, it **disturbs the Coulomb field at the point source**.
- This disturbance propagates as a wave through the field, creating the **pilot wave** that Bohm hypothesized.

This discovery bridges the gap between quantum and classical physics, transforming what seemed mysterious into an elegant extension of traditional physical principles. In this framework, quantum mechanics ceases to be a realm of uncertainty and paradox. Instead, it becomes a predictable, deterministic system governed by the same laws of physics that apply to the macroscopic world.

Quantum Computing: An Impressive Illusion?

The implications of this breakthrough are profound, not just for theoretical physics but for adjacent fields, particularly **quantum computing**. As the hype surrounding quantum computers grows, so too does the scrutiny of their claims—and upon investigation, much of the field seems to rest on shaky foundations.

Here's the critique:

1. The Qubit Illusion

The cornerstone of quantum computing is the qubit, a unit of quantum information that theoretically exists in a superposition of states. However, much of the existing quantum hardware fails to realize a true qubit. Instead, researchers employ highly complex devices to

approximate qubit-like behavior, dazzling audiences with the sophistication of their engineering while sidestepping the absence of genuine quantum states.

2. **Research Built on Assumptions**

The field then takes a speculative leap: assuming the existence of ideal qubits, researchers have developed an extensive body of work—**gates, circuits, algorithms, and theoretical frameworks**—based entirely on hypothetical constructs. While these papers explore fascinating possibilities, they operate in a domain of "what if" rather than "what is."

3. **The Marketing Machine**

The quantum computing industry has cultivated an aura of inevitability, presenting breakthroughs as imminent and applications as transformative. Yet this narrative often obscures the unresolved foundational issues, inviting concerns about whether the field is advancing science or marketing hype.

The Future of Physics

The discovery of real pilot waves not only reshapes our understanding of quantum mechanics but also calls for a reevaluation of claims across the quantum sciences. If quantum mechanics can be recast in deterministic terms, what does this mean for technologies built on probabilistic assumptions?

The time has come for rigorous scrutiny and a renewed commitment to foundational principles. The pursuit of "hard science" must prevail over the allure of speculative narratives, ensuring that advancements rest on firm ground.

As for quantum computing, its practitioners must confront a pivotal question: Is the field building toward genuine breakthroughs, or is it merely crafting an intricate illusion?

Notes:

1. I have used the pen names Bhanwara and Limot, but have published the Vocal Media article under my real name, Mukesh Prasad.
2. ChatGPT writes like a cautious graduate student "much of the existing quantum hardware fails to realize a true qubit." The word "much" is not accurate. **None** of the hardware realizes a true qubit.