Quantum mechanics

Ton Haarmans · Wide Open Windows



The world that seemed obvious

There was a time when the world seemed self-evident. Objects existed, carried properties, and persisted whether observed or not. Measurement revealed what was already there. Knowledge followed reality.

This picture still feels natural. It rarely appears as a theory. It presents itself as the way things are.

The experimental fracture

Quantum mechanics does not begin as philosophy. It begins in the laboratory. Experiments on entangled particles, from Bell tests to long-distance photon correlations, show that physical systems cannot be described as possessing definite properties prior to measurement.

The result is not uncertainty in the usual sense. It is a structural limitation. The world resists being described as a collection of independently existing objects.

Anton Zeilinger, whose experiments on entanglement and quantum teleportation helped establish this field, formulates the shift with striking clarity:

> “The world is open… we can give only probabilities for individual events.”

What appears here is not ignorance, but a different kind of structure. Not hidden variables, but possibilities.

From objects to information

Within contemporary physics, this has led to a remarkable reinterpretation. Quantum mechanics is increasingly understood not as a theory of objects, but as a theory of information. The wave function does not describe a thing. It encodes what can be said about possible outcomes.

Entanglement, once considered paradoxical, is now treated as a resource. It can be generated, manipulated, and used for communication and computation. The focus shifts from what systems are to what relations can be established between them.

In this sense, physics itself begins to speak in a different language. Not substance, but structure. Not being, but constraint. Not objects, but correlations.

The persistence of a distinction

And yet, something remains unchanged.

The move from objects to information appears radical, but it preserves a deeper assumption. There is still something, and there is information about it. The distinction between reality and knowledge survives, even if both sides have been transformed.

Objects dissolve into probabilities. Certainty dissolves into information. But the structure persists: a world, and a description of that world.

Where the framework becomes visible

From a dioramic perspective, this distinction is not fundamental. It is itself part of the configuration. “Reality” and “information” are not two layers of existence, but two roles within a single structure of experience.

They arise together. They define each other. They stabilize a field in which something appears as “what is” and something else as “what is known.”

Quantum mechanics does not simply replace one side with the other. It reveals the instability of the entire arrangement.

Not a theory, but a limit

The paradoxes of quantum theory are often treated as puzzles to be solved. But they may function differently. They may mark a boundary. A point at which a certain way of thinking reaches its limit.

Not because reality is mysterious, but because the distinction through which we approach it begins to fail.

What collapses is not only the classical image of the world. What becomes visible is the structure that made that image possible.

References

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