Two Dogmas About Quantum Mechanics

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Abstract

We argue that the intractable part of the measurement problem -- the 'big' measurement problem -- is a pseudo-problem that depends for its legitimacy on the acceptance of two dogmas. The first dogma is John Bell's assertion that measurement should never be introduced as a primitive process in a fundamental mechanical theory like classical or quantum mechanics, but should always be open to a complete analysis, in principle, of how the individual outcomes come about dynamically. The second dogma is the view that the quantum state has an ontological significance analogous to the significance of the classical state as the 'truthmaker' for propositions about the occurrence and non-occurrence of events, i.e., that the quantum state is a representation of physical reality. We show how both dogmas can be rejected in a realist information-theoretic interpretation of quantum mechanics as an alternative to the Everett interpretation. The Everettian, too, regards the 'big' measurement problem as a pseudo-problem, because the Everettian rejects the assumption that measurements have definite outcomes, in the sense that one particular outcome, as opposed to other possible outcomes, actually occurs in a quantum measurement process. By contrast with the Everettians, we accept that measurements have definite outcomes. By contrast with the Bohmians and the GRW 'collapse' theorists who add structure to the theory and propose dynamical solutions to the 'big' measurement problem, we take the problem to arise from the failure to see the significance of Hilbert space as a new kinematic framework for the physics of an indeterministic universe, in the sense that Hilbert space imposes kinematic (i.e., pre-dynamic) objective probabilistic constraints on correlations between events.

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