Probability in Everettian quantum mechanics

Lewis, Peter J. (2005) Probability in Everettian quantum mechanics.

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Abstract

The main difficulty facing no-collapse theories of quantum mechanics in the Everettian tradition concerns the role of probability within a theory in which every possible outcome of a measurement actually occurs. The problem is two-fold: First, what do probability claims mean within such a theory? Second, what ensures that the probabilities attached to measurement outcomes match those of standard quantum mechanics? Deutsch has recently proposed a decision-theoretic solution to the second problem, according to which agents are rationally required to weight the outcomes of measurements according to the standard quantum-mechanical probability measure. I show that this argument admits counterexamples, and hence fails to establish the standard probability weighting as a rational requirement.

Keywords:	Many worlds, Everett, probability.
Subjects:	Specific Sciences: Physics: Quantum Mechanics
ID Code:	2716
Deposited By:	Lewis, Peter J.
Deposited On:	23 April 2006

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