

Probability in the Everett World: Comments on Wallace and Greaves

Price, Huw (2006) Probability in the Everett World: Comments on Wallace and Greaves.

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Abstract

It is often objected that the Everett interpretation of QM cannot make sense of quantum probabilities, in one or both of two ways: either it can't make sense of probability at all, or it can't explain why probability should be governed by the Born rule. David Deutsch has attempted to meet these objections. He argues not only that rational decision under uncertainty makes sense in the Everett interpretation, but also that under reasonable assumptions, the credences of a rational agent in an Everett world should be constrained by the Born rule.

David Wallace has developed and defended Deutsch's proposal, and greatly clarified its conceptual basis. In particular, he has stressed its reliance on the distinguishing symmetry of the Everett view, viz., that all possible outcomes of a quantum measurement are treated as equally real. The argument thus tries to make a virtue of what has usually been seen as the main obstacle to making sense of probability in the Everett world.

In this note I outline some objections to the Deutsch-Wallace argument, and to related proposals by Hilary Greaves about the epistemology of Everettian QM. (In the latter case, my arguments include an appeal to an Everettian analogue of the Sleeping Beauty problem.) The common thread to these objections is that the symmetry in question remains a very significant obstacle to making sense of probability in the Everett interpretation.

Keywords: Everett, probability, quantum mechanics, many worlds

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ID Code: 2719

Deposited By: [Price, Huw](#)

Deposited On: 25 April 2006

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