Probability in modal interpretations of quantum mechanics

Dieks, Dennis (2007) Probability in modal interpretations of quantum mechanics.

Abstract

Modal interpretations have the ambition to construe quantum mechanics as an objective, man-independent description of physical reality. Their second leading idea is probabilism: quantum mechanics does not completely fix physical reality but yields probabilities. In working out these ideas an important motif is to stay close to the standard formalism of quantum mechanics and to refrain from introducing new structure by hand. In this paper we explain how this programme can be made concrete. In particular, we show that the Born probability rule, and sets of definite-valued observables to which the Born probabilities pertain, can be uniquely defined from the quantum state and Hilbert space structure. We discuss the status of probability in modal interpretations, and to this end we make a comparison with many-worlds alternatives. An overall point that we stress is that the modal ideas define a general framework and research programme rather than one definite and finished interpretation.

Keywords:	Modal interpretations, quantum theory, probability, Born rule, many worlds
Subjects:	Specific Sciences: Probability/Statistics Specific Sciences: Physics: Quantum Mechanics
ID Code:	3207
Deposited By:	Dieks, Dennis
Deposited On:	03 March 2007