

Probability, Arrow of Time and Decoherence

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Abstract

This paper relates both to the metaphysics of probability and to the physics of time asymmetry. Using the formalism of decoherent histories, it investigates whether intuitions about intrinsic time directedness that are often associated with probability can be justified in the context of no-collapse approaches to quantum mechanics. The standard (two-vector) approach to time symmetry in the decoherent histories literature is criticised, and an alternative approach is proposed, based on two decoherence conditions ('forwards' and 'backwards') within the one-vector formalism. In turn, considerations of forwards and backwards decoherence and of decoherence and recoherence suggest that a time-directed interpretation of probabilities, if adopted, should be both contingent and perspectival.

Keywords: time asymmetry of probabilities, decoherent histories

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