

# Self-Induced Decoherence and the Classical Limit of Quantum Mechanics

Castagnino, Mario and Lombardi, Olimpia (2004) Self-Induced Decoherence and the Classical Limit of Quantum Mechanics. In *[2004] Philosophy of Science Assoc. 19th Biennial Meeting - PSA2004: Contributed Papers (Austin, TX; 2004): PSA 2004 Contributed Papers*, Austin, texas.

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## Abstract

In this paper we argue that the emergence of the classical world from the underlying quantum reality involves two elements: self-induced decoherence and macroscopicity. Self-induced decoherence does not require the openness of the system and its interaction with the environment: a single closed system can decohere when its Hamiltonian has continuous spectrum. We show that, if the system is macroscopic enough, after self-induced decoherence it can be described as an ensemble of classical distributions weighted by their corresponding probabilities. We also argue that classicality is an emergent property that arises when the behavior of the system is described from an observational perspective.

**Keywords:** decoherence, classical limit, quantum mechanics

**Subjects:** [Specific Sciences: Physics: Quantum Mechanics](#)

**Conferences and Volumes:** [\[2004\] Philosophy of Science Assoc. 19th Biennial Meeting - PSA2004: Contributed Papers \(Austin, TX; 2004\): PSA 2004 Contributed Papers](#)

**ID Code:** 1883

**Deposited By:** [Lombardi, Olimpia](#)

**Deposited On:** 15 August 2004