

Quantum trajectories and spontaneous decoherence

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Quantum trajectories arise when we couple a quantum system to a sequence of ancillas consecutively, and perform von Neumann measurements on the ancillas. Let the average evolution of the system be described by a semigroup (T^n) . Then the ergodic components of the random outcome sequence are in one-to-one correspondence with the minimal projections in the center of the Kraus algebra of T .

If we omit the measurements, and only perform the couplings, then the sequence of ancillas goes into a so-called finitely correlated state. This state defines via the GNS-construction a von Neumann algebra extension of the product of the ancilla algebras. We show that again the center of this algebra is isomorphic to the center of the Kraus algebra.

We discuss the connection to discussions of the measurement problem by Klaus Hepp and Jürg Fröhlich.

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