

An ergodic theorem for quantum trajectories  
Hans Maassen, Raboud University, Nijmegen

When a quantummechanical system is observed repeatedly or continuously in time, then the conditional expectations of all its observables, given the observations made up to time  $t$ , together define a state  $\rho(t)$  on the system. The (random) curve  $t \mapsto \rho(t)$  is known as its quantum trajectory. It is a Markov process; in the case of continuous time an Ito diffusion or a jump process.

Quantum trajectories have become popular in quantum optics and molecular physics during the last decade, not in the least because they can be simulated on computers.

We prove an ergodic theorem for these trajectories, relating the time average of  $\rho$  to the fixed points of the mean time evolution.