

Titre: The gambler's ruin problem and quantum measurement

Abstract:

The dynamics of a single microscopic or mesoscopic non quantum system interacting with a macroscopic environment is generally stochastic. In the same way, the reduced density operator of a single quantum system interacting with a macroscopic environment is a priori a stochastic variable, and decoherence describes only the average dynamics of this variable, not its fluctuations. I will show that a general unbiased quantum measurement can be reformulated as a gambler's ruin problem where the game is a martingale. The Born's rule then appears as a direct consequence of the optional stopping theorem for martingales. I will also present explicit computations in detail on a specific simple example.