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Title: Stochastic evolution of a quantum system interacting with an environment prepared in n-photon state

Abstract:

We derive stochastic master equation for a quantum system interacting with an environment prepared in a continuous-mode n photon state. To determine the conditional evolution of the quantum system depending on the continuous in time measurements of the output field we apply the model repeated interactions and measurements with the environment given as an infinite chain of harmonic oscillators which do not interact between themselves and they are prepared initially in an entangled state being a discrete analogue of a continuous-mode n photon state. We derive the continuous in time conditional evolution of the quantum system starting from determination of discrete in time recurrence equations. We present not only the quantum trajectories but also the analytical formulas for the whole statistics of the output photons and the solution to the master equation.