Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Robust quantum channel for optical coherent-state qubits under environment noise[1] SHIN-TZA WU, MING-JAY YANG, Department of Physics, National Chung Cheng University — We study the non-Markovian dynamics of optical qubits encoded via coherent states with opposite phases which are exposed to environment noises. Making use of a coherent-state path integral formulation, we are able to study non-perturbatively the dynamics of the coherent-state qubits under strong environment coupling. We apply this formulation to examine the time evolution of a noisy quantum channel formed by two coherent-state qubits that are subject to uncorrelated local environment noises. In particular, we examine the time evolution of entanglement and maximal teleportation fidelity of the noisy quantum channel and show that at strong coupling, due to large feedbacks from the environment noise, it is possible to maintain a robust quantum channel in the long-time limit if appropriate error-correcting code is applied.

[1]Research supported by the National Science Council of Taiwan through grant no. NSC 99-2112-M-194 -009 -MY3, and also partly by the Center for Theoretical Sciences, Taiwan.

Shin-Tza Wu
Department of Physics, National Chung Cheng University

Date submitted: 05 Nov 2013 Electronic form version 1.4