Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Foundations for Cooperating with Control Noise in the Manipulation of Quantum Dynamics[1] FENG SHUANG, HERSCHEL RABITZ, Department of Chemistry, Princeton University, MARK DYKMAN, Department of Physics and Astronomy, Michigan State University — This work develops the theoretical foundations for the ability of a control field to cooperate with noise in the manipulation of quantum dynamics. The noise enters as run-to-run variations in the control amplitudes, phases and frequencies with the observation being an ensemble average over many runs as is commonly done in the laboratory. Weak field perturbation theory is developed to show that noise in the amplitude and frequency components of the control field can enhance the process of population transfer in a multilevel ladder system. The analytical results in this paper support the point that under suitable conditions an optimal field can cooperate with noise to improve the control outcome.

[1]The authors acknowledge support from the Department of Energy and NSF-PHY 0555346

Feng Shuang
Department of Chemistry, Princeton University

Date submitted: 20 Nov 2006 Electronic form version 1.4