Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Bounded-strength dynamical control of qubit coherence based on Eulerian cycles[1] LEA F. SANTOS, Yeshiva University, TAYLOR S. SMITH, WENXIAN ZHANG, LORENZA VIOLA, Dartmouth College — Decoherence and faulty controls are two of the primary obstacles to realize scalable quantum information processing. Here, we investigate dynamical decoupling (DD) techniques for dynamical control and decoherence suppression in the limit of low-power faulty control, using the approach of Eulerian DD introduced in L. Viola and E. Knill, Phys. Rev. Lett. 90, 037901 (2003). By focusing on the illustrative case of single-qubit DD, we identify scenarios where naive transcriptions of bang-bang sequences with finite pulses are outperformed by the Eulerian method – both in terms of DD fidelity and robustness against systematic errors. Results on Eulerian decoherence control in solid-state qubit devices are presented.

[1]Supported in part by the NSF through grant No. PHY-0555417 and by the DOE through contract No. DE-AC02-07CH11358.

Lorenza Viola
Dartmouth College

Date submitted: 19 Nov 2007 Electronic form version 1.4