Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Quantum error correction with soft-pulse dynamically corrected gates with always-on qubit couplings on bipartite lattices[1] AMRIT DE, LEONID P. PRYADKO, University of California - Riverside — We suggest a scalable implementation of a universal set of high fidelity quantum gates on a bipartite lattice with always-on Ising couplings using dynamical decoupling (DD) sequences with second-order self-refocusing pulses. In addition to decoupling the unwanted parts of the inter-qubit interaction, the constructed gates also protect the qubits against low-frequency phase noise. This allows heterogeneous concatenation of DD and quantum error correction. We illustrate the technique by simulating the encoding/decoding and repeated ancilla based measurements for 4- and 5-qubit quantum error detecting/correcting codes on a spin chain and on a star graph.

[1]This research was supported in part by the U.S. Army Research O?ce under Grant No. W911NF-11-1-0027, and by the NSF under Grant No. 1018935

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Date submitted: 18 Dec 2012 Electronic form version 1.4