Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

**Adiabatic Quantum Computing via the Rydberg Blockade** TYLER KEATING, KRITTIKA GOYAL[1], IVAN DEUTSCH, CQuIC, University of New Mexico — We study an architecture for implementing adiabatic quantum computation with trapped neutral atoms. Ground state atoms are dressed by laser fields in a manner conditional on the Rydberg blockade mechanism, thereby providing the requisite entangling interactions. As a benchmark we study the performance of a Quadratic Unconstrained Binary Optimization (QUBO) problem whose solution is found in the ground state spin configuration of an Ising-like model. We model a realistic architecture, including the effects of magnetic level structure, with qubits encoded into the clock states of $^{133}$Cs, effective B-fields implemented through microwaves and light shifts, and atom-atom coupling achieved by excitation to a high-lying Rydberg level. Including the fundamental effects of photon scattering we find a high fidelity for the two-qubit implementation.

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Date submitted: 27 Jan 2012 Electronic form version 1.4