Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Manipulation of Ultracold Rubidium Atoms Using a Single Linearly Chirped Laser Pulse THOMAS COLLINS, SVETLANA MALINOVSKAYA, Stevens Institute of Technology — The ability to manipulate ultracold atomic and molecular systems allows us to utilize their potential for use in the emerging field of quantum computing, which holds the promise of developing computing systems which operate at speeds far greater than those of conventional computers. Also, ultracold atomic and molecular systems have possible chemical applications that make it desirable to find an efficient way to control which quantum states available to the system are occupied. In this work we studied the behavior of Rubidium atoms dressed by a linearly-chirped laser pulse, modeling the quantum states of the atoms as a three level lambda system. We set as our control knobs the pulse duration, chirp parameter, field strength, and the one-photon detuning. We discovered certain sets of values for the control knobs which yielded near total transfer to the desired state and thus may be used in experimental setup.

Thomas Collins
Stevens Institute of Technology

Date submitted: 31 Jan 2011 Electronic form version 1.4