

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Control of Ultracold Collisions with Nonlinear Frequency Chirps

J.A. PECHKIS, J.L. CARINI, C.E. ROGERS III, P.L. GOULD, Department of Physics, University of Connecticut — We report on measurements of ultracold excited-state collisions between Rb atoms induced by frequency-chirped laser light. The chirps, either positive or negative, sweep over 1 GHz in 100 ns and are centered at a variable detuning below the atomic resonance. If the laser light is resonant with an attractive potential of an atom-pair at some point during the chirp, the pair is excited, potentially resulting in loss from the trap. In previous work with linear chirps,¹ we observed that at certain center detunings, the negative chirp yielded a lower collisional loss rate than the positive chirp. We attribute this suppression to the fact that the negative chirp follows the excited atom-pair trajectory and can therefore de-excite the atom-pair during the collision. In the present work, we incorporate nonlinear frequency chirps. For the negative chirp, we find a significant dependence on the details of the nonlinearity. This indicates the importance of matching the chirp to the atom-pair trajectories. This work is supported by DOE.

¹ M.J. Wright *et al.*, Phys. Rev. A **75** 051401(R) (2007)

J.A. Pechkis
Department of Physics, Univ. of Connecticut

Date submitted: 01 Feb 2008

Electronic form version 1.4