Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Effect of Pulse Asymmetry on Strongly Driven Two-Level Systems[1] C.W.S. CONOVER, R.O. WILSON, Department of Physics, Colby College — We present an experimental study of the interaction between an effective two-level system and strong radiation pulses as a function of symmetry and energy of the pulse. We have explored the behavior of the transition probability as a function of pulse area and the degree of asymmetry for Gaussian, Lorentzian and hyperbolic secant pulses. The experimental system consists of fine-structure levels of Rydberg states in alkali atoms. Raman transitions are driven through far-off-resonance intermediate states. The pulses are in the microwave regime and have high fidelity, $F \geq 0.995$, and uniform intensity. Experiments were performed with pulses that range from nearly diabatic evolution to nearly adiabatic evolution. It is shown that for highly asymmetric pulses that the population transfer is independent of pulse area.

[1]This work is supported by the National Science Foundation.

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Date submitted: 01 Feb 2005 Electronic form version 1.4