Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Robust manipulation of atomic qubits using composite pulses[1]
THOMAS HENAGE, ERICH URBAN, TODD JOHNSON, LARRY ISENHOWER, THAD WALKER, MARK SAFFMAN, University of Wisconsin — Scalable quantum computing relies on the development of techniques for robust and accurate qubit manipulation. We report on experimental progress in using composite pulses to provide accurate single qubit rotations that are insensitive to experimental errors in pulse area. The experiments use optically trapped cold Rb atoms that are manipulated by stimulated Raman transitions between hyperfine qubit states. The Raman laser system has fast amplitude and phase control electronics that allow arbitrary composite pulse sequences to be implemented at a rate of several MHz. Using this system we demonstrate the use of composite pulses for manipulation of trapped atomic qubits.

[1]This work was supported by the NSF and ARO-IARPA.

Mark Saffman
University of Wisconsin

Date submitted: 12 Feb 2008 Electronic form version 1.4