

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Non-destructive state measurement of individual neutral atoms
MICHAEL GIBBONS, CHUNG-YU SHIH, CHRIS HAMLEY, MICHAEL CHAP-
MAN, Georgia Institute of Technology — Non-destructive state detection of indi-
vidual neutral atoms is essential for scalable neutral atom quantum information
processing. We have demonstrated non-destructive fluorescent state detection of
individual neutral atom qubits trapped in an optical lattice. The hyperfine state
of the atom is measured with 95% accuracy and the atom loss rate of 1%. State
detection is performed on individual atoms over 100 times before being lost from
the trap, representing a significant increase in the data collection rates. Using this
technique, we have observed microwave Rabi oscillations with measurements done
on one-and-the-same atom.

Chung-Yu Shih
Georgia Institute of Technology

Date submitted: 04 Feb 2011

Electronic form version 1.4