

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

High-Precision Measurement of the Rydberg Constant¹ KAITLIN MOORE, GEORG RAITHEL, University of Michigan — A new spectroscopic method is proposed to couple circular Rydberg states of rubidium using lattice modulation. This excitation strategy could allow for a competitive measurement of the Rydberg constant while relying very little on the accuracy of QED calculations and being insensitive to nuclear charge distribution. The spectroscopic method requires preparing circular-state Rydberg atoms via an RF adiabatic passage method and confining prepared atoms in an optical lattice. Excitation of a two-photon electric quadrupole transition between circular Rydberg states can be accomplished through electro-optic modulation of the lattice at the microwave transition frequency between these states. Detection of the target-state population as a function of the modulation frequency can be accomplished through state-selective electric-field ionization. We discuss frequency shift corrections that will contribute to determining the Rydberg constant from this frequency, along with theoretical and experimental progress.

¹Supported by NSF, NIST

Kaitlin Moore
University of Michigan

Date submitted: 24 Jan 2013

Electronic form version 1.4