

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Millimeter Wave Spectroscopy of cold Rb Rydberg atoms¹ JIAN-ING HAN, YASIR JAMIL², PAUL TANNER, DON NORUM, T.F. GALLAGHER, University of Virginia — By using the cold ⁸⁵Rb Rydberg atoms in a magneto optical trap, we have measured the single photon ⁸⁵Rb $nd-(n-2)f$ millimeter wave transitions for $32 \leq n \leq 39$. The measurements were carried out at densities of 10^9 atoms/cm⁻³, roughly five orders of magnitude lower than those used in optical measurements. Since the 10 G/cm gradient of the trap magnetic field would result in 5 MHz wide resonances, we switched off the field during the measurements. The observed narrow resonances will be used to improve the accuracy of the f quantum defect of ⁸⁵Rb.

¹Supported by Air Force Office of Scientific Research

²Supported by HEC of Pakistan and on leave from University of Agriculture, Faisalabad

Paul Tanner
University of Virginia

Date submitted: 27 Jan 2006

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