

Abstract Submitted  
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**Single atom Rydberg spectroscopy and AC Stark shifts in two-photon excitation** ERICH URBAN, THOMAS HENAGE, LARRY ISENHOWER, University of Wisconsin, TODD JOHNSON, NIST, Boulder, THAD WALKER, MARK SAFFMAN, University of Wisconsin — We have developed an instrument that allows spectroscopy of Rydberg states to be performed on single, optically trapped atoms. Two-photon excitation of single Rb atoms is used to measure dynamic (AC) Stark shifts of the ground to Rydberg transition. The measured shifts are compared with theoretical calculations. The influence of the AC Stark shifts on the fidelity of Rydberg gate operations is discussed, and we present a simple method for canceling the Stark shifts by balancing the single photon excitation Rabi frequencies.

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