Abstract Submitted
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Fine Structure Measurements in High-L Rydberg States of Argon.[1] LAURA E. WRIGHT, ERICA L. SNOW, STEPHEN R. LUNDEEN, Dept. of Physics, Colorado State Univ., W. GREGG STURRUS, Dept. of Physics and Astronomy, Youngstown State Univ. — A Doppler-tuned CO_2 laser has been used to study n=9 to n=17 excitation transitions in high-L Rydberg states of Argon, revealing fully-resolved fine structure patterns in states with $5 \leq L \leq 8$. The experimental method is similar to that used previously to study Ba Rydberg levels[1]. A fast beam of Argon Rydberg states with $n \sim 9$ is produced by charge exchange between a 9.5 keV Ar^+ beam and a 9F Rb Rydberg target. Argon atoms excited to n=17 by the CO_2 laser are detected by Stark ionization. The measured fine structure patterns are used to deduce the dipole polarizability and quadrupole moment of the $^2P_{3/2}$ ground state of Ar^+. [1] E.L. Snow, et. al., Phys. Rev. A 71, 022510 (2005)

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