Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Focusing of Rydberg Ps atoms using an electrostatic mirror with minimal chromatic aberration[1] ADRIC JONES, J. MOXOM, H. J. RUTBECK-GOLDMAN, K. A. OSORNO, G. G. CECCHINI, M. FUENTES-GARCIA, D. J. ADAMS, R. G. GREAVES, H. W. K. TOM, A. P. MILLS, JR., Univ of California - Riverside — We present experimental measurements demonstrating the electrostatic focusing of point source of Rydberg Ps atoms to a 30 mm spot on a position sensitive detector 6 m away, using a novel mirror design that is very nearly free of chromatic aberrations. The mirror is composed of 360 wires, 1 mm in diameter, arranged to form a truncated oblate cylindrical surface. Alternating positive and negative potentials are applied to neighboring wires, producing a radial electric field $\leq 10^5$ V/m which diminishes exponentially. We see an increase in the signal rate of a factor of 7 ± 1, about 2.8 times smaller than the geometric ratio of the mirror collection area to that of the detector. This apparent deviation from the expected efficiency is understood to result from two systematic effects: (1) the angular range of excitation accessible with the UV laser bandwidth on resonance, and (2) the difficulty in producing Rydberg Ps in low-field seeking Stark states (*i.e.*, those of $k > 0$). Using a mirror of similar design with an optical quality finish, it would be possible to make a measurement of the gravitational deflection of antimatter in Earth's field to a precision of about 1%.

[1]Work supported by NSF grants PHY 1404576 & PHY 1505903

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Date submitted: 29 Jan 2017 Electronic form version 1.4