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High-Precision Measurement of the Static Dipole Polarizability of Cs with a Cold Atom Fountain

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We direct a fountain of laser-cooled Cs atoms into a static perpendicular electric field, E, and measure the increase in flight time, due to the acceleration of the atoms into the field, as a function of electric field [1]. The change in potential energy, W, equals the change in kinetic energy, where W = -1/2 alpha E^2, and alpha is the polarizability. Our result is alpha = xxxxx (xx) which makes this the most precise condensible atom polarizability yet measured. It is in agreement with Derevianko et. al [2].

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[1] J.A. Maddi, T.P. Dinneen, and H. Gould, Phys. Rev A60, 3882 (1999).

[2] A. Derevianko, W.R. Johnson, M.S. Safronova, and J.F. Babb, Phys. Rev. Lett. 82, 3589 (1999)