

Abstract Submitted  
for the DAMOP09 Meeting of  
The American Physical Society

**Direct measurement of the dwell time of spin polarized Rb atoms on coated Pyrex glass surfaces using light shift**<sup>1</sup> K.F. ZHAO, M. SCHADEN, Z. WU, Department of Physics, Rutgers University, Newark, NJ 07102 — We present a simple method for directly measuring the average dwell time of spin polarized Rb atoms on coated Pyrex glass surfaces. The method relies on the light shift of the Zeeman resonances of spin polarized Rb atoms pumped and probed by evanescent waves, and does not depend on the microscopic details of surface interactions. We use a cell whose length is adjustable between 70 and 500  $\mu m$ . The inverse of the difference in peak frequencies for  $\sigma^+$  and  $\sigma^-$  pump beams depends linearly on the cell length, from which we obtain the average dwell time  $\tau_s$ . For a Pyrex glass cell coated with octadecyltrichlorosilane (OTS) we find that  $\tau_s = 0.53 \pm 0.03 \mu s$  at a cell wall temperature of 103 °C. The temperature dependence of  $\tau_s$  is fitted to  $\tau_s = \bar{\tau}_0 \exp(E_a/kT)$ , yielding a pre-exponential factor  $\bar{\tau}_0 = (3.1 \pm 0.1) \times 10^{-9}$  s and an activation energy  $E_a = 0.18 \pm 0.3$  eV.

<sup>1</sup>We gratefully acknowledge support by the ONR (KFZ and ZW) and the NSF (MS).

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Date submitted: 20 Jan 2009

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