

Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Sorting Category: 1. (C)

Direct measurement of the dwell time of spin polarized Rb atoms on coated Pyrex glass surfaces using light shift¹

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 μm . The inverse of the difference in peak frequencies for σ^+ and σ^- pump beams depends linearly on the cell length, from which we obtain the average dwell time τ_s . For a Pyrex glass cell coated with octadecyltrichlorosilane (OTS) we find that $\tau_s = 0.53 \pm 0.03 \mu\text{s}$ at a cell wall temperature of 103 °C. The temperature dependence of τ_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.

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

Prefer Oral Session
 Prefer Poster Session

Zhen Wu
zwu@andromeda.rutgers.edu
Physics Department, Rutgers University

Date submitted: 20 Jan 2009

Electronic form version 1.4