

Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Edge enhancement in optically pumped Rb vapor¹ Z. WU, K.F. ZHAO, M. SCHADEN, Department of Physics, Rutgers University, Newark, NJ 07102 — We report the first observation of edge enhancement in optically pumped Rb vapor. We use evanescent waves to probe Zeeman polarization in the vicinity ($\sim 10^{-4}$ cm) of cell surface. Under certain experimental conditions, the magnetic resonance signal consists of two peaks localized near the cell surfaces in frequency space (edge enhancement). The excellent signal-to-noise ratio allows us to make a quantitative comparison between experimentally measured and theoretically calculated line shapes. Unlike the symmetric edge enhancement peaks observed in traditional NMR experiments, the peaks observed in the present experiment have different height owing to the fact that the evanescent beam probes only the polarization near the front surface. The asymmetry between the front and back peaks strongly depends on surface characteristics. Therefore the line shape of the edge enhanced peaks provides a sensitive way to determine surface interaction parameters of spin-polarized atoms. In particular, we are able to deduce the dwell time τ_s and the spin relaxation probability ξ_s of Rb atoms on coated Pyrex glass surfaces.

¹We 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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