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**Theoretical description of transverse measurements of polarization in optically-pumped Rb vapor cells** JOAN DREILING, University of Nebraska-Lincoln, DALE TUPA, Los Alamos National Laboratory, ERIC NORRGARD, TIMOTHY GAY, University of Nebraska-Lincoln — In optical pumping of alkali-metal vapors, the polarization of the atoms is typically determined by probing along the entire length of the pumping beam, resulting in an averaged value of polarization over the length of the cell. Such measurements do not give any information about spatial variations of the polarization along the pump beam axis. Using a D1 probe beam oriented perpendicular to the pumping beam, we have demonstrated a heuristic method for determining the polarization along the pump beam's axis. Adapting a previously developed theory [1], we provide an analysis of the experiment which explains why this method works. The model includes the effects of Rb density, buffer gas pressure, and pump detuning.

[1] E.B. Norrgard, D. Tupa, J.M. Dreiling, and T.J. Gay, Phys. Rev. A 82, 033408 (2010).

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