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Anti-Relaxation Coatings at High Magnetic Field BEN OLSEN, WILL HAPPER, Princeton University, BRIAN PATTON, DMITRY BUDKER, UC Berkeley, MIKHAIL BALABAS, S. I. Vavilov State Optical Institute — Polarized alkali metal vapors are the basis for many technologies and experiments in atomic physics such as magnetometers, atomic clocks, precision measurements and spin exchange optical pumping (SEOP). These applications all rely on long relaxation times of the populations and coherences in the vapor, and considerable effort has been spent developing techniques to extend these times. The significant relaxation due to the glass walls of vapor cells can be drastically reduced by applying a coating of organic molecules such as paraffin to the cell's interior. To study the effects of anti-relaxation coatings on alkali vapors, we measured the ground-state populations of cesium vapor in coated vapor cells at high magnetic field. In this regime, each ground-state sublevel population can be individually measured with a weak D1 ($S_{1/2} \rightarrow P_{1/2}$) laser while a stronger D2 ($S_{1/2} \rightarrow P_{3/2}$) laser depopulates a single sublevel. We physically translated the probe beam to measure the populations at different distances from the wall of the vapor cell, over a range of pump laser frequencies. We also measured the longitudinal relaxation rates of the cesium populations in the coated vapor cells by monitoring absorption of the probe while modulating the pump laser intensity.

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