

Abstract Submitted  
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**Progress towards atomic magnetometry below room temperature.** ALEXANDER SUSHKOV, DMITRY BUDKER, UC Berkeley — We are working towards obtaining ultra-narrow magneto-optical resonance lines with a vapor of paramagnetic atoms in a high-density buffer gas. Such ultra-narrow lines are used in a number of precision experiments and devices, such as an atomic magnetometer. Laser ablation of sub-millimeter diameter wires, as well as bulk targets, has been used to produce atomic vapor of a number of paramagnetic atoms: silver, gold, lithium, and rubidium. Vapor densities of  $10^{11} \text{ cm}^{-3}$  are achieved in helium buffer gas (helium density on the order of  $10^{18} \text{ cm}^{-3}$ ) at temperatures between 30 K and 295 K. Vapor lifetimes in excess of 100 ms are observed. The techniques of optical pumping and non-linear magneto-optical rotation can now be applied to these paramagnetic atoms at temperatures far lower than those needed to maintain an appreciable saturated vapor pressure necessary for vapor cell-based experiments.

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