

Abstract Submitted
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Polarization spectroscopy and laser-locking for excitation of ultracold potassium atoms¹ CHARLES CONOVER, MAX EBERHART, PHILIP ADAMSON, Colby College Department of Physics — We report on the use of polarization spectroscopy to lock the frequency of an external-cavity diode laser to a the $4s - 4p_{1/2}$ (770 nm), $4s - 4p_{3/2}$ (767 nm) and $4s - 5p_{1/2}$ and $4s - 5p_{3/2}$ (405 nm) transitions in potassium. A rate equation model is in good agreement with the observed lineshapes and the D2 transition lineshapes agree with prior experiments. We have used the dispersion shaped lines to lock the frequency of lasers for probing a magneto-optical trap's density on the D1 line and for stepwise excitation of potassium Rydberg states using the $4s - 5p_{3/2}$ transition. The technique has proven particularly helpful by enabling modulation-free locking of blue diode lasers.

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Charles Conover
Colby College Department of Physics

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