

Abstract Submitted  
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**Two-Step Dichroic Atomic Vapor Laser Lock Using Electromagnetically Induced Transparency and Absorption**<sup>1</sup> FRANCISCO E. BECERRA, RICHARD T. WILLIS, STEVEN L. ROLSTON, LUIS A. OROZCO, Joint Quantum Institute, Department of Physics, University of Maryland, and National Institute of Standards and Technology, College Park, MD, U. S. A. — We demonstrate a technique to lock the frequency of a laser to a two-photon transition of Rb vapor in the presence of a weak magnetic field. We use a ladder configuration from specific hyperfine sublevels of the  $5S_{1/2}$ ,  $5P_{3/2}$ , and  $5D_{5/2}$  levels. This transition shows Electromagnetically Induced Transparency and Absorption processes. The error signal comes from the difference in the transparency or absorption felt by the two orthogonal polarizations of the probe beam. A simplified model is in good quantitative agreement with the observed signals for the experimental parameters. We have used this technique to lock the frequency of the laser up to 1.5 GHz off atomic resonance.

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