

Abstract Submitted  
for the OSF05 Meeting of  
The American Physical Society

**Elementary laboratory for determination of the Faraday rotation in Rubidium-85 vapor** BRIAN HAMILTON, BRANDON LATRONICA, MICHAEL CRESCIMANNO, Youngstown State University, Physics Department — The Faraday effect is the optical rotation of the polarization of light in passing through an amorphous material partially ordered by an external (usually magnetic) field [1]. For small fields and low light intensities this rotation is nearly linear with the applied magnetic field and was first observed in metallic vapors more than 100 years ago by Macaluso and Corbino [2]. The non-linear relatives of this effect figure prominently in the modern designs of high sensitivity magnetometers [3]. We describe the construction and data from a minimally expensive, student-friendly version of that original experiment. Features of our implementation include a very low cost linux data acquisition system, “found” optical elements and the reuse of an anisotropic magnetoresistance sensor (from a non-functioning disk drive).

[1] Faraday, M., 1846, Philos. Trans. R. Soc. London XIX, Faraday, M., 1846, Philos. Mag. 28, 294., Faraday, M., 1855, Experimental Researches in Electricity, Vol. III (Taylor, London).

[2] D. Macaluso and O. M. Corbino, Nuovo Cimento, 8, 257 (1898), *ibid*, 9, 384 (1899).

[3] See for example, “Nonlinear Electro- and Magneto-Optic Effects related to Bennett Structures,” by D. Budker, D. F. Kimball, S. M. Rochester, and V. V. Yashchuk, to be published.

Michael Crescimanno  
Youngstown State University

Date submitted: 30 Sep 2005

Electronic form version 1.4