MNO - Nonlinear Spectroscopy and Magneto-Optics

Signature Sheet

Student's Name _____ Partner's Name _____

Pre-Lab Discussion Questions

It is your responsibility to discuss this lab with an instructor before your first day of your scheduled lab period. This signed sheet must be included as the first page of your report. Without it you will lose grade points. You should be prepared to discuss at least the following before you come to lab:

1. Briefly describe the principle of operation of an external-cavity diode laser.
2. What is a confocal Fabry-Perot spectrum analyzer? See the appendix on Spherical mirror Fabry-Perot. Define the following terms: free spectral range, finesse, and longitudinal and transverse modes. How do we achieve frequency tuning of the analyzer?
3. What are the main mechanisms of spectral line broadening? Explain how it is possible to eliminate Doppler broadening using saturation spectroscopy.
4. What are Faraday rotation and the Macaluso-Corbino effect? What is it that is nonlinear in the nonlinear Faraday effect?
5. What are the safety requirements for working with this Laser?

Staff Signature _____ Date _____

Completed before the first day of lab? (Circle one) Yes / No

Mid-Lab Discussion Questions

By the third day of the lab:

1. Demonstrate to a staff member your experimental plots of laser-induced fluorescence and Doppler-free absorption.
2. Explain which features of your scans arise due to isotope shift and hyperfine structure.

Staff Signature _____ Date _____

Completed by day 3 of lab? (Circle one) Yes / No

Checkpoint Signatures

1. Optical Setup

   Staff Signature _____

2. Laser Beam Size and Shape

   Staff Signature _____

3. Frequency Range Scan

   Staff Signature _____

4. Vapor Cell

   Staff Signature _____

5. Earth's Magnetic Field

   Staff Signature _____