Lab 4: Interferometry

EQUIPMENT

INCLUDED:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
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<td>Pasco Precision Interferometer</td>
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<td>Metrologic Neon Laser</td>
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<tr>
<td>1</td>
<td>Screwdriver</td>
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EXPERIMENT OBJECTIVES

This experiment contains several parts. Where this document differs from the manual, this document will take priority.

Note that this experimental setup is incredibly precise and very sensitive to all movements. Tapping on the table or even breathing over the setup will affect your results. There are many optical elements involved and you should clean all components before taking data.

CAUTION: Do not look into the laser or point it at other people (and watch out for reflections).

For setup: Please follow the instructions in the lab manual. Keep in mind that you will not see interference patterns until the alignment of the system is nearly perfect; this will take some time.

Experiment 1: Introduction to Interferometry
1. Follow Parts 1 and 2 of the experiment including the subsequent analyses using the Michelson Interferometer setup.
2. Repeat Part 1 but this time use the Fabry-Perot Interferometer setup.
   Include your analyses of Parts 1 and 2 and answer the corresponding questions in your lab report.

Experiment 2: Index of Refraction of Air
Follow the procedure given in the lab manual. Include your analysis and answer the corresponding questions in your lab report.

Experiment 3: The Index of Refraction of Glass
Follow the procedure given in the lab manual. Include your data analysis in your lab report.
Derive the equation for the index of refraction of glass (the last equation under step 2).

You do not need to do the suggested additional experiments.

For your lab report: Discuss in detail the theory behind this experiment including the wave nature of light and interference. Also, discuss the designs and functions of the various types of interferometer setups.