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HeNe Laser Outline

The objective of the first lab session is to develop procedures in setting up the experiments from the lab manual. Getting a basic understanding of the steps needed to be taken in order to produce **good** data. We will attempt to gather all the data from one session, since most of the tasks seem quick enough, however we may end up taking beam radius measurements for the next session.

Setup: (Transverse Laser Modes)

- Image all components in the system
- Place and adjust mirror to produce laser (long)
- Make adjustments to placement and image TEM modes (quick)
- Open close Brewster windows, observe

Mirror Curvature: (quick)

- Using planar mirror, determine the ROC for fixed cavity mirror (develop procedure)
- Compare actual cavity stability to theoretical stability
- Consider replacing ROC mirror with convex mirror (calculate stability)

Polarization: (quick)

- Check polarization direction (develop procedure)
- Explain polarization of TEM modes

Spectral Output: (quick)

- Use the monochromator to measure spectrum of light from outside the cavity (between 580 nm and 640 nm)
- Use the monochromator to measure spectrum of light from inside the cavity (same range)
- Compare

Beam Radius Measurement:

- Place wire between mirror and iris, move through beam
- Align mirrors to see TEM_10 TEM_20 modes (CHECK WITH TA)
- Translate wire through beam, measuring position for each TEM mode occurring (long)
- Use camera to take images of TEM_00,10,20 modes
- Determine beam radius at each location of the wire (long)
- Calculate theoretical beam profile using ROC's determined earlier
- Compare the theoretical beam profile to the experimentally determined profile