

Opti 380A – Intermediate Optics Lab I – Fall 2009

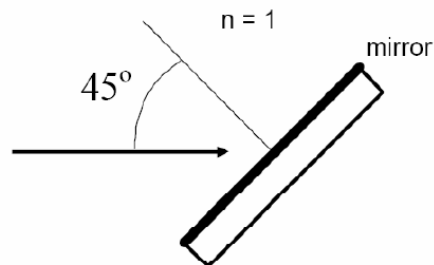
Post-Lab Questions for Lab 8: Interference

Post-lab questions are due at the beginning of lecture on the Monday following your lab.

1.) Starting by rearranging Eq. (8.5), derive Eq. (8.6) in the Lab 8 – Procedures document.

2.) A plane wave illuminates a mirror in air as shown below. Assume a perfect mirror (no phase shifts on reflection). Polarization is out of the drawing plane.

- a.) If $\lambda = 500\text{nm}$, what is the orientation of the resulting fringe pattern? (Show your answer pictorially with a simple drawing of the mirror.)
- b.) What is the minimum spacing between fringe planes?
- c.) How does the fringe pattern change if the mirror is immersed in water? ($n = 1.33$)



3.) A point source is placed distance c above a mirror surface, as shown below. Light reflected from the mirror exhibits a π phase change.

- a.) If $\lambda = 500\text{ nm}$ and $c = 1\text{ }\mu\text{m}$, plot the fringe field (plots of maximum irradiance at the center of bright fringes) in the plane of the drawing.
- b.) Indicate the direction of power flow on the diagram in (a).
- c.) If the separation between the mirror and the point source increases, do the number of fringes increase or decrease? Justify your answer.

