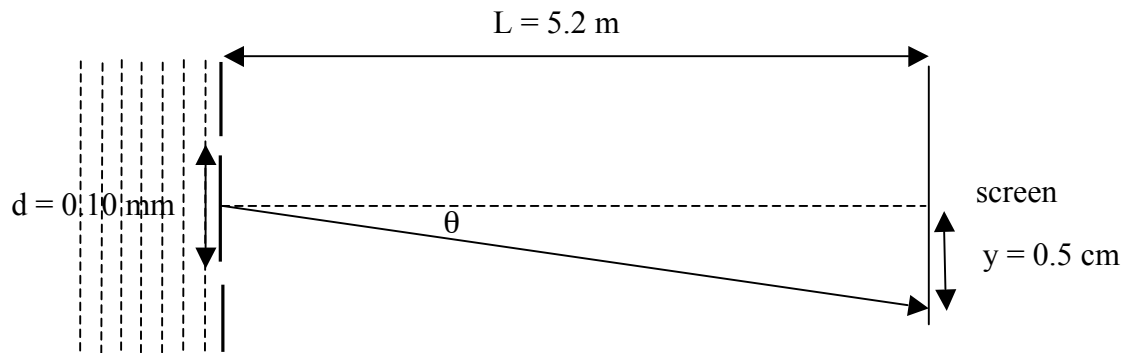


Consider the interference pattern from two identical slits equally illuminated by coherent light of a wavelength $\lambda = 450 \text{ nm}$ and separated by a distance $d = 0.10 \text{ mm}$. A screen is placed at a distance $L = 5.2 \text{ m}$ away from the slits. We are interested in the intensity of the light at position $y = 0.5 \text{ cm}$ on the screen.



- [3 points] Calculate the angle θ . Are you justified to use the small angle approximation?
- [5 points] Calculate the phase shift between the two sources arriving at the same point y on the screen. What approximation are you using?
- [7 points] Draw the phasor diagram for the addition of the waves. What is the ratio of the intensity at point y to the intensity at the center of the screen?
- [5 points] If the distance between slits d is doubled what happens to the phase shift? What happens to the interference pattern? (The pattern stretches/shrinks by a factor of _____.)