

PHYS 2C

Discussion Section – 3/04

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Before we Begin:

- Try and **sit next to a student you don't know**
- Introduce yourselves and find out where the other student is from
- **Quick Review** followed by solving **3 Problems** today

Discussion Problem 1

Double-Slit Experiment

Find the slit separation of a double-slit arrangement, that will produce interference fringes 0.018 rad apart on a distant screen, when the light used has a frequency of 509THz . Give your answer in μm

Discussion Problem 1 - Solution

Double-Slit Experiment

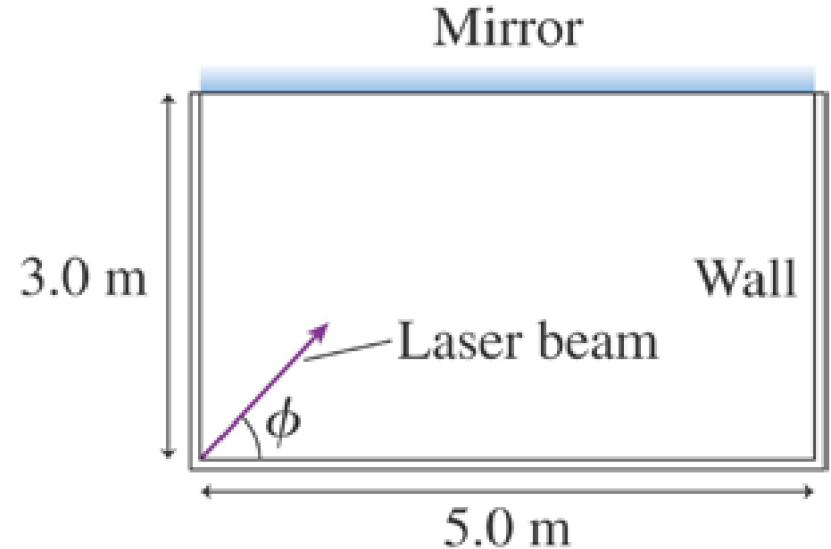
Find the slit separation of a double-slit arrangement, that will produce interference fringes 0.018 rad apart on a distant screen, when the light used has a frequency of 509THz. Give your answer in μm

32.72 μm

Discussion Problem 2

Ray Optics

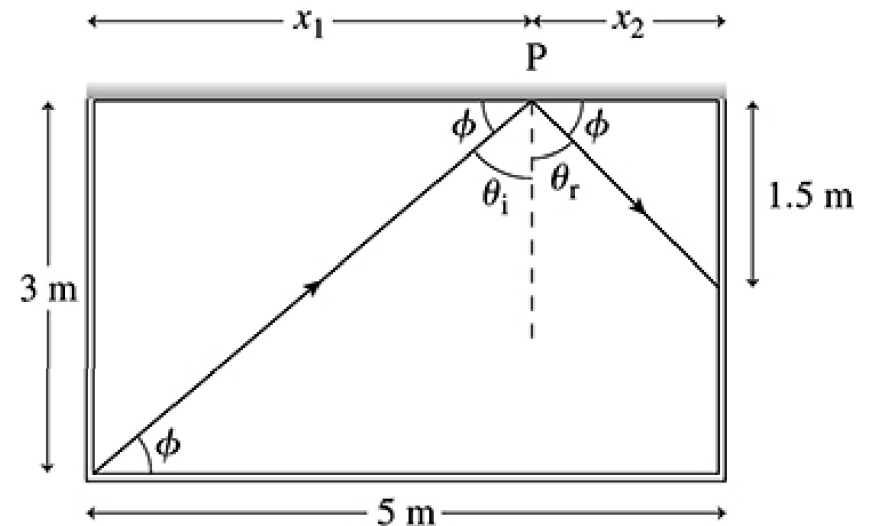
At what angle ϕ should the laser be aimed at the mirrored ceiling in order to hit the midpoint of the far wall on the right?



Discussion Problem 2 - Setup

Ray Optics

At what angle ϕ should the laser be aimed at the mirrored ceiling in order to hit the midpoint of the far wall on the right?

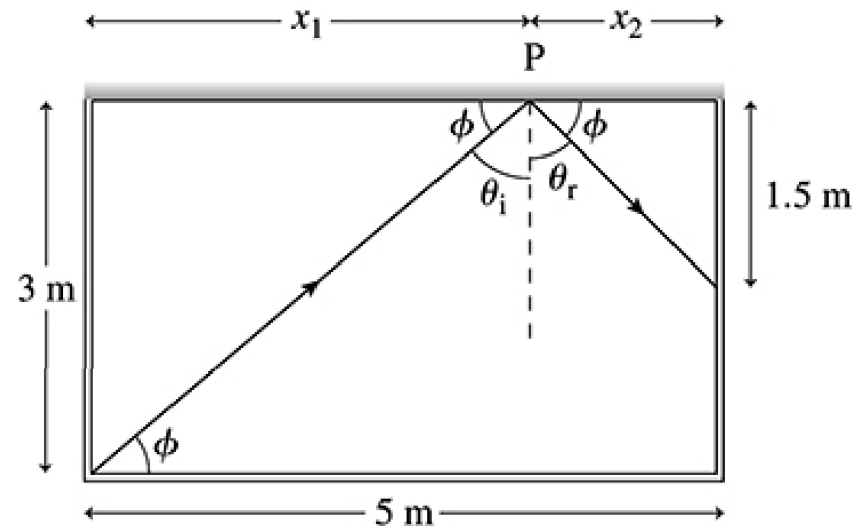


Discussion Problem 2 - Solution

Ray Optics

At what angle ϕ should the laser be aimed at the mirrored ceiling in order to hit the midpoint of the far wall on the right?

41.98° ($\approx 42^\circ$)

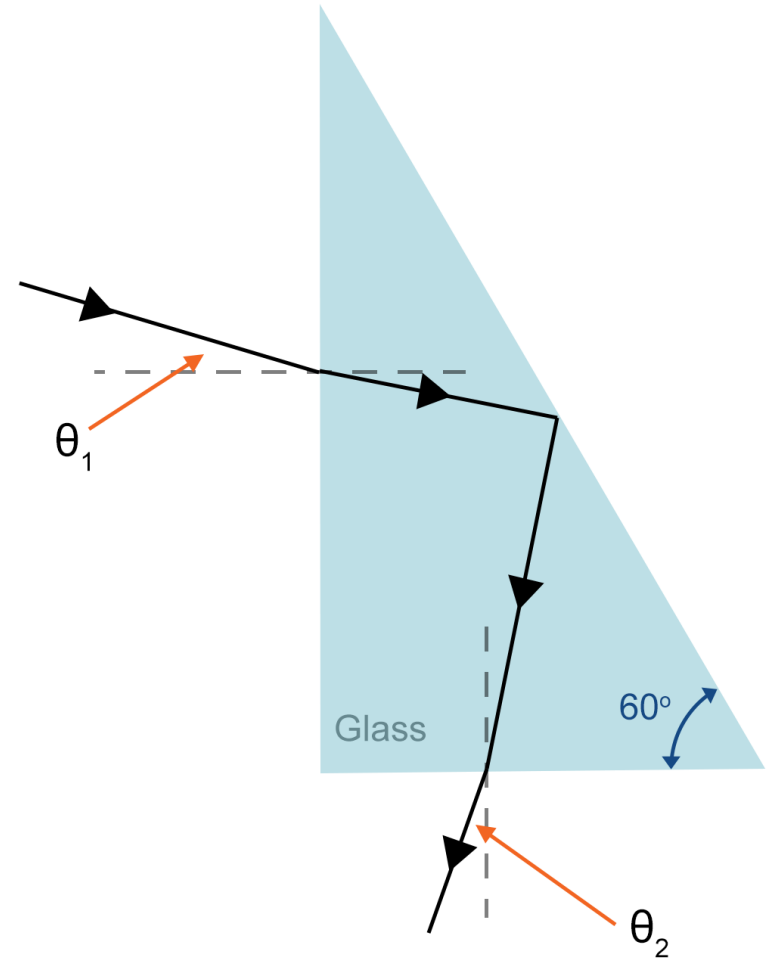


Discussion Problem 3

Ray Optics - Harder

$$(n_{\text{glass}} = 1.50, n_{\text{air}} = 1.0)$$

- 1) What is the smallest incident angle θ_1 for which a laser beam will undergo total internal reflection on the hypotenuse of the glass prism shown?
- 2) At what angle θ_2 does the ray exit, for the smallest θ_1 ?

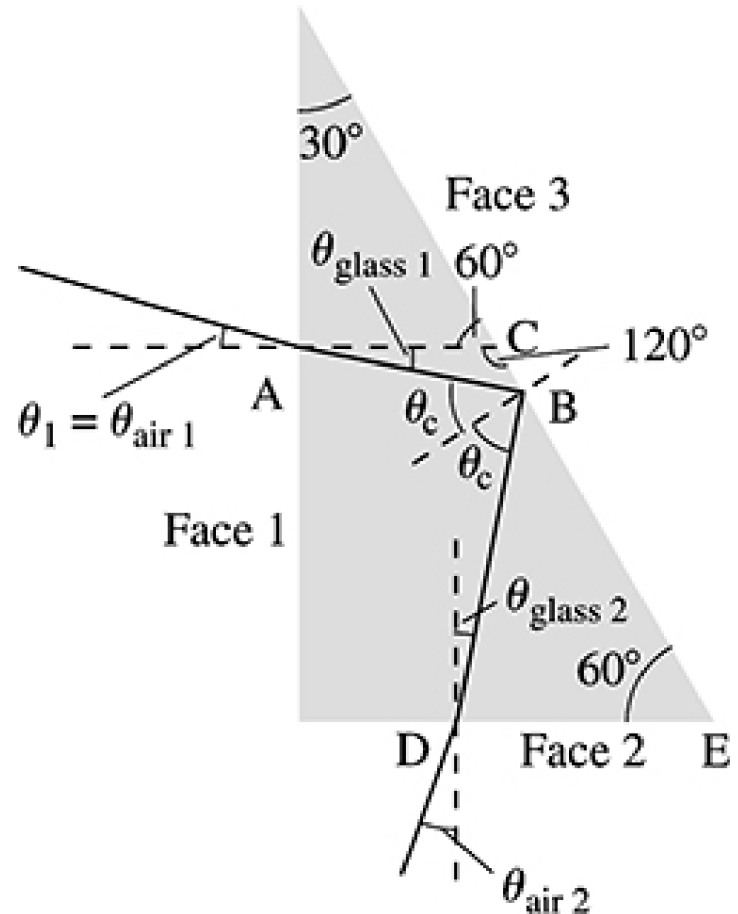


Discussion Problem 3 - Setup

Ray Optics - Harder

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- 1) What is the smallest incident angle θ_1 for which a laser beam will undergo total internal reflection on the hypotenuse of the glass prism shown?
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Discussion Problem 3 - Solution

Ray Optics - Harder

$$(n_{\text{glass}} = 1.50, n_{\text{air}} = 1.0)$$

- 1) What is the smallest incident angle θ_1 for which a laser beam will undergo total internal reflection on the hypotenuse of the glass prism shown?

$$\theta_1 = 17.88^\circ \approx 17.9^\circ$$

- 1) At what angle θ_2 does the ray exit?

$$\theta_2 = 27.9^\circ$$

