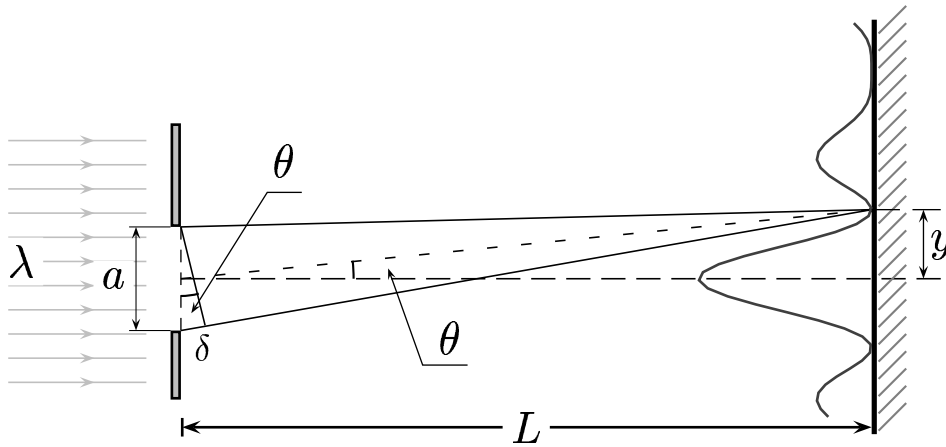


Consider a single slit experiment. Use small angle approx. $\theta \approx \frac{\delta}{a} \approx \frac{y}{L}$.



Estimate angle θ at first minimum, for $a = 0.5 \text{ mm}$, $\lambda = 500 \text{ nm}$, $L = 10 \text{ m}$.

- A) $\theta = 10^{-2}$.
- B) $\theta = 0.5 \times 10^{-2}$.
- C) $\theta = 10^{-3}$.
- D) $\theta = 0.5 \times 10^{-3}$.

$$\frac{I(\beta)}{I(0^\circ)} = \frac{\sin^2\left(\frac{\beta}{2}\right)}{\left(\frac{\beta}{2}\right)^2}, \quad \beta = k \delta.$$

The first minimum occurs at $\beta = 2\pi$, or $\delta = \lambda$. So $\theta \approx \frac{\delta}{a} = \frac{500 \times 10^{-9}}{0.5 \times 10^{-3}} =$

10^{-3} .

Answer **C**.

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