

22.5. Model: Two closely spaced slits produce a double-slit interference pattern.

Visualize: The interference pattern looks like the photograph of Figure 22.3(b).

Solve: The dark fringes are located at positions given by Equation 22.9:

$$y'_m = \left(m + \frac{1}{2}\right) \frac{\lambda L}{d} \quad m = 0, 1, 2, 3, \dots$$

$$\Rightarrow y'_5 - y'_1 = \left(5 + \frac{1}{2}\right) \frac{\lambda L}{d} - \left(1 + \frac{1}{2}\right) \frac{\lambda L}{d} \Rightarrow 6.0 \times 10^{-3} \text{ m} = \frac{4\lambda(60 \times 10^{-2} \text{ m})}{0.20 \times 10^{-3} \text{ m}} \Rightarrow \lambda = 500 \text{ nm}$$