

Related Problems

A monochromatic light with a wavelength of $\lambda = 600 \text{ nm}$ passes through a single slit which has a width of 0.800 mm . (a) What is the distance between the slit and the screen be located if the first minimum in the diffraction pattern is at a distance 1.00 mm from the center of the screen? (b) Calculate the width of the central maximum.

Solutions:

(a) The general condition for destructive interference is

$$\sin \theta = m \lambda / a \quad m = \pm 1, \pm 2, \pm 3 \dots\dots\dots$$

(b) For small θ , we employ the approximation $\sin \theta \approx \tan \theta = y / L$, which yields $y \approx m L \lambda / a \approx 14-15$

The first minimum corresponds to $m = 1$.