

Single & double-slit interference

Single-slit: Location of the center of the dark fringes (CDI):

$$y_l = \frac{l\lambda D}{na}, \quad l = \pm 1, \pm 2, \pm 3 \dots$$

Double-slit: Location of the center of the bright fringes (CCI):

$$y_m = \frac{m\lambda D}{nd}, \quad m = 0, \pm 1, \pm 2, \pm 3 \dots$$

where

n = index of refraction

λ = wavelength in a vacuum

a = slit width

d = slit separation

D = distance from the slit(s) to the screen

Single & double-slit interference

Intensity:

$$I = 4I_0 \left(\frac{\sin \beta}{\beta} \right)^2 \cos^2 \alpha$$

$$\alpha = \frac{\pi n d y}{\lambda D}, \quad \beta = \frac{\pi n a y}{\lambda D}$$

where

n = index of refraction

λ = wavelength in a vacuum

a = slit width

d = slit separation

D = distance from the slit(s) to the screen

I_0 = intensity of light beam before passing through slits