

HW 8 extra problems

A. Consider a plane wave with wavelength λ incident normally on a screen with a circular aperture of radius a . The point of observation is directly opposite the center of the aperture at a distance of $r_0 = 2a^2/\lambda$ from the screen ($r_0 \gg \lambda$).

- a) How many Fresnel zones are contained in the aperture as seen from the observation point?
- b) Draw the vibration curve and the phasor corresponding to this case.
- c) What is the intensity at the observation point in terms of the intensity with the screen absent?

B. Draw the Cornu spiral. Consider a long slit that contains one Fresnel zone. Discuss and show how you would use the Cornu spiral to find the intensity at a point directly opposite the slit. How does this intensity compare with that from a slit that contains two Fresnel zones?

Other PRACTICE problems (no need to turn in; will not be graded)

Hecht: 10.72, 10.74, 10.76, 10.81, 10.84, 10.92