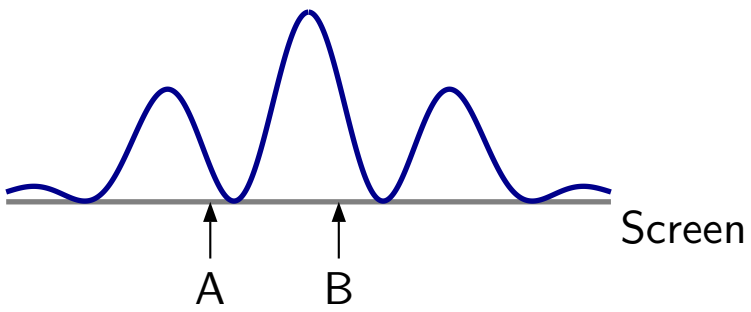
Question 1

Photons are fired toward a screen. The intensity of the interference pattern as predicted by wave optics is as illustrated. Consider the two illustrated locations.



Which of the following is true?

1. Photons will never arrive at A but will sometimes arrive at B.
2. Photons will never arrive at B but will sometimes arrive at A.
3. Photons could arrive at either A or B; they are more likely to arrive at A.
4. Photons could arrive at either A or B; they are more likely to arrive at B.
5. Photons will always arrive at B.

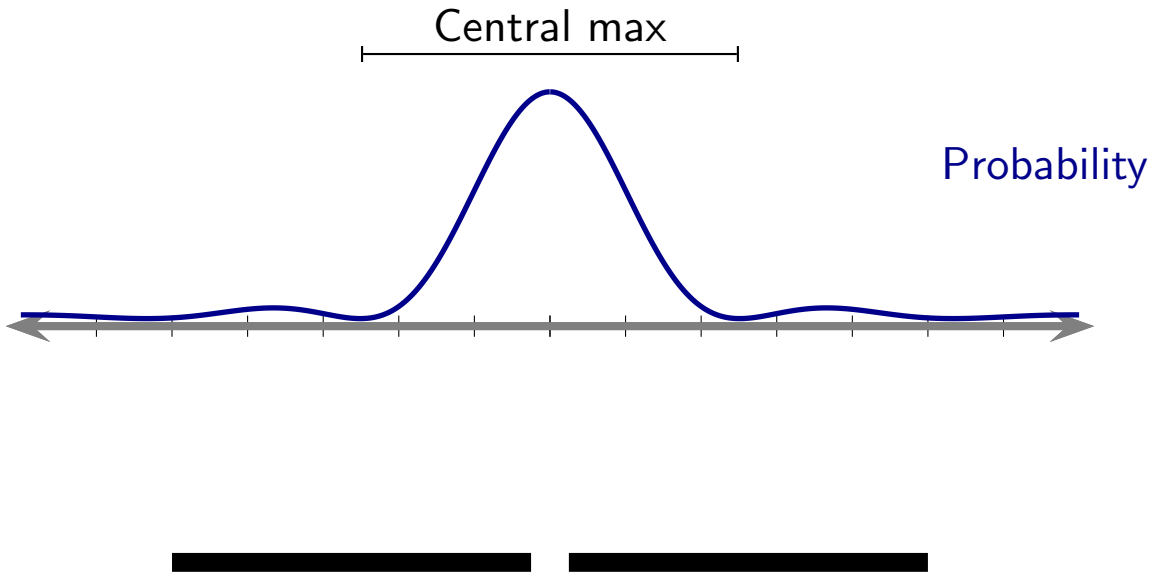
Single Slit Pattern

Single slit interference pattern.

$$I = I_{\max} \left(\frac{\sin \alpha}{\alpha} \right)^2$$

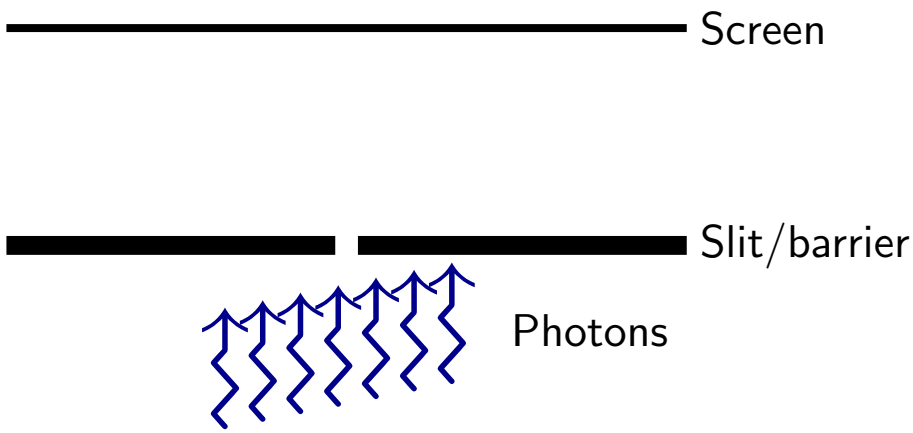
where

$$\alpha = \frac{\pi a}{\lambda} \sin \theta.$$



Question 2

In a single slit photon experiment, the distribution of most likely locations of arrival is centered above the slit.



Suppose that the slit width is decreased. What happens to the width of the distribution of most likely arrival locations when the slit width is decreased?

1. It stays the same.
2. It decreases.
3. It increases.