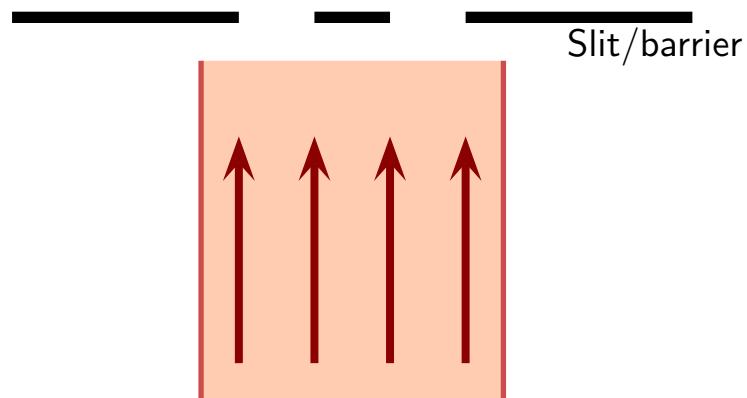


Question 1

Very low intensity light travels toward a double slit arrangement. The beam of light is wide enough to cover both slits. One detector is placed just beyond each slit. A pulse of light containing exactly one photon is created. Suppose that this photon is detected in the left detector.



Another identical pulse is created and this arrives at a detector. Which of the following is true?

1. The photon will definitely be detected by the right detector.
2. The photon will definitely be detected by the left detector.
3. The photon may be detected by one of the detectors but it is uncertain which.

Question 2

A pulse of light containing exactly 4000 photons is fired toward a screen that contains a small detector at one location. The number of photons that arrive at the detector is 1600.

Which of the following is true about the probability of arrival of any single photon at that detector?

1. Prob = 4000
2. Prob = 1600
3. Prob = 2.5
4. Prob = 1.0
5. Prob = 0.40
6. Prob = 0.25

Question 3

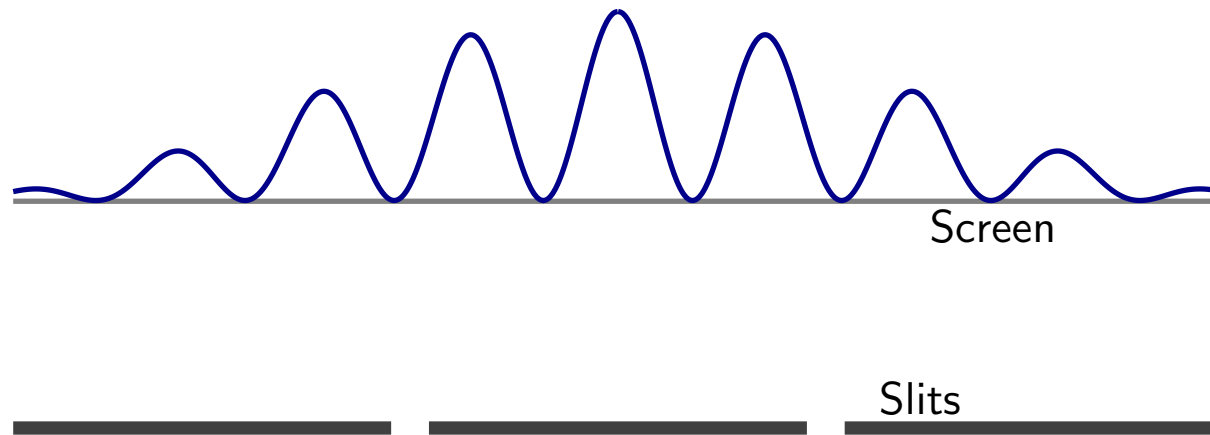
A pulse of light containing exactly 4000 photons is fired toward a screen that contains a small detector at one location. The probability of arrival of a single photon at the detector is 0.20.

Which of the following is true about the number of photons that are expected to arrive at that detector?

1. Number = 0.20
2. Number = 1
3. Number = 80
4. Number = 800
5. Number = 4000

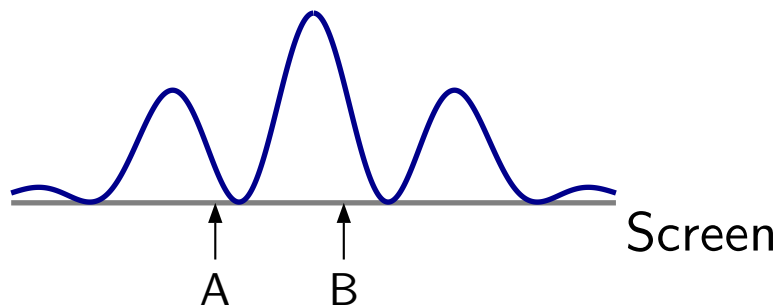
Photon Interference: Double Slits

Probability of arrival of photons at various screen locations.



Question 4

Photons are fired toward a screen. The probability distribution for arrival at various locations is as illustrated. Consider the two illustrated locations.

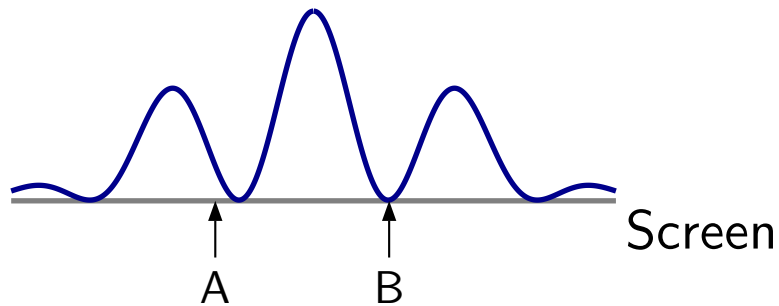


Which of the following is true?

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.

Question 5

Photons are fired toward a screen. The probability distribution for arrival at various locations 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.