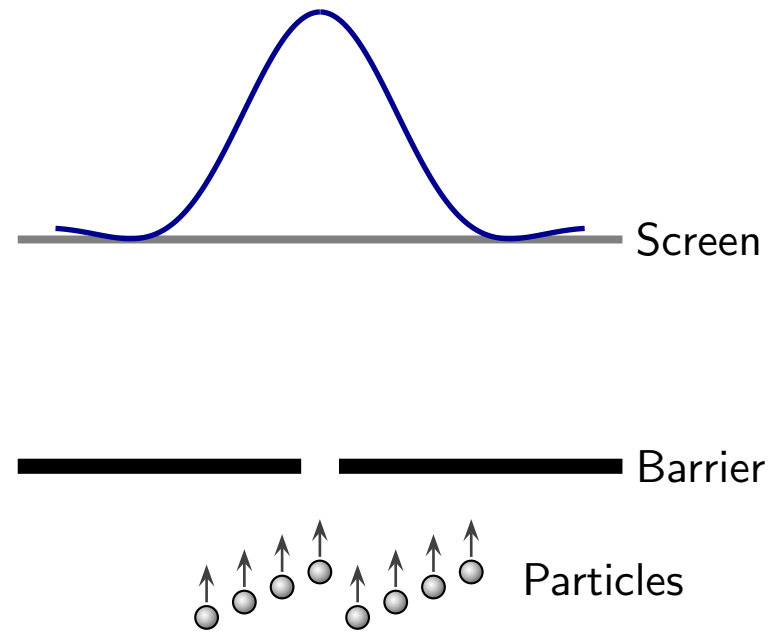
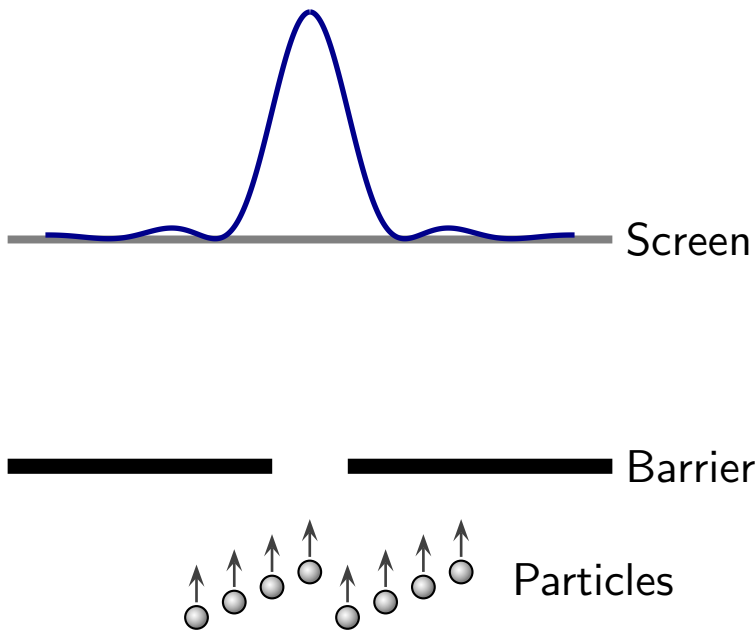


# Particles Passing Through Single Slits with Different Widths

Probability of arrival of particles at various screen locations.



# Question 1

An electron and a neutron move with exactly the same velocity.

Which of the following is true regarding their wavelengths?

1. Their wavelengths are the same.
2. The electron has a larger wavelength than the neutron.
3. The electron has a smaller wavelength than the neutron.

## Question 2

A partial energy level diagram for a system is as illustrated. The energies are in units of  $10^{-19}$  J.

$$E_3 = 9.0 \text{ —————}$$

$$E_2 = 5.0 \text{ —————}$$

$$E_1 = 2.0 \text{ —————}$$

Which of the following are possible energies of any single photon that this atom could emit (all in units of  $10^{-19}$  J)? Ignore any other energy levels that the atom may have.

1. Only 2.0
2. Only 3.0
3. Only 4.0
4. Either 3.0 or 4.0
5. Either 3.0 or 4.0 or 7.0
6. Either 2.0 or 5.0 or 9.0

## Question 3

A partial energy level diagram for a system is as illustrated. The energies are in units of  $10^{-19}$  J.

$$E_3 = 8.0 \text{ —————}$$

$$E_2 = 4.0 \text{ —————}$$

$$E_1 = 2.0 \text{ —————}$$

Which jump results in emission of light with the lowest frequency?

1.  $1 \rightarrow 2$
2.  $2 \rightarrow 1$
3.  $3 \rightarrow 1$
4.  $1 \rightarrow 3$
5.  $3 \rightarrow 2$