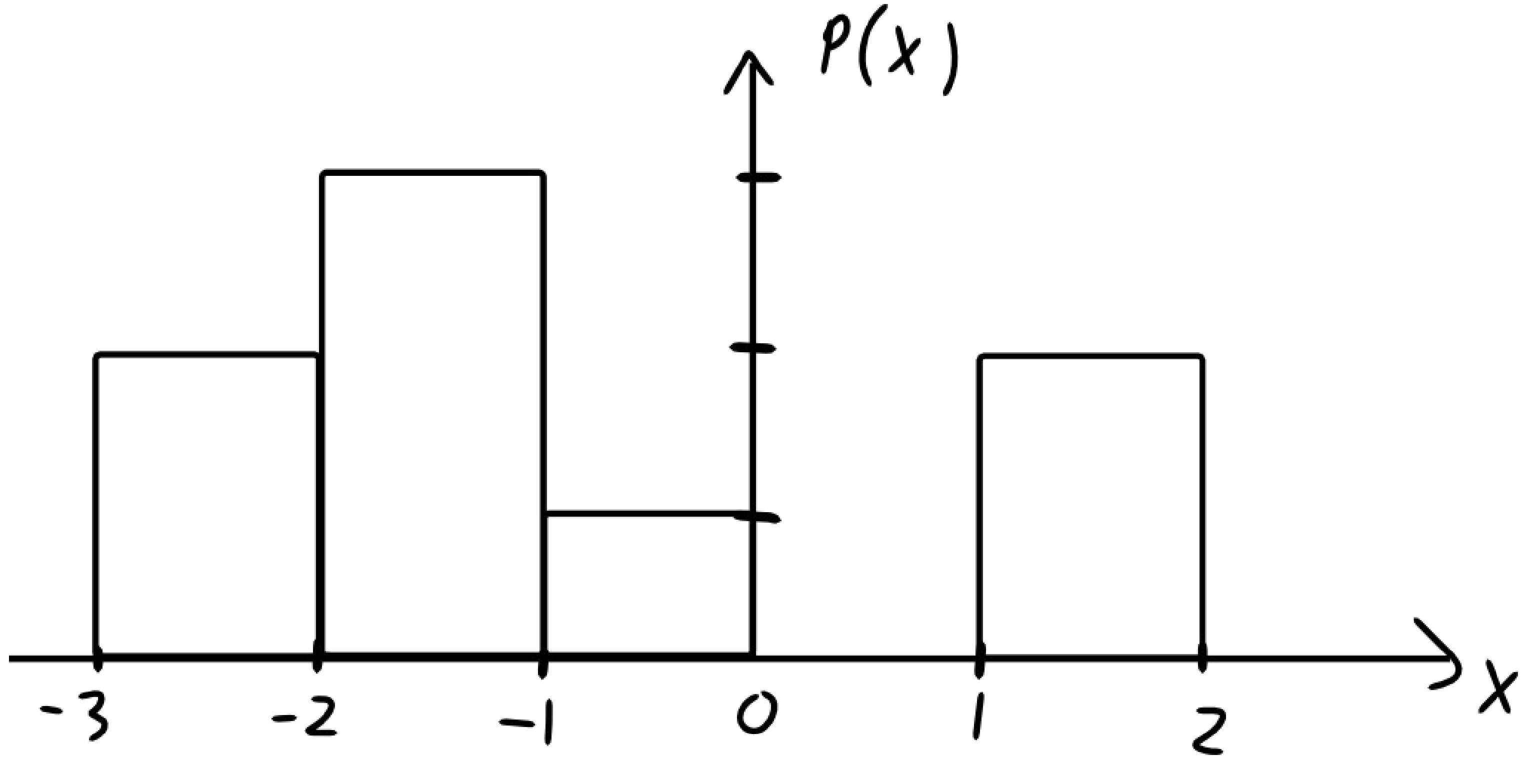
The curve below represents the probability density as a function of x for a photon in some quantum state. What is the probability that the photon will be found between x=1 and x=2?



A) 2

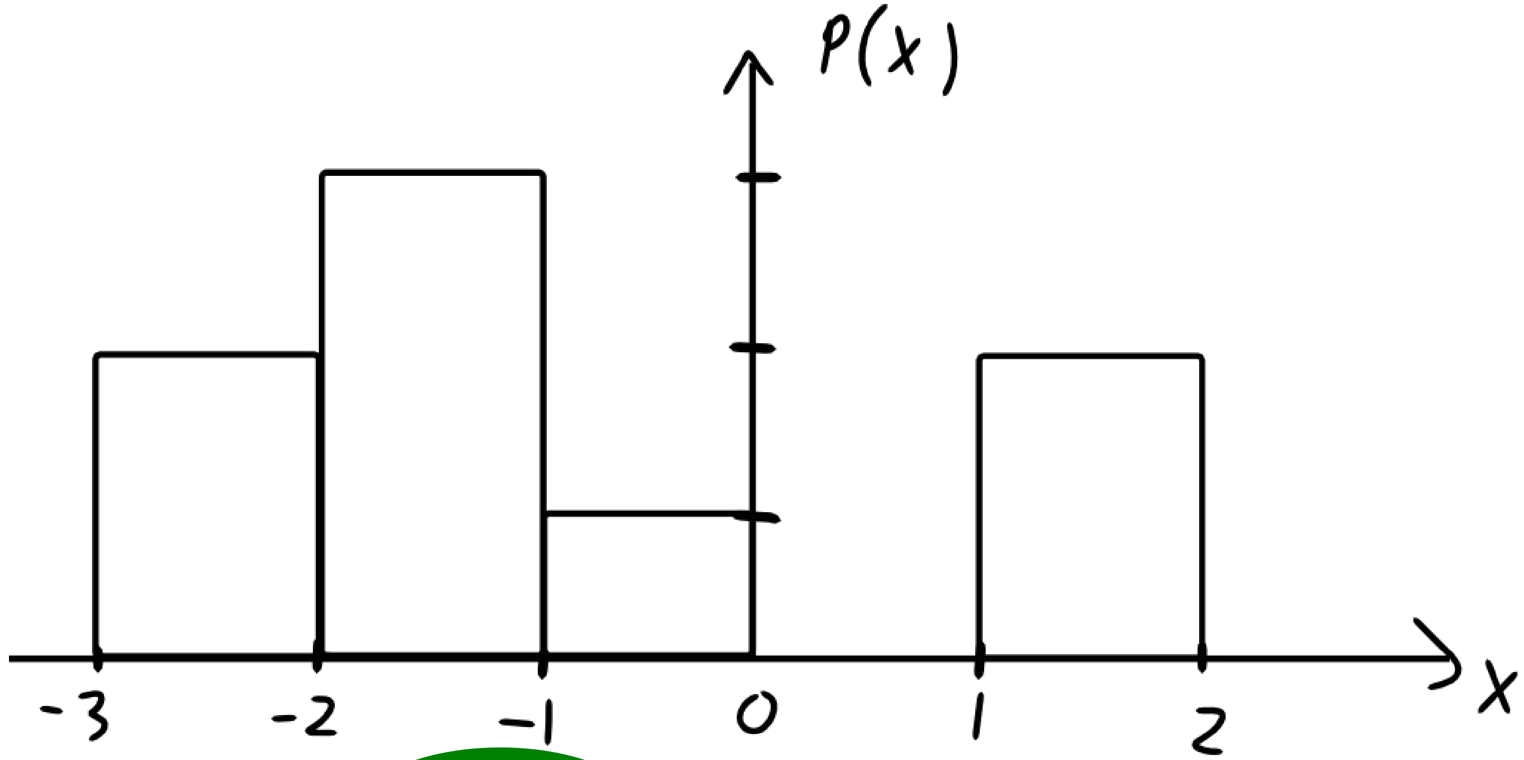
B) 1/4

C) 1/3

D) 0

E) 1/2

The curve below represents the probability density as a function of x for a photon in some quantum state. What is the probability that the photon will be found between x=1 and x=2?



A) 2

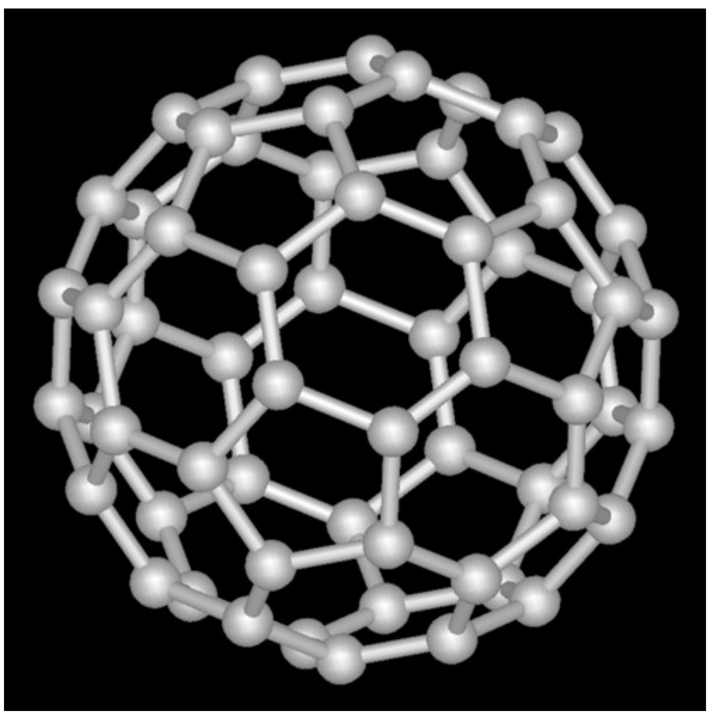
B) 1/4

C) 1/3

D) 0

E) 1/2

Interference pattern
from passing C_{60} (buckyball)
molecules, one at a time,
through a grating
(a bunch of slits)



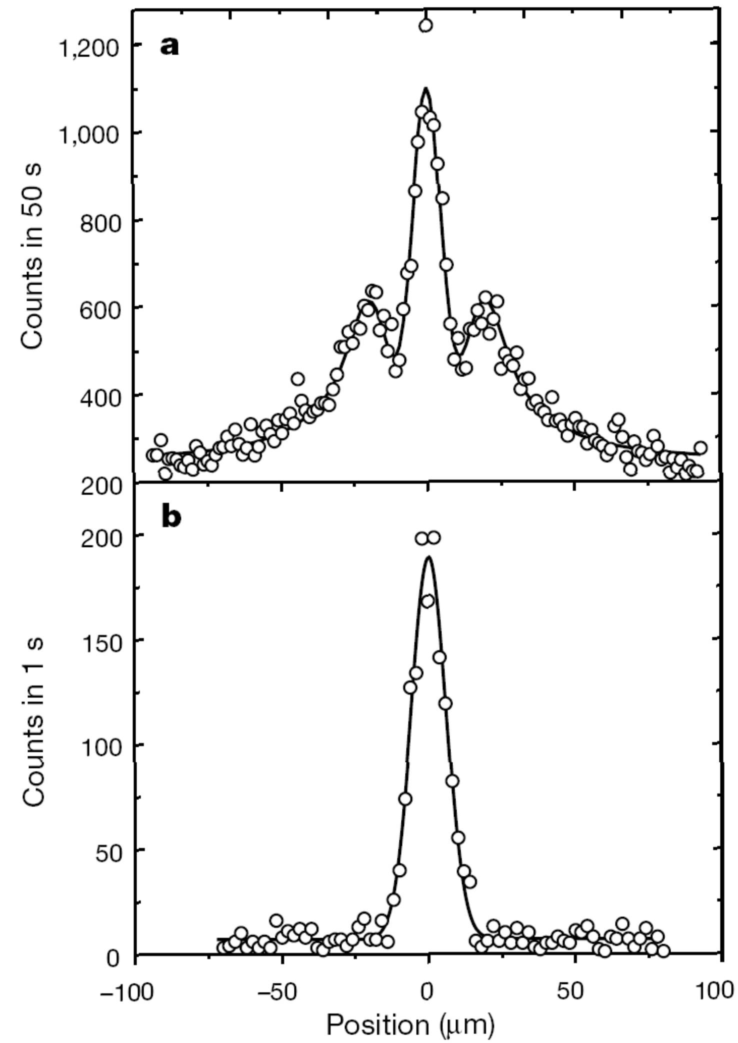


Figure 2 Interference pattern produced by C_{60} molecules. **a**, Experimental recording (open circles) and fit using Kirchhoff diffraction theory (continuous line). The expected zeroth and first-order maxima can be clearly seen. Details of the theory are discussed in the text. **b**, The molecular beam profile without the grating in the path of the molecules.

What happens to the interference pattern if we double the momentum of the electrons?

A) Nothing

B) It gets brighter

C) The fringes get closer together

D) The fringes get further apart

What happens to the interference pattern if we double the momentum of the electrons?

A) Nothing

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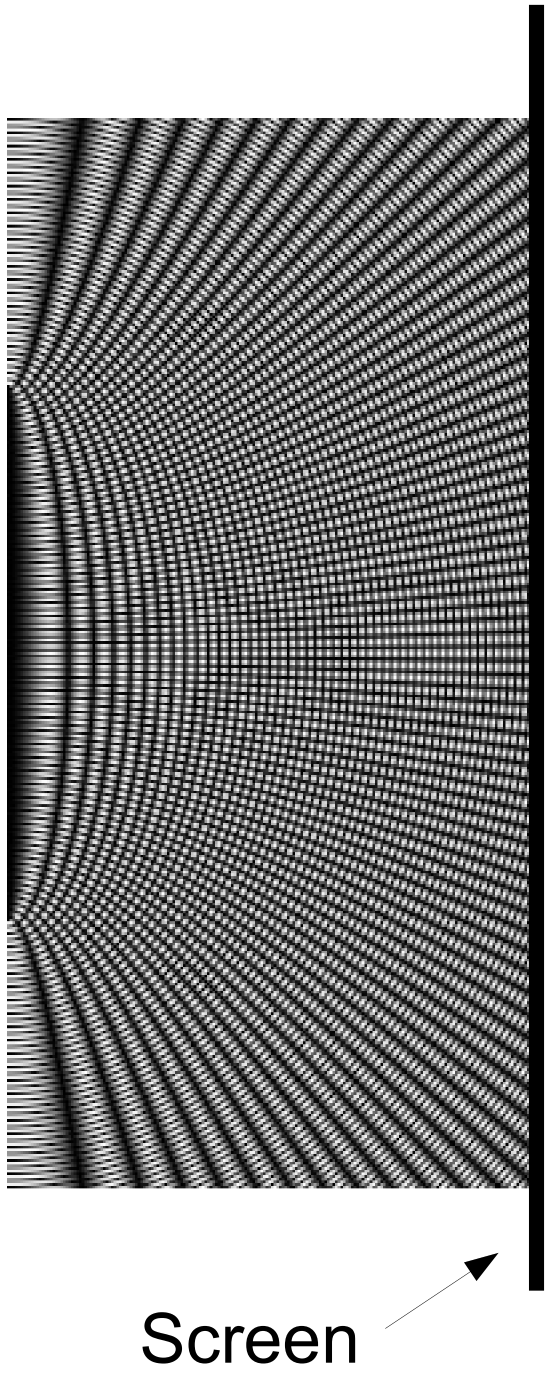
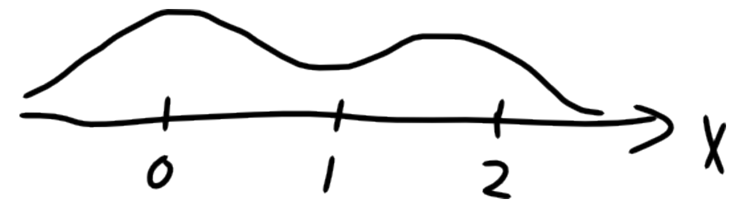
Since $\lambda = h/p$, the wavelength is shorter with a higher momentum, leading to fringes with are more closely spaced together

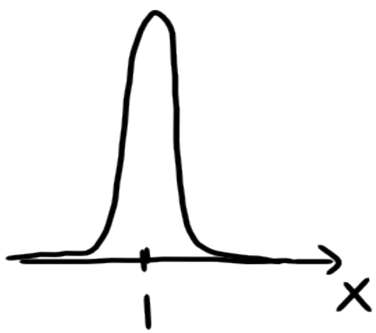
Interference of quantum matter waves (wavefunctions) emanating from two small pinholes. Notice that we need both components to get the interference pattern: the particle must go through both pinholes on its way to the screen.

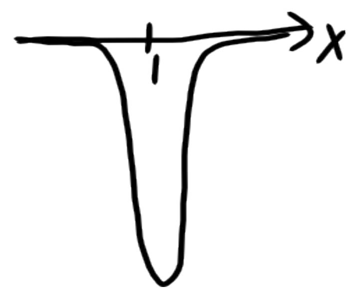
On the a screen on the RHS, the probability of observing a particle at any point would be equal to the square of the wavefunction at that point.

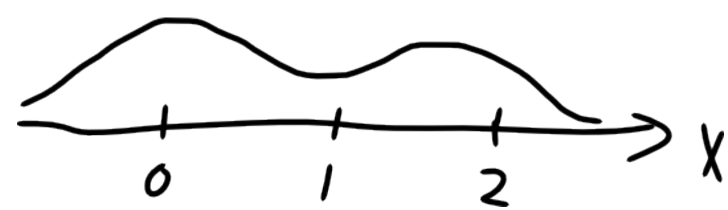


A particle with this wavefunction: 

is detected at x=1. Which of the following **could** represent its wavefunction shortly after the measurement?

A) 

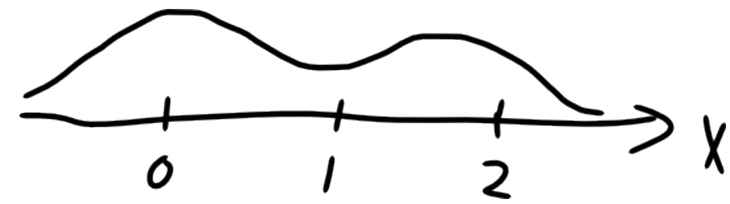
B) 

C) 

D) A or B

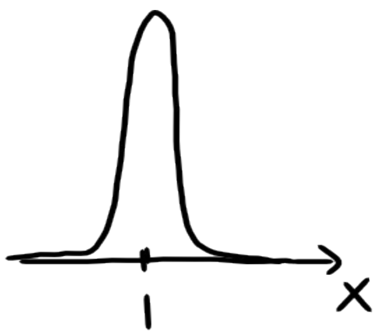
E) A, B or C

A particle with this wavefunction:

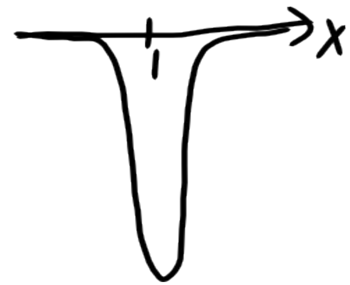


is detected at x=1. Which of the following **could** represent its wavefunction shortly after the measurement?

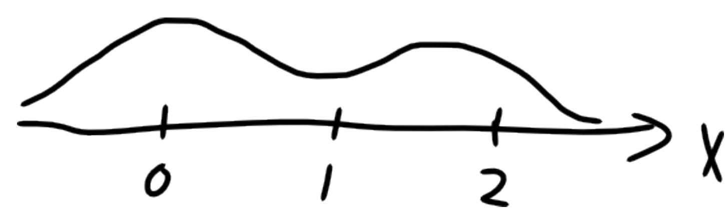
A)



B)



C)



D) A or B

E) A, B or C

The probability distribution (which is the square of the wavefunction) must be peaked around x=1, but the wavefunction itself can have a minus-sign in it