How does the momentum wavefunction change with time?

A) It does not change at all.

B) It acquires a constant phase.

C) It acquires a momentum-dependent phase.

D) It spreads.

E) It acquires a phase and it spreads.

By a '**acquiring a phase**' I mean multiplication by a complex factor of the form $e^{i\theta}$ where θ is a real angle. This angle can be constant (the same for all p) or depend on the momentum p.

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see lecture notes for explaination

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Which of the below boundary conditions is necessary and sufficient for existence of a unique solution to the time-dependent Schrodinger equation?

A) Fixed Psi(t=0, x=0)

B) Fixed Psi(t=0,x) for any x

C) Fixed Psi(t=0, x $\rightarrow$ -∞)

D) Fixed Psi(t,x=0) for any t

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If we know the wavefunction at some time, the Schrodinger equation allows us to compute the wavefunction a little time later. But we need to know it everywhere!

The position of an electron is measured. Some time later, the position is measured again. Generally, the second measurement gives a value which is

A) same as the first measurement

B) different from the first measurement

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The wavefunction in position space spreads out

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A) same as the first measurement

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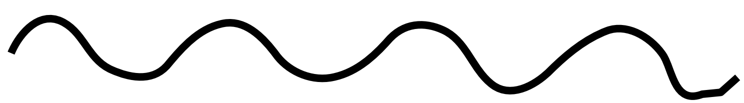
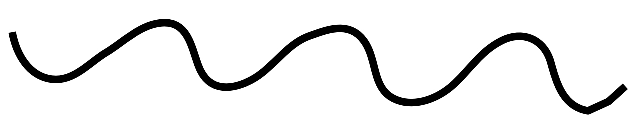
The wavefunction in momentum space does not spread out: a free particle with a well defined momentum will have this momentum for ever.

t=0: 

later: 

(same wavelength, same momentum)