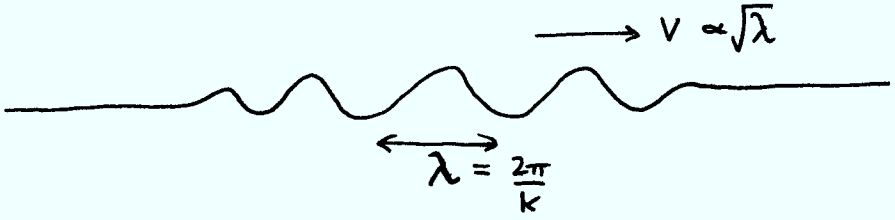
Wave packets in deep water are observed to travel with a velocity proportional to the square root of the wavelength:



We can say that these waves are superpositions of pure waves $\cos(kx - \omega t)$ with:

A) $\omega = a \cdot k$

B) $\omega = a \cdot k^2$

C) $\omega = a \cdot \sqrt{k}$

D) $\omega = a \cdot \frac{1}{\sqrt{k}}$

E) $\omega = a \cdot \frac{1}{k^2}$

EXTRA: how fast do the ripples travel relative to the packet?

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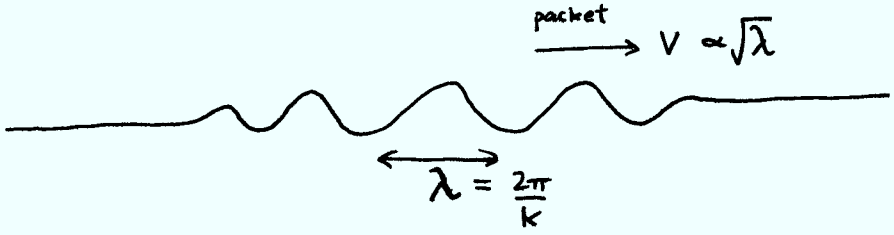

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$v_{group} = \frac{d\omega}{dk}$

want $\propto \sqrt{\lambda} = \sqrt{\frac{2\pi}{k}}$

$\therefore \omega \propto \sqrt{k}$

EXTRA: how fast do the ripples travel relative to the packet?

$v_{phase} = \frac{\omega}{k} = \frac{a}{\sqrt{k}}$ → ripples travel at double the speed of packets.

$v_{group} = \frac{d\omega}{dk} = \frac{1}{2}\frac{a}{\sqrt{k}}$

What feature of the Schrödinger equation implies that the sum of any two solutions is a solution?

A) The fact that it has only one time derivative.

B) The fact that each term has only a single ψ.

C) Nothing in particular; this is true for any differential equation.

D) The fact that ψ is a complex function.

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