Last lecture: wave equation

- Photons and electrons
  - $p=h/\lambda = \hbar k$
  - $E= \hbar \omega$
- But are different!
  - E=pc for photons, $v= \omega/k=c$ for all λ
  - $E=p^2/2m=\hbar^2k^2/2m$ for NR electrons
  - $mv=h/\lambda$ so v CHANGES with λ

This lecture

- What does it mean???
- Interpretation of $\Psi(x,t)$
- Example – 1D potential well

$$E^2 \propto k^2 \propto \omega^2$$
$$E^2\varepsilon \propto k^2 \varepsilon \propto \omega^2\varepsilon$$
$$\varepsilon = A\sin(kx-\omega t)+B\cos(kx-\omega t)$$

$$E \propto k^2 \propto \omega$$
$$E\Psi \propto k^2 \Psi \propto \omega \Psi$$

$$\Psi = A[\cos(kx-\omega t)+i\sin(kx-\omega t)]$$
$$= Ae^{\,i(kx-\omega t)}$$