ECE 535 Quantum Sensing

Lectures by Prof. Jennifer Choy.
not sure what this class is about...

Contents

1 1c Diffraction and the nunncertainty principle

- Wave function EM wave : $\vec{p} = \hbar\vec{k}, E = \hbar\omega$:

$$E \propto E_0 \exp\left(\frac{i}{\hbar(\vec{p}\cdot\vec{r} - E\omega t)}\right) \tag{1}$$

For a particle in 1D (Fourier Transform):

$$\begin{gathered}\psi(x,t) \propto \exp(i\hbar(p_0 x - Et)); \quad E_0 = \frac{p^2}{2}m \\ \Psi(x,t) \propto \int_{-\infty}^{\infty} \psi \,\mathrm{d}t\end{gathered} \tag{2}$$

- Uncertainty Principle

$$\Delta p \Delta x \geq \frac{\hbar}{2}; \quad \Delta E \Delta t \geq \frac{\hbar}{2} \tag{3}$$