New Quantum Mechanics topics

McIntyre Chapter 4

- What is entanglement?
- What does it mean that a system violates the locality principle?
- What do Bell's inequalities show?

Griffiths Chapter 5

- Wavefunction of bosons and fermions
- Exchange "force"
- Helium atom model
- Orbitals in an atom with $Z>2$
- Free electron gas
- Periodic potential
- Fermi energy
- Statistical mechanics: Bose-Einstein and Fermi-Dirac distributions

Chapter 6

- First-order correction to the energy
- First-order correction to the eigenstates
- Second-order correction to the energy
- Degenerate Perturbation Theory

Chapter 7

- The Variational Principle

Chapter 8: WKB Approximation

- Equation for the WKB Approximation
- When the approximation is valid
- Solutions to the infinite square well with a bumpy floor
- Tunnelling solutions under a bumpy ceiling

Chapter 9: Time-Dependent Perturbation Theory

- Two-Level System and the transition probability
- Sinusoidal perturbation

Chapter 10: Adiabatic Approximation

- What is an "adiabatic process" in quantum mechanics?
- What is the adiabatic approximation in words?

Chapter 11: Scattering

- What is the impact parameter b and scattering angle θ in a scattering problem?
- What does $d\sigma / d\Omega$ mean?
- How do you find the total cross section?
- What is the scattering amplitude $f(\theta)$?
- What is a Green's function?