



Lecture 1 – Atomic Structure

Lecture 2 – The Ultraviolet Catastrophe

Lecture 3 – Particle Nature of Light

Lecture 4 – Atomic Energy Levels and Spectra

Lecture 5 – X-ray Production and Diffraction

Lecture 6 – X-ray Spectra

Lecture 7 – Matter Waves

Lecture 8 – Wave-Particle Duality

Lecture 9 – Wave functions for Quantum Particles

**Lecture 10 – A Quantum Mechanical Wave  
Equation**

Lecture 11 – Applications of Schrödinger's Equation



## **Recap of Lecture 9**

- Wave equation and QM general solutions
- Meaning of probability amplitude, density
- Integrating to normalise, then find probability of particle being in a given region (particle in a box)

## **In this lecture**

- The Schrödinger equation
- Expectation values of observables

## Schrödinger



Erwin Schrödinger  
(1887–1961)

- Erwin Schrödinger proposed a QM wave equation for non-relativistic particles in 1926
- Note that the QM wave equation can not be derived from basic laws of physics – it is a postulate, which must be tested by experiment (and has been!)
- Schrödinger and Paul Dirac shared the 1933 Nobel Prize for this work



- Prue Leith (1801 - ) was not involved in this work, and confusingly has also not yet received a Nobel Prize