



**PH204 Jan 3:0**

## **Quantum Mechanics II**

### **Instructor**

Biplob Bhattacharjee  
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### **Teaching Assistant**

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Email:

**Department: course offered by CHEP and Physics**

Course Time: Tue, Thu : 11.30-1.00

Lecture venue: Physical Science auditorium

Detailed Course Page:

## **Announcements**

### **Brief description of the course**

suitable for students who have taken a basic quantum mechanics including

basic angular momentum algebra and time independent perturbation theory

### **Prerequisites**

Quantum mechanics I

### **Syllabus**

Time dependent perturbation theory. Fermi golden rule. Transitions caused by a periodic external field. Dipole transitions and selection rules. Decay of an unstable state. Born cross section for weak potential scattering.

Adiabatic and sudden approximations. WKB method for bound states and tunneling. Scattering theory: partial

wave analysis, low energy scattering, scattering length, born approximation, optical theorem, Levinson's

theorem, resonances, elements of formal scattering theory. Minimal coupling between radiation and matter,

diamagnetism and paramagnetism of atoms, Landau levels and Aharonov Bohm effect. Addition of angular

momenta, Clebsch Gordon series, Wigner Eckart theorem, Lande's g factor. Many particle systems:

identity of particles, Pauli principle, exchange interaction, bosons and fermions. Second quantization,

multielectron atoms, Hund's rules. Binding of diatomic molecules. Introduction to Klein Gordon and Dirac equations, and their non relativistic reduction, g factor of the electron.

### **Course outcomes**

various approximation methods used in QM, scattering theory as well as a brief introduction to relativistic quantum mechanics

### **Grading policy**

30 % for midterm, 20 % assignments and quiz, 50 % final

### **Assignments**

### **Resources**