TEQIP workshop: QuantOEM

Quantum mechanics in optical and electron microscopy

Theory and practical aspects of quantum mechanics in application for various fields such as optical microscopy, raman spectroscopy as well as electron microscopy.

Date	9:30 – 11:00	11:00 to 11:30 TEA	11:30 – 13:00	13:00 - 14:30 Lunch	14:30 – 16:00 – HS1	16:00 - 16:30 break	16:30 – 18:00 HS2
14/10/19	PB		SDG		SRKM (P1)		SRKM (P1)
15/10/19	SRKM		PB		SDG (P2)		PB (T1)
16/10/19	SDG		SRKM		SRKM + SDG (P3)		SRKM + SDG (P3)
17/10/19	PB		SDG		SDG (P4)		PB (T2)
18/10/19	PB		SRKM		SDG + SRKM (P5)		SDG + SRKM (P5)
19/10/19	PB		SRKM		PB (T3)		PB (T4)

Quantum Mechanics by

Priyotosh Bandyopadhyay (PB)

Lectures

Lec 1: Introduction to Quantum Mechanics, Boundary value problems.

Lec 2: Angular momentum algebra, Spin-1/2 system, CG coefficient.

Lec 3: Static EM field, Effect of spin, spin orbit interaction.

Lec 4: Variational method, Pauli's exclusion principle, Fine structure, He spectra.

Lec 5: Rotational and vibrational spectra, Raman spectroscopy, Stark effect.

Tutorials

Tut 1: Mathematica basics

Tut 2: Schrödinger equation and boundary value problems

Tut 3: Spectroscopy and energy splitting

Tut 4: Raman spectroscopy exercises

Optics: From classical to quantum by Shourya Dutta Gupta (SDG)

Lectures

Lec 1: Classical Optics

Lec 2: Quantum nature of light: The photon picture

Lec 3: Plasmonics, Quantum effects in plasmonics

Lec 4: Applications of quantum optics and plasmonics

Lab Session

Prac 2: UV-vis spectroscopy

Prac 4: Raman spectroscopy

Electron Microscopy by Sai Rama Krishna Malladi (SRKM)

Lectures

Lec 1: Introduction to principles of electron microscopy

Lec 2: Basics Scanning electron microscopy and applications

Lec 3: Basics Transmission electron microscopy and applications

Lec 4: Specimen preparation techniques for electron microscopy

Lab Session

Prac 1 (1st AN session): Specimen preparation

Prac 3 (2nd AN session): SEM and TEM (1 batch each)

Prac 5 (3rd AN session): SEM and TEM (1 batch each)