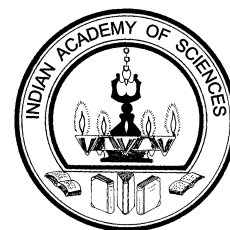


Science Academies' Refresher Course on APPLICATIONS OF QUANTUM MECHANICS: ATOMS, MOLECULES AND RADIATION



In Collaboration With
Department of Physics, University of Mumbai



December 21st, 2015 to January 04, 2016

Indian Academy of Sciences, Bangalore

Sponsored by Indian National Science Academy, New Delhi

The National Academy of Sciences, India, Allahabad



The two-week refresher course is primarily aimed at college teachers of Physics at the UG / PG level. It will cover basics of the subject through lectures and tutorials.

Students pursuing Ph.D. degree in Physics may also apply. College/ university teachers of Physics will be given preference.

The course will consist of four modules. In addition, there will be interactive sessions and tutorials aimed at clarifying basic concepts and improving the pedagogical skills of participants.



Resource persons:

Module 1: Basic Quantum Mechanics	V. Balakrishnan (IITM, Chennai)
Module 2: Physics of Atoms	A. A. Rangwala (MU)
Module 3: Physics of Molecules	Vaibhav Prabhudesai (TIFR)
Module 4: Radiation-matter interactions	N. Mukunda (IISc, Bangalore)

Organising committee:

Course Director :	Deepak Dhar (TIFR, Mumbai)
Course Coordinator :	Anuradha Misra (University of Mumbai)
Members:	Praveen Pathak (HBCSE, TIFR, Mumbai)
	Radha Srinivasan (University of Mumbai)
	Siddharth Kasthurirangan (University of Mumbai)

Teachers who wish to participate should send their applications online using the following link

<http://web-japps.ias.ac.in:8080/Refreshcourse/RCQA.jsp>.

Alternatively, applications in the prescribed format may be sent by email to RCQM2015@mu.ac.in.

Please note that participants have to attend the full duration of the Course.

Last date for receiving applications: 10 November 2015.

Participation

Teachers who wish to participate should send their applications online using the following link

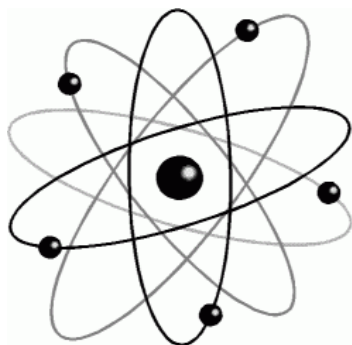
<http://web-japps.ias.ac.in:8080/Refreshcourse/RCQMMU>

Alternatively, applications in the prescribed format may be sent by email to

RCQM2015@mu.ac.in

Please note that participants have to attend the full duration of the Course

**Last date for receiving applications:
10 November 2015.**



How to reach

The Vidyanagari campus of the University of Mumbai is located centrally at Kalina, and is easily accessible by both the Central and Western railway lines, and connected by local trains, and is also very close to the domestic Airport.

Outstation candidates alighting at CST/Lokmanya Tilak Terminus/Dadar can board a train to Kurla and travel from Kurla station by bus/autorickshaw. Similarly, candidates alighting at Mumbai Central may board a train to Santacruz and complete their journey by bus/autorickshaw.

Organising committee:

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University of Mumbai



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(Autonomous),
University of Mumbai**

December 21st, 2015 to January 04, 2016

*Sponsored by
Indian Academy of Sciences, Bangalore
Indian National Science Academy, New Delhi
The National Academy of Sciences, India, Allahabad*

Venue

Department of Physics (Autonomous),
University of Mumbai,
3rd floor, Lokmanya Tilak Bhavan,
Vidyanagari, Santacruz,
Mumbai - 400098.
Tel: 022-26526250

Preamble

Refresher Courses form an important segment of activities under the Science Academies' programmes. A two week Refresher Course on the theme "Applications of Quantum Mechanics : Atoms, Molecules and Radiation" will be held at University of Mumbai during December 21,2015- January 4,2016. The Course is primarily aimed at college teachers of Physics at the UG / PG level. It will cover basics of the subject through lectures and tutorials.

The Department of Physics at the University of Mumbai has taken the initiative to organize this course, mainly for the benefit of teachers of M.Sc. Level Atomic Physics courses. The main aim of this course is to prepare the teachers who will be teaching at the PG level at the various centres of the University.

Students pursuing Ph.D. degree in Physics may also apply. College/ University teachers of Physics will be given preference.

Resource persons

The resource persons of the course are experienced lecturers and researchers in this field, with good pedagogical skills, so that even participants who know the subject quite well already, will be able to improve their presentation skills. The present course will cover basic concepts and techniques of Atomic Physics in a pedagogical manner through lectures and tutorials while covering some advanced topics as well. Discussions will include common difficulties faced by students, problems designed to explain concepts and techniques to improve the presentation and teaching skills of the participants.

Module 1: V. Balakrishnan, IITM, Chennai

Module 2: A. A. Rangwala, MU

Module 3: V. Prabhudesai, TIFR, Mumbai

Module 4: N. Mukunda, IISc, Bangalore

Topics: to be covered:

The course will consist of four modules.

Module 1: Basics of quantum mechanics: Historical Remarks, Mathematical Background, Schrodinger equation, Dirac notation, Representations and Pictures, Linear Oscillator, Perturbation Theory

Module 2 : Atoms : Hydrogen Atom, Fine Structure, Helium Atom, Multi-electron Atoms , Orbital, spin angular momentum, Addition of angular momenta, L-S and j-j coupling, Ortho and para hydrogen

Module 3: Interaction of electromagnetic radiation with matter: Quantum theory of radiation, spontaneous, stimulated emission and absorption probabilities, electric dipole selection rules, Einstein A and B coefficients, Rabi coefficients, Thomson Scattering, Javnes-Cummings Model

Module 4: Molecules : Different types of chemical bonds, Hydrogen molecule ion, Hydrogen molecule, Diatomic molecules, Basics of molecular orbital and valence bond theories, Rotational and vibrational spectra, Basic theory of NMR.