

# Refresher Course in Applications of Quantum Mechanics to 'Atoms, Molecules and Radiation'

8- 20 December 2014

at Indian Academy of Sciences, Bangalore

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

A Refresher Course in Applications of Quantum Mechanics to 'Atoms, Molecules and Radiation' will be held at the Indian Academy of Sciences, Bangalore from December 8 to 20, 2014. The Course is primarily aimed at teachers teaching quantum mechanics and/or atomic and molecular physics at the UG/PG level. The course will cover basics of quantum mechanics and its applications to atoms, molecules and their interaction with radiation, through lectures and tutorials. College/ university teachers having at least a Master's degree in Physics are particularly encouraged to apply.

**Topics:** Most of the topics in standard UG/ PG level courses in these areas will be covered. There will be four modules:

**Module 1:** Basics of quantum mechanics (review): Interpretative postulates, Schrodinger equation, abstract vector space formulation, Dirac notation, representations and pictures, linear oscillator, perturbation theory

**Module 2:** Orbital and spin angular momentum, addition of angular momenta, hydrogen atom, fine structure, helium atom, multi-electron atoms (brief), L-S and j-j coupling.

**Module 3:** Quantum theory of radiation (non-covariant), spontaneous, stimulated emission and absorption probabilities, electric dipole selection rules, Zeeman effect

**Module 4:** Hydrogen molecule ion, molecular orbitals, diatomic molecules, nature of bonds, rotational and vibrational spectra, polyatomic molecules (brief)

**Resource Persons:** A. Rangwala (Univ. of Mumbai), Swapan K. Ghosh (BARC and Centre for Basic Sciences, Mumbai), Ushadevi (Bangalore Univ.), Arvind Kumar ( Centre for Basic Sciences: formerly at Homi Bhabha Centre for Science Education (TIFR), Mumbai).

**Course Director:** Arvind Kumar

Teachers who wish to participate in the course should send their applications online using the following link. <http://web-japps.ias.ac.in:8080/Refreshcourse/RCQM.jsp>

A print copy of the same application through the Head of the institution should be sent by speed post to: Sri G. Madhavan, Coordinator, Science Education Programmes, Indian Academy of Sciences  
C.V. Raman Avenue, Sadashivanagar, Bangalore 560 080

For any further query, please e-mail to [sep@ias.ernet.in](mailto:sep@ias.ernet.in)

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

**Last date for receipt of online applications: 20 September 2014.**

