



**Science Academies'**  
**Refresher Course in Applications of Quantum Mechanics to**  
**'Atoms, Molecules and Radiation'**  
**8–20 December 2014**

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

A Refresher Course in Applications of Quantum Mechanics to 'Atoms, Molecules and Radiation' will be held at the Indian Academy of Sciences, Bangalore from 8 to 20 December 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, Schrödinger 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 (University of Mumbai), Swapan K. Ghosh (BARC and Centre for Basic Sciences, Mumbai), Ushadevi (Bangalore University), 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 Programme  
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.**