



Science Academies Virtual Lecture Workshop

on

Elements of Quantum Information

12-14 March, 2021

Organised by

Department of Physics, Christ Church College, Kanpur (UP)

The Department of Physics, Christ Church College, Kanpur is going to organize a three days virtual lecture workshop on “**Elements of Quantum Information**” sponsored by *Indian Academy of Sciences, Bengaluru; Indian National Science Academy, New Delhi & The Indian National Academy of Sciences, India, Allahabad* from **12-14 March, 2021**. It is intended for the benefit of students and faculty members at UG, PG and research level. The main objective of the workshop is to provide the participants an opportunity to learn basics of quantum mechanics from renowned experts and make them aware of the excitement and importance of quantum mechanical applications. The following topics will be covered.

Photoelectric Effect, de Broglie relation, Schrödinger equation, Particle in a box – eigen values and eigenvectors, Linear superposition of states, average values of observables, time development of states. Bra-Ket notation and connection of the state vector to one particle wave function, Spin half system and possible states, operators and the need for Hermitian operators, Pauli matrices and their use, Variational principle for a two-level system and application to Hydrogen atom, Harmonic oscillator and Anharmonic oscillator, Bell's work on hidden variable theories and Bell's inequality.

Introduction to quantum gates, quantum circuits, quantum computers, Hands on session on IBM quantum computer, Quantum cryptography or quantum information, Quantum Optics, Spectroscopy and quantum mechanics with hands-on demonstration of Gaussian, Schrödinger, Gromas and similar tools with a stress on the role of these simulators in designing drugs for COVID-19 and similar problems.

Course Director: Professor H. S. Mani, FASc, FNASc, Adjunct Professor, Chennai Mathematical Institute (CMI), Chennai – 603 103 (Tamil Nadu).

Lecture and Laboratory Coordinators: 1. Prof. Anirban Pathak, FNASc, Jaypee Institute of Information Technology, Noida

2. Prof. Anuradha Misra, FNASc, University of Mumbai, Mumbai

The interested teachers teaching undergraduate and postgraduate courses along with motivated students with keen interest in research from university and academic institutions are required to register for the workshop using the following link. The registration is free. The maximum number of seats for the workshop will be 120.

Registration Link: https://docs.google.com/forms/d/1EtKVnTrH_wMKztgLx70DInPB0qp-bgL7TZ0rPcA-b00/edit

Workshop link will be sent to all selected participants by e-mail.

E-letter of attendance will be issued to all the participants after successful completion.

Course Co-ordinator: Dr. R. K. Dwivedi, Associate Professor & Head, Department of Physics, Christ Church College, Kanpur. Contact: 09936966543; E-mail: rkdwivedi1963@gmail.com	Co Co-ordinator: Dr. S. P. Singh, Associate Professor, Department of Physics, Christ Church College, Kanpur. Contact: 09415477516; E-mail: sprakash_1203@rediffmail.com
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Last Date of registration is 28 February, 2021.

Selected participants will be intimated by e-mail by 05 March 2021.