



Module 3: Inelastic and quasielastic neutron scattering for dynamics

Prof. S.L. Chaplot

MODULE OUTLINE:

Basic Lattice Dynamics and Neutron Inelastic Scattering: Theoretical lattice dynamics (LD): Debye model, dynamical matrix, acoustic and optical branches. phonon dispersion relations: in monoatomic and polyatomic crystals, Incoherent scattering: phonon density of states, Coherent scattering, Quasielastic neutron scattering (QENS), theoretical formalism, Different kinds of motions and contributions to scattering law, Vibrational spectroscopy using neutrons

ABOUT INSTRUCTOR:

Prof. S.L. Chaplot is an INSA Senior Scientist at Bhabha Atomic Research Centre (BARC), Mumbai, and a Senior Professor at Homi Bhabha National Institute (HBNI), Mumbai. He has been working in the area of neutron scattering and dynamics of solids. He joined the 18th batch of the BARC Training School in 1974, and then as a scientist at BARC. He served as Director of the Physics Group at BARC. He is a recipient of the Homi Bhabha Award for Science and Technology, presented by DAE; an elected Fellow of the Indian National Science Academy and the National Academy of Sciences; Academician in Asia-Pacific Academy of Materials; and an 'Outstanding Referee' as selected by American Physical Society. He served as the President of the Indian Physics Association and President of the Neutron Scattering Society of India. He was a Member of the Executive Committee, Treasurer and Board Member of Asia Oceania Neutron Scattering Association. He serves as Chairman of the DAE-BRNS Committee on Basic Research and Science Education (BRNS) and a Member of BRNS.

MODULE PLAN:

- 1. Vibrational spectroscopy using Inelastic Neutron Scattering (INS) Lattice dynamics theory - 1 Lecture**
- 2. Inelastic and Quasi-elastic Neutron Scattering - 3 Lectures**
- 3. Tutorial on INS - 1 Lecture**
- 4. Stochastic dynamics using Quasi-elastic neutron scattering (QENS) Molecular dynamics simulation - 3 Lectures**
- 5. Tutorial on QENS - 1 Lecture**