



Module 1: Basics of thermal neutron scattering

Prof. Saibal Basu

MODULE OUTLINE:

Properties of neutron, Comparison with other probes: optical rays, x-rays, electrons, Neutron Sources: Reactors and Accelerator based sources, Neutron Scattering Instrumentation for condensed matter studies via various neutron sources, Neutron detectors.

Principles of Neutron Scattering under Born approximation, Scattering Laws, coherent and incoherent scattering, Principle of detailed balance, correlation functions. Diffraction from powder and single crystals.

ABOUT INSTRUCTOR:

Prof. Saibal Basu was a Raja Ramanna Fellow in Department of Atomic Energy. He is a senior professor at Homi Bhabha National Institute, a university of repute under Department of Atomic Energy, India. Prof. Basu received his M. Sc. In Solid State Physics from Indian Institute of Technology, Kharagpur and then joined the training school at Bhabha Atomic Research Centre (BARC). He won Bhabha gold medal for topping the physics discipline. He carried out research in the field of neutron scattering and received his Ph. D. from Mumbai University for his work in 1996. Based on his experience in neutron research he was appointed as research reactor specialist at International Atomic Energy Agency in the year 2001 and served the Agency in its effort to help neutron research in many countries. He was also a visiting scientist at National Institute for Standards and Testing (NIST) at Gaithersburg USA, working on neutron reflectometry. He delivered the keynote address in the occasion to celebrate the silver jubilee of the Malaysian research reactor TRIGA PUSPATI. He had been the Head of Solid-State Physics Division at BARC and was responsible for leading the neutron beam research team in the institute. He has more than 100 research publications to his name. He has received several awards for his research work, including a medal from Materials Research Society of India. Presently he is a Fellow of Maharashtra Academy of Science and is also serving in various committees. Apart from his science interest, he is also interested in technology and related development in the Country.

MODULE PLAN:

- 1. Properties of neutron and its utilization for condensed matter - 1 Lecture**
- 2. Neutron Sources, Neutron transport, beam lines - 2 Lectures**
- 3. Basics of neutron scattering under Born Approximation, Correlation function, Scattering Law - 5 Lectures**
- 4. Tutorial - 2 Lectures**
- 5. Neutron Spectrometers and Neutron Detectors - 2 Lectures**