



Module 2: Magnetic Neutron Diffraction - I

Prof. S.M. Yusuf

MODULE OUTLINE:

Diffraction from polycrystalline materials for physical and magnetic structure using thermal neutrons. Magnetic neutron diffraction using polarized and un-polarized neutrons.

ABOUT INSTRUCTOR:

Dr. S M Yusuf is a fellow of the Indian Academy of Sciences, and National Academy of Sciences, India. Currently he is the Director, Physics Group of BARC, Mumbai. He also served as Director, Institute of Physics, Bhubaneswar during Jan 2020 – June 2021. He is also a Senior Professor of Homi Bhabha National Institute (HBNI), and Convener, Board of Studies, HBNI. He was a post-doctoral fellow at Argonne National Laboratory, USA, and a visiting scientist at the Institute of Materials Science, Spain. He has expertise on advanced magnetic materials and neutron scattering, and published nearly 300 research papers. He has obtained one US patent and one European patent. He has written several book chapters. His H-index is 46. He has guided (is guiding) 10 (4) Ph D students, and delivered more than 175 invited and plenary talks. Presently,

He serves as

- (i) Vice Chair, Division of Condensed Matter Physics, Association of Asia Pacific Physical Society,
- (ii) Vice-President, Materials Research Society of India,
- (iii) President, Neutron Scattering Society of India,
- (iv) INSA nominated member of the National Committee for IUCr, and
- (v) also serves in various committees of DST, CSIR, UGC, and DAE.

He also served as

- (i) Vice-President of Indian Physics Association (2018-2020), and
- (ii) Vice President, Indian Crystallographic Association (2016-2019).

Currently, Dr. Yusuf is a Member of Neutron Science Review Committee, ORNL, USA, and Board member of The Asia-Oceania Neutron Scattering Association. Dr. Yusuf is the recipient of D. Sc (Hon), P K Iyenger memorial award from Indian Physics Association, DAE Group Achievement Awards, Raja Ramanna Prize Lecture in Physics, DAE Homi Bhabha Science & Technology Award, DAE SRC outstanding research investigator award, MRSI Materials Science Annual Prize, MRSI Medal, N. S. Sathya Murthy Memorial Award of IPA, 1st prize in Young Physicist Colloquium from Indian Physical Society, etc. He was the recipient of U.S. Department of Energy Fellowship, and The Spanish Ministry of Science and Education-Fellowship.

MODULE PLAN:

1. Introduction to Detectors - 1 Lecture
2. Introduction to Magnetic Neutron Scattering - 1 Lecture
3. Differential cross-section for magnetic neutron scattering in dipole approximation, Magnetic form factor - 1 Lecture
4. Determination of magnetic structures by neutron diffraction - (i) - 1 Lecture